



Analysis of US Patent Referencing to IEEE Papers and Conferences 2005-2024

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Executive Summary

Prior studies performed by 1790 Analytics have demonstrated a strong relationship between IEEE research and new patent development and have shown that citations to IEEE can often lead to higher impact patents. Specifically, the impact is measured by examining the extent to which patented inventions build upon papers from IEEE journals and IEEE-sponsored conferences. This is an update of previous reports and examines US patents issued from January 1, 2005 through December 31, 2024.

The main findings of this report are:

- Although this report is based on US patents, it covers technology developed worldwide. More than half (29) of the top 50 patenting companies are non-US companies. Twelve of the top 50 are Japanese companies. Six are from South Korea and four are from China including two newcomers for this year Tencent Holdings and TCL Corp. (Huawei and BOE Technology are the other Chinese firms, but they have been in the top 50 for several years.)
- New technology continues to build upon science, and the dependence is increasing. In this study, the top 50 firms (in 2024) were granted 87,384 patents, which made a total of 648,188 non-patent references (an average of 7.41 non-patent references per patent). Back in 2011 the top 25 firms were granted 51,826 patents. These patents made a total of 205,634 non-patent references, (an average of 3.97 non-patent references per patent) Thus, the number of patents is trending upward but the number of references from those patents is rising at a greater rate. Since many these non-patent references are to scientific articles and conference papers, this suggests that today's technology developments are increasingly linked to developments in published science.
- A large portion of this science base comes from papers presented at IEEE sponsored conferences and published in IEEE journals. The top 50 patenting firms in 2024 have referenced 2,458,811 articles in the last 20 years. About 27% (666,902) of those articles appeared in IEEE journals or IEEE sponsored conferences (see Figure 2).
- In this study, we also went beyond the top 50 patenting companies and analyzed all patents from the last 20 years in several technology categories of interest to IEEE members and customers. For example, over 31% of all scientific references from Computer Hardware patents go to IEEE publications. The second most referenced publisher is ACM (Association for Computer Machinery) with 17.7% of the referenced publications. In other Information Technology areas, such as Information Storage, and Computer Software, the results are similar.
- In Telecommunications technology, IEEE is particularly impactful. The 689,670 references to IEEE articles and conferences represents almost half of all science references from Telecommunications patents since 2005. In other words, IEEE provides half of the science base for new innovations in Telecommunications.

- Although we've generated reports like this for over two decades, we try to add technology categories that are currently hot or emerging. In recent years we've added Blockchain and Distributed Ledgers, Cybersecurity, and Virtual and Augmented Reality. In these emerging areas, IEEE receives the most references and enjoys roughly a 2-fold lead over second place ACM.
- We also have three other areas containing older technologies that are having a renaissance (Artificial Intelligence (AI) and Machine Learning, Autonomous Vehicles, and Internet-of-Things related patents). In each of these areas IEEE is the dominant publisher of the science base. In AI, IEEE enjoys more than a 3-fold lead over second place ACM. In Autonomous Vehicles, IEEE has a dominant lead (10-fold lead) over the second-place entry RELX/Elsevier. In the Internet-of-Things category IEEE has almost a 4-fold lead over second place ACM.
- In the Robotics and Intelligent Manufacturing category, 37% of the patent references are to articles published in IEEE journals or in proceedings of IEEE sponsored conferences. Second place RELX/Elsevier receives about one-fourth as many references in the category.
- IEEE is referenced a surprising amount in areas which are not central to its mission.
 - In broadcasting technologies IEEE leads with 39.51% of the references, which is almost five times as many as second place ACM.
 - 8.20% of the science references from patents in medical devices go to IEEE publications. This ranks IEEE fourth behind RELX and Wiley, and Wolters Kluwer (with 19.92%, 9.90%, and 8.31% respectively). These publishers have hundreds of journals in the medical area, whereas IEEE has only a few, so the 8.20% figure is quite solid for a non-core area and not far behind second place Wiley's 9.90%.
 - Optics is also somewhat surprising. The two optics societies: OSA – The Optical Society of America (now Optica), and SPIE – The International Society of Optical Engineering sponsor many conferences and have several journal articles, but Optica has only a slight lead over IEEE which has a slight lead over SPIE. Specifically, Optica receives 17.13% of the references, IEEE receives 13.39% and SPIE receives 12.32% of the references from optics related patents.
 - In Measuring, Testing, and Control, IEEE gets 19.17% of all references, which ranks ahead of the 14.87% of second place RELX/Elsevier while, again, RELX has many more journal titles in the space.
 - Patents related to Power Systems and Transmission also reference IEEE publications most frequently. The 77,956 references to IEEE journal and proceedings papers are more than the next two top referenced publishers (RELX

and American Chemical Society) combined. We also examined a specialized subset of the Power Transmission category related to smart meters and smart grids. In this category, 52.16% of the scientific references from patents go to IEEE journal or conference papers. The second most referenced publisher is RELX with only 10.76% of all references.

- Several years back we started tracking some green energy categories: Solar and Photovoltaic energy and Wind energy. In the Wind category IEEE science has a big advantage over the other publishers with more than 35% of the references. In solar energy, IEEE has a smaller lead over RELX. IEEE leads RELX even though RELX has 50+ journal titles related to the area including several high impact journals such as *Solar Energy Materials and Solar Cells*, *Thin Solid Films*, *Solar Energy*, *Synthetic Metals*, *Journal of Crystal Growth*, and *Solar Cells*, while IEEE has only a few titles.
- It has been shown that high-quality, high-impact, and valuable patents tend to be cited more frequently by later patents. Citation impact is thus often used as a quantitative measure for evaluating patents (see [3]). In this study, we found that the patents that reference IEEE papers are cited more often than patents that do not. This was shown to be true for each of the twenty technology categories we examined. This suggests that, not only do IEEE publications frequently provide the science base for new inventions, but that inventions that build upon IEEE publications are more likely to be valuable in the future than inventions that do not build upon IEEE.
- Although this study concentrates on patents in specific technology areas, it should be noted that the importance of scientific and technical literature to patented technology is increasing in all areas. Our research shows that the average US patent had only 2.76 non-patent references (NPRs) back in 1997. That number jumped to 12.38 by 2024 – a 349% increase. These numbers are for all issued US patents and not just those in the twenty categories covered in this report.¹ This means that in the overall patent system, patented technologies are increasingly referencing scientific articles.
- Since we only look at specific categories of technology plus the top 50 firms, there is no way to know exactly how much referencing to IEEE has increased since 1997. However, we can make an estimate for the whole patent system by identifying any Non-Patent References that mention “IEEE” or “I.E.E.E.” (This will of course miss things like the *Journal of Lightwave Technology* or *Spectrum* which may not have IEEE in the reference, but it will be a reasonable estimate.) If we do a comparison as above, we find that there were just 14,635 patent references with IEEE or I.E.E.E in 1997, but 144,862 in 2024 (an 890% increase). Thus, science referencing has increased in general since 1997 but IEEE referencing has increased at an even faster rate.

¹ Including science intensive areas like Biotechnology, Pharmaceuticals, Chemicals, and other areas where IEEE typically has less influence.

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I. Introduction

In previous studies, it was found that patents reference papers from IEEE journals much more often than papers from other journal publishers. In this report, we update the previous results, and study US patents issued from January 2005 through December 2024. Although this report is an update of previous results, we have made our best efforts to make this report self-contained. The aim of this report, as in previous reports, is to analyze references from patents to journal articles and conferences, to assess IEEE's impact upon technological developments.

This report covers twenty subcategories of Technology where IEEE members and readers are active. Many, but not all are related to Information Technology. The categories patent counts are shown below in Table 1.

Table 1: Number of Patents for Each Category Covered in this Study

Category	# Patents 2005-2024
Artificial Intelligence and Machine Learning	73616
Autonomous Vehicles	14469
Blockchain/Distributed Ledger	8316
Broadcasting	246874
Computer Hardware	571637
Computer Software	348581
Cybersecurity	194469
Diagnosis/Surgery/Medical Instruments	289850
Information Storage	126750
IOT/Internet of Things	25600
Measuring, Testing and Control Devices	260662
Optics/Photography/Electrophotography	163126
Power Systems	165177
Robotics and Intelligent Manufacturing	48979
Semiconductors/Solid-State Devices/Electronics	342096
Smart Grid/Smart Meters/Energy Infrastructure	5216
Solar/Photovoltaic	16876
Telecom and Other Communications	839037
Virtual/Augmented Reality	32991
Wind Energy	11276

II. Methodology

This study is based on referencing patterns from patents to prior art documents. When an inventor files a patent for an invention, he/she will typically reference earlier documents to show that the new invention either builds upon, or improves upon, what came earlier. The inventor's patent attorney and/or the examiner may also add prior art references to either clarify or limit the claims of the invention.

As an example, Figure 1 shows the front page of a patent owned by IBM. The prior art references on this patent come in two forms - references to earlier patents, and “other references”. These other references are often to scientific publications, such as those produced by IEEE. In this report we are primarily concerned with these other references, which are also sometimes called “Non-Patent References”.

It has been suggested that patents with many non-patent references are likely to contain new leading-edge ideas, whereas patents that only reference earlier patents are likely to be incremental improvements on earlier patented technologies. For a comprehensive study on various hypotheses surrounding the motivations of inventors in citing other references, see [1].

Patent Sets used in the Analysis

This study is based on two patent sets. Our analysis is based on determining the number of references from these patent sets to publications from publishers such as IEEE, RELX (formerly Elsevier), the American Institute of Physics, and others.

The first set contains patents from the top 50 patenting companies in 2024. Analysis of this patent set provides an insight into how the top tier companies rely upon science from IEEE and other publishers. The second set contains all patents in twenty technology categories from all companies, universities, government agencies, and individuals. The twenty technology categories examined are shown in Table 1 above. Analysis of this patent set reveals the wider influence of IEEE science in these technologies.

Identifying Relevant Non-Patent References

Non-patent references can be to any published document, from comic strips and brochures, to scientific articles and technical reports. The main difficulty in identifying relevant non-patent references for a study such as this is that inventors do not use a standard form for listing references. As an example, Table 2 contains eight different variants for the IEEE Global Telecom Conference. Note that some inventors just use the GLOBECOM shorthand, while others list the entire name. Sometimes IEEE is mentioned and sometimes it is not. When abbreviation variations are included such as Telecom, Tele, Tcom, Proc., Proceed., the number of variants increases further. The same issue exists for all conferences as well as variant names in journal names. For example, there are more than 30 variant spellings of the journal title *Journal Of Thoracic And Cardiovascular Surgery* including numerous misspellings of thoracic and every conceivable way of abbreviating cardiovascular.

Table 2 – Variants for IEEE Global Telecom Conference

Proceedings of Globecom '96
IEEE Global Telecommunications Conference
GLOBECOM '90:IEEE
Proceedings of IEEE Globecom '94
IEEE GLOBECOM 2007 - IEEE Global Telecommunications Conference
IEEE Globecom, Global Telecommunications Conference and Exhibition
Proc of the Global Tele Conf, U.S. New York, IEEE

Conference Identification – to identify conference proceedings among the non-patent references, we first identified references containing keywords such as meeting, symposia, conference, etc. We then used parsing software to identify 2-word and 3-word phrases that appear frequently in this set of papers. The full string was identified for these string sub-sequences to identify frequently cited conferences. In this way, we identified the top conferences referenced in the patent sets, and standardized the names of these conferences (i.e., all the different variants of a conference were collected under a single name). As an example, Table 2 shows 8 of the 95 variant names for IEEE Globecom which are unified to the name ‘<conf> IEEE Global Telecommunications Conference (GLOBECOM)’ in this report and the underlying analysis database.

We look up each of these conferences online to determine who is listed as their primary sponsor. For example, many of the conferences are sponsored by organizations such as IEEE, ACM (Association for Computer Machinery) and ASME (American Society of Mechanical Engineers). Some conferences are jointly sponsored by multiple organizations and this is noted as well.

When we first started identifying conferences in the 2005 report, we looked up the top 100 most referenced conferences to identify the primary sponsors, hosts, and organizers. In this current report we track more than 3000 conferences which appear under some 40,000 variant names.

Journal Identification – identifying and standardizing journal names is a very difficult process because there are so many different journals, and their names can be abbreviated in many different ways. To make the problem more manageable, we base our analysis primarily to the 45,000+ journals covered by the combined databases of ISI/Clarivate, Elsevier/SCOPUS, and 1790 Analytics, LLC. This is not a severe limitation, since these databases include more than 200 IEEE journals, transactions, and magazines, 3,000+ RELX/Elsevier journals, and 1,200 Wiley journals. In addition, we also identify publishers of thousands of non-ISI, non-SCOPUS journals if they appear very frequently in the patent references, but do not appear in these databases.

Once restricted to these 45,000+ journals, we used software that transforms journal names into common abbreviations and then implements string matching. Care must be taken with string matching because, for example, searching for “Urology Journal” will also accidentally identify “Neurology Journal”. Similarly, a search for the journal “Science” would accidentally pick up any reference with ‘science’ in the paper title as well as any of the 800+ journals with science in their titles such as “Game and Wildlife Science”. Our proprietary software for journal identification (along with some human intervention) deals with these problems, so that we generate an accurate match between the patent references and 45,000+ journals. After identifying all relevant journals, we then used the Clarivate and SCOPUS databases and online research to identify the publisher of each journal.

In prior reports, we included a broader range of content types in the study, including standards such as the IEEE 802 wireless standard. This year we are focusing on comparing Journal, Magazine and Conference content as these types of publications are responsible for generating the majority of citations found in the study. It also provides uniform criteria to allow comparison of results across very similar types of STEM publishers.

III. Results

References from Top 50 Patenting Organizations

Table 3 shows the 50 firms that were granted the largest number of US patents in 2024. It should be noted that many of these firms consist of multiple subsidiaries, and these firms patent under many names. (For example, GE Aviation has patents filed under 214 names, of which only a fraction contain General Electric or Aviation in the name.) We identified all the subsidiary names for each company to ensure that our patent counts are accurate.

We identified the top 50 patenting firms because we want to understand the extent to which the current technology leaders use IEEE science. Figure 2 shows the 20 publishers of science whose publications are referenced most frequently by the 50 firms shown in Table 3. This figure shows that patents issued to the top 50 firms between 2005 and 2024 reference IEEE papers and conferences 666,902 times. This is 2.5 times as many references as the second placed publisher RELX/Elsevier.

IEEE receives 27.12% of the science references from the patents of the top 50 companies. The next closest publisher (RELX/Elsevier) has 10.70% of the total.

Table 4 illustrates the reference distribution of Samsung Electronics which is first in patenting in 2024 and holds the most patents for the 20 year period from 2005-2024. This reference distribution is typical of the top 50 firms. The references from Samsung to IEEE are to several different IEEE journals and conferences. In this table, IEEE journals are highlighted in yellow and IEEE conferences are highlighted in orange.

Notice that 28 of the top 65 journals and conferences referenced by Samsung patents are published or sponsored by IEEE. Seven of the top 65 journals and conferences are published or sponsored by the American Chemical Society (ACS) and 3 of the top 65 journals or conferences are published or sponsored by ACM (Association for Computing Machinery). The reader may notice the large number of references to 'IEEE Unseparated' or 'Misc ACM' in Table 4. These are articles that reference IEEE or ACM, but the inventor has not given a reference specific enough to identify the proper journal or conference. A few examples can be found in Table 5 below.

Table 3 – Top-Patenting Firms in 2023

Rank	Full Parent Name	2024 Patent Count	2005-2024 Patent Count
1	Samsung Electronics Co Ltd	9,444	129,128
2	Taiwan Semiconductor Manufacturing Co.	4,014	33,956
3	Qualcomm Inc	3,480	40,145
4	Huawei Technologies Company Ltd.	3,309	28,685
5	Apple Inc	3,099	31,979
6	LG Electronics Inc.	2,826	38,623
7	International Business Machines Corp	2,759	127,929
8	Alphabet Inc. (Parent of Google)	2,683	34,398
9	Canon Inc	2,661	65,818
10	Sony Group Corp	2,420	49,812
11	Toyota Motor Corp	2,274	33,254
12	RTX Corporation (f/k/a Raytheon Co.)	2,043	30,442
13	Intel Corporation	2,028	49,176
14	BOE Technology Group Ltd	1,996	17,634
15	Dell Technologies Inc	1,880	22,477
16	Micron Technology Inc.	1,799	27,908
17	Microsoft Corporation	1,766	49,799
18	Panasonic Holding Corporation	1,746	47,049
19	Amazon.com Inc.	1,656	22,277
20	Johnson & Johnson	1,548	21,138
21	Ericsson	1,542	22,163
22	Nippon Telegraph & Telephone Corp.	1,344	8,461
23	Hyundai Motor Co.	1,303	15,495
24	Fujifilm Business Innovation Co.	1,294	28,961
25	Kia Motors Corp.	1,289	9,751
26	NEC Corp	1,215	19,212
27	Medtronic Inc	1,195	24,149
28	Ford Motor Co.	1,157	21,966
29	LG Chem Ltd.	1,156	9,569
30	CapitalOne	1,139	5,307
31	Cisco Systems Inc.	1,123	21,322
32	Tencent Holding Ltd	1,112	5,518
33	Murata Manufacturing Co. Ltd.	1,079	10,413
34	Bosch (Robert) GmbH	1,067	20,651
35	Mitsubishi Electric Corp	1,058	18,773
36	TCL Corp	1,054	9,263
37	Saudi Arabian Oil Company (Saudi Aramco)	1,036	8,634
38	Seiko Epson Corporation	1,014	27,115
39	Honda Motor Co. Ltd.	1,009	20,610
40	Toshiba Corp	984	36,939
41	Texas Instruments Inc	968	19,182
42	General Motors Corp	956	19,669
43	GE Aerospace (f/k/a General Electric Company)	921	28,286
44	Applied Materials Inc.	919	11,528
45	Nokia Corporation	889	24,584
46	Denso Corp	846	18,899
47	LG Display Co Ltd	835	13,279
48	Boeing Co. (The)	825	17,575
49	Honeywell International Inc.	822	20,156
50	Hon Hai Precision Industry Co. Ltd. (aka Foxconn)	802	36,965

Table 4 – Reference Distribution from Samsung Electronics Patents 2005-2024

References	Journal/Conference
2363	IEEE Unseparated
2215	APPLIED PHYSICS LETTERS
1057	JOURNAL OF THE AMERICAN CHEMICAL SOCIETY
788	SID (Soc Inf Disp) Misc
769	JOURNAL OF APPLIED PHYSICS
721	NANO LETTERS
680	Proc SPIE
652	IEEE Int Conf Acous, Speech, and Sig Proc (ICASSP)
623	IEEE JOURNAL OF SOLID-STATE CIRCUITS
601	IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY
600	NATURE
576	Misc Optical Society of America
553	Science
538	IEEE Comp Soc comp Vision and Pattern Recognition
538	CHEMISTRY OF MATERIALS
518	IEEE tr INFORMATION THEORY
494	SID (Soc Inf Disp) Misc Conf
472	ACM tr Graphics (TOG)
451	Proceedings of IEEE International Conference on Image Processing (ICIP)
426	IEEE Int Electron Devices Meeting (IEDM)
389	Misc ACM
388	IEEE Vehicular Tech Conf
387	PHYSICAL REVIEW B
377	IEEE/JPN Soc App Phys - symp on VLSI tech
367	IEEE Proceedings
364	Adv Mater
363	IEEE tr COMMUNICATIONS
359	JOURNAL OF MATERIALS CHEMISTRY
358	IEEE tr IMAGE PROCESSING
358	IEEE Comp Soc comp Vision and Pattern Recognition (CVPR)
356	IEEE tr CONSUMER ELECTRONICS
356	IEEE Global Telecommunications Conference (GLOBECOM)
356	IEEE tr ELECTRON DEVICES
341	ACM SIGGRAPH Computer Graphics Conf
328	Audio eng soc (misc)
325	American Chemical Society (Misc)
318	JOURNAL OF PHYSICAL CHEMISTRY B
318	JOURNAL OF THE AUDIO ENGINEERING SOCIETY
312	IEEE COMMUNICATIONS MAGAZINE
309	JOURNAL OF THE ELECTROCHEMICAL SOCIETY
300	leprint arXiv
300	OPTICS EXPRESS
297	IEEE tr ACOUSTICS SPEECH AND SIGNAL PROCESSING
296	JOURNAL OF PHYSICAL CHEMISTRY
292	ANGEWANDTE CHEMIE-INTERNATIONAL EDITION
287	IEEE/CVF Conference on Computer Vision and Pattern Recognition
286	IEEE ELECTRON DEVICE LETTERS
279	IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
277	IEEE tr PATTERN ANALYSIS AND MACHINE INTELLIGENCE
272	JPN J APPL PHYS
269	Misc SPIE
264	IEEE int conf on imag proc (ICIP)
264	Proc IEEE int Solid State Circuits Conf (ISSCC)
250	IEEE Misc Conf
239	ADVANCED FUNCTIONAL MATERIALS
239	Neural inf proc sys conf (NIPS)
239	INFORMATION DISPLAY
238	NATURE COMMUNICATIONS
231	THIN SOLID FILMS
227	ACS NANO
227	MACROMOLECULES
225	IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS
219	J Vac Sci tech
218	IEEE int symp on Circuits and sys (ISCAS)
215	Proc Natl Acad Sci USA

These are relatively complete references; it is not clear why the inventors were not more careful about listing the full journal names.

Table 5 – Examples of References Mapped to “IEEE Unseparated”

Patent	NPR #	NPR Text
05692177	3	Lewis et al. "Hashing for dynamic and static internal tables." IEEE, pp. 45-56 Oct. 1988.
05699518	4	"The Design and Implementation of a Reliable Distributed Operating System--ROSE", Ng, IEEE, pp. 2-11, Apr. 1990.
05699518	5	"A service Platform for Distributed Applications", Popescu-Zeletin et al, IEEE, pp. 11-17, Jul. 1992.
05709219	5	Kotoku, Tetsuo et al., "Environment Modeling for the Interactive Display (EMID) Used in Telerobotic Systems," IEEE Nov. 3-5 1991, pp. 999-1004.
05709219	6	Kotoku, Tetsuo, "A Predictive Display with Force Feedback and Its Application to Remote Manipulation System with Transmission Time Delay," IEEE Jul. 7-10 1992, pp. 239-246.
05709219	8	Burdea, Grigore et al., "Distributed Virtual Force Feedback," IEEE May 2, 1993, Atlanta, GA, pp. 25-44.

References from Companies in Twenty Technology Categories

In the previous section, we analyzed the use of IEEE science by the top patenting organizations. Out of all science publishers, IEEE was cited most often by these organizations by a wide margin. However, looking only at the top companies tells an incomplete story. IEEE publishes journals and runs conferences mainly in information technology, electronics, and related areas. It is therefore useful to examine the extent to which IEEE science is referenced by all organizations that patent in specific technologies and not just by the leading companies.

As mentioned in the methodology section, we identified all patents in the twenty technology categories shown above in Table 1. 1790 Analytics has developed a classification scheme that categorizes all patents into 50 broad technology areas based on International Patent Classes (IPCs) and Cooperative Patent Classes (CPCs) which are assigned to each patent as part of the examination process. This scheme was used to identify all relevant patents for the current analysis.

We examined each of the technology areas separately, and the results are summarized in Figures 3-19. The first category shown (in Figure 3) is Artificial Intelligence (AI) and Machine Learning. We identified all non-patent references on patents related to this technology issued between 2005 and 2024. We then determined the science publishers responsible for the largest number of these non-patent references. Figure 3 shows the result of this analysis, namely that IEEE science is referenced far more in AI related patents than science from any other publisher. 30.95% of all science references from these patents go to IEEE journal papers or IEEE sponsored conference papers. In second place is the ACM with 8.66% of the references.

AI is currently a very hot area and often written about in the popular press. The same can be said for Autonomous Vehicles which are shown in Figure 4. Here again IEEE dominates in references. In this case almost half (48.89%) of all references are to IEEE in this category. IEEE receives about 10 times as many references from autonomous vehicles as second place Elsevier.

Blockchain and Distributed Ledgers is a relatively new category with only a few thousand patents (as opposed to AI which is a much more established category with 40,000+ patents). We see in Figure 5 that 5,144 (39.84%) of all science references from these patents go to IEEE. This is approximately 4 times as many as second place ACM with 1,240 (9.60%) of all references.

Figure 6 covers Broadcasting patents, which consists of US patents classified by the IPC (International Patent Classification) for Broadcast Communication and Pictorial Communication (Television). It would seem that this would be an area that is somewhat tangential to IEEE's core mission. However, IEEE leads in references in this category as well with 39.51% of all references. ACM is a distant second with 8.53% of all references.

Figures 7 and 8 show referencing patterns from Computer Hardware and Software patents. Here IEEE once again receives far more references than the other publishers. In both cases, ACM is the second most referenced publisher, but it receives about half of the references that papers published by IEEE receive.

Figure 9 shows references in the fast-growing area of Cybersecurity. This is a very hot area with a lot of recent patent growth, and again IEEE leads by a wide margin (33.21% of all references compared to 18.32% for second place ACM).

Figure 10 examines the top referenced publishers in the Medical Device field, which covers devices as well as diagnostic tools and surgical instruments. Here, IEEE is a respectable fourth in an area that is outside its core competency. RELX who has more than 400 journals in the field, such as *Annals of Thoracic Surgery*, and the *Journal of the American College of Cardiology* has a substantial lead with 19.92% of all references. Wiley with 9.90% of references and Wolters Kluwer (parent of Lippincott) with 8.31% of references are just ahead of IEEE's 8.20% of references in the category. (IEEE is slightly up from 8.01% last year and 7.78% of the references two years ago in this category.)

Figure 11 contains the results for the information storage category. In this area, IEEE is particularly dominant. 42.33% of all the science references from patents in information storage are to papers in IEEE journals or conferences. IEEE's 91,815 references in this category are about six times as many as second place ACM.

Another hot technology area consists of Internet-of-Things patents. As Figure 12 shows, IEEE science is very important to the development of this new and active area of patenting. More than 42% of all science references are to IEEE content. ACM is a distant second with 9.21% of all references.

Figure 13 contains the results of patents covering Measuring, Testing, and Control technology. Patents in this category are related to measuring or testing force, pressure, weight, etc. as well as chemically measuring substances (e.g. measuring CO2 levels). The category also contains control devices since these technologies are often combined. For example, a patent might be related to a valve that adjusts at a certain pressure or at a certain pollution level. Since this type of measuring can be done both mechanically, magnetically, electrically, or chemically, it is not too surprising to see both IEEE and RELX and the Optical and Chemical Societies all near the top of Figure 13. IEEE receives the most references, but the lead is not as dominant as in the Information Technology related technology areas.

The results for the Optics category can be found in Figure 14. This is another area that is slightly outside the IEEE core. In this case IEEE is sandwiched between the two major optics societies. Optica (formerly The Optical Society of America (OSA)) leads with 40,581 science references, IEEE is second with 31,727 and the International Society of Optical Engineering (SPIE) is third with 29,180 references from optics patents.

Figure 15 contains results for the patents related to power generation and transmission. Although this is a non-information technology category, IEEE leads in references in this category as well. 30.42% of science references from patents in this category go to IEEE publications. RELX is second with 21.93% of all US patent references in the category.

Intelligent Manufacturing and Robotics contains patents related to robotics, and robotics and control systems related to manufacturing. According to Markets and Markets [8], service robotics market is projected to reach USD 103.3 billion by 2026 because of a population explosion in service robots that mow lawns, vacuum floors, and manufacture things.

As this industry grows, new innovations will be patented, and from Figure 16 it looks like those innovations will build upon ideas published in IEEE journal articles or presented at IEEE conferences. We see that 37.16% of all science references from patents in this space refer to IEEE published articles. RELX is the second ranked publisher, but its papers receive only 9.44% of the science references. In this category, IEEE has more references than the next ten publishers combined.

Figure 17 shows that IEEE is also very strong in the Semiconductor category. Here, the inclusion of conferences gives IEEE a substantial boost. Approximately one-third of the references to IEEE are to conference papers. With conferences excluded, IEEE would be about the same level as the American Institute of Physics in terms of science references from semiconductor patents.

The Smart Meter/Smart Grid category covers patents related to improving the power grid as well as for advanced residential electric meters. This is a relatively small category but as we see in Figure 18, the IEEE provides the bulk of the science base with over half of all patent references.

Solar and Photovoltaic energy results are contained in Figure 19. IEEE (22.21% of references) holds a lead over RELX (16.61%) in this category in spite of having fewer journal titles. RELX has several strong journals in this category including *Solar Energy Materials and Solar Cells*, *Thin Solid Films*, *Solar Energy*, *Synthetic Metals*, *Journal of Crystal Growth*, *Solar Cells*, plus

more than 50 smaller journal titles related to this technology. The references to IEEE science in this category mainly go to the *IEEE Photovoltaic Specialists conference*, the *IEEE World conference on Photovoltaic Energy Conversion*, and *IEEE Transactions on Electronic Devices*.

The Telecommunications category is one of the strongest large categories for IEEE. IEEE articles receive almost half of all references from the top 1,500 publishers in the database and more references than the top 200 publishers combined.

Virtual and Augmented Reality is another relatively small but hot category. We see in this category that again IEEE leads by a wide margin with 30.41% of all science references from patents. ACM is in second place with 17.38% of references.

Wind Energy is another relatively small area where IEEE has a big lead. We see in Figure 22 that in this area 35.10% of all science references from Wind Energy patents go to IEEE journal and conference papers. This is about 1.5 times as many references as second place RELX receives, despite IEEE having fewer journal titles in the area than RELX does.

Figures 3-22 show aggregate counts of references from all patents in each technology category. Readers who wish to see the firms that reference IEEE publications in each category can consult Appendix B. This appendix contains the 100 organizations that reference IEEE most frequently in each category. Appendix C is similar, except that it contains the organizations that reference IEEE most frequently in the twenty technology categories combined.

Citation Index for Patents Referencing IEEE

In an earlier study (see [2]) it was shown that patents that reference specific IEEE journals perform better on a number of quality metrics. Moreover, it was shown that the results were statistically significant. In this report, we update a key figure from the previous study showing the citation index of patents that reference IEEE papers versus peer patents that do not reference IEEE.

The citation index is a normalized citation metric that takes the number of citations received by a particular set of patents and divides it by the expected number of citations for patents of the same age and technology class. A random set of patents therefore should have a citation index of 1.0. Research has shown that patents cited by many later patents tend to contain important ideas upon which the later patents are building (see [3] and [6]). Citation indicators are also the basis for the patented financial models (see [4] and [7]) invented by the two 1790 founders Breitzman and Thomas.

Figure 23 contains the Citation Index for the patents in the twenty technology categories that reference IEEE papers and conferences. Also shown is the Citation Index for the set of the remaining patents in each category that do not reference IEEE. Note that the set of all patents in each category have an expected citation index of 1.0. Thus, we see that the patents that reference IEEE are cited sometimes 3 to 4 times more often than expected, while the patents that do not reference IEEE are cited up to 10% less often than expected in some categories. This of course does not imply that all patents that reference IEEE are likely to be more valuable than patents

that do not reference IEEE, but it does suggest that in general, patented technologies that build upon IEEE published or sponsored science are more likely to be valuable than patented technologies that do not reference IEEE science.

IV. Conclusions

When a patent is filed, it must reference the prior art upon which it builds, as well as any prior art that limits the claims of the new invention. This study and prior studies show that science published by IEEE forms a significant portion of this prior art for new patents.

In this study, we examined two separate patent sets. The first patent set consisted of patents granted between 2005 and 2024 to the 50 organizations with the largest number of US patents granted in 2024. The second patent set consisted of all US patents granted between 2005 and 2024 patents in twenty key technologies: Artificial Intelligence, Autonomous Vehicles, Cybersecurity, and several other categories. In most of these patent sets IEEE is the dominant source of non-patent prior art. In other words, IEEE journals and conferences are key outlets for scientific discoveries relevant to cutting edge technology.

Finally, we conducted an analysis of citation indices for IEEE related patents and non-IEEE related patents. These types of metrics have been shown in validation studies to be good markers for the quality, impact, and potential value of patents [3]. In this study, it was shown that patents that build upon IEEE published science tend to have higher citation indices than patents that do not reference IEEE. This suggests but does not guarantee that patents that build upon IEEE science are more likely to become high-quality, high-impact, valuable inventions than patents that do not build upon IEEE.

Specific key results are identified in the Executive Summary.

V. References

- [1] Branstetter, Lee. "Is Academic Science Driving a Surge in Industrial Innovation? Evidence from Patent Citations," Columbia Business School, Discussion Paper #28.
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- [5] Fortune Magazine, "Ten Tech Trends," January 10, 2005.
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- [7] Thomas, Patrick., "System and Method for Producing Technology-Based Price Targets for a Company Stock," US Patent #6,832,211, Dec. 14, 2004.
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Figure 1: Sample Patent Front Page

United States Patent
Bulzacchelli, et al.

7,822,114
October 26, 2010

Decision feedback equalizer using soft decisions

Abstract

A decision feedback equalizer (DFE) and method include at least two paths. Each path includes the following. An adder is configured to sum an input with a first feedback tap fed back from a different path. A latch is coupled to the adder to receive a summation signal as input. The latch includes a transparent state, and an output of the latch is employed as the first tap in a feedback path to an adder of a different path, wherein a partially resolved first tap in the feedback path is employed during the transparent state to provide a soft decision to supply correction information in advance of a hard decision of the latch.

Inventors: Bulzacchelli; John F. (Yonkers, NY), Friedman; Daniel J. (Sleepy Hollow, NY)
Assignee: International Business Machines Corporation (Armonk, NY)
Appl. No.: 11/761,586
Filed: June 12, 2007

Current U.S. Class: 375/233; 375/229
Current CPC Class: H04L 25/03057 (20130101); H04L 25/067 (20130101)
Current International Class: H03H 7/30 (20060101)
Field of Search: 375/233,229

References Cited

U.S. Patent Documents

7106099	September 2006	Nix
7539243	May 2009	Toifl et al.
2006/0188043	August 2006	Zerbe et al.

Other References

Grozing, "Sampling Receive Equalizer with Bit-Rate Flexible Operation up to 10 Gbit/s," Proceedings of the 32nd European Solid-State Circuits Conference, 2006, ESSCIRC 2006, Sep. 2006 pp. 516-519. cited by examiner.

Kenney, "A parallel architecture for multilevel decision feedback equalization," *IEEE Transactions on Magnetics*, vol. 34, Issue 2, Part 2, Mar. 1998 pp. 588-595. cited by examiner.

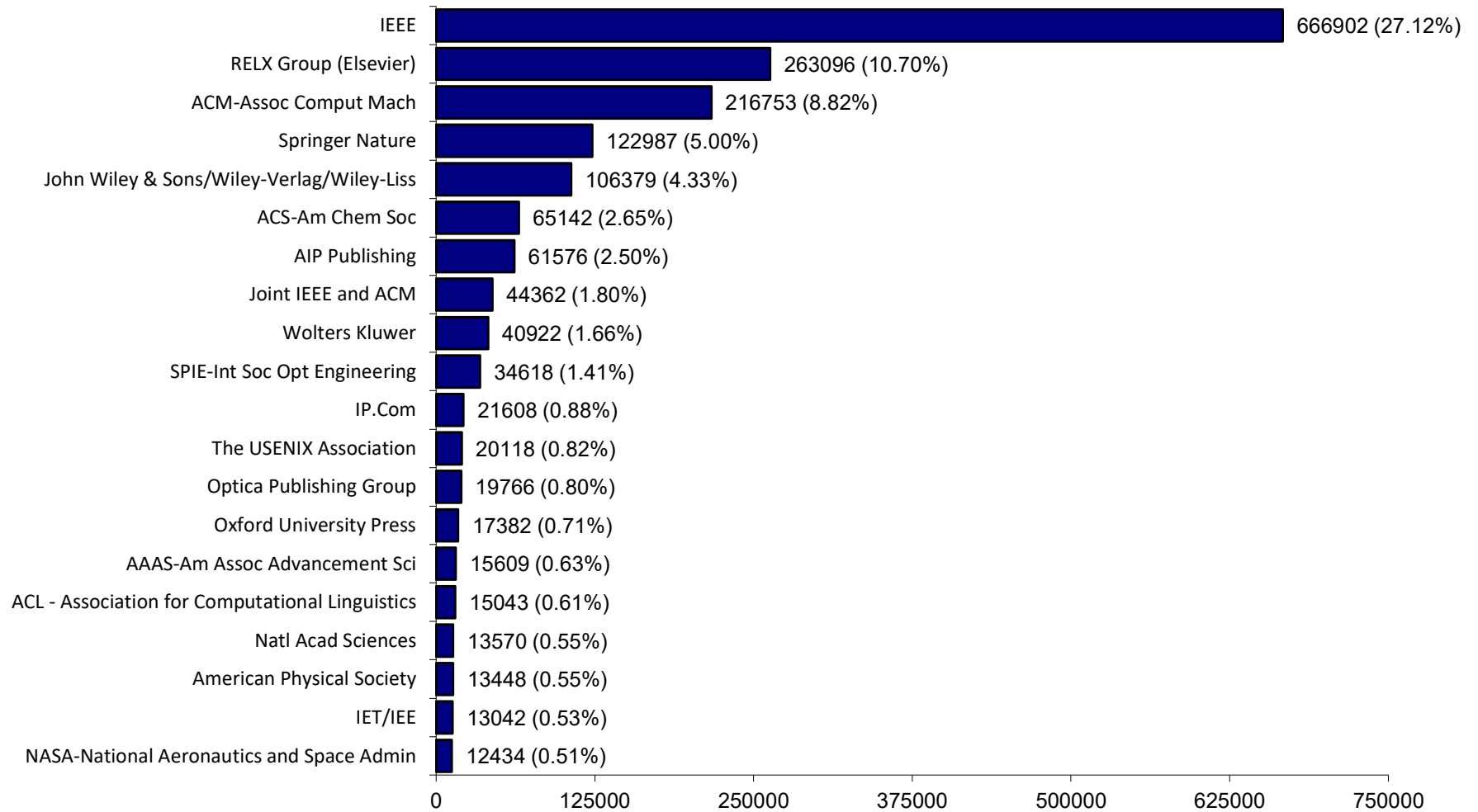
Kenney, "Pipelining for speed doubling in MDFE," 1996 *IEEE International Conference on Communications*, 1996, ICC 96, Conference Record, Converging Technologies for Tomorrow's Applications, vol. 1, Jun. 23-27, 1996 pp. 561-565 vol. 1. cited by examiner.

Varzaghani, "A 6-GSamples/s multi-level decision feedback equalizer embedded in a 4-bit time-interleaved pipeline A/D converter," *IEEE Journal of Solid-State Circuits*, on pp. 935-944, vol. 41, Issue: 4, Apr. 2006. cited by examiner.

Krishna, "A multigigabit backplane transceiver core in 0.13-.mu.m CMOS with a power-efficient equalization architecture," *IEEE Journal of Solid-State Circuits*, pp. 2658-2666, vol. 40, Issue: 12, Dec. 2005. cited by examiner.

Ren, "Performance Analysis of Edge-based DFE", *Electrical Performance of Electronic Packaging* Oct. 2006 pp. 265-268. cited by examiner.

Figure 2 - # and % of US Patent References from Top 50 Companies to Top 20 Publishers and Conference Organizers



and % References to Papers/Standards/Conferences from 2005-2024 Patents

Figure 3 - # and % of Science References from 2005-2024 Artificial Intelligence and Machine Learning US Patents to Top 20 Publishers and Conference Organizers

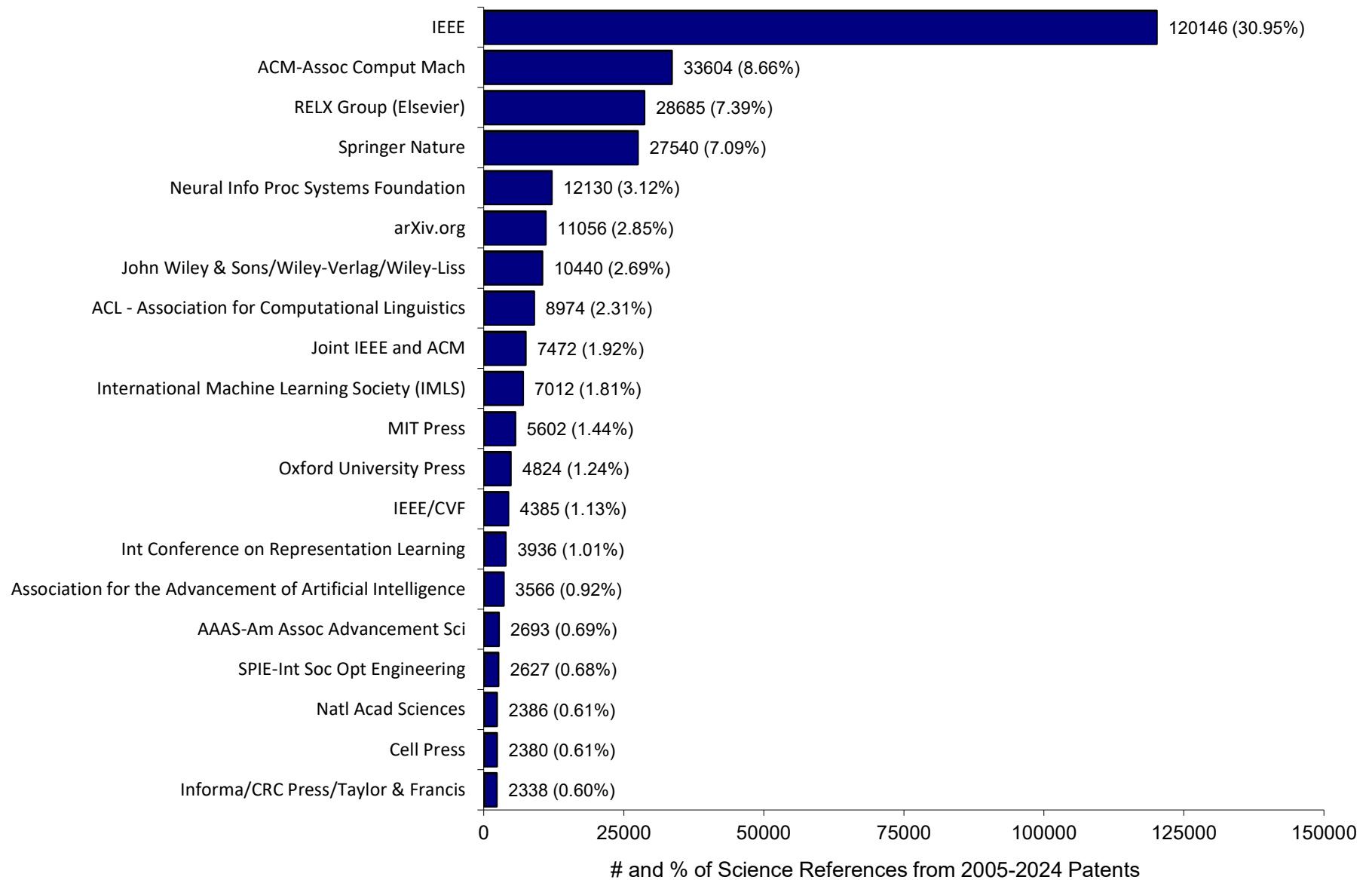
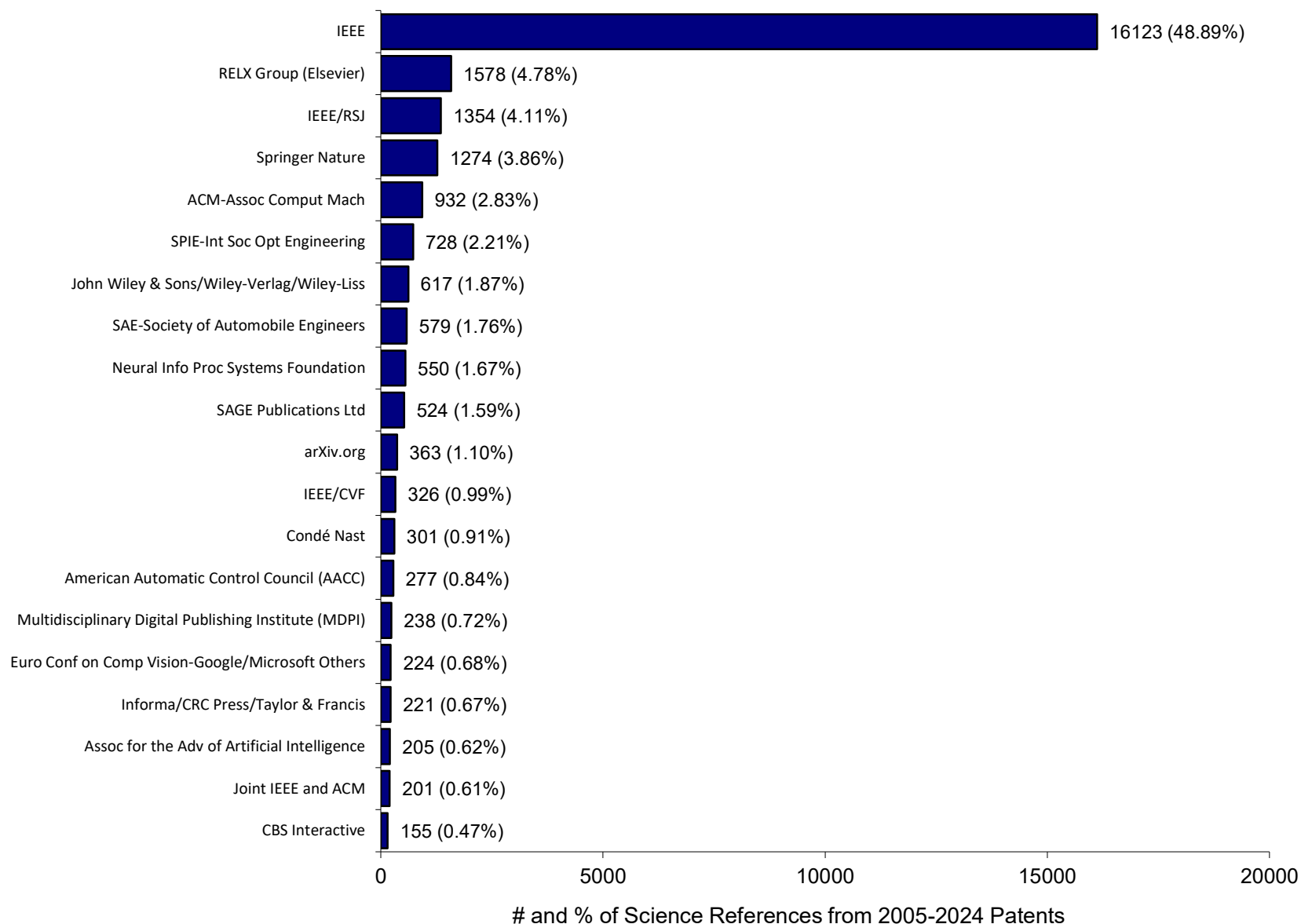


Figure 4 - # and % of Science References from 2005-2024 Autonomous Vehicle US Patents to Top 20 Publishers and Conference Organizers



**Figure 5 - # and % of Science References from 2005-2024
Blockchain/Distributed Ledger US Patents to Top 20 Publishers and
Conference Organizers**

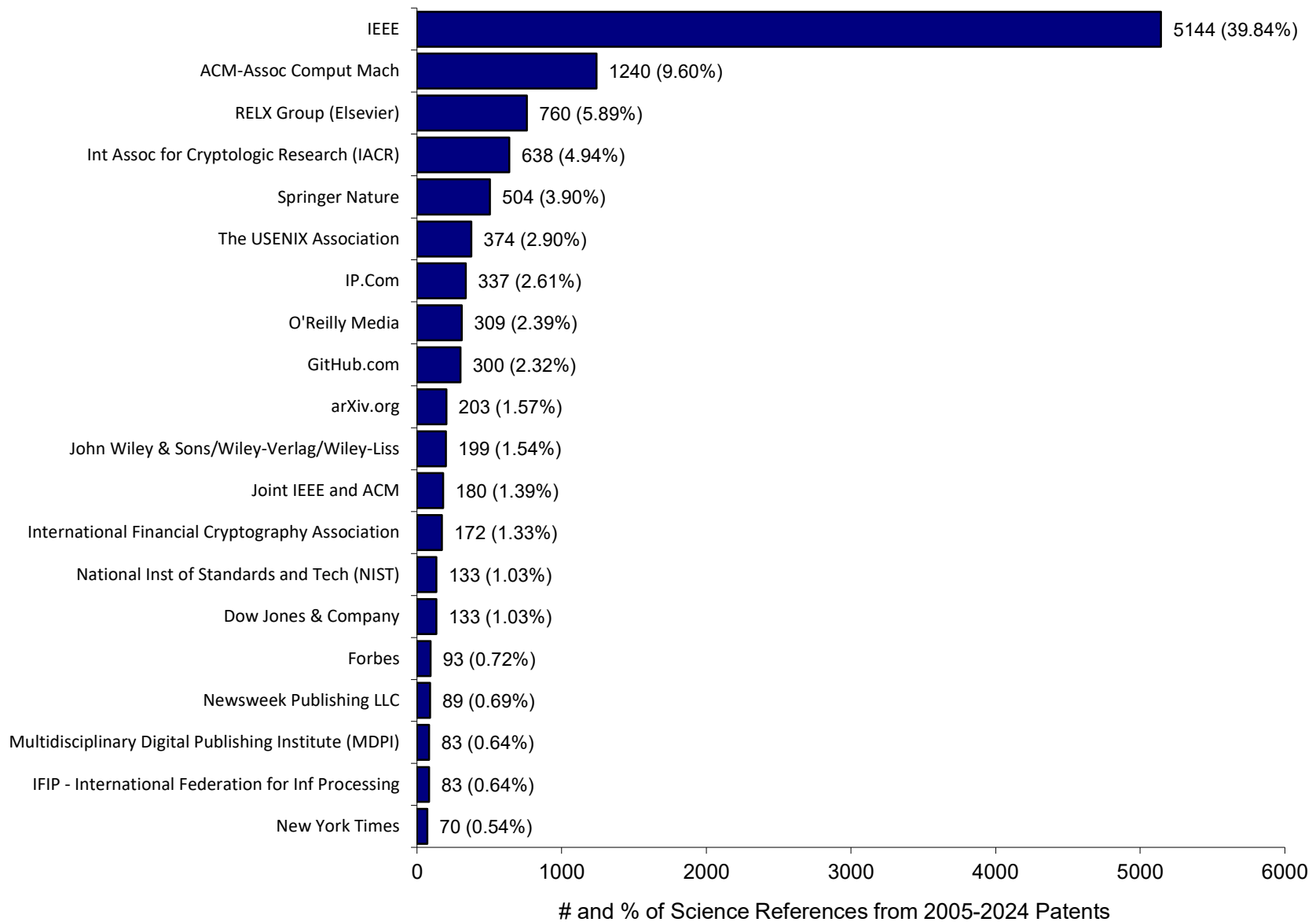


Figure 6: # and % of Science References from 2005-2024 Broadcasting US Patents to Top 20 Publishers and Conference Organizers

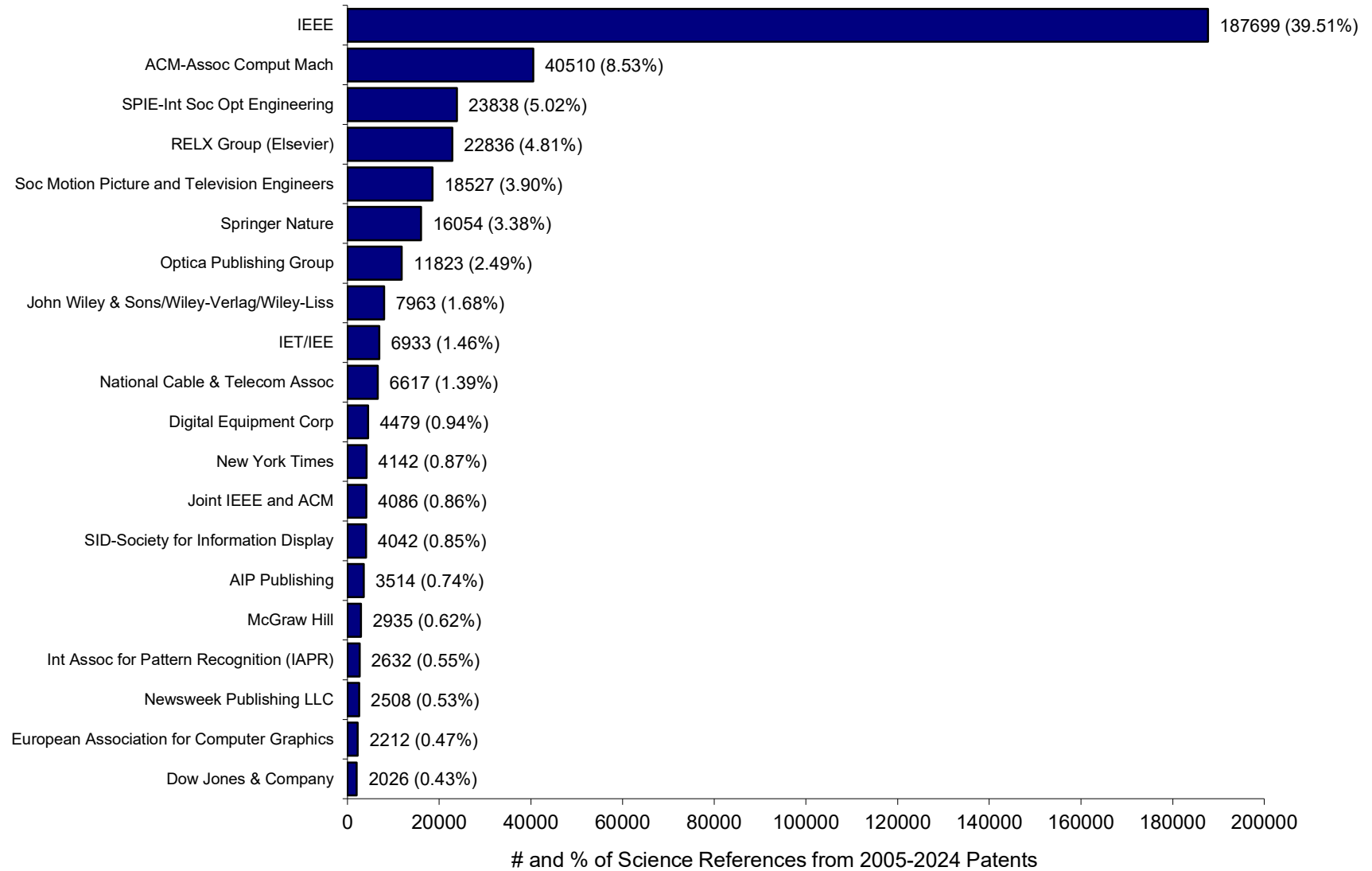


Figure 7 - # and % of Science References from 2005-2024 Computer Hardware US Patents to Top 20 Publishers and Conference Organizers

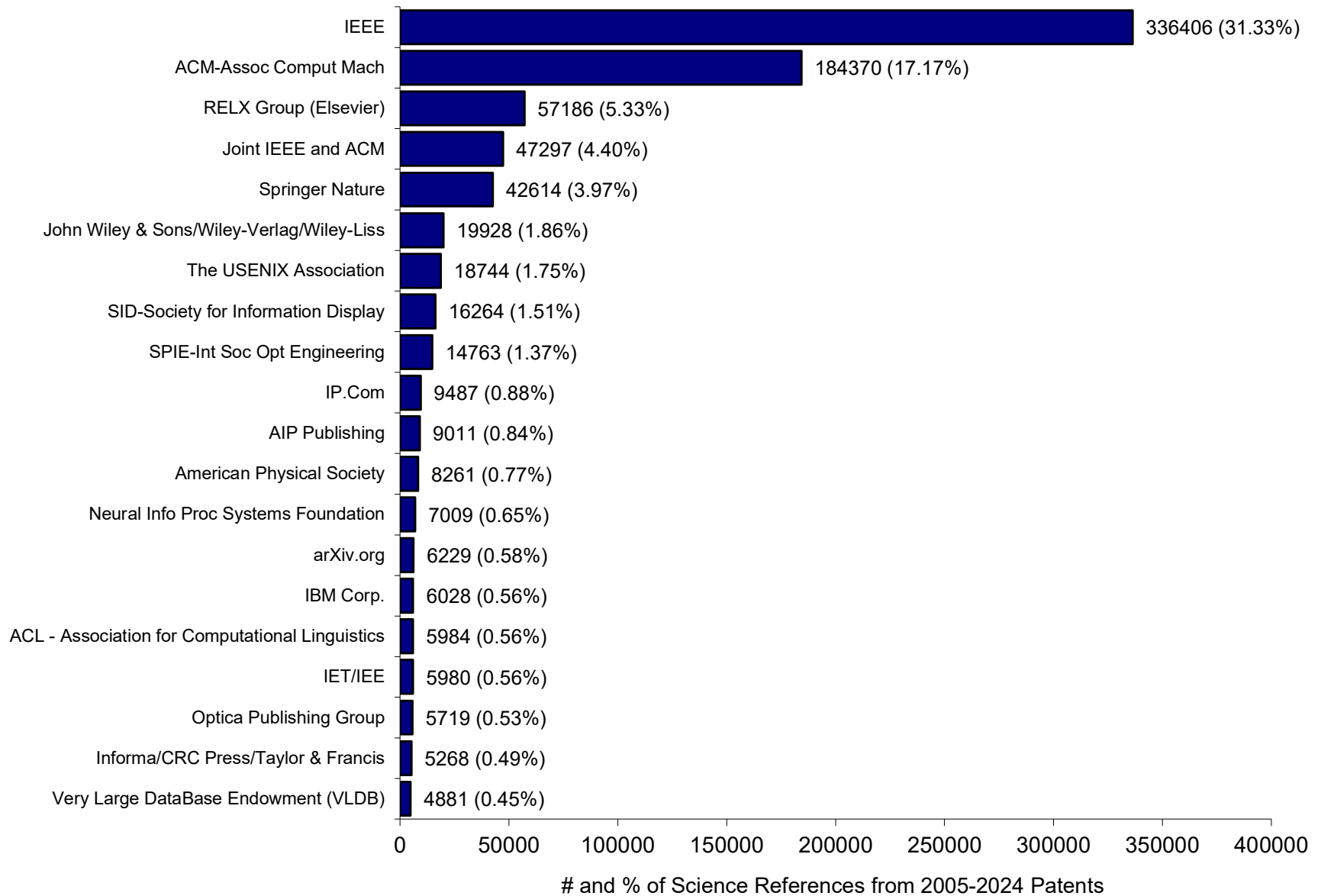


Figure 8 - # and % of Science References from 2005-2024 Computer Software US Patents to Top 20 Publishers and Conference Organizers

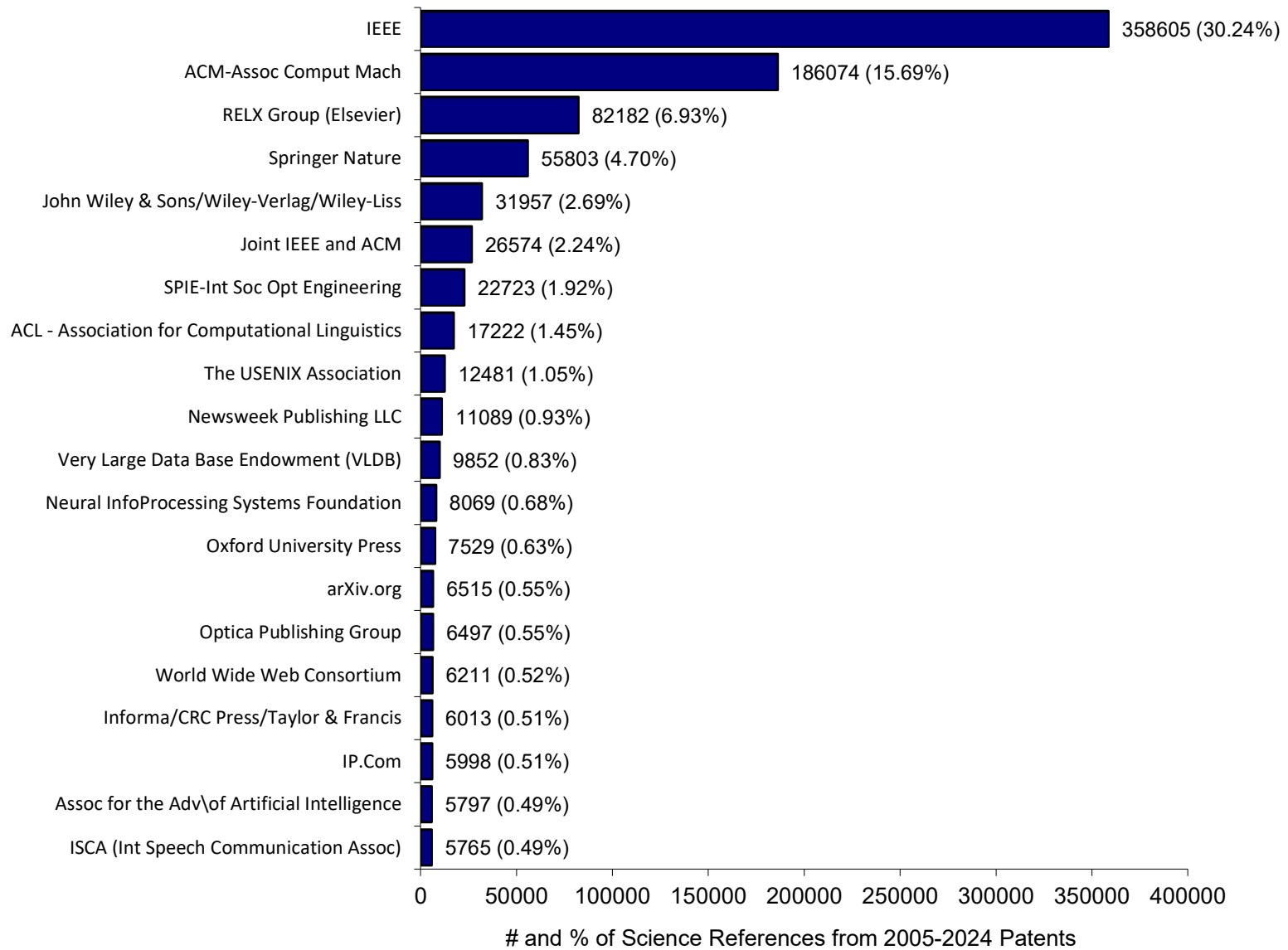
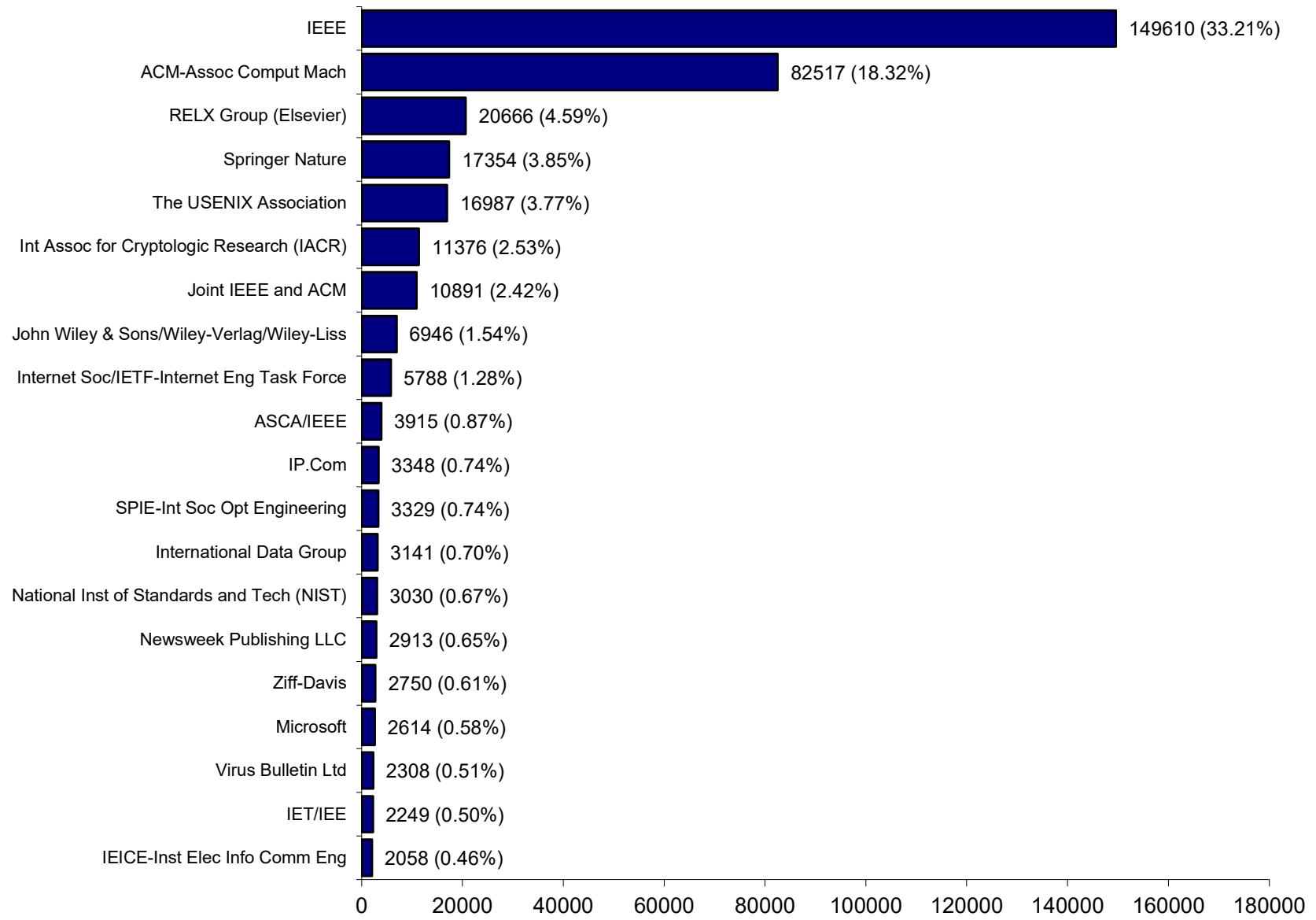


Figure 9 - # and % of Science References from 2005-2024 Cybersecurity US Patents to Top 20 Publishers and Conference Organizers



and % of Science References from 2005-2024 Patents

Figure 10 - # and % of Science References from 2005-2024 Medical Device US Patents to Top 20 Publishers and Conference Organizers

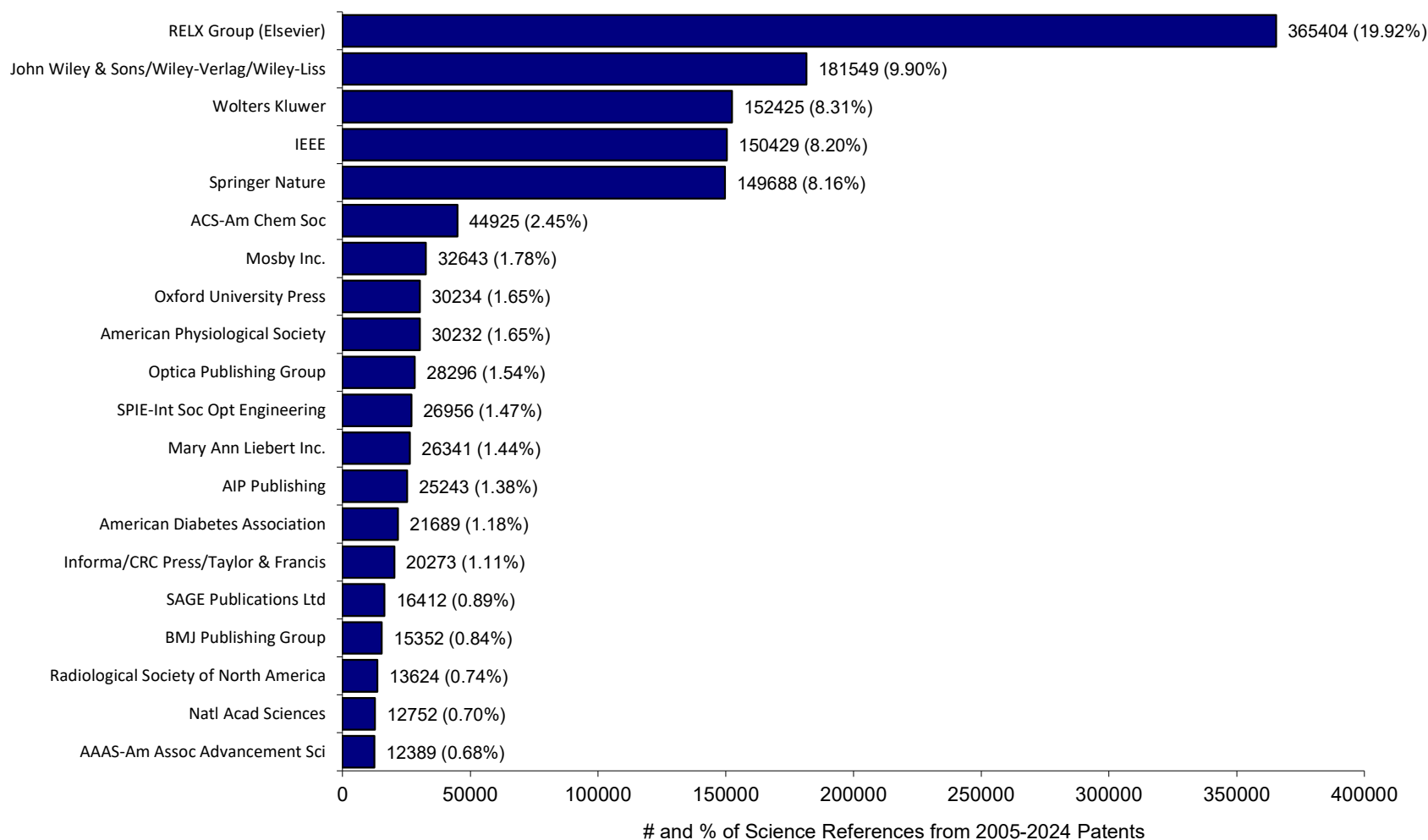


Figure 11 - # and % of Science References from 2005-2024 Information Storage US Patents to Top 20 Publishers and Conference Organizers

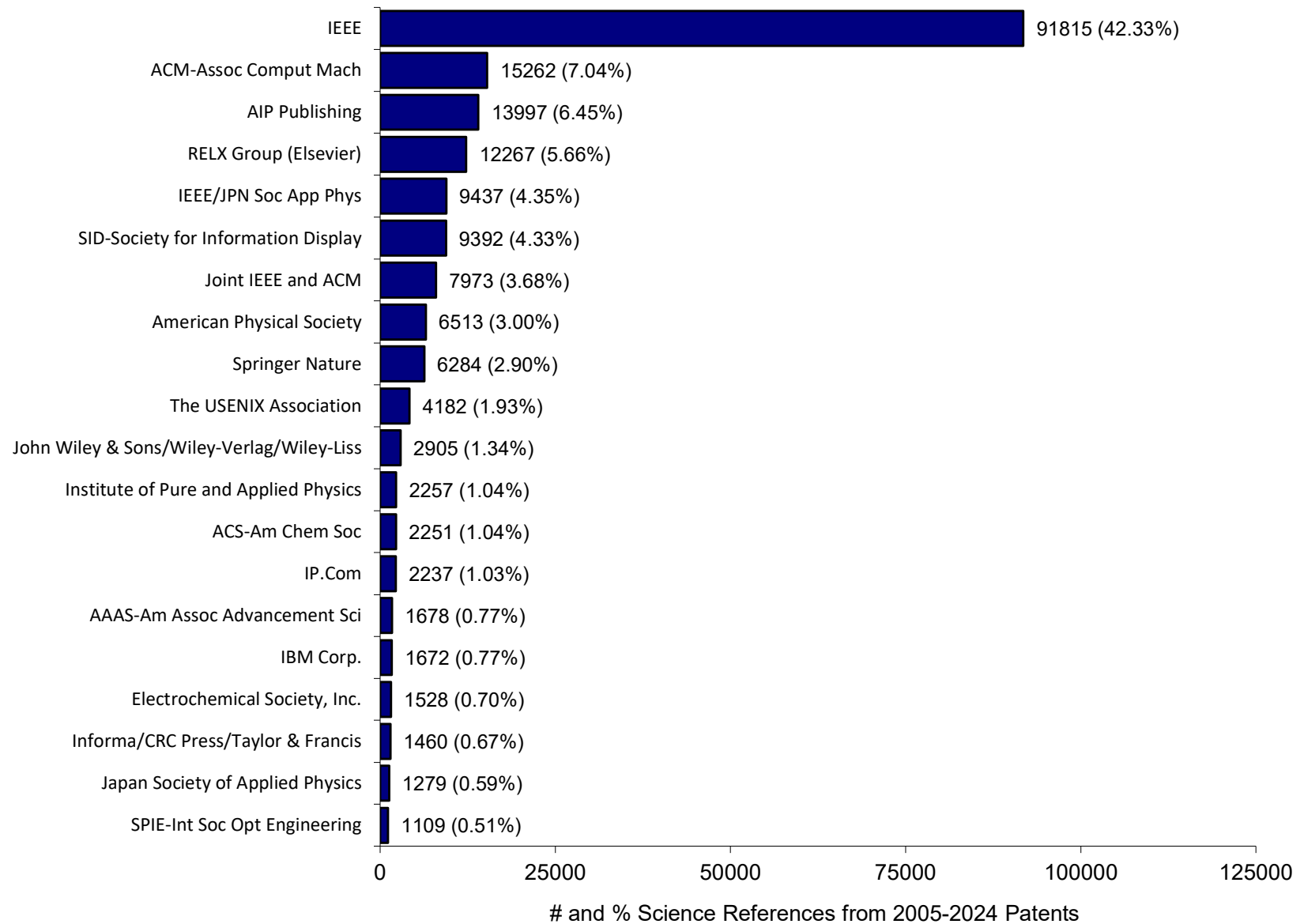
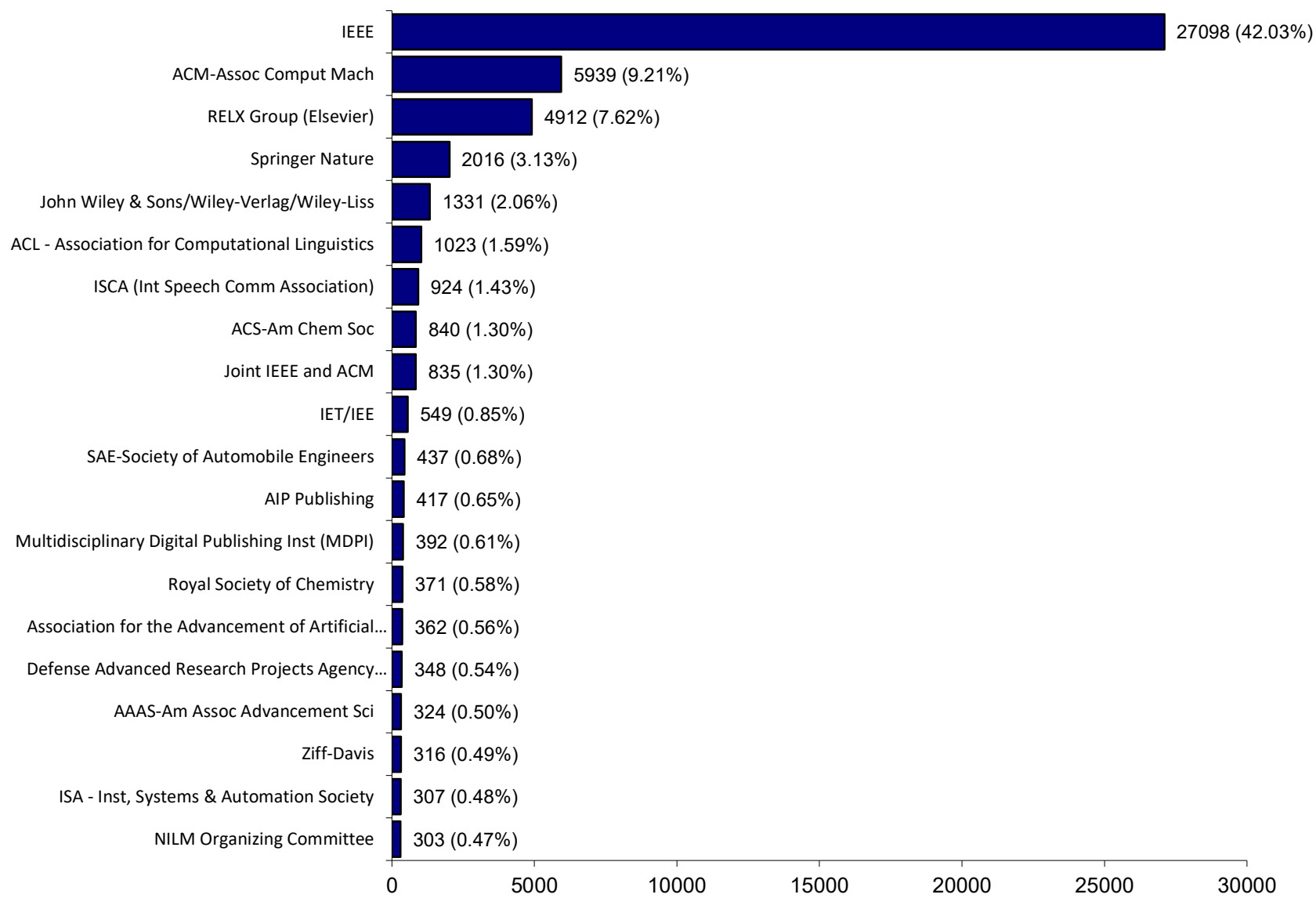


Figure 12 - # and % of Science References from 2005-2024 Internet-Of-Things (IOT) US Patents to Top 20 Publishers and Conference Organizers



and % of Science References from 2005-2024 Patents

**Figure 13 - # and % of Science References from 2005-2024
Measuring/Testing/Control
US Patents to Top 20 Publishers and Conference Organizers**

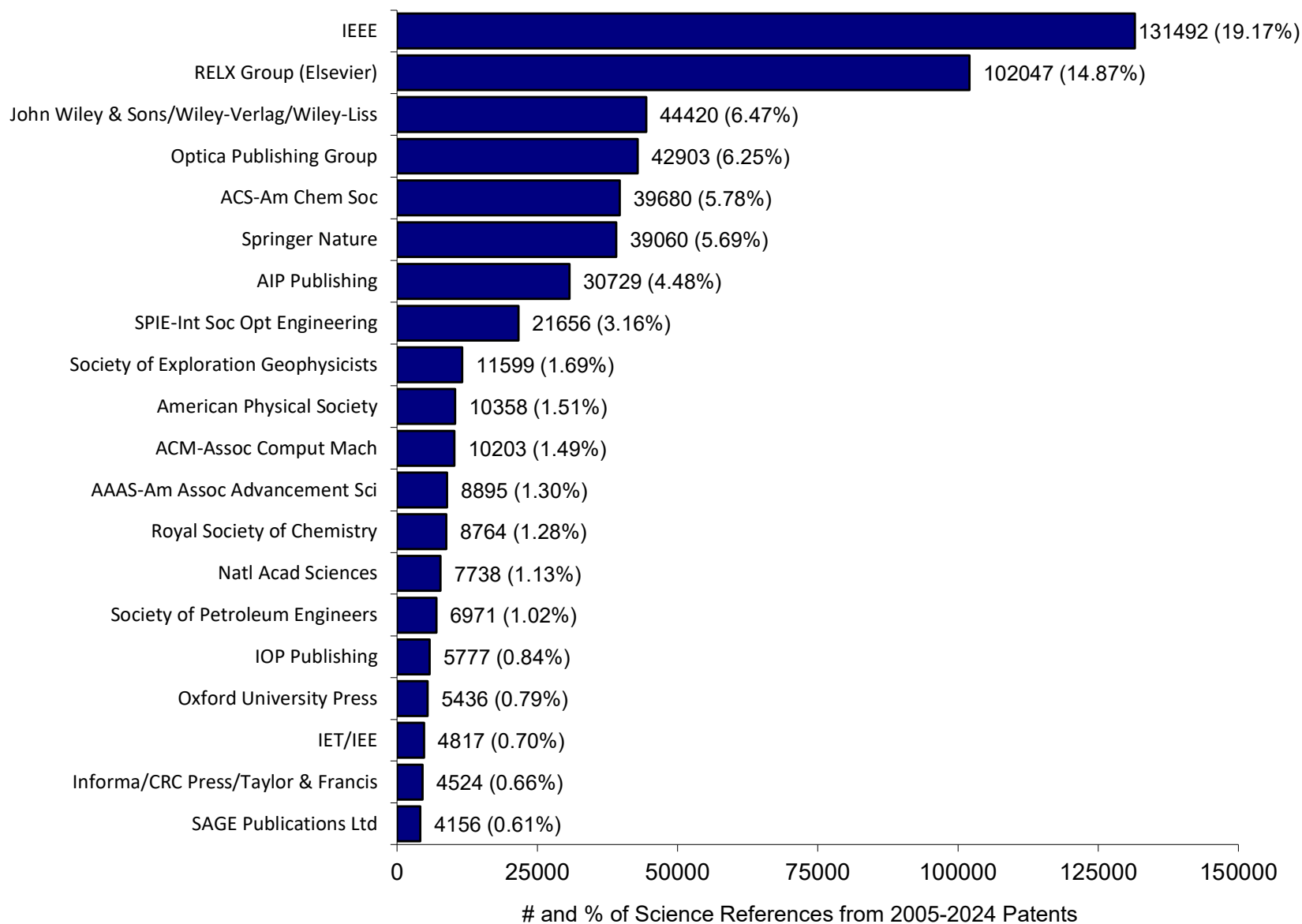


Figure 14 - # and % of Science References from 2005-2024 Optics US Patents to Top 20 Publishers and Conference Organizers

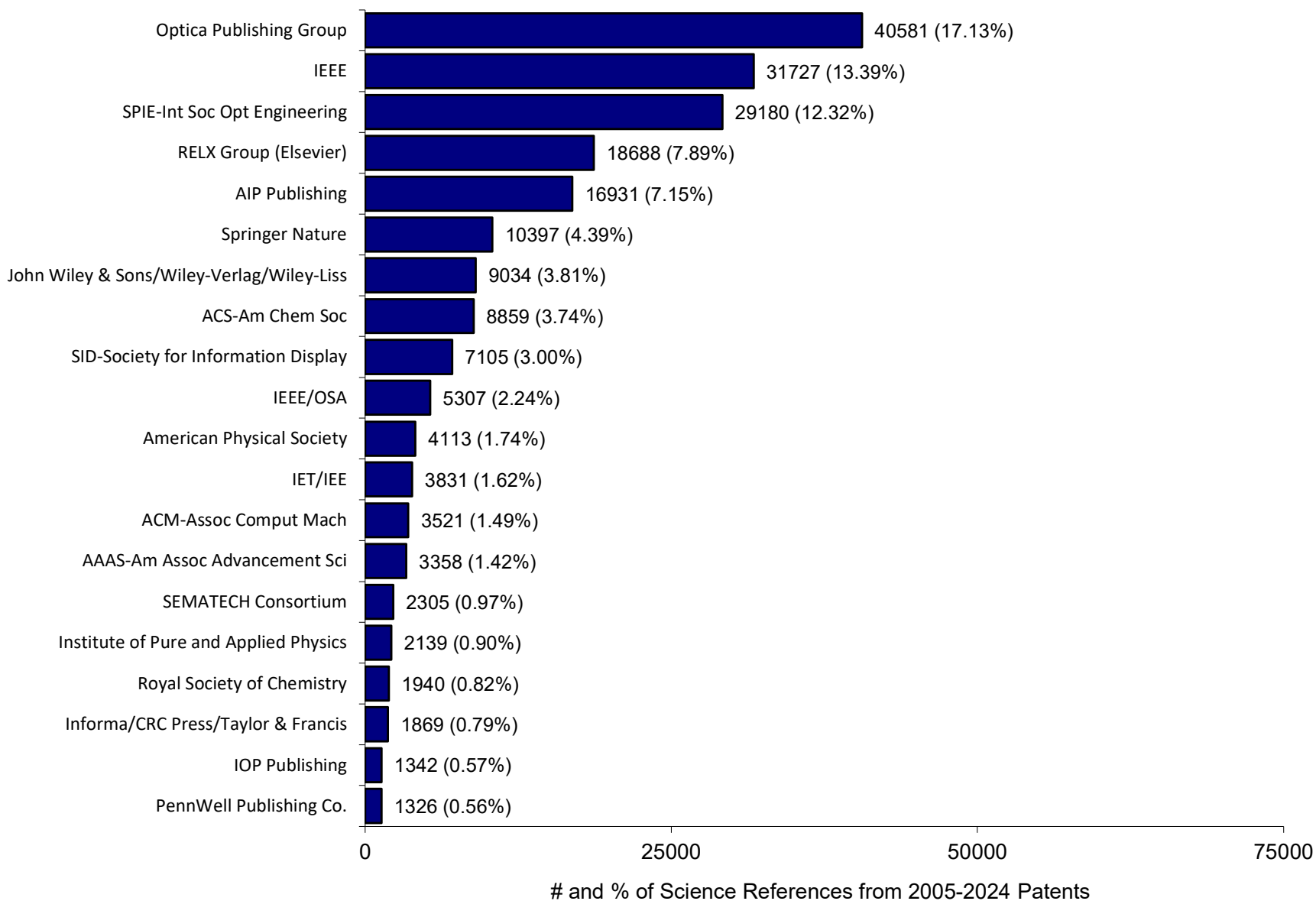


Figure 15 - # and % of Science References from 2005-2024 Power Systems US Patents to Top 20 Publishers and Conference Organizers

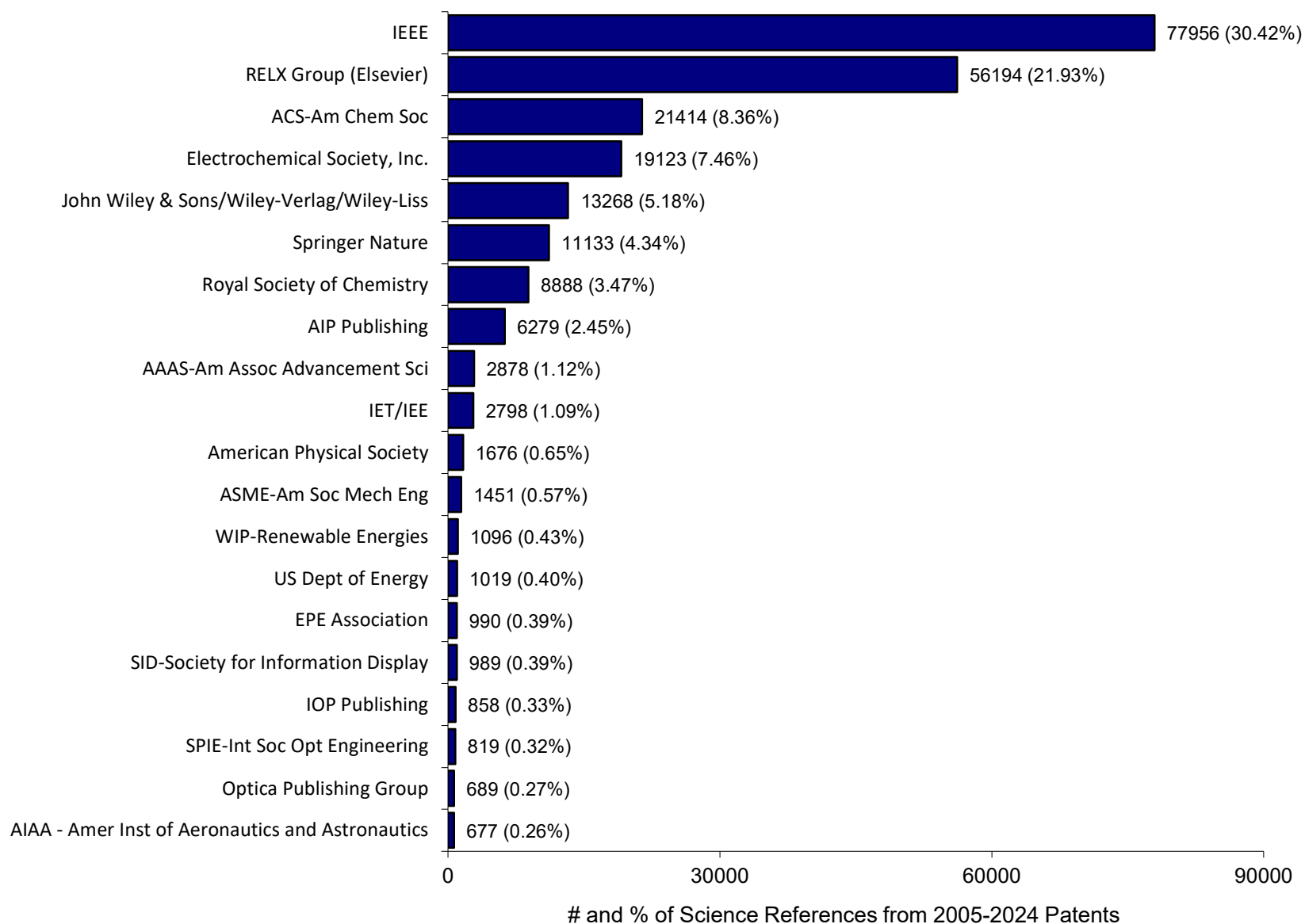


Figure 16 - # and % of Science References from 2005-2024 Robotics and Intelligent Mfg US Patents to Top 20 Publishers and Conference Organizers

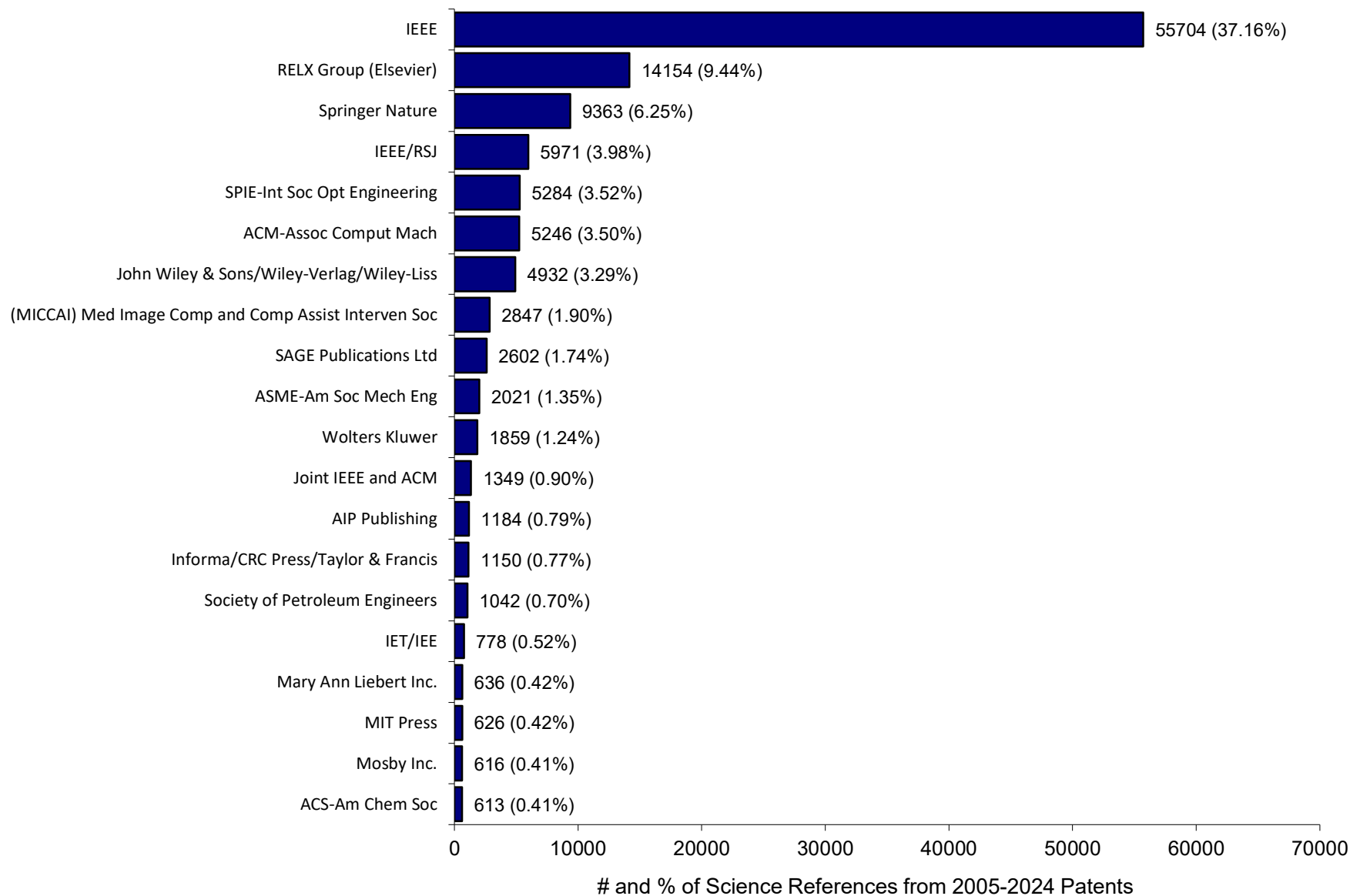


Figure 17 - # and % of Science References from 2005-2024 Semiconductor US Patents to Top 20 Publishers and Conference Organizers

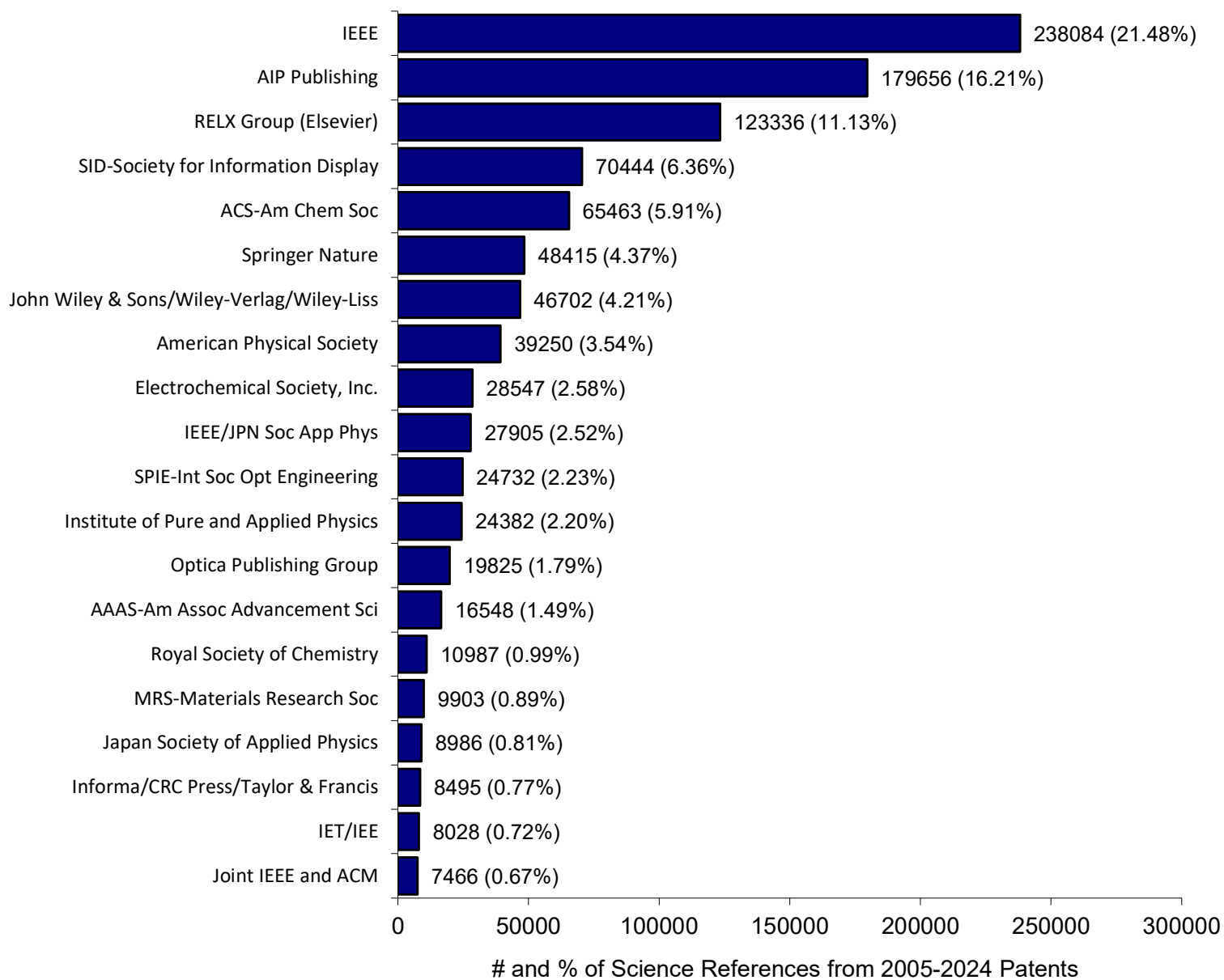


Figure 18 - # and % of Science References from 2005-2024 Smart Meter/Smart Grid US Patents to Top 20 Publishers and Conference Organizers

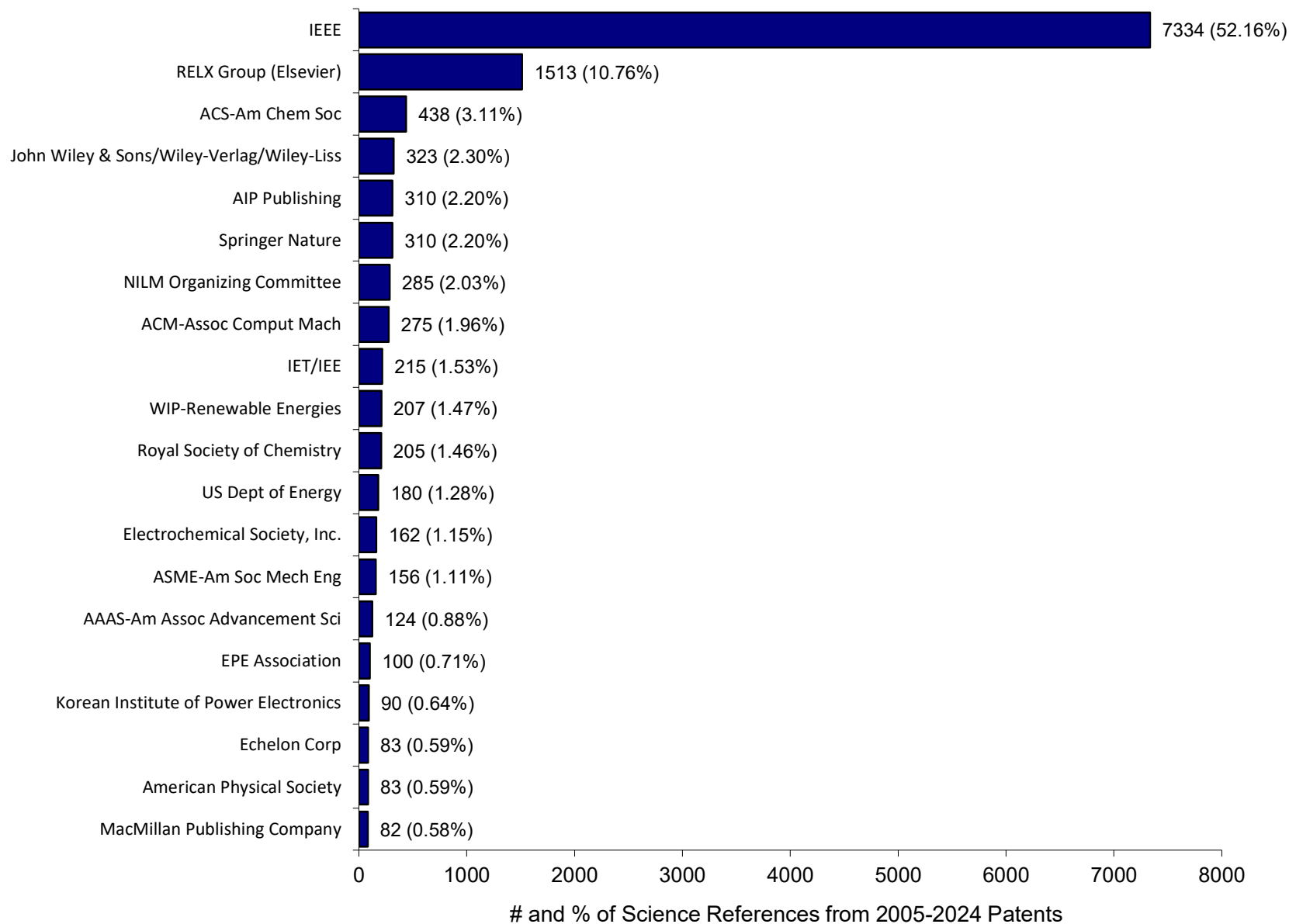


Figure 19 - # and % of Science References from 2005-2024 Solar/Photovoltaic US Patents to Top 20 Publishers and Conference Organizers

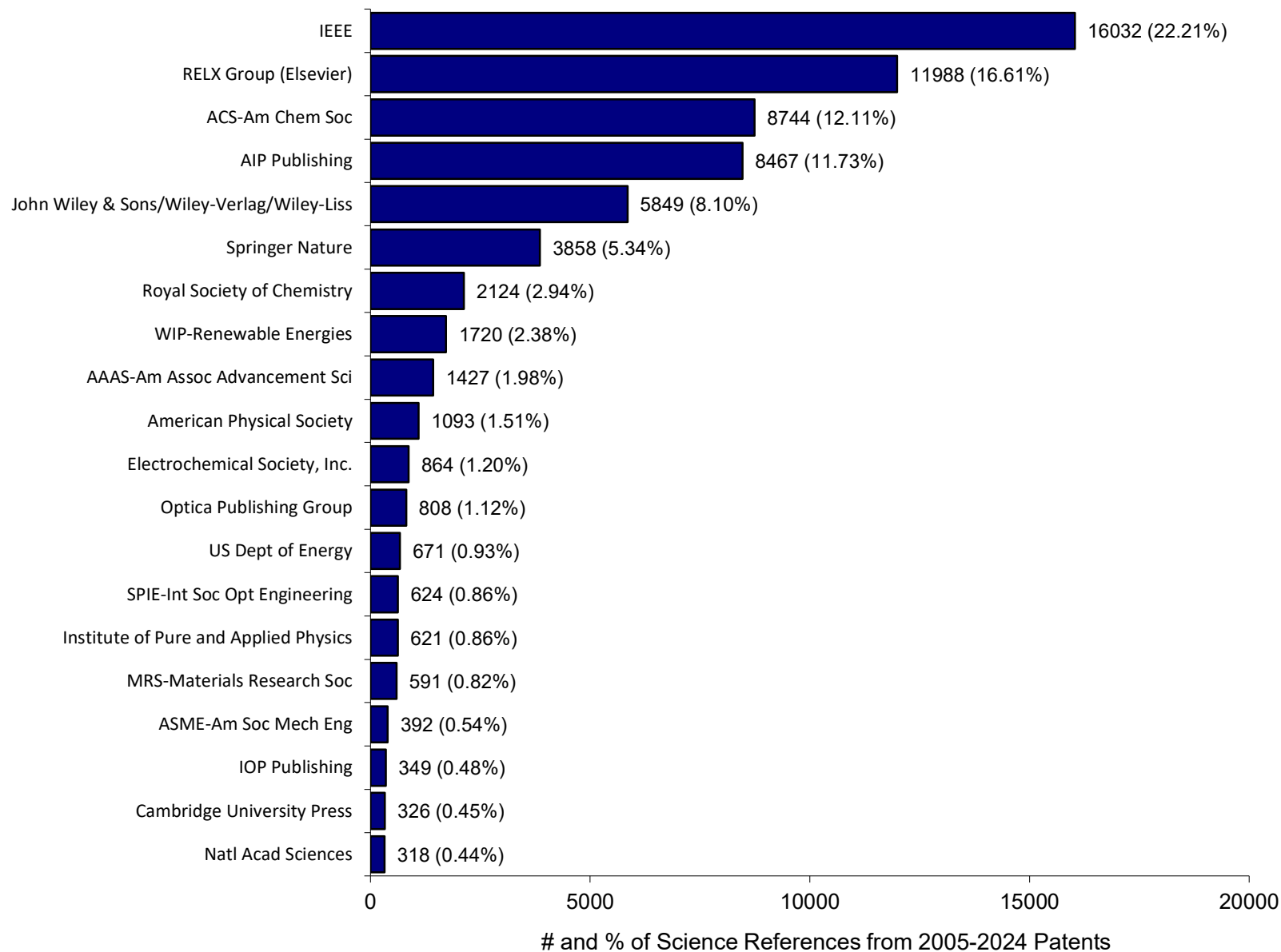


Figure 20 - # and % of Science References from 2005-2024 Telecommunications US Patents to Top 20 Publishers and Conference Organizers

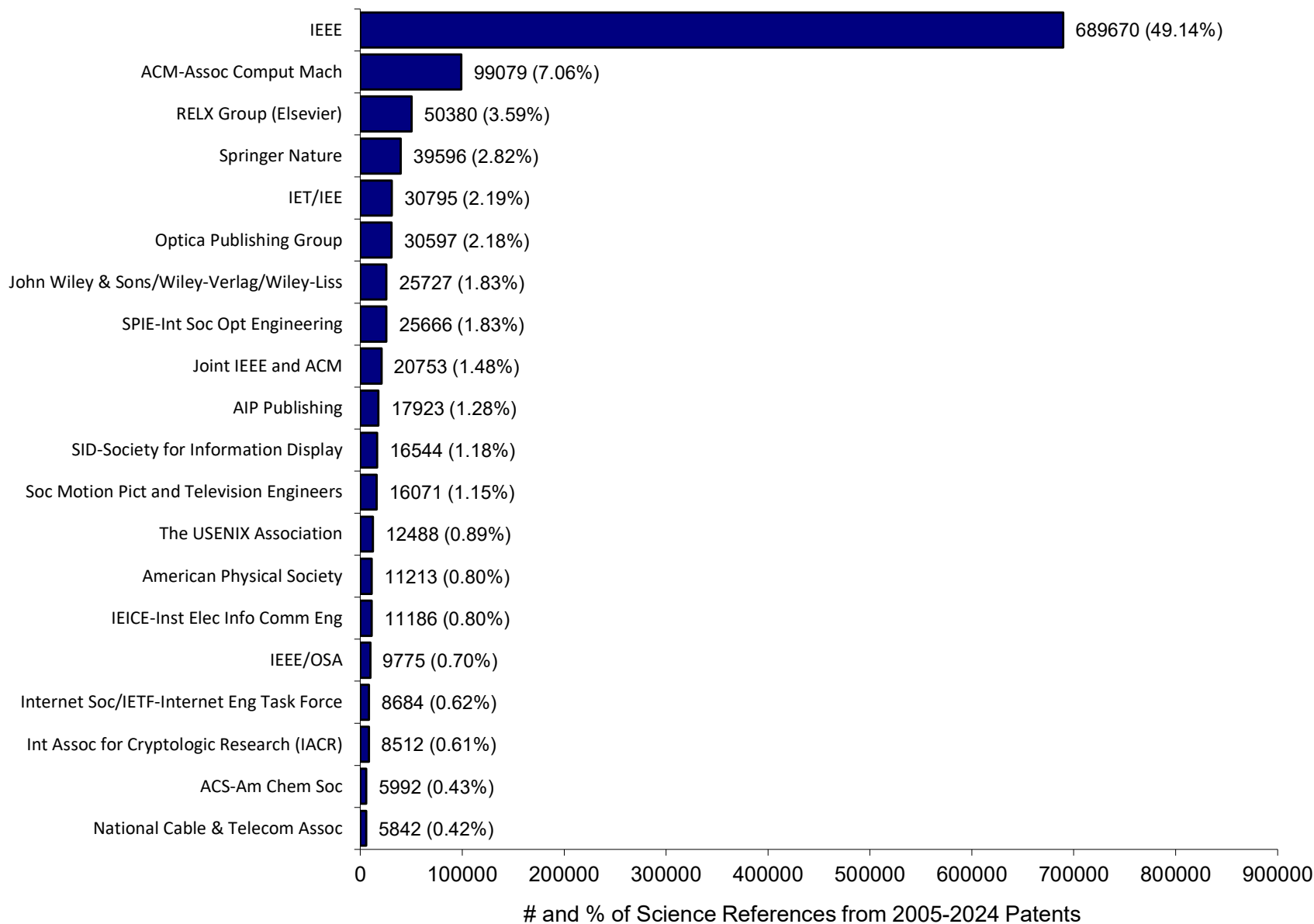
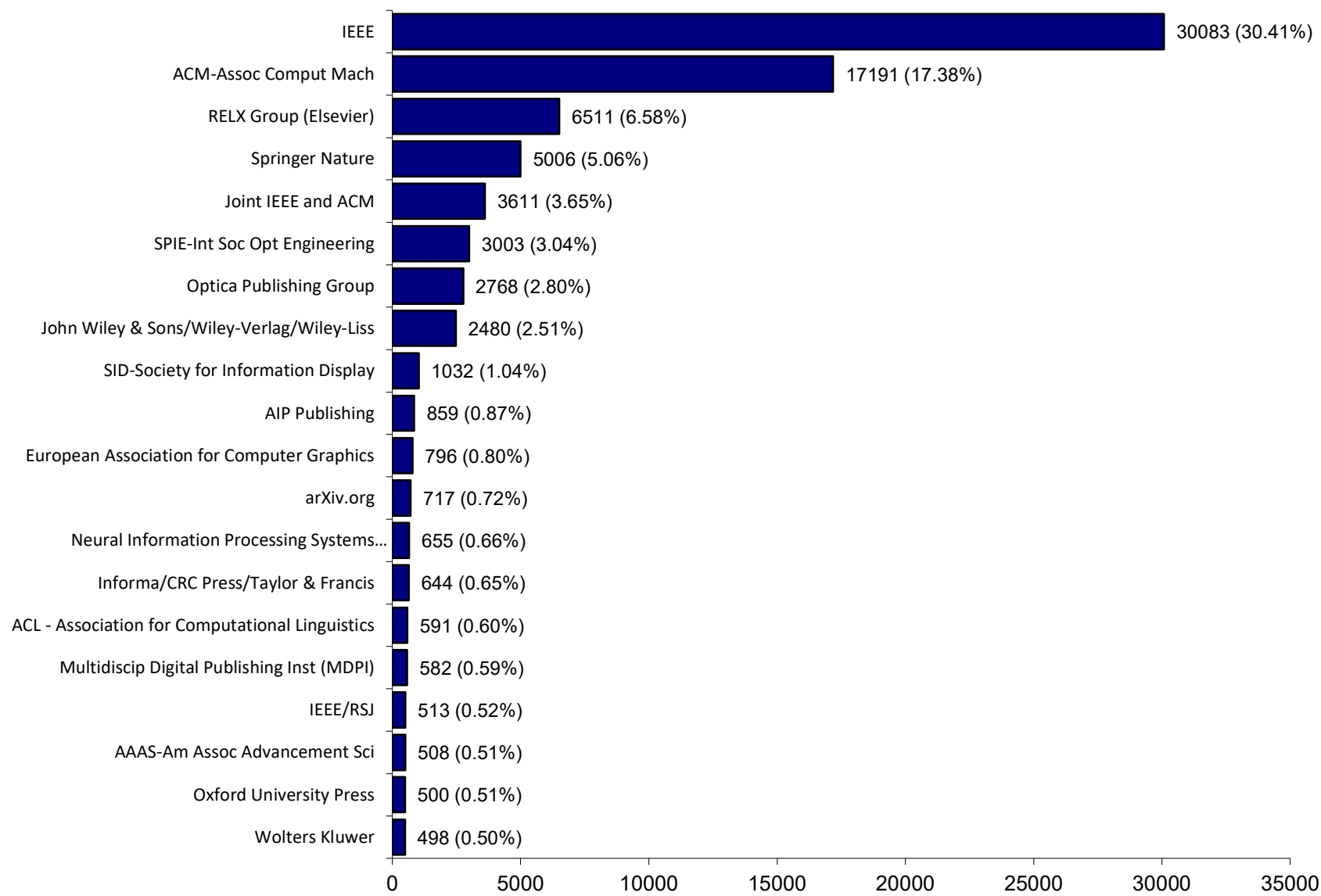


Figure 21 - # and % of Science References from 2005-2024 Virtual/Augmented Reality US Patents to Top 20 Publishers and Conference Organizers



and % of Science References from 2005-2024 Patents

Figure 22 - # and % of Science References from 2005-2024 Wind Energy US Patents to Top 20 Publishers and Conference Organizers

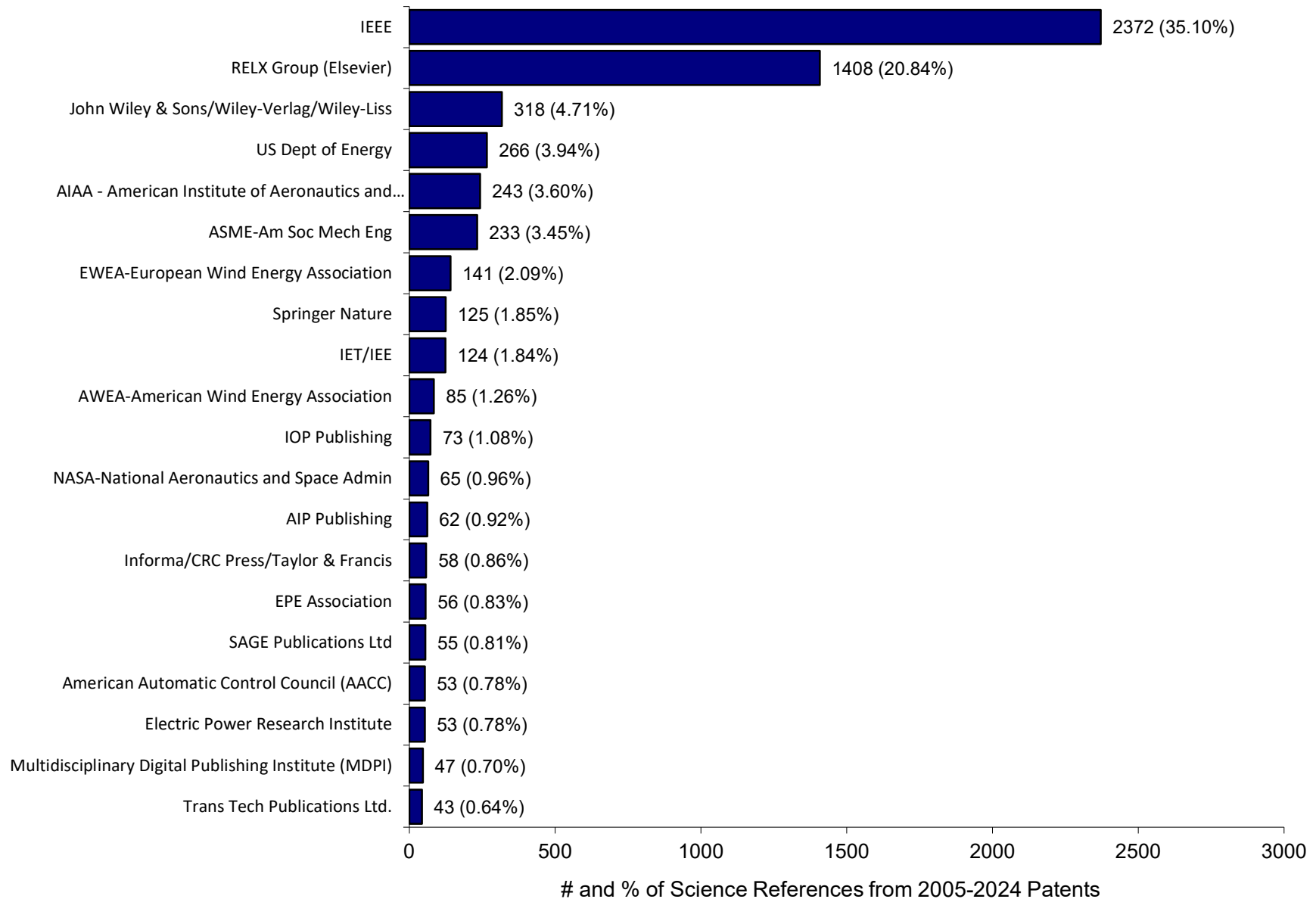
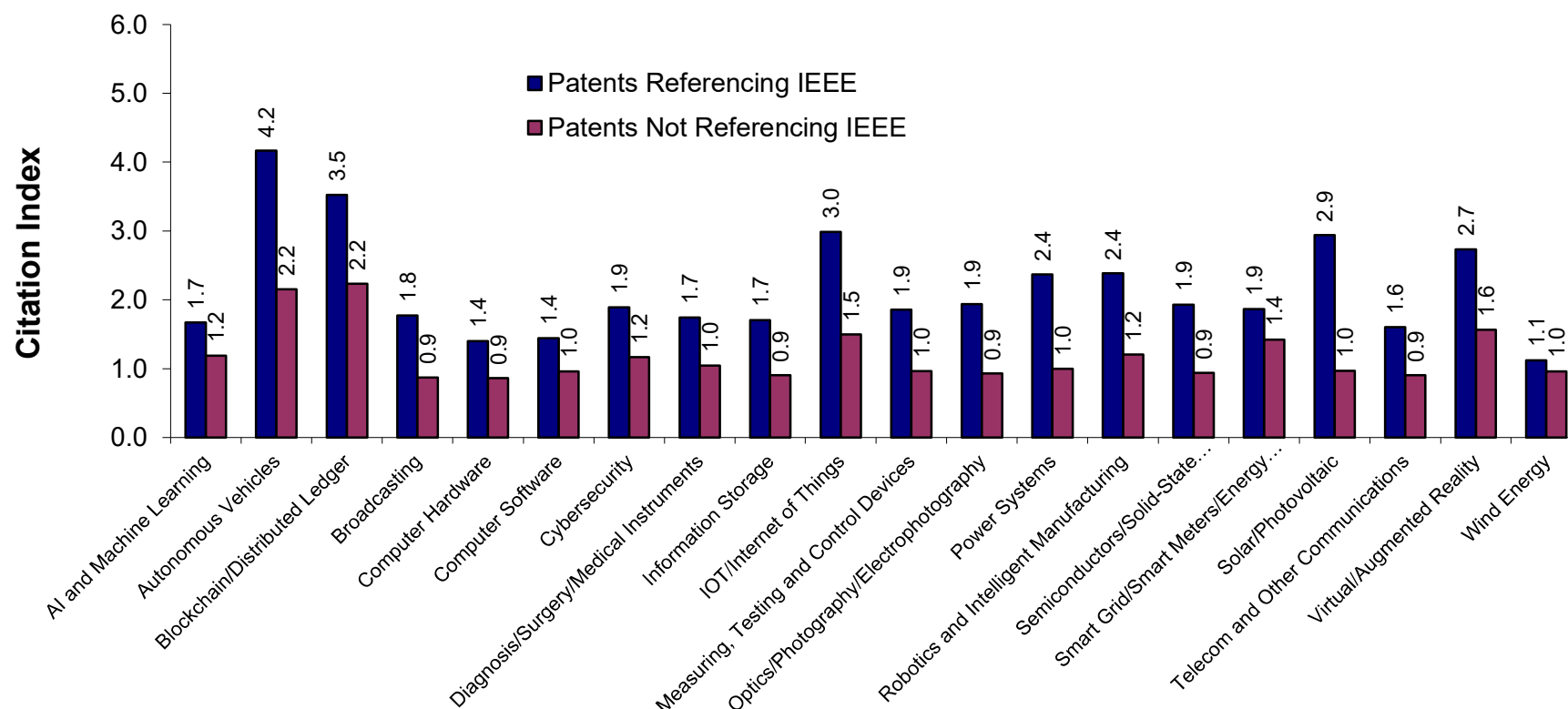


Figure 23 - 2005-2024 Citation Index of US Patents Referencing IEEE Papers and Conferences Versus US Patents not Referencing IEEE for 20 Categories



Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Alphabet Inc.</i>		
IEEE	38760	32.6
ACM-Assoc Comput Mach	20496	17.2
RELX Group (Elsevier)	6504	5.5
Springer Nature	5230	4.4
Neural Information Processing Systems Foundation	3077	2.6
SPIE-Int Soc Opt Engineering	2678	2.3
Joint IEEE and ACM	2251	1.9
ACL - Association for Computational Linguistics	1962	1.7
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	2024	1.7
The USENIX Association	1975	1.7
International Machine Learning Society (IMLS)	1847	1.6
CBS Interactive	1352	1.1
World Wide Web Consortium	1208	1.0
ISCA (Int Speech Comm Association)	1246	1.0
594 others with less than 1% each	28247	21.2
<i>Amazon.com Inc.</i>		
IEEE	10190	28.6
ACM-Assoc Comput Mach	7795	21.8
RELX Group (Elsevier)	1675	4.7
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1284	3.6
Springer Nature	1300	3.6
Joint IEEE and ACM	1066	3.0
American Physical Society	741	2.1
arXiv.org	590	1.7
The USENIX Association	619	1.7
Information Processing Society of Japan	567	1.6
International Data Group	440	1.2
CBS Interactive	344	1.0
Ziff-Davis	364	1.0
Neural Information Processing Systems Foundation	340	1.0
309 others with less than 1% each	8369	21.4
<i>Apple Inc</i>		
IEEE	55238	32.0
ACM-Assoc Comput Mach	35469	20.6
RELX Group (Elsevier)	9203	5.3
ACL - Association for Computational Linguistics	5554	3.2
ISCA (Int Speech Comm Association)	5232	3.0
Springer Nature	4907	2.8
Joint IEEE and ACM	3296	1.9
Association for the Advancement of Artificial Intelligence	2294	1.3
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1809	1.0
472 others with less than 1% each	49555	26.3

Appendix A - Publishers Receiving Most References from Top 50 Companies ***(Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)***

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Applied Materials Inc.</i>		
IEEE	5876	22.1
AIP Publishing	4496	16.9
RELX Group (Elsevier)	3944	14.8
Electrochemical Society, Inc.	1952	7.3
SPIE-Int Soc Opt Engineering	1073	4.0
ACS-Am Chem Soc	1052	4.0
MRS-Materials Research Soc	871	3.3
Institute of Pure and Applied Physics	839	3.2
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	798	3.0
Springer Nature	667	2.5
PennWell Publishing Co.	571	2.1
Cahners Pub. Co.	351	1.3
IOP Publishing	313	1.2
AAAS-Am Assoc Advancement Sci	294	1.1
210 others with less than 1% each	3482	11.6
<i>BOE Technology Group Ltd</i>		
IEEE	369	25.4
RELX Group (Elsevier)	146	10.0
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	131	9.0
ACS-Am Chem Soc	116	8.0
Springer Nature	92	6.3
AIP Publishing	88	6.0
SID-Society for Information Display	50	3.4
China Academic Journal Electronic Publishing House	44	3.0
Royal Society of Chemistry	42	2.9
Optica Publishing Group	31	2.1
ACM-Assoc Comput Mach	29	2.0
SPIE-Int Soc Opt Engineering	24	1.6
Institute of Pure and Applied Physics	19	1.3
IEEE/CVF	16	1.1
American Physical Society	15	1.0
103 others with less than 1% each	243	17.6

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Boeing Co. (The)</i>		
IEEE	5175	25.7
RELX Group (Elsevier)	3199	15.9
AIAA - American Institute of Aeronautics and Astronautics	1460	7.3
Springer Nature	865	4.3
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	786	3.9
AIP Publishing	689	3.4
SPIE-Int Soc Opt Engineering	615	3.1
ACS-Am Chem Soc	528	2.6
ACM-Assoc Comput Mach	457	2.3
NASA-National Aeronautics and Space Admin	420	2.1
SAE-Society of Automobile Engineers	348	1.7
Optica Publishing Group	276	1.4
SAGE Publications Ltd	256	1.3
American Physical Society	217	1.1
ASME-Am Soc Mech Eng	223	1.1
IET/IEE	228	1.1
419 others with less than 1% each	4369	17.9
<i>Bosch (Robert) GmbH</i>		
IEEE	4070	26.8
RELX Group (Elsevier)	1503	9.9
Springer Nature	1058	7.0
ACS-Am Chem Soc	449	3.0
ACM-Assoc Comput Mach	384	2.5
American Diabetes Association	365	2.4
Amer Thoracic Soc	351	2.3
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	337	2.2
Electrochemical Society, Inc.	312	2.1
SAGE Publications Ltd	229	1.5
Royal Society of Chemistry	197	1.3
American Medical Informatics Association	194	1.3
Georg Thieme Verlag	188	1.2
SAE-Society of Automobile Engineers	175	1.2
Wichtig Publishing	177	1.2
SPIE-Int Soc Opt Engineering	173	1.1
Ziff-Davis	159	1.0
330 others with less than 1% each	4854	29.2

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
Canon Inc		
IEEE	6759	23.6
RELX Group (Elsevier)	3324	11.6
AIP Publishing	2896	10.1
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1965	6.9
SPIE-Int Soc Opt Engineering	1654	5.8
Springer Nature	1473	5.1
ACS-Am Chem Soc	1400	4.9
ACM-Assoc Comput Mach	979	3.4
Optica Publishing Group	875	3.1
AAAS-Am Assoc Advancement Sci	394	1.4
Institute of Pure and Applied Physics	396	1.4
American Physical Society	294	1.0
Society of Magnetic Resonance in Medicine (SMRM)	281	1.0
462 others with less than 1% each	5983	17.7
CapitalOne		
IEEE	1342	28.0
CBS Interactive	389	8.1
ACM-Assoc Comput Mach	352	7.4
Springer Nature	348	7.3
Joint IEEE and ACM	252	5.3
RELX Group (Elsevier)	245	5.1
National Institute of Standards and Technology (NIST)	198	4.1
International Association for Cryptologic Research (IACR)	189	3.9
The Science and Information (SAI) Organization Limited	176	3.7
Neural Information Processing Systems Foundation	121	2.5
Cambridge University Press	101	2.1
ACL - Association for Computational Linguistics	102	2.1
arXiv.org	77	1.6
Association for the Advancement of Artificial Intelligence	53	1.1
International Conference on Representation Learning	50	1.0
138 others with less than 1% each	792	14.9
Cisco Systems Inc.		
IEEE	19056	40.7
ACM-Assoc Comput Mach	8106	17.3
The USENIX Association	2165	4.6
RELX Group (Elsevier)	2129	4.6
Internet Soc/IETF-Internet Eng Task Force	1898	4.1
Springer Nature	1561	3.3
Joint IEEE and ACM	1415	3.0
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	784	1.7
Optica Publishing Group	587	1.3
337 others with less than 1% each	9063	17.4

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Dell Technologies Inc</i>		
IEEE	4487	34.2
ACM-Assoc Comput Mach	2459	18.7
The USENIX Association	1202	9.2
RELX Group (Elsevier)	504	3.8
Joint IEEE and ACM	463	3.5
Springer Nature	464	3.5
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	184	1.4
NVM Express Work Group	174	1.3
Very Large Data Base Endowment Inc. (VLDB Endowment)	159	1.2
Microsoft	153	1.2
International Association for Cryptologic Research (IACR)	150	1.1
266 others with less than 1% each	2727	18.3
<i>Denso Corp</i>		
IEEE	841	42.0
RELX Group (Elsevier)	194	9.7
ACM-Assoc Comput Mach	78	3.9
Springer Nature	71	3.6
AIP Publishing	60	3.0
ACS-Am Chem Soc	50	2.5
IET/IEE	48	2.4
SAE-Society of Automobile Engineers	41	2.0
IEICE-Inst Elec Info Comm Eng	40	2.0
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	35	1.8
Trans Tech Publications Ltd.	31	1.6
International Association for Cryptologic Research (IACR)	22	1.1
IEEE/RSJ	20	1.0
Joint IEEE and ACM	19	1.0
149 others with less than 1% each	450	19.1
<i>Ericsson</i>		
IEEE	14715	63.6
Internet Soc/IETF-Internet Eng Task Force	1639	7.1
ACM-Assoc Comput Mach	1191	5.2
RELX Group (Elsevier)	530	2.3
Optica Publishing Group	490	2.1
IET/IEE	449	1.9
Springer Nature	442	1.9
Joint IEEE and ACM	341	1.5
IEEE/OSA	329	1.4
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	269	1.2
288 others with less than 1% each	2730	9.8

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Ford Motor Co.</i>		
IEEE	2623	27.2
SAE-Society of Automobile Engineers	2048	21.2
RELX Group (Elsevier)	1206	12.5
IP.Com	392	4.1
Springer Nature	284	2.9
ACM-Assoc Comput Mach	227	2.4
IEEE/RSJ	184	1.9
American Automatic Control Council (AACC)	188	1.9
ACS-Am Chem Soc	154	1.6
IET/IEE	121	1.3
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	112	1.2
ASME-Am Soc Mech Eng	101	1.0
255 others with less than 1% each	2014	18.6
<i>Fujifilm Business Innovation Co. (f/k/a Fuji Film Holdings Corp)</i>		
RELX Group (Elsevier)	2353	14.0
IEEE	2212	13.1
ACM-Assoc Comput Mach	1347	8.0
Springer Nature	1348	8.0
ACS-Am Chem Soc	1314	7.8
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1109	6.6
SPIE-Int Soc Opt Engineering	699	4.1
AIP Publishing	580	3.4
Cell Press	290	1.7
AAAS-Am Assoc Advancement Sci	251	1.5
Natl Acad Sciences	249	1.5
Optica Publishing Group	217	1.3
Royal Society of Chemistry	204	1.2
Oxford University Press	195	1.2
American Society of Hematology	185	1.1
451 others with less than 1% each	4297	21.0

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
GE Aerospace (f/k/a General Electric Company)		
IEEE	10541	29.9
RELX Group (Elsevier)	5768	16.4
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	2497	7.1
Springer Nature	1682	4.8
ACS-Am Chem Soc	1450	4.1
AIP Publishing	1047	3.0
ASME-Am Soc Mech Eng	839	2.4
SPIE-Int Soc Opt Engineering	730	2.1
AIAA - American Institute of Aeronautics and Astronautics	642	1.8
NASA-National Aeronautics and Space Admin	565	1.6
US Dept of Energy	398	1.1
IOP Publishing	341	1.0
ACM-Assoc Comput Mach	341	1.0
626 others with less than 1% each	8387	18.5

General Motors Corp

IEEE	1870	26.0
RELX Group (Elsevier)	1133	15.7
SAE-Society of Automobile Engineers	757	10.5
ACS-Am Chem Soc	465	6.5
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	378	5.3
Springer Nature	364	5.1
Electrochemical Society, Inc.	244	3.4
Royal Society of Chemistry	129	1.8
ASME-Am Soc Mech Eng	105	1.5
AIP Publishing	100	1.4
Optica Publishing Group	94	1.3
Trans Tech Publications Ltd.	88	1.2
ACM-Assoc Comput Mach	83	1.2
American Automatic Control Council (AACC)	76	1.1
IET/IEE	72	1.0
212 others with less than 1% each	1238	15.1

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Hon Hai Precision Industry Co. Ltd.(also known as Foxconn)</i>		
IEEE	3772	26.3
SID-Society for Information Display	1326	9.3
RELX Group (Elsevier)	1140	8.0
AIP Publishing	1121	7.8
ACS-Am Chem Soc	948	6.6
ACM-Assoc Comput Mach	887	6.2
Springer Nature	598	4.2
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	541	3.8
AAAS-Am Assoc Advancement Sci	489	3.4
SPIE-Int Soc Opt Engineering	437	3.0
American Physical Society	328	2.3
Institute of Pure and Applied Physics	240	1.7
IEICE-Inst Elec Info Comm Eng	220	1.5
Electrochemical Society, Inc.	181	1.3
Royal Society of Chemistry	167	1.2
248 others with less than 1% each	1936	11.4

Honda Motor Co. Ltd.(Honda Giken Kogyo KK)

IEEE	4169	35.8
RELX Group (Elsevier)	1551	13.3
Springer Nature	727	6.2
ACS-Am Chem Soc	590	5.1
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	399	3.4
IEEE/RSJ	390	3.3
ACM-Assoc Comput Mach	342	2.9
IEEE/CVF	174	1.5
ASME-Am Soc Mech Eng	147	1.3
arXiv.org	135	1.2
Royal Society of Chemistry	144	1.2
Neural Information Processing Systems Foundation	145	1.2
SAGE Publications Ltd	136	1.2
AAAS-Am Assoc Advancement Sci	119	1.0
277 others with less than 1% each	2484	19.2

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Honeywell International Inc.</i>		
IEEE	10171	23.8
RELX Group (Elsevier)	6549	15.4
ACS-Am Chem Soc	3429	8.0
SPIE-Int Soc Opt Engineering	2424	5.7
Optica Publishing Group	2295	5.4
Springer Nature	2317	5.4
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1946	4.6
AIP Publishing	1232	2.9
Royal Society of Chemistry	1047	2.5
ACM-Assoc Comput Mach	542	1.3
American Physical Society	511	1.2
AAAS-Am Assoc Advancement Sci	432	1.0
569 others with less than 1% each	9758	18.5
<i>Huawei Technologies Company Ltd. (owned by HUAWEI Investment/Holding)</i>		
IEEE	15495	61.1
ACM-Assoc Comput Mach	1820	7.2
Optica Publishing Group	750	3.0
RELX Group (Elsevier)	676	2.7
Joint IEEE and ACM	549	2.2
Springer Nature	511	2.0
IEEE/OSA	385	1.5
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	320	1.3
IET/IEEE	315	1.2
Internet Soc/IETF-Internet Eng Task Force	300	1.2
The USENIX Association	264	1.0
332 others with less than 1% each	3982	13.0
<i>Hyundai Motor Co.</i>		
IEEE	431	27.1
RELX Group (Elsevier)	428	26.9
ACS-Am Chem Soc	122	7.7
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	81	5.1
Electrochemical Society, Inc.	76	4.8
Springer Nature	62	3.9
SAE-Society of Automobile Engineers	39	2.4
Royal Society of Chemistry	39	2.4
ACM-Assoc Comput Mach	33	2.1
AIP Publishing	23	1.4
104 others with less than 1% each	258	18.3

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Intel Corporation</i>		
IEEE	34650	48.5
ACM-Assoc Comput Mach	7467	10.4
Joint IEEE and ACM	5817	8.1
RELX Group (Elsevier)	2628	3.7
Springer Nature	2249	3.1
AIP Publishing	1899	2.7
IET/IEE	1007	1.4
The USENIX Association	849	1.2
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	809	1.1
IEEE/JPN Soc App Phys	694	1.0
ACS-Am Chem Soc	726	1.0
Intel Corp	713	1.0
493 others with less than 1% each	11951	14.0
<i>International Business Machines Corp</i>		
IEEE	73124	29.1
ACM-Assoc Comput Mach	39970	15.9
IP.Com	18049	7.2
RELX Group (Elsevier)	13221	5.3
Joint IEEE and ACM	12449	5.0
Springer Nature	10241	4.1
AIP Publishing	6025	2.4
ACS-Am Chem Soc	5299	2.1
The USENIX Association	4768	1.9
IBM Corp.	4632	1.8
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	4329	1.7
National Institute of Standards and Technology (NIST)	3518	1.4
Very Large Data Base Endowment Inc. (VLDB Endowment)	2664	1.1
SPIE-Int Soc Opt Engineering	2406	1.0
ACL - Association for Computational Linguistics	2403	1.0
1036 others with less than 1% each	48240	14.7

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Johnson & Johnson</i>		
RELX Group (Elsevier)	81976	23.3
Springer Nature	38589	11.0
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	36630	10.4
ACS-Am Chem Soc	17891	5.1
Wolters Kluwer	12835	3.7
IEEE	11746	3.3
Natl Acad Sciences	9535	2.7
American Society for Biochemistry and Molecular Biology Inc.	6525	1.9
Oxford University Press	6499	1.8
AAAS-Am Assoc Advancement Sci	6125	1.7
American SociETy for Microbiology	5586	1.6
Cell Press	4922	1.4
American Society for Pharmacology and Experimental Therapeutics	4370	1.2
Mary Ann Liebert Inc.	3898	1.1
SAGE Publications Ltd	3360	1.0
825 others with less than 1% each	100970	24.7

Kia Motors Corp.

IEEE	333	29.1
RELX Group (Elsevier)	288	25.2
ACS-Am Chem Soc	84	7.3
Electrochemical Society, Inc.	64	5.6
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	56	4.9
Springer Nature	38	3.3
SAE-Society of Automobile Engineers	32	2.8
Royal Society of Chemistry	28	2.4
ACM-Assoc Comput Mach	17	1.5
AIP Publishing	15	1.3
IP.Com	11	1.0
79 others with less than 1% each	178	16.2

LG Chem Ltd.

RELX Group (Elsevier)	2643	28.6
ACS-Am Chem Soc	1927	20.8
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1284	13.9
Royal Society of Chemistry	776	8.4
Springer Nature	497	5.4
AIP Publishing	316	3.4
Electrochemical Society, Inc.	271	2.9
237 others with less than 1% each	1538	14.2

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>LG Display Co Ltd</i>		
SID-Society for Information Display	819	28.1
AIP Publishing	465	16.0
RELX Group (Elsevier)	272	9.3
Korean Information Display Society (KIDS)	236	8.1
ACS-Am Chem Soc	190	6.5
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	143	4.9
IEEE	123	4.2
Institute of Pure and Applied Physics	119	4.1
Springer Nature	98	3.4
Royal Society of Chemistry	90	3.1
SPIE-Int Soc Opt Engineering	80	2.7
68 others with less than 1% each	275	8.7
<i>LG Electronics Inc.</i>		
IEEE	8079	62.7
Audio Eng Soc	835	6.5
ATSC Std	712	5.5
ACM-Assoc Comput Mach	348	2.7
RELX Group (Elsevier)	287	2.2
SPIE-Int Soc Opt Engineering	258	2.0
AIP Publishing	184	1.4
Springer Nature	164	1.3
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	165	1.3
IET/IEEE	159	1.2
Electronics and Telecommunications Research Institute	141	1.1
183 others with less than 1% each	1548	10.8
<i>Medtronic Inc</i>		
RELX Group (Elsevier)	36867	17.3
Wolters Kluwer	26555	12.4
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	19723	9.2
Springer Nature	17537	8.2
IEEE	14029	6.6
Oxford University Press	7082	3.3
American Physiological Society	5832	2.7
American Association of Neurological Surgeons	4181	2.0
ACS-Am Chem Soc	3803	1.8
Radiological Society of North America	3470	1.6
International Federation of Gynecology and Obstetrics (FIGO)	3084	1.4
Mosby Inc.	2330	1.1
S. Karger AG	2126	1.0
SPIE-Int Soc Opt Engineering	2199	1.0
American Heart Association (AHA)	2123	1.0
639 others with less than 1% each	62469	26.7

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Micron Technology Inc.</i>		
IEEE	41599	32.8
RELX Group (Elsevier)	20607	16.2
AIP Publishing	14126	11.1
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	5538	4.4
IEEE/JPN Soc App Phys	4636	3.7
ACS-Am Chem Soc	4509	3.6
Springer Nature	3071	2.4
Electrochemical Society, Inc.	2969	2.3
American Physical Society	2798	2.2
Institute of Pure and Applied Physics	2571	2.0
SPIE-Int Soc Opt Engineering	1614	1.3
MRS-Materials Research Soc	1582	1.2
Informa/CRC Press/Taylor & Francis	1293	1.0
274 others with less than 1% each	19968	14.8
<i>Microsoft Corporation</i>		
IEEE	78285	32.0
ACM-Assoc Comput Mach	66338	27.1
Joint IEEE and ACM	8380	3.4
RELX Group (Elsevier)	8187	3.3
Springer Nature	7416	3.0
The USENIX Association	6209	2.5
Microsoft	4324	1.8
ACL - Association for Computational Linguistics	3423	1.4
SPIE-Int Soc Opt Engineering	3088	1.3
Very Large Data Base Endowment Inc. (VLDB Endowment)	2954	1.2
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	2723	1.1
698 others with less than 1% each	53450	17.9
<i>Mitsubishi Electric Corp</i>		
IEEE	4992	51.5
ACM-Assoc Comput Mach	754	7.8
RELX Group (Elsevier)	451	4.7
IEICE-Inst Elec Info Comm Eng	396	4.1
IET/IEE	311	3.2
International Association for Cryptologic Research (IACR)	292	3.0
Springer Nature	263	2.7
AIP Publishing	182	1.9
Optica Publishing Group	155	1.6
SPIE-Int Soc Opt Engineering	151	1.6
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	143	1.5
255 others with less than 1% each	1606	13.9

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Murata Manufacturing Co. Ltd.</i>		
IEEE	14663	72.1
RELX Group (Elsevier)	1385	6.8
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	629	3.1
Springer Nature	475	2.3
Institute of Pure and Applied Physics	447	2.2
Joint IEEE and ACM	336	1.7
IEICE-Inst Elec Info Comm Eng	321	1.6
AIP Publishing	278	1.4
IEEE/JPN Soc App Phys	254	1.2
Horizon House Publications	224	1.1
IET/IEE	230	1.1
European Microwave Association	206	1.0
102 others with less than 1% each	903	3.6

NEC Corp

IEEE	7166	40.1
ACM-Assoc Comput Mach	1595	8.9
IEICE-Inst Elec Info Comm Eng	834	4.7
RELX Group (Elsevier)	816	4.6
Springer Nature	680	3.8
Optica Publishing Group	492	2.8
Joint IEEE and ACM	415	2.3
AIP Publishing	354	2.0
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	289	1.6
IET/IEE	235	1.3
The USENIX Association	229	1.3
IEEE/OSA	224	1.3
ACS-Am Chem Soc	222	1.2
International Association for Cryptologic Research (IACR)	195	1.1
Information Processing Society of Japan	199	1.1
Neural Information Processing Systems Foundation	187	1.0
380 others with less than 1% each	3738	18.1

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Nippon Telegraph & Telephone Corp.</i>		
IEEE	6621	42.0
IEICE-Inst Elec Info Comm Eng	1364	8.7
ACM-Assoc Comput Mach	1056	6.7
RELX Group (Elsevier)	555	3.5
Optica Publishing Group	541	3.4
International Association for Cryptologic Research (IACR)	483	3.1
Springer Nature	476	3.0
IET/IEE	381	2.4
IEEE/OSA	298	1.9
Nippon Telephone and Telegraph	285	1.8
The USENIX Association	275	1.7
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	236	1.5
European Conference on Optical Communication (ECOC) Society	232	1.5
Newsweek Publishing LLC	230	1.5
Joint IEEE and ACM	226	1.4
AIP Publishing	168	1.1
234 others with less than 1% each	2337	13.2

Nokia Corporation

IEEE	17048	51.1
ACM-Assoc Comput Mach	2426	7.3
RELX Group (Elsevier)	1333	4.0
Optica Publishing Group	1205	3.6
Springer Nature	1025	3.1
IET/IEE	684	2.1
AIP Publishing	676	2.0
IEEE/OSA	609	1.8
ACS-Am Chem Soc	600	1.8
Joint IEEE and ACM	584	1.8
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	569	1.7
American Physical Society	323	1.0
441 others with less than 1% each	6257	14.7

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Panasonic Holding Corporation</i>		
IEEE	10225	43.1
RELX Group (Elsevier)	2054	8.6
IEICE-Inst Elec Info Comm Eng	1631	6.9
AIP Publishing	1059	4.5
Institute of Pure and Applied Physics	735	3.1
ACS-Am Chem Soc	582	2.5
Springer Nature	565	2.4
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	529	2.2
ACM-Assoc Comput Mach	527	2.2
Electrochemical Society, Inc.	447	1.9
SPIE-Int Soc Opt Engineering	405	1.7
Japan Society of Applied Physics	253	1.1
IET/IEE	242	1.0
423 others with less than 1% each	4496	16.2

Qualcomm Inc

IEEE	42832	62.9
ACM-Assoc Comput Mach	2837	4.2
RELX Group (Elsevier)	2258	3.3
SID-Society for Information Display	1947	2.9
Springer Nature	1684	2.5
SPIE-Int Soc Opt Engineering	1651	2.4
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1349	2.0
IET/IEE	1133	1.7
AIP Publishing	1089	1.6
Joint IEEE and ACM	1027	1.5
421 others with less than 1% each	10287	12.9

Appendix A - Publishers Receiving Most References from Top 50 Companies ***(Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)***

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>RTX Corporation (f/k/a Raytheon Co.)</i>		
NASA-National Aeronautics and Space Admin	9637	17.3
IEEE	7960	14.3
RELX Group (Elsevier)	3834	6.9
IHS Markit	3700	6.6
ASME-Am Soc Mech Eng	3223	5.8
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	2583	4.6
AIAA - American Institute of Aeronautics and Astronautics	2509	4.5
SAE-Society of Automobile Engineers	1830	3.3
SPIE-Int Soc Opt Engineering	1678	3.0
Optica Publishing Group	1593	2.9
Springer Nature	1588	2.8
ACS-Am Chem Soc	1312	2.3
Federal Aviation Administration	878	1.6
AIP Publishing	921	1.6
Cambridge University Press	819	1.5
McGraw Hill	661	1.2
Informa/CRC Press/Taylor & Francis	667	1.2
American Society of Mechanical Engineers	613	1.1
439 others with less than 1% each	9839	14.5

Samsung Electronics Co Ltd

IEEE	22716	33.2
RELX Group (Elsevier)	5486	8.0
ACS-Am Chem Soc	5380	7.9
AIP Publishing	3788	5.5
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	3510	5.1
Springer Nature	3329	4.9
ACM-Assoc Comput Mach	3182	4.6
SID-Society for Information Display	1639	2.4
SPIE-Int Soc Opt Engineering	1385	2.0
Royal Society of Chemistry	1282	1.9
Optica Publishing Group	1275	1.9
Joint IEEE and ACM	1067	1.6
American Physical Society	733	1.1
Audio Eng Soc	711	1.0
669 others with less than 1% each	12957	14.7

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Saudi Arabian Oil Company (Saudi Aramco)</i>		
RELX Group (Elsevier)	13028	28.0
Society of Petroleum Engineers	7900	17.0
ACS-Am Chem Soc	6180	13.3
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	3386	7.3
Springer Nature	2307	5.0
Society of Exploration Geophysicists	2037	4.4
Royal Society of Chemistry	1653	3.6
IEEE	971	2.1
421 others with less than 1% each	9085	16.9
<i>Seiko Epson Corporation</i>		
IEEE	2308	32.9
RELX Group (Elsevier)	594	8.5
ACM-Assoc Comput Mach	465	6.6
AIP Publishing	465	6.6
Joint IEEE and ACM	441	6.3
SID-Society for Information Display	274	3.9
ACS-Am Chem Soc	266	3.8
Springer Nature	229	3.3
Institute of Pure and Applied Physics	156	2.2
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	154	2.2
SPIE-Int Soc Opt Engineering	112	1.6
IP.Com	102	1.5
IBM Corp.	97	1.4
American Physical Society	96	1.4
IEEE/JPN Soc App Phys	91	1.3
IEICE-Inst Elec Info Comm Eng	71	1.0
Optica Publishing Group	71	1.0
187 others with less than 1% each	1019	12.1
<i>Sony Group Corp</i>		
IEEE	13464	43.0
ACM-Assoc Comput Mach	2857	9.1
RELX Group (Elsevier)	2010	6.4
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1259	4.0
ACS-Am Chem Soc	957	3.1
Springer Nature	927	3.0
SPIE-Int Soc Opt Engineering	833	2.7
AIP Publishing	599	1.9
Joint IEEE and ACM	486	1.6
IEICE-Inst Elec Info Comm Eng	472	1.5
Royal Society of Chemistry	298	1.0
479 others with less than 1% each	7167	19.3

Appendix A - Publishers Receiving Most References from Top 50 Companies ***(Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)***

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Taiwan Semiconductor Manufacturing Co.</i>		
IEEE	11460	34.3
AIP Publishing	8381	25.1
RELX Group (Elsevier)	3459	10.4
Electrochemical Society, Inc.	1277	3.8
Institute of Pure and Applied Physics	1053	3.2
IEEE/JPN Soc App Phys	959	2.9
Springer Nature	969	2.9
SPIE-Int Soc Opt Engineering	896	2.7
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	759	2.3
ACS-Am Chem Soc	517	1.5
191 others with less than 1% each	3654	9.9
<i>TCL Corp</i>		
ACS-Am Chem Soc	241	17.6
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	162	11.9
IEEE	157	11.5
AIP Publishing	121	8.9
Royal Society of Chemistry	121	8.9
Springer Nature	109	8.0
ACM-Assoc Comput Mach	78	5.7
RELX Group (Elsevier)	67	4.9
Miller Freeman	26	1.9
Time Inc.	25	1.8
Joint IEEE and ACM	22	1.6
Chemical Society of Japan/Nippon Kagakukai	18	1.3
Ziff-Davis	18	1.3
International Data Group	15	1.1
ACL - Association for Computational Linguistics	14	1.0
SPIE-Int Soc Opt Engineering	14	1.0
73 others with less than 1% each	159	11.9

Appendix A - Publishers Receiving Most References from Top 50 Companies (Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Tencent Holding Ltd</i>		
IEEE	2677	56.9
ACM-Assoc Comput Mach	284	6.0
SPIE-Int Soc Opt Engineering	240	5.1
RELX Group (Elsevier)	194	4.1
Springer Nature	143	3.0
International Telecommunication Union	115	2.4
arXiv.org	113	2.4
IEEE/CVF	81	1.7
Neural Information Processing Systems Foundation	65	1.4
IEEE/SPIE	64	1.4
Cambridge University Press	59	1.3
ISCA (Int Speech Comm Association)	56	1.2
ACL - Association for Computational Linguistics	52	1.1
Joint IEEE and ACM	52	1.1
104 others with less than 1% each	507	9.3
<i>Texas Instruments Inc</i>		
IEEE	10092	68.6
RELX Group (Elsevier)	643	4.4
AIP Publishing	545	3.7
Joint IEEE and ACM	324	2.2
SPIE-Int Soc Opt Engineering	302	2.1
IET/IEE	246	1.7
IEEE/JPN Soc App Phys	244	1.7
ACM-Assoc Comput Mach	226	1.5
Springer Nature	223	1.5
SID-Society for Information Display	159	1.1
212 others with less than 1% each	1707	8.9
<i>Toshiba Corp</i>		
IEEE	8160	39.9
AIP Publishing	1679	8.2
RELX Group (Elsevier)	1566	7.7
IEEE/JPN Soc App Phys	694	3.4
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	700	3.4
Springer Nature	681	3.3
American Physical Society	555	2.7
ACM-Assoc Comput Mach	480	2.3
IEICE-Inst Elec Info Comm Eng	464	2.3
SPIE-Int Soc Opt Engineering	457	2.2
ACS-Am Chem Soc	410	2.0
Institute of Pure and Applied Physics	359	1.8
Electrochemical Society, Inc.	217	1.1
Joint IEEE and ACM	218	1.1
Japan Society of Applied Physics	206	1.0
378 others with less than 1% each	3598	14.3

Appendix A - Publishers Receiving Most References from Top 50 Companies ***(Top 50 Companies in terms of 2024 Patent Activity; References from 2005-2024 Patents)***

<i>Publisher</i>	<i># Pat Refs to:</i>	<i>Percent of Total</i>
<i>Toyota Motor Corp</i>		
IEEE	4304	24.0
RELX Group (Elsevier)	2972	16.6
Springer Nature	1241	6.9
John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1095	6.1
ACS-Am Chem Soc	925	5.2
AIP Publishing	428	2.4
American Society of Plant Biologists	394	2.2
ACM-Assoc Comput Mach	382	2.1
IEEE/CVF	352	2.0
AAAS-Am Assoc Advancement Sci	322	1.8
Royal Society of Chemistry	287	1.6
SAE-Society of Automobile Engineers	273	1.5
Electrochemical Society, Inc.	269	1.5
Optica Publishing Group	260	1.5
Natl Acad Sciences	227	1.3
arXiv.org	172	1.0
349 others with less than 1% each	4008	19.8

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Artificial Intelligence and Machine Learning</i>										
1	Alphabet Inc.	8898	26987	33.0	IEEE	8898	33.0	Neural Information Processing Systems Foundation	2420	9.0
2	International Business Machi	6661	25606	26.0	IEEE	6661	26.0	ACM-Assoc Comput Mach	2880	11.2
3	Microsoft Corporation	5705	19450	29.3	IEEE	5705	29.3	ACM-Assoc Comput Mach	3543	18.2
4	Adobe Inc. (former Adobe Sy	4249	11156	38.1	IEEE	4249	38.1	ACM-Assoc Comput Mach	1859	16.7
5	Samsung Electronics Co Ltd	2620	5549	47.2	IEEE	2620	47.2	ACM-Assoc Comput Mach	297	5.4
6	STRONG FORCE IOT PORT	2281	3184	71.6	IEEE	2281	71.6	RELX Group (Elsevier)	285	9.0
7	Apple Inc	2117	6414	33.0	IEEE	2117	33.0	ACM-Assoc Comput Mach	1143	17.8
8	NVIDIA Corp.	2091	4972	42.1	IEEE	2091	42.1	ACM-Assoc Comput Mach	456	9.2
9	Magic Leap Inc	1682	2831	59.4	IEEE	1682	59.4	Neural Information Processing Systems Foundation	238	8.4
10	Amazon.com Inc.	1631	4597	35.5	IEEE	1631	35.5	ACM-Assoc Comput Mach	514	11.2
11	Intel Corporation	1548	3778	41.0	IEEE	1548	41.0	ACM-Assoc Comput Mach	442	11.7
12	Meta Platforms Inc.(formerly	1399	5455	25.6	IEEE	1399	25.6	ACM-Assoc Comput Mach	879	16.1
13	The Arizona Board of Regent	1089	2515	43.3	IEEE	1089	43.3	ACM-Assoc Comput Mach	219	8.7
14	Brain Corporation	1069	3183	33.6	IEEE	1069	33.6	MIT Press	427	13.4
15	HRL Laboratories LLC	1053	2788	37.8	IEEE	1053	37.8	RELX Group (Elsevier)	239	8.6
16	Baidu Inc	1009	3520	28.7	IEEE	1009	28.7	arXiv.org	909	25.8
17	Salesforce Inc. (f/k/a Salesfor	1008	4378	23.0	IEEE	1008	23.0	ACL - Association for Computational Linguistics	910	20.8
18	Toyota Motor Corp	986	1946	50.7	IEEE	986	50.7	IEEE/CVF	186	9.6
19	Honda Motor Co. Ltd.(Honda	972	1786	54.4	IEEE	972	54.4	IEEE/CVF	107	6.0
20	STRONG FORCE TX PORT	966	2208	43.8	IEEE	966	43.8	RELX Group (Elsevier)	398	18.0
21	Siemens Aktiengesellschaft	916	3017	30.4	IEEE	916	30.4	RELX Group (Elsevier)	398	13.2
22	Qualcomm Inc	845	2229	37.9	IEEE	845	37.9	Springer Nature	205	9.2
23	Oracle Corporation	815	5020	16.2	ACL - Association for Computational Linguist	889	17.7	IEEE	815	16.2
24	Xperi Inc. (f/k/a Tessera Inc)	814	1611	50.5	IEEE	814	50.5	Joint IEEE and ACM	202	12.5
25	NUMENTA INC	788	3295	23.9	Numenta Inc.	1198	36.4	IEEE	788	23.9
26	UATC LLC	678	1156	58.7	IEEE	678	58.7	IEEE/CVF	159	13.8
27	Bosch (Robert) GmbH	652	1548	42.1	IEEE	652	42.1	Neural Information Processing Systems Foundation	103	6.7
28	NEWVALUEXCHANGE LT	652	1858	35.1	IEEE	652	35.1	ACM-Assoc Comput Mach	420	22.6
29	STMicroelectronics	631	998	63.2	IEEE	631	63.2	Joint IEEE and ACM	78	7.8
30	Cisco Systems Inc.	630	1825	34.5	IEEE	630	34.5	ACM-Assoc Comput Mach	246	13.5
31	Cortica Ltd	606	919	65.9	IEEE	606	65.9	ACM-Assoc Comput Mach	111	12.1
32	STATS LLC	605	1177	51.4	IEEE	605	51.4	arXiv.org	97	8.2
33	NEC Corp	587	1749	33.6	IEEE	587	33.6	ACM-Assoc Comput Mach	186	10.6
34	Huawei Technologies Compa	583	1546	37.7	IEEE	583	37.7	arXiv.org	169	10.9
35	University of Alabama	537	699	76.8	IEEE	537	76.8	RELX Group (Elsevier)	31	4.4
36	GE Aerospace (f/k/a General	526	972	54.1	IEEE	526	54.1	RELX Group (Elsevier)	83	8.5
37	Massachusetts Institute of Te	508	3109	16.3	Springer Nature	579	18.6	IEEE	508	16.3
38	DIVEPLANE CORP	483	1902	25.4	IEEE	483	25.4	Springer Nature	240	12.6
39	Micron Technology Inc.	469	859	54.6	IEEE	469	54.6	ACM-Assoc Comput Mach	74	8.6

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Cambricon Technologies Co	459	1397	32.9	IEEE	459	32.9	ACM-Assoc Comput Mach	433	31.0
41	University of California	458	2796	16.4	IEEE	458	16.4	Springer Nature	400	14.3
42	CapitalOne	439	1501	29.2	IEEE	439	29.2	RELX Group (Elsevier)	150	10.0
43	Tencent Holding Ltd	435	958	45.4	IEEE	435	45.4	arXiv.org	66	6.9
44	Sony Group Corp	430	1004	42.8	IEEE	430	42.8	ACM-Assoc Comput Mach	84	8.4
45	RTX Corporation (f/k/a Rayt	423	926	45.7	IEEE	423	45.7	RELX Group (Elsevier)	70	7.6
46	Columbia University	417	1263	33.0	IEEE	417	33.0	ACM-Assoc Comput Mach	149	11.8
47	Nokia Corporation	415	774	53.6	IEEE	415	53.6	ACM-Assoc Comput Mach	71	9.2
48	TuSimple	407	708	57.5	IEEE	407	57.5	arXiv.org	80	11.3
49	Koninklijke Philips N.V.	403	1174	34.3	IEEE	403	34.3	RELX Group (Elsevier)	137	11.7
50	Xerox Corp	395	1302	30.3	IEEE	395	30.3	ACM-Assoc Comput Mach	135	10.4
51	IP RESERVOIR LLC	376	705	53.3	IEEE	376	53.3	ACM-Assoc Comput Mach	107	15.2
52	Fujitsu Limited	371	1183	31.4	IEEE	371	31.4	ACM-Assoc Comput Mach	137	11.6
53	SAS Institute	370	1499	24.7	IEEE	370	24.7	RELX Group (Elsevier)	195	13.0
54	Canon Inc	359	769	46.7	IEEE	359	46.7	RELX Group (Elsevier)	46	6.0
55	Snap Inc	358	856	41.8	IEEE	358	41.8	ACM-Assoc Comput Mach	146	17.1
56	Illumina Inc.	351	1700	20.6	Springer Nature	450	26.5	IEEE	351	20.6
57	SRI International	335	901	37.2	IEEE	335	37.2	Neural Information Processing Systems Foundation	61	6.8
58	CARTICA AI LTD	334	515	64.9	IEEE	334	64.9	ACM-Assoc Comput Mach	60	11.7
59	eBay Inc	331	713	46.4	IEEE	331	46.4	ACM-Assoc Comput Mach	126	17.7
60	NEURALA INC	328	726	45.2	IEEE	328	45.2	RELX Group (Elsevier)	72	9.9
61	Naver Corp.	322	702	45.9	IEEE	322	45.9	ACL - Association for Computational Linguistics	87	12.4
62	Twitter Inc	318	459	69.3	IEEE	318	69.3	RELX Group (Elsevier)	27	5.9
63	Accenture Ltd.	311	1115	27.9	IEEE	311	27.9	ACM-Assoc Comput Mach	161	14.4
64	Battelle Memorial Institute	310	535	57.9	IEEE	310	57.9	RELX Group (Elsevier)	47	8.8
65	Walt Disney Co.	298	993	30.0	IEEE	298	30.0	ACM-Assoc Comput Mach	247	24.9
66	CEREBRAS SYSTEMS INC	297	598	49.7	IEEE	297	49.7	Joint IEEE and ACM	96	16.1
67	Western Digital Corp.	297	754	39.4	IEEE	297	39.4	Joint IEEE and ACM	131	17.4
68	PINDROP SECURITY INC	295	521	56.6	IEEE	295	56.6	ISCA (Int Speech Comm Association)	95	18.2
69	Spotify AB	294	671	43.8	IEEE	294	43.8	International Society for Music Information Retrieval Conferen	102	15.2
70	Hewlett Packard Enterprises	280	691	40.5	IEEE	280	40.5	ACM-Assoc Comput Mach	106	15.3
71	Cornell University	278	1905	14.6	IEEE	278	14.6	RELX Group (Elsevier)	261	13.7
72	COGNIZANT TECHNOLOG	268	1375	19.5	IEEE	268	19.5	ACM-Assoc Comput Mach	252	18.3
73	AUTOBRAINS TECHNOLO	265	405	65.4	IEEE	265	65.4	ACM-Assoc Comput Mach	37	9.1
74	Ohio State University	261	397	65.7	IEEE	261	65.7	RELX Group (Elsevier)	24	6.0
75	Sap SE	258	972	26.5	IEEE	258	26.5	ACM-Assoc Comput Mach	133	13.7
76	Stanford University	258	1678	15.4	Springer Nature	311	18.5	IEEE	258	15.4
77	23ANDME INC	253	6180	4.1	Cell Press	1252	20.3	Springer Nature	915	14.8
78	AT&T Inc	253	752	33.6	IEEE	253	33.6	ACM-Assoc Comput Mach	161	21.4
79	BERTEC CORP	246	375	65.6	IEEE	246	65.6	Institute for Scientific and Engineering Research (ISER)	45	12.0
80	Dell Technologies Inc	244	743	32.8	IEEE	244	32.8	ACM-Assoc Comput Mach	95	12.8

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Toshiba Corp	240	500	48.0	IEEE	240	48.0	Springer Nature	33	6.6
82	Purdue University	233	572	40.7	IEEE	233	40.7	ACM-Assoc Comput Mach	95	16.6
83	Tobii Ab	227	387	58.7	IEEE	227	58.7	ACM-Assoc Comput Mach	22	5.7
84	LIGHTTELLIGENCE PTE LT	224	2002	11.2	Springer Nature	479	23.9	Optica Publishing Group	352	17.6
85	ASAPP INC	221	1065	20.8	IEEE	221	20.8	ACL - Association for Computational Linguistics	183	17.2
86	INCEPTION INSTITUTE OF	221	348	63.5	IEEE	221	63.5	IEEE/CVF	37	10.6
87	Boeing Co. (The)	219	627	34.9	IEEE	219	34.9	RELX Group (Elsevier)	81	12.9
88	University of Illinois	212	851	24.9	IEEE	212	24.9	ACM-Assoc Comput Mach	87	10.2
89	Korea Advanced Institute for	211	453	46.6	IEEE	211	46.6	arXiv.org	49	10.8
90	D-Wave Quantum Inc. (forme	210	1038	20.2	IEEE	210	20.2	International Machine Learning Society (IMLS)	145	14.0
91	University of Tennessee Rese	208	548	38.0	IEEE	208	38.0	RELX Group (Elsevier)	81	14.8
92	SK Hynix Inc	205	408	50.2	IEEE	205	50.2	arXiv.org	33	8.1
93	DIGITAL GLOBAL SYSTE	202	202	100.0	IEEE	202	100.0			
94	INAIT SA	201	1716	11.7	Springer Nature	344	20.0	RELX Group (Elsevier)	277	16.1
95	Intellective AI Inc (f/k/a Omn	201	246	81.7	IEEE	201	81.7	International Association for Pattern Recognition (IAPR)	26	10.6
96	EMOTIONAL PERCEPTIO	197	314	62.7	IEEE	197	62.7	Springer Nature	20	6.4
97	University of South Florida	191	410	46.6	IEEE	191	46.6	RELX Group (Elsevier)	44	10.7
98	VEKTOR MEDICAL INC	188	746	25.2	IEEE	188	25.2	RELX Group (Elsevier)	164	22.0
99	Ford Motor Co.	181	371	48.8	IEEE	181	48.8	RELX Group (Elsevier)	26	7.0
100	Johnson Controls Internationa	180	828	21.7	RELX Group (Elsevier)	241	29.1	ACM-Assoc Comput Mach	213	25.7

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Autonomous Vehicles</i>										
1	Irobot Corp	1761	3372	52.2	IEEE	1761	52.2	SPIE-Int Soc Opt Engineering	429	12.7
2	TuSimple	1324	2195	60.3	IEEE	1324	60.3	arXiv.org	182	8.3
3	Amazon.com Inc.	931	1514	61.5	IEEE	931	61.5	SAGE Publications Ltd	91	6.0
4	NVIDIA Corp.	775	1467	52.8	IEEE	775	52.8	SAE-Society of Automobile Engineers	183	12.5
5	UATC LLC	764	1219	62.7	IEEE	764	62.7	IEEE/CVF	95	7.8
6	State Farm Mutual Automobi	702	2198	31.9	IEEE	702	31.9	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	134	6.1
7	Alphabet Inc.	665	1267	52.5	IEEE	665	52.5	IEEE/RSJ	78	6.2
8	Honda Motor Co. Ltd.(Honda	332	680	48.8	IEEE	332	48.8	RELX Group (Elsevier)	39	5.7
9	Walmart Stores Inc	320	893	35.8	IEEE	320	35.8	CBS Interactive	92	10.3
10	Toyota Motor Corp	318	585	54.4	IEEE	318	54.4	IEEE/RSJ	35	6.0
11	CARTICA AI LTD	310	477	65.0	IEEE	310	65.0	ACM-Assoc Comput Mach	55	11.5
12	Nio Co. Ltd	302	572	52.8	IEEE	302	52.8	CBS Interactive	40	7.0
13	FedEx Corp	290	565	51.3	IEEE	290	51.3	RELX Group (Elsevier)	78	13.8
14	MOTIONAL AD LLC	256	537	47.7	IEEE	256	47.7	SAE-Society of Automobile Engineers	57	10.6
15	Ford Motor Co.	245	457	53.6	IEEE	245	53.6	RELX Group (Elsevier)	33	7.2
16	Intel Corporation	235	647	36.3	IEEE	235	36.3	Neural Information Processing Systems Foundation	54	8.3
17	Aptiv Plc (former Delphi Aut	230	447	51.5	IEEE	230	51.5	RELX Group (Elsevier)	34	7.6
18	Nissan Motor Co. Ltd.	174	260	66.9	IEEE	174	66.9	International Joint Conferences on Artificial Intelligence	17	6.5
19	Siemens Aktiengesellschaft	173	264	65.5	IEEE	173	65.5	Springer Nature	21	8.0
20	Baidu Inc	170	266	63.9	IEEE	170	63.9	RELX Group (Elsevier)	16	6.0
21	NURO INC	168	286	58.7	IEEE	168	58.7	Neural Information Processing Systems Foundation	18	6.3
22	AURORA OPERATIONS IN	154	258	59.7	IEEE	154	59.7	International Machine Learning Society (IMLS)	13	5.0
23	Uber Technologies Inc	154	258	59.7	IEEE	154	59.7	RELX Group (Elsevier)	12	4.7
24	International Business Machi	153	654	23.4	IEEE	153	23.4	IP.Com	112	17.1
25	AUTOBRAINS TECHNOLO	147	225	65.3	IEEE	147	65.3	ACM-Assoc Comput Mach	20	8.9
26	Brain Corporation	140	309	45.3	IEEE	140	45.3	Springer Nature	30	9.7
27	Bosch (Robert) GmbH	132	206	64.1	IEEE	132	64.1	IEEE/RSJ	14	6.8
28	HRL Laboratories LLC	132	251	52.6	IEEE	132	52.6	IEEE/RSJ	17	6.8
29	Boeing Co. (The)	124	287	43.2	IEEE	124	43.2	IEEE/RSJ	17	5.9
30	Zebra Technologies Corp.	115	236	48.7	IEEE	115	48.7	ACM-Assoc Comput Mach	21	8.9
31	TRIFO INC	109	145	75.2	IEEE	109	75.2	SAGE Publications Ltd	30	20.7
32	DIVEPLANE CORP	107	454	23.6	IEEE	107	23.6	Springer Nature	67	14.8
33	APEX ARTIFICIAL INTELL	106	361	29.4	IEEE	106	29.4	RELX Group (Elsevier)	52	14.4
34	Renault SA	104	156	66.7	IEEE	104	66.7	International Joint Conferences on Artificial Intelligence	11	7.1
35	Allstate Corp	95	215	44.2	IEEE	95	44.2	ACM-Assoc Comput Mach	21	9.8
36	IFLIGHT Innovation Technol	95	206	46.1	IEEE	95	46.1	AIAA - American Institute of Aeronautics and Astronautics	22	10.7
37	University of Pennsylvania	93	180	51.7	IEEE	93	51.7	Springer Nature	15	8.3
38	University of Massachusetts	90	141	63.8	IEEE	90	63.8	International Joint Conferences on Artificial Intelligence	16	11.3
39	General Motors Corp	88	146	60.3	IEEE	88	60.3	RELX Group (Elsevier)	10	6.8

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	MAY MOBILITY INC	82	102	80.4	IEEE	82	80.4	IEEE/RSJ	20	19.6
41	California Institute of Techno	81	202	40.1	IEEE	81	40.1	IEEE/RSJ	13	6.4
42	SPHERO INC	79	82	96.3	IEEE	79	96.3	American Automatic Control Council (AACC)	3	3.7
43	University of California	77	131	58.8	IEEE	77	58.8	arXiv.org	13	9.9
44	PELOTON TECHNOLOGY I	72	153	47.1	IEEE	72	47.1	American Automatic Control Council (AACC)	21	13.7
45	GECKO ROBOTICS INC	67	126	53.2	IEEE	67	53.2	IEEE/RSJ	23	18.3
46	THE CHAMBERLAIN GRO	65	185	35.1	IEEE	65	35.1	International Association for Cryptologic Research (IACR)	30	16.2
47	Huawei Technologies Compa	61	102	59.8	IEEE	61	59.8	IEEE/RSJ	9	8.8
48	PERCEPTIVE AUTOMATA	60	94	63.8	IEEE	60	63.8	Neural Information Processing Systems Foundation	22	23.4
49	INTOUCH HEALTH INC	55	156	35.3	IEEE	55	35.3	IEEE/RSJ	16	10.3
50	NEC Corp	46	75	61.3	IEEE	46	61.3	European Conference on Computer Vision-Google/Microsoft	7	9.3
51	Deka Products LP	45	88	51.1	IEEE	45	51.1	IEEE/RSJ	6	6.8
52	PLUSAI INC	44	87	50.6	IEEE	44	50.6	Springer Nature	10	11.5
53	CYBERNET SYSTEMS CO	43	67	64.2	IEEE	43	64.2	SPIE-Int Soc Opt Engineering	6	9.0
54	Garrett Motion (f/k/a Garrett	43	149	28.9	SAE-Society of Automobile Engineers	48	32.2	IEEE	43	28.9
55	Qualcomm Inc	43	78	55.1	IEEE	43	55.1	SAGE Publications Ltd	6	7.7
56	AT&T Inc	41	99	41.4	IEEE	41	41.4	RELX Group (Elsevier)	19	19.2
57	GATIK AI INC	41	52	78.8	IEEE	41	78.8	American Automatic Control Council (AACC)	10	19.2
58	STARSHIP TECHNOLOGIE	41	81	50.6	IEEE	41	50.6	RELX Group (Elsevier)	9	11.1
59	Massachusetts Institute of Te	40	105	38.1	IEEE	40	38.1	RELX Group (Elsevier)	12	11.4
60	Digimarc Corp.	39	96	40.6	IEEE	39	40.6	ACM-Assoc Comput Mach	14	14.6
61	University of Michigan	39	69	56.5	IEEE	39	56.5	RELX Group (Elsevier)	7	10.1
62	Hyundai Motor Co.	38	63	60.3	IEEE	38	60.3	Springer Nature	2	3.2
63	Zhejiang Geely Holding Grou	38	56	67.9	IEEE	38	67.9	Springer Nature	5	8.9
64	Kia Motors Corp.	36	61	59.0	IEEE	36	59.0	Informa/CRC Press/Taylor & Francis	2	3.3
65	Micron Technology Inc.	36	75	48.0	IEEE	36	48.0	ACM-Assoc Comput Mach	7	9.3
66	Apple Inc	35	103	34.0	IEEE	35	34.0	ACM-Assoc Comput Mach	18	17.5
67	AUTONOMOUS SOLUTIO	35	99	35.4	IEEE	35	35.4	American Automatic Control Council (AACC)	18	18.2
68	Brown University Research F	34	63	54.0	IEEE	34	54.0	RELX Group (Elsevier)	12	19.0
69	Duke University	34	63	54.0	IEEE	34	54.0	RELX Group (Elsevier)	12	19.0
70	Here Global BV	34	60	56.7	IEEE	34	56.7	RELX Group (Elsevier)	7	11.7
71	Toshiba Corp	34	57	59.6	IEEE	34	59.6	European Conference on Computer Vision-Google/Microsoft	7	12.3
72	Deere & Co.	32	80	40.0	IEEE	32	40.0	IP.Com	9	11.3
73	University of Illinois	32	73	43.8	IEEE	32	43.8	RELX Group (Elsevier)	8	11.0
74	INDIVIDUAL PATENTER	29	39	74.4	IEEE	29	74.4	Springer Nature	3	7.7
75	Porsche Automobil Holding S	29	41	70.7	IEEE	29	70.7	RELX Group (Elsevier)	2	4.9
76	STRADVISION INC	29	47	61.7	IEEE	29	61.7	IEEE/CVF	5	10.6
77	Lockheed Martin Corp.	28	549	5.1	American Physical Society	99	18.0	Springer Nature	99	18.0
78	ROBART GMBH	28	47	59.6	IEEE	28	59.6	Joint IEEE and ACM	17	36.2
79	Samsung Electronics Co Ltd	27	40	67.5	IEEE	27	67.5	European Conference on Computer Vision-Google/Microsoft	2	5.0
80	TELADOC HEALTH INC	27	81	33.3	IEEE	27	33.3	IEEE/RSJ	8	9.9

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Stanford University	26	46	56.5	IEEE	26	56.5	Neural Information Processing Systems Foundation	3	6.5
82	NODAR INC	24	31	77.4	IEEE	24	77.4	FORBES INC	2	6.5
83	Mitsubishi Electric Corp	23	36	63.9	IEEE	23	63.9	RELX Group (Elsevier)	5	13.9
84	Oshkosh Corporation	23	29	79.3	IEEE	23	79.3	SAE-Society of Automobile Engineers	2	6.9
85	RTX Corporation (f/k/a Rayt	23	57	40.4	IEEE	23	40.4	SPIE-Int Soc Opt Engineering	12	21.1
86	Wipro Ltd	23	35	65.7	IEEE	23	65.7	RELX Group (Elsevier)	4	11.4
87	AUTOMATED TIRE INC	22	26	84.6	IEEE	22	84.6	IEEE/RSJ	2	7.7
88	CAVH LLC	22	47	46.8	IEEE	22	46.8	SAE-Society of Automobile Engineers	15	31.9
89	EPISYS SCIENCE INC	22	48	45.8	IEEE	22	45.8	JOHNS HOPKINS UNIV, APPLIED PHYSICS LABORATO	6	12.5
90	LG Electronics Inc.	22	30	73.3	IEEE	22	73.3	Multidisciplinary Digital Publishing Institute (MDPI)	3	10.0
91	The Arizona Board of Regent	22	49	44.9	IEEE	22	44.9	Joint IEEE and ACM	6	12.2
92	AFFECTIVA INC	21	43	48.8	IEEE	21	48.8	Springer Nature	7	16.3
93	Aviation Industry Corporatio	21	35	60.0	IEEE	21	60.0	SAE-Society of Automobile Engineers	13	37.1
94	BLUEOWL LLC	21	31	67.7	IEEE	21	67.7	USC Annenberg School for Communication & Journalism	3	9.7
95	COGNATA LTD	21	26	80.8	IEEE	21	80.8	SAE-Society of Automobile Engineers	3	11.5
96	HANGZHOU ZERO ZERO	20	26	76.9	IEEE	20	76.9	SAGE Publications Ltd	4	15.4
97	PERCEPTIN SHENZHEN L	20	27	74.1	IEEE	20	74.1	Society for Industrial and Applied Mathematics	3	11.1
98	Fujitsu Limited	19	31	61.3	IEEE	19	61.3	RELX Group (Elsevier)	2	6.5
99	Panasonic Holding Corporati	19	27	70.4	IEEE	19	70.4	IEEE/RSJ	2	7.4
100	Rockwell Automation Inc	19	25	76.0	IEEE	19	76.0	SAGE Publications Ltd	4	16.0

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Blockchain/Distributed Ledger</i>										
1	Ant Group (ANT Financial S	524	980	53.5	IEEE	524	53.5	ACM-Assoc Comput Mach	83	8.5
2	International Business Machi	452	1356	33.3	IEEE	452	33.3	IP.Com	290	21.4
3	NCHAIN LICENSING AG	291	1003	29.0	IEEE	291	29.0	O'Reilly Media	151	15.1
4	STRONG FORCE TX PORT	248	549	45.2	IEEE	248	45.2	RELX Group (Elsevier)	92	16.8
5	INVENIAM CAPITAL PAR	188	274	68.6	IEEE	188	68.6	Dow Jones & Company	36	13.1
6	Hewlett Packard Enterprises	137	280	48.9	IEEE	137	48.9	ACM-Assoc Comput Mach	50	17.9
7	Cisco Systems Inc.	118	183	64.5	IEEE	118	64.5	The USENIX Association	21	11.5
8	Alibaba Group Holding Ltd	103	219	47.0	IEEE	103	47.0	ACM-Assoc Comput Mach	34	15.5
9	Salesforce Inc. (f/k/a Salesfor	90	100	90.0	IEEE	90	90.0	Springer Nature	5	5.0
10	nChain Holdings Ltd	85	291	29.2	IEEE	85	29.2	GitHub.com	60	20.6
11	IP RESERVOIR LLC	84	147	57.1	IEEE	84	57.1	ACM-Assoc Comput Mach	27	18.4
12	eBay Inc	71	132	53.8	IEEE	71	53.8	RELX Group (Elsevier)	18	13.6
13	Bank of America Corp.	69	128	53.9	IEEE	69	53.9	New York Times	20	15.6
14	BT Group PLC	65	171	38.0	IEEE	65	38.0	RELX Group (Elsevier)	25	14.6
15	MasterCard Inc	65	155	41.9	IEEE	65	41.9	ACM-Assoc Comput Mach	20	12.9
16	State Farm Mutual Automobi	57	101	56.4	IEEE	57	56.4	RELX Group (Elsevier)	11	10.9
17	Microsoft Corporation	50	142	35.2	IEEE	50	35.2	ACM-Assoc Comput Mach	37	26.1
18	Dell Technologies Inc	46	122	37.7	IEEE	46	37.7	ACM-Assoc Comput Mach	39	32.0
19	AMERICORP INVESTMEN	42	51	82.4	IEEE	42	82.4	IOP Publishing	2	3.9
20	ELUVIO INC	42	149	28.2	IEEE	42	28.2	ACM-Assoc Comput Mach	27	18.1
21	Accenture Ltd.	37	195	19.0	ACM-Assoc Comput Mach	61	31.3	Springer Nature	43	22.1
22	EYGS LLP	37	137	27.0	IEEE	37	27.0	International Association for Cryptologic Research (IACR)	27	19.7
23	NXGEN PARTNERS IP LLC	35	109	32.1	Optica Publishing Group	39	35.8	IEEE	35	32.1
24	Wells Fargo & Co	35	66	53.0	IEEE	35	53.0	Informa/CRC Press/Taylor & Francis	14	21.2
25	FACTOM INC	33	43	76.7	IEEE	33	76.7	Dow Jones & Company	10	23.3
26	NEC Corp	33	119	27.7	ACM-Assoc Comput Mach	44	37.0	IEEE	33	27.7
27	Oracle Corporation	33	102	32.4	IEEE	33	32.4	ACM-Assoc Comput Mach	19	18.6
28	INDIVIDUAL PATENTER	31	41	75.6	IEEE	31	75.6	International Association for Cryptologic Research (IACR)	4	9.8
29	Juniper Networks Inc.	30	34	88.2	IEEE	30	88.2	IEEE/Eurasip	1	2.9
30	BLOCKCHAIN ASICS INC	29	30	96.7	IEEE	29	96.7	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1	3.3
31	Intel Corporation	29	66	43.9	IEEE	29	43.9	ACM-Assoc Comput Mach	21	31.8
32	VERONA HOLDINGS SEZC	29	33	87.9	IEEE	29	87.9	Springer Nature	4	12.1
33	JINAN UNIVERSITY	25	43	58.1	IEEE	25	58.1	ACM-Assoc Comput Mach	5	11.6
34	LO3 ENERGY INC	25	89	28.1	RELX Group (Elsevier)	46	51.7	IEEE	25	28.1
35	FACETEC INC	23	28	82.1	IEEE	23	82.1	RELX Group (Elsevier)	2	7.1
36	CapitalOne	22	44	50.0	IEEE	22	50.0	ACM-Assoc Comput Mach	5	11.4
37	Ericsson	22	34	64.7	IEEE	22	64.7	ACM-Assoc Comput Mach	3	8.8
38	Micron Technology Inc.	22	31	71.0	IEEE	22	71.0	Joint IEEE and ACM	4	12.9
39	Nokia Corporation	22	45	48.9	IEEE	22	48.9	The USENIX Association	4	8.9

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Visa Inc	21	82	25.6	ACM-Assoc Comput Mach	25	30.5	IEEE	21	25.6
41	COGNITIVE SCALE INC	20	52	38.5	IEEE	20	38.5	Very Large Data Base Endowment Inc. (VLDB Endowment)	8	15.4
42	EQUITY SHIFT INC	20	20	100.0	IEEE	20	100.0			
43	MILESTONE ENTERTAIN	20	56	35.7	IEEE	20	35.7	The USENIX Association	11	19.6
44	SYMBIONT IO INC	20	54	37.0	IEEE	20	37.0	ACM-Assoc Comput Mach	11	20.4
45	University of South Florida	20	22	90.9	IEEE	20	90.9	Joint IEEE and ACM	1	4.5
46	LEDGERDOMAIN INC	19	127	15.0	National Institute of Standards and Technolog	36	28.3	US Department of Health and Human Services	24	18.9
47	Meta Platforms Inc.(formerly	19	135	14.1	ACM-Assoc Comput Mach	53	39.3	International Association for Cryptologic Research (IACR)	20	14.8
48	Emerson Electric Co.	18	28	64.3	IEEE	18	64.3	Springer Nature	5	17.9
49	Sony Group Corp	18	21	85.7	IEEE	18	85.7	IFIP - International Federation for Information Processing	1	4.8
50	Causam Enterprises (former	17	30	56.7	IEEE	17	56.7	RELX Group (Elsevier)	4	13.3
51	WORLDPAY LLC	17	23	73.9	IEEE	17	73.9	Informa/CRC Press/Taylor & Francis	3	13.0
52	AT&T Inc	16	28	57.1	IEEE	16	57.1	ACM-Assoc Comput Mach	4	14.3
53	R3 LTD	16	54	29.6	International Association for Cryptologic Rese	18	33.3	IEEE	16	29.6
54	Block Inc. (formerSquare Inc)	15	23	65.2	IEEE	15	65.2	Gardner Publications, Inc.	3	13.0
55	DIGITAL ASSET (SWITZER	15	24	62.5	IEEE	15	62.5	O'Reilly Media	3	12.5
56	THE VANGUARD GROUP I	15	32	46.9	IEEE	15	46.9	ACM-Assoc Comput Mach	6	18.8
57	THETA LABS INC	15	16	93.8	IEEE	15	93.8	ACM-Assoc Comput Mach	1	6.3
58	Forcepoint LLC	14	20	70.0	IEEE	14	70.0	Microsoft	3	15.0
59	Broadcom Ltd	13	20	65.0	IEEE	13	65.0	The USENIX Association	2	10.0
60	Sap SE	13	28	46.4	IEEE	13	46.4	World Wide Web Consortium	2	7.1
61	City University of New York	12	15	80.0	IEEE	12	80.0	Informa/CRC Press/Taylor & Francis	1	6.7
62	GENESYS CLOUD SERVIC	12	17	70.6	IEEE	12	70.6	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	4	23.5
63	JPMorgan	12	27	44.4	IEEE	12	44.4	ACL - Association for Computational Linguistics	4	14.8
64	MASSACHUSETTS MUTU	12	15	80.0	IEEE	12	80.0	IFIP - International Federation for Information Processing	1	6.7
65	T-Mobile USA INC	12	17	70.6	IEEE	12	70.6	IBM Corp.	3	17.6
66	TRANSACTIVE GRID INC	12	46	26.1	RELX Group (Elsevier)	27	58.7	IEEE	12	26.1
67	Amazon.com Inc.	11	38	28.9	IEEE	11	28.9	ACM-Assoc Comput Mach	11	28.9
68	ANCHOR LABS INC	11	30	36.7	IEEE	11	36.7	Condé Nast	10	33.3
69	Baidu Inc	11	18	61.1	IEEE	11	61.1	RELX Group (Elsevier)	2	11.1
70	Boeing Co. (The)	11	18	61.1	IEEE	11	61.1	IP.Com	3	16.7
71	Cornell University	11	51	21.6	International Association for Cryptologic Rese	17	33.3	IEEE	11	21.6
72	Huawei Technologies Compa	11	23	47.8	IEEE	11	47.8	ACM-Assoc Comput Mach	5	21.7
73	MOX-SPEEDCHAIN LLC	11	11	100.0	IEEE	11	100.0			
74	Siemens Aktiengesellschaft	11	33	33.3	ACM-Assoc Comput Mach	12	36.4	IEEE	11	33.3
75	3DNS INC	10	11	90.9	IEEE	10	90.9	Joint IEEE and ACM	1	9.1
76	ALCHEMY INSIGHTS INC	10	30	33.3	IEEE	10	33.3	ACM-Assoc Comput Mach	8	26.7
77	Experian Plc	10	64	15.6	Dow Jones & Company	15	23.4	IEEE	10	15.6
78	NUMERAIRE FINANCIAL I	10	56	17.9	ACL - Association for Computational Linguist	14	25.0	IEEE	10	17.9
79	Panasonic Holding Corporati	10	58	17.2	International Association for Cryptologic Rese	13	22.4	IEEE	10	17.2
80	Tencent Holding Ltd	10	15	66.7	IEEE	10	66.7	IEICE-Inst Elec Info Comm Eng	2	13.3

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	THE BANK OF NEW YORK	10	14	71.4	IEEE	10	71.4	IEICE-Inst Elec Info Comm Eng	1	7.1
82	THE TORONTO-DOMINIO	10	38	26.3	IEEE	10	26.3	World Wide Web Consortium	10	26.3
83	American Express Co.	9	22	40.9	IEEE	9	40.9	ACM-Assoc Comput Mach	6	27.3
84	BRAVE SOFTWARE INC	9	18	50.0	IEEE	9	50.0	International Association for Cryptologic Research (IACR)	4	22.2
85	CIRCLESX LLC	9	86	10.5	RELX Group (Elsevier)	13	15.1	FORBES INC	12	14.0
86	CME Group Inc	9	33	27.3	FORBES INC	19	57.6	IEEE	9	27.3
87	Endress+Hauser (Internationa	9	11	81.8	IEEE	9	81.8	IFAC Secretariat	1	9.1
88	Nippon Telegraph & Telepho	9	19	47.4	IEEE	9	47.4	Nippon Telephone and Telegraph	3	15.8
89	SIDE INC	9	18	50.0	ACM-Assoc Comput Mach	9	50.0	IEEE	9	50.0
90	SMARTAXIOM INC	9	10	90.0	IEEE	9	90.0	Joint IEEE and ACM	1	10.0
91	SPEEDCHAIN INC	9	9	100.0	IEEE	9	100.0			
92	United Services Automobile	9	24	37.5	IEEE	9	37.5	ACM-Assoc Comput Mach	5	20.8
93	UnitedHealth Group Inc	9	39	23.1	IEEE	9	23.1	ACM-Assoc Comput Mach	6	15.4
94	Via Technologies Inc.	9	16	56.3	IEEE	9	56.3	Joint IEEE and ACM	2	12.5
95	LM FUNDING AMERICA I	8	14	57.1	IEEE	8	57.1	ACM-Assoc Comput Mach	2	14.3
96	McAfee Inc	8	15	53.3	IEEE	8	53.3	ACM-Assoc Comput Mach	4	26.7
97	NOK NOK LABS INC	8	33	24.2	IEEE	8	24.2	ACM-Assoc Comput Mach	4	12.1
98	SYNIVERSE TECHNOLOGI	8	10	80.0	IEEE	8	80.0	The USENIX Association	2	20.0
99	Workday Inc	8	8	100.0	IEEE	8	100.0			
100	ACUANT INC	7	7	100.0	IEEE	7	100.0			

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Broadcasting</i>										
1	Microsoft Corporation	12340	23747	52.0	IEEE	12340	52.0	ACM-Assoc Comput Mach	3596	15.1
2	Personalized Media Commun	8858	52636	16.8	Society of Motion Picture and Television Engi	15883	30.2	IEEE	8858	16.8
3	Alphabet Inc.	7715	18118	42.6	IEEE	7715	42.6	ACM-Assoc Comput Mach	3278	18.1
4	Qualcomm Inc	6389	9682	66.0	IEEE	6389	66.0	SPIE-Int Soc Opt Engineering	480	5.0
5	Magna International Inc.	5811	10826	53.7	IEEE	5811	53.7	SAE-Society of Automobile Engineers	877	8.1
6	Tobii Ab	5664	11942	47.4	IEEE	5664	47.4	SPIE-Int Soc Opt Engineering	1565	13.1
7	Xperi Inc. (f/k/a Tessera Inc)	4844	12714	38.1	IEEE	4844	38.1	SPIE-Int Soc Opt Engineering	1191	9.4
8	Apple Inc	4478	11212	39.9	IEEE	4478	39.9	ACM-Assoc Comput Mach	1745	15.6
9	Sony Group Corp	4013	7392	54.3	IEEE	4013	54.3	ACM-Assoc Comput Mach	712	9.6
10	Samsung Electronics Co Ltd	3549	7468	47.5	IEEE	3549	47.5	ACM-Assoc Comput Mach	773	10.4
11	AT&T Inc	2796	5965	46.9	IEEE	2796	46.9	ACM-Assoc Comput Mach	870	14.6
12	GE Aerospace (f/k/a General	2498	3962	63.0	IEEE	2498	63.0	RELX Group (Elsevier)	433	10.9
13	Dolby Laboratories Inc	2352	4799	49.0	IEEE	2352	49.0	SPIE-Int Soc Opt Engineering	479	10.0
14	LG Electronics Inc.	2219	3575	62.1	IEEE	2219	62.1	ATSC Std	639	17.9
15	Vantiva SA (f/k/a Technicolo	2046	3478	58.8	IEEE	2046	58.8	SPIE-Int Soc Opt Engineering	327	9.4
16	Cisco Systems Inc.	2042	4096	49.9	IEEE	2042	49.9	ACM-Assoc Comput Mach	457	11.2
17	Softbank Corp	2034	3614	56.3	IEEE	2034	56.3	ACM-Assoc Comput Mach	366	10.1
18	Adeia Inc (f/k/a Xperi Holdin	1983	6327	31.3	IEEE	1983	31.3	ACM-Assoc Comput Mach	647	10.2
19	InterDigital Inc	1923	3728	51.6	IEEE	1923	51.6	ACM-Assoc Comput Mach	375	10.1
20	Huawei Technologies Compa	1880	2887	65.1	IEEE	1880	65.1	ACM-Assoc Comput Mach	198	6.9
21	Sonos Inc	1872	4999	37.4	IEEE	1872	37.4	SPIE-Int Soc Opt Engineering	642	12.8
22	Panasonic Holding Corporati	1766	2889	61.1	IEEE	1766	61.1	IEICE-Inst Elec Info Comm Eng	199	6.9
23	Broadcom Ltd	1755	2607	67.3	IEEE	1755	67.3	ACM-Assoc Comput Mach	184	7.1
24	Massachusetts Institute of Te	1744	3297	52.9	IEEE	1744	52.9	ACM-Assoc Comput Mach	286	8.7
25	Intel Corporation	1724	3002	57.4	IEEE	1724	57.4	ACM-Assoc Comput Mach	243	8.1
26	Tencent Holding Ltd	1645	2294	71.7	IEEE	1645	71.7	SPIE-Int Soc Opt Engineering	225	9.8
27	Adobe Inc. (former Adobe Sy	1545	3499	44.2	IEEE	1545	44.2	ACM-Assoc Comput Mach	798	22.8
28	Fraunhofer Gesellschaft	1512	2205	68.6	IEEE	1512	68.6	RELX Group (Elsevier)	171	7.8
29	ByteDance Ltd	1510	1971	76.6	IEEE	1510	76.6	SPIE-Int Soc Opt Engineering	205	10.4
30	Nokia Corporation	1422	2372	59.9	IEEE	1422	59.9	ACM-Assoc Comput Mach	233	9.8
31	GoPro Inc	1317	2597	50.7	IEEE	1317	50.7	ACM-Assoc Comput Mach	275	10.6
32	Canon Inc	1311	2757	47.6	IEEE	1311	47.6	ACM-Assoc Comput Mach	225	8.2
33	International Business Machi	1226	3448	35.6	IEEE	1226	35.6	ACM-Assoc Comput Mach	590	17.1
34	Hon Hai Precision Industry C	1169	2084	56.1	IEEE	1169	56.1	ACM-Assoc Comput Mach	341	16.4
35	NETWORK-1 TECHNOLOG	1017	3055	33.3	IEEE	1017	33.3	ACM-Assoc Comput Mach	727	23.8
36	Honeywell International Inc.	907	3996	22.7	Optica Publishing Group	1036	25.9	IEEE	907	22.7
37	Meta Platforms Inc.(formerly	890	3653	24.4	IEEE	890	24.4	ACM-Assoc Comput Mach	446	12.2
38	Cortica Ltd	869	1301	66.8	IEEE	869	66.8	ACM-Assoc Comput Mach	165	12.7
39	HP Inc	867	1741	49.8	IEEE	867	49.8	ACM-Assoc Comput Mach	255	14.6

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	STMicroelectronics	847	1271	66.6	IEEE	847	66.6	RELX Group (Elsevier)	77	6.1
41	Commscope Holding (formerl	845	1416	59.7	IEEE	845	59.7	ACM-Assoc Comput Mach	72	5.1
42	Ericsson	792	1108	71.5	IEEE	792	71.5	ACM-Assoc Comput Mach	71	6.4
43	Amazon.com Inc.	787	1769	44.5	IEEE	787	44.5	ACM-Assoc Comput Mach	258	14.6
44	INTOUCH HEALTH INC	737	2063	35.7	IEEE	737	35.7	IEEE/RSJ	217	10.5
45	Digimarc Corp.	715	1928	37.1	IEEE	715	37.1	SPIE-Int Soc Opt Engineering	356	18.5
46	Ricoh Co. Ltd.	710	1574	45.1	IEEE	710	45.1	ACM-Assoc Comput Mach	205	13.0
47	Nielsen Holdings Plc	690	4011	17.2	IEEE	690	17.2	RELX Group (Elsevier)	536	13.4
48	California Institute of Techno	627	4094	15.3	Optica Publishing Group	1126	27.5	IEEE	627	15.3
49	Electronics and Telecommuni	621	917	67.7	IEEE	621	67.7	SPIE-Int Soc Opt Engineering	70	7.6
50	SUN PATENT TRUST	590	792	74.5	IEEE	590	74.5	SPIE-Int Soc Opt Engineering	120	15.2
51	REARDEN LLC	580	807	71.9	IEEE	580	71.9	Optica Publishing Group	74	9.2
52	Motorola Solutions Inc.	575	1100	52.3	IEEE	575	52.3	RELX Group (Elsevier)	77	7.0
53	Walt Disney Co.	575	1618	35.5	IEEE	575	35.5	ACM-Assoc Comput Mach	504	31.1
54	Wisteria Trading Inc	570	1221	46.7	IEEE	570	46.7	SPIE-Int Soc Opt Engineering	135	11.1
55	Texas Instruments Inc	563	842	66.9	IEEE	563	66.9	SPIE-Int Soc Opt Engineering	49	5.8
56	Columbia University	562	1273	44.1	IEEE	562	44.1	ACM-Assoc Comput Mach	187	14.7
57	MONOLITHIC 3D INC	549	970	56.6	IEEE	549	56.6	IEEE/JPN Soc App Phys	99	10.2
58	Comcast Corp	545	1571	34.7	IEEE	545	34.7	ACM-Assoc Comput Mach	358	22.8
59	Xerox Corp	531	1305	40.7	IEEE	531	40.7	SPIE-Int Soc Opt Engineering	142	10.9
60	BLANDING HOVENWEEP	530	1419	37.4	IEEE	530	37.4	SPIE-Int Soc Opt Engineering	201	14.2
61	Blackberry Ltd.	519	690	75.2	IEEE	519	75.2	ACM-Assoc Comput Mach	25	3.6
62	Nippon Telegraph & Telepho	510	778	65.6	IEEE	510	65.6	IEICE-Inst Elec Info Comm Eng	58	7.5
63	Toshiba Corp	495	919	53.9	IEEE	495	53.9	Springer Nature	94	10.2
64	Mitsubishi Electric Corp	487	820	59.4	IEEE	487	59.4	ACM-Assoc Comput Mach	94	11.5
65	EchoStar Corp	469	960	48.9	IEEE	469	48.9	RELX Group (Elsevier)	91	9.5
66	Industrial Technology Resear	462	700	66.0	IEEE	462	66.0	SPIE-Int Soc Opt Engineering	55	7.9
67	NVIDIA Corp.	458	1159	39.5	IEEE	458	39.5	ACM-Assoc Comput Mach	185	16.0
68	Koninklijke Philips N.V.	457	1153	39.6	IEEE	457	39.6	ACM-Assoc Comput Mach	126	10.9
69	Mediatek Inc.	454	541	83.9	IEEE	454	83.9	SPIE-Int Soc Opt Engineering	18	3.3
70	Verance Corp	446	970	46.0	IEEE	446	46.0	SPIE-Int Soc Opt Engineering	127	13.1
71	NEC Corp	441	791	55.8	IEEE	441	55.8	IEICE-Inst Elec Info Comm Eng	52	6.6
72	Netflix Inc	438	680	64.4	IEEE	438	64.4	RELX Group (Elsevier)	56	8.2
73	Walmart Stores Inc	432	1200	36.0	IEEE	432	36.0	CBS Interactive	92	7.7
74	STATS LLC	429	724	59.3	IEEE	429	59.3	RELX Group (Elsevier)	72	9.9
75	Fujifilm Business Innovation	426	1248	34.1	IEEE	426	34.1	ACM-Assoc Comput Mach	308	24.7
76	Semiconductor Energy Labor	422	5117	8.2	SID-Society for Information Display	1798	35.1	AIP Publishing	622	12.2
77	ACACIA MEDIA TECHNO	408	717	56.9	IEEE	408	56.9	ACM-Assoc Comput Mach	66	9.2
78	PixelWorks Inc	407	631	64.5	IEEE	407	64.5	SPIE-Int Soc Opt Engineering	66	10.5
79	Magic Leap Inc	405	1750	23.1	IEEE	405	23.1	ACM-Assoc Comput Mach	303	17.3
80	On Semiconductor Corporati	395	585	67.5	IEEE	395	67.5	SPIE-Int Soc Opt Engineering	55	9.4

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Twitter Inc	387	593	65.3	IEEE	387	65.3	ACM-Assoc Comput Mach	47	7.9
82	Toyota Motor Corp	374	918	40.7	IEEE	374	40.7	ACM-Assoc Comput Mach	91	9.9
83	The Arizona Board of Regent	361	2085	17.3	Optica Publishing Group	603	28.9	IEEE	361	17.3
84	Witricity Corp	360	678	53.1	IEEE	360	53.1	AIP Publishing	46	6.8
85	University of Minnesota (The	358	544	65.8	IEEE	358	65.8	SAGE Publications Ltd	38	7.0
86	ONPOINT MEDICAL INC	338	1563	21.6	IEEE	338	21.6	RELX Group (Elsevier)	242	15.5
87	Will Semiconductor Co. Ltd	338	555	60.9	IEEE	338	60.9	SPIE-Int Soc Opt Engineering	64	11.5
88	BRIGHT DATA LTD	331	2155	15.4	ACM-Assoc Comput Mach	573	26.6	IEEE	331	15.4
89	United Services Automobile	329	1607	20.5	IEEE	329	20.5	Source Media	252	15.7
90	Johnson & Johnson	323	877	36.8	IEEE	323	36.8	RELX Group (Elsevier)	154	17.6
91	ECOLE DE TECHBOLOGIE	322	413	78.0	IEEE	322	78.0	SPIE-Int Soc Opt Engineering	32	7.7
92	Align Technology Inc	319	2695	11.8	JCO - Journal of Clinical Orthodontics	333	12.4	RELX Group (Elsevier)	324	12.0
93	Bosch (Robert) GmbH	317	600	52.8	IEEE	317	52.8	RELX Group (Elsevier)	38	6.3
94	Intellectual Ventures Manage	314	1251	25.1	IEEE	314	25.1	ACM-Assoc Comput Mach	174	13.9
95	University of Washington	311	929	33.5	IEEE	311	33.5	SPIE-Int Soc Opt Engineering	106	11.4
96	Ostendo Technologies Inc	297	907	32.7	IEEE	297	32.7	SPIE-Int Soc Opt Engineering	163	18.0
97	Advanced Micro Devices Inc	296	448	66.1	IEEE	296	66.1	RELX Group (Elsevier)	26	5.8
98	BLACK HILLS MEDIA LLC	289	872	33.1	IEEE	289	33.1	Open Connectivity Foundation	144	16.5
99	EUCLID DISCOVERIES LL	289	534	54.1	IEEE	289	54.1	RELX Group (Elsevier)	141	26.4
100	Orange	287	410	70.0	IEEE	287	70.0	SPIE-Int Soc Opt Engineering	30	7.3

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Computer Hardware</i>										
1	International Business Machi	22409	79637	28.1	IEEE	22409	28.1	ACM-Assoc Comput Mach	17413	21.9
2	Microsoft Corporation	18655	75052	24.9	ACM-Assoc Comput Mach	24803	33.0	IEEE	18655	24.9
3	Apple Inc	15891	60406	26.3	ACM-Assoc Comput Mach	17351	28.7	IEEE	15891	26.3
4	Intel Corporation	11044	24529	45.0	IEEE	11044	45.0	ACM-Assoc Comput Mach	3724	15.2
5	Alphabet Inc.	9832	34436	28.6	IEEE	9832	28.6	ACM-Assoc Comput Mach	6735	19.6
6	OneTrust	6814	19566	34.8	ACM-Assoc Comput Mach	9111	46.6	IEEE	6814	34.8
7	Samsung Electronics Co Ltd	6477	15290	42.4	IEEE	6477	42.4	ACM-Assoc Comput Mach	1516	9.9
8	Oracle Corporation	4586	17262	26.6	ACM-Assoc Comput Mach	6217	36.0	IEEE	4586	26.6
9	Broadcom Ltd	4417	9321	47.4	IEEE	4417	47.4	ACM-Assoc Comput Mach	2031	21.8
10	Qualcomm Inc	3564	8417	42.3	IEEE	3564	42.3	ACM-Assoc Comput Mach	921	10.9
11	Advanced Micro Devices Inc	3215	9166	35.1	IEEE	3215	35.1	ACM-Assoc Comput Mach	2895	31.6
12	Cadence Design Systems Inc	3198	8041	39.8	IEEE	3198	39.8	Joint IEEE and ACM	2842	35.3
13	Sony Group Corp	3123	7059	44.2	IEEE	3123	44.2	ACM-Assoc Comput Mach	1087	15.4
14	Commvault Systems Inc.	3087	5470	56.4	IEEE	3087	56.4	ACM-Assoc Comput Mach	1017	18.6
15	Immersion Corp.	3048	9051	33.7	IEEE	3048	33.7	ACM-Assoc Comput Mach	983	10.9
16	Micron Technology Inc.	2634	5184	50.8	IEEE	2634	50.8	ACM-Assoc Comput Mach	498	9.6
17	Canon Inc	2528	6251	40.4	IEEE	2528	40.4	ACM-Assoc Comput Mach	523	8.4
18	Ricoh Co. Ltd.	2380	5012	47.5	IEEE	2380	47.5	ACM-Assoc Comput Mach	889	17.7
19	Amazon.com Inc.	2230	9276	24.0	ACM-Assoc Comput Mach	2639	28.4	IEEE	2230	24.0
20	Cisco Systems Inc.	2141	6099	35.1	IEEE	2141	35.1	ACM-Assoc Comput Mach	1330	21.8
21	Nokia Corporation	2086	4525	46.1	IEEE	2086	46.1	ACM-Assoc Comput Mach	821	18.1
22	Dell Technologies Inc	2058	5765	35.7	IEEE	2058	35.7	ACM-Assoc Comput Mach	1009	17.5
23	Siemens Aktiengesellschaft	1983	4361	45.5	IEEE	1983	45.5	Joint IEEE and ACM	408	9.4
24	Fujitsu Limited	1980	5320	37.2	IEEE	1980	37.2	ACM-Assoc Comput Mach	673	12.7
25	Sonos Inc	1976	5201	38.0	IEEE	1976	38.0	SPIE-Int Soc Opt Engineering	566	10.9
26	HP Inc	1876	5691	33.0	IEEE	1876	33.0	ACM-Assoc Comput Mach	1326	23.3
27	Xperi Inc. (f/k/a Tessera Inc)	1853	4096	45.2	IEEE	1853	45.2	ACM-Assoc Comput Mach	273	6.7
28	AT&T Inc	1851	4937	37.5	IEEE	1851	37.5	ACM-Assoc Comput Mach	1130	22.9
29	Ignis Innovation Inc	1808	2536	71.3	IEEE	1808	71.3	SID-Society for Information Display	398	15.7
30	IP RESERVOIR LLC	1769	3473	50.9	IEEE	1769	50.9	ACM-Assoc Comput Mach	587	16.9
31	MicroUnity Systems Enginee	1766	2966	59.5	IEEE	1766	59.5	Joint IEEE and ACM	266	9.0
32	Huawei Technologies Compa	1753	4129	42.5	IEEE	1753	42.5	ACM-Assoc Comput Mach	693	16.8
33	Fraunhofer Gesellschaft	1689	3295	51.3	IEEE	1689	51.3	Audio Eng Soc	733	22.2
34	Personalized Media Commun	1661	10397	16.0	Society of Motion Picture and Television Engi	3109	29.9	IEEE	1661	16.0
35	Columbia University	1628	6440	25.3	IEEE	1628	25.3	ACM-Assoc Comput Mach	1377	21.4
36	Adobe Inc. (former Adobe Sy	1596	5849	27.3	ACM-Assoc Comput Mach	1989	34.0	IEEE	1596	27.3
37	NVIDIA Corp.	1581	3962	39.9	IEEE	1581	39.9	ACM-Assoc Comput Mach	730	18.4
38	Infineon Technologies AG	1541	2584	59.6	IEEE	1541	59.6	Joint IEEE and ACM	315	12.2
39	STMicroelectronics	1536	2588	59.4	IEEE	1536	59.4	Joint IEEE and ACM	138	5.3

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Sap SE	1528	5911	25.9	ACM-Assoc Comput Mach	1910	32.3	IEEE	1528	25.9
41	Honeywell International Inc.	1525	4038	37.8	IEEE	1525	37.8	RELX Group (Elsevier)	335	8.3
42	NEC Corp	1498	4030	37.2	IEEE	1498	37.2	ACM-Assoc Comput Mach	608	15.1
43	Magic Leap Inc	1490	3970	37.5	IEEE	1490	37.5	ACM-Assoc Comput Mach	478	12.0
44	Panasonic Holding Corporati	1461	3067	47.6	IEEE	1461	47.6	IEICE-Inst Elec Info Comm Eng	193	6.3
45	Semiconductor Energy Labor	1455	21994	6.6	SID-Society for Information Display	8209	37.3	AIP Publishing	2723	12.4
46	Softbank Corp	1394	3240	43.0	IEEE	1394	43.0	Joint IEEE and ACM	480	14.8
47	Toshiba Corp	1383	3143	44.0	IEEE	1383	44.0	ACM-Assoc Comput Mach	217	6.9
48	The Arizona Board of Regent	1344	3813	35.2	IEEE	1344	35.2	ACM-Assoc Comput Mach	370	9.7
49	Rambus Inc.	1323	1794	73.7	IEEE	1323	73.7	IEEE/JPN Soc App Phys	69	3.8
50	The Texas A&M University S	1302	1446	90.0	IEEE	1302	90.0	IET/IEE	22	1.5
51	III HOLDINGS 12 LLC	1288	2762	46.6	IEEE	1288	46.6	ACM-Assoc Comput Mach	359	13.0
52	Meta Platforms Inc.(formerly	1244	4380	28.4	IEEE	1244	28.4	ACM-Assoc Comput Mach	1079	24.6
53	PACT XPP TECHNOLOGIE	1168	2032	57.5	IEEE	1168	57.5	ACM-Assoc Comput Mach	197	9.7
54	P4TENTS1 LLC	1156	2611	44.3	IEEE	1156	44.3	ACM-Assoc Comput Mach	414	15.9
55	Synopsys Inc.	1141	2879	39.6	IEEE	1141	39.6	Joint IEEE and ACM	672	23.3
56	Western Digital Corp.	1080	2896	37.3	IEEE	1080	37.3	ACM-Assoc Comput Mach	412	14.2
57	Blackberry Ltd.	1039	2486	41.8	IEEE	1039	41.8	ACM-Assoc Comput Mach	414	16.7
58	Hewlett Packard Enterprises	961	3019	31.8	IEEE	961	31.8	ACM-Assoc Comput Mach	801	26.5
59	Xerox Corp	939	3787	24.8	IEEE	939	24.8	ACM-Assoc Comput Mach	879	23.2
60	Emerson Electric Co.	931	2600	35.8	IEEE	931	35.8	RELX Group (Elsevier)	269	10.3
61	Massachusetts Institute of Te	925	3456	26.8	IEEE	925	26.8	Springer Nature	432	12.5
62	Vantiva SA (f/k/a Technicolo	908	1711	53.1	IEEE	908	53.1	ACM-Assoc Comput Mach	166	9.7
63	NXP Semiconductors NV	904	1655	54.6	IEEE	904	54.6	Joint IEEE and ACM	203	12.3
64	PURE Storage Inc	897	3905	23.0	ACM-Assoc Comput Mach	1572	40.3	IEEE	897	23.0
65	Intellectual Ventures Manage	893	3905	22.9	IEEE	893	22.9	ACM-Assoc Comput Mach	624	16.0
66	TABULA INC	873	2331	37.5	IEEE	873	37.5	ACM-Assoc Comput Mach	865	37.1
67	Hitachi Ltd	843	2928	28.8	IEEE	843	28.8	ACM-Assoc Comput Mach	542	18.5
68	Seiko Epson Corporation	818	2474	33.1	IEEE	818	33.1	Joint IEEE and ACM	290	11.7
69	LG Electronics Inc.	808	1694	47.7	IEEE	808	47.7	Audio Eng Soc	358	21.1
70	Salesforce Inc. (f/k/a Salesfor	802	3152	25.4	IEEE	802	25.4	ACM-Assoc Comput Mach	383	12.2
71	University of California	781	3785	20.6	IEEE	781	20.6	RELX Group (Elsevier)	415	11.0
72	Texas Instruments Inc	760	1358	56.0	IEEE	760	56.0	Joint IEEE and ACM	145	10.7
73	Brain Corporation	756	2455	30.8	IEEE	756	30.8	MIT Press	363	14.8
74	UltraLeap Holdings Limited (	750	2183	34.4	IEEE	750	34.4	ACM-Assoc Comput Mach	446	20.4
75	Ericsson	731	1678	43.6	IEEE	731	43.6	ACM-Assoc Comput Mach	242	14.4
76	Nippon Telegraph & Telepho	728	2031	35.8	IEEE	728	35.8	ACM-Assoc Comput Mach	246	12.1
77	Fujifilm Business Innovation	718	2175	33.0	IEEE	718	33.0	ACM-Assoc Comput Mach	473	21.7
78	Cloud Software Group	697	1951	35.7	IEEE	697	35.7	ACM-Assoc Comput Mach	315	16.1
79	Hon Hai Precision Industry C	696	2582	27.0	IEEE	696	27.0	SID-Society for Information Display	444	17.2
80	Tela Innovations inc	696	1921	36.2	IEEE	696	36.2	SPIE-Int Soc Opt Engineering	585	30.5

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Baidu Inc	695	2037	34.1	IEEE	695	34.1	arXiv.org	440	21.6
82	HRL Laboratories LLC	695	1979	35.1	IEEE	695	35.1	ACM-Assoc Comput Mach	202	10.2
83	Electronics and Telecommuni	689	1350	51.0	IEEE	689	51.0	ACM-Assoc Comput Mach	145	10.7
84	Netapp Inc	688	3404	20.2	ACM-Assoc Comput Mach	1431	42.0	IEEE	688	20.2
85	SRC Computers Inc.	683	768	88.9	IEEE	683	88.9	Springer Nature	31	4.0
86	Accenture Ltd.	681	2131	32.0	IEEE	681	32.0	ACM-Assoc Comput Mach	452	21.2
87	Empire Technology Develop	673	2108	31.9	IEEE	673	31.9	Joint IEEE and ACM	640	30.4
88	Math Works Inc (The)	652	1734	37.6	IEEE	652	37.6	ACM-Assoc Comput Mach	363	20.9
89	NEWVALUEXCHANGE LT	652	1858	35.1	IEEE	652	35.1	ACM-Assoc Comput Mach	420	22.6
90	Industrial Technology Resear	641	1317	48.7	IEEE	641	48.7	ACM-Assoc Comput Mach	128	9.7
91	Mitsubishi Electric Corp	641	1332	48.1	IEEE	641	48.1	ACM-Assoc Comput Mach	183	13.7
92	Tencent Holding Ltd	640	1387	46.1	IEEE	640	46.1	ACM-Assoc Comput Mach	151	10.9
93	Marvell Technology Group Lt	637	1159	55.0	IEEE	637	55.0	ACM-Assoc Comput Mach	152	13.1
94	Dolby Laboratories Inc	635	1434	44.3	IEEE	635	44.3	Audio Eng Soc	208	14.5
95	Murata Manufacturing Co. Lt	635	831	76.4	IEEE	635	76.4	RELX Group (Elsevier)	34	4.1
96	InterDigital Inc	634	1578	40.2	IEEE	634	40.2	ACM-Assoc Comput Mach	242	15.3
97	GE Aerospace (f/k/a General	625	1552	40.3	IEEE	625	40.3	RELX Group (Elsevier)	177	11.4
98	RTX Corporation (f/k/a Rayt	623	1722	36.2	IEEE	623	36.2	RELX Group (Elsevier)	142	8.2
99	EXEGY INC	621	1208	51.4	IEEE	621	51.4	ACM-Assoc Comput Mach	205	17.0
100	Koninklijke Philips N.V.	621	1803	34.4	IEEE	621	34.4	RELX Group (Elsevier)	175	9.7

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Computer Software</i>										
1	Microsoft Corporation	32676	1E+05	32.3	IEEE	32676	32.3	ACM-Assoc Comput Mach	27073	26.8
2	Apple Inc	24772	75320	32.9	IEEE	24772	32.9	ACM-Assoc Comput Mach	14372	19.1
3	International Business Machi	18602	68573	27.1	IEEE	18602	27.1	ACM-Assoc Comput Mach	14027	20.5
4	Alphabet Inc.	14706	45380	32.4	IEEE	14706	32.4	ACM-Assoc Comput Mach	9219	20.3
5	Adobe Inc. (former Adobe Sy	7177	20098	35.7	IEEE	7177	35.7	ACM-Assoc Comput Mach	5659	28.2
6	Oracle Corporation	4611	19588	23.5	ACM-Assoc Comput Mach	6072	31.0	IEEE	4611	23.5
7	Amazon.com Inc.	3850	13972	27.6	IEEE	3850	27.6	ACM-Assoc Comput Mach	3256	23.3
8	Siemens Aktiengesellschaft	3675	10062	36.5	IEEE	3675	36.5	SPIE-Int Soc Opt Engineering	1040	10.3
9	Intel Corporation	3643	8118	44.9	IEEE	3643	44.9	ACM-Assoc Comput Mach	1545	19.0
10	Qualcomm Inc	3581	6750	53.1	IEEE	3581	53.1	ACM-Assoc Comput Mach	520	7.7
11	Cisco Systems Inc.	3481	10320	33.7	IEEE	3481	33.7	ACM-Assoc Comput Mach	2246	21.8
12	Xperi Inc. (f/k/a Tessera Inc)	3101	6818	45.5	IEEE	3101	45.5	ACM-Assoc Comput Mach	613	9.0
13	Dolby Laboratories Inc	2986	5526	54.0	IEEE	2986	54.0	Audio Eng Soc	1005	18.2
14	AT&T Inc	2666	6436	41.4	IEEE	2666	41.4	ACM-Assoc Comput Mach	1035	16.1
15	Sap SE	2644	12610	21.0	ACM-Assoc Comput Mach	4452	35.3	IEEE	2644	21.0
16	Commvault Systems Inc.	2584	4547	56.8	IEEE	2584	56.8	ACM-Assoc Comput Mach	771	17.0
17	Xerox Corp	2471	7631	32.4	IEEE	2471	32.4	ACM-Assoc Comput Mach	1461	19.1
18	NVIDIA Corp.	2409	7643	31.5	IEEE	2409	31.5	ACM-Assoc Comput Mach	2214	29.0
19	Ricoh Co. Ltd.	2233	4835	46.2	IEEE	2233	46.2	ACM-Assoc Comput Mach	784	16.2
20	Tobii Ab	2211	4454	49.6	IEEE	2211	49.6	SPIE-Int Soc Opt Engineering	485	10.9
21	Meta Platforms Inc.(formerly	2137	8639	24.7	ACM-Assoc Comput Mach	2153	24.9	IEEE	2137	24.7
22	Koninklijke Philips N.V.	2110	8136	25.9	IEEE	2110	25.9	RELX Group (Elsevier)	1044	12.8
23	Magna International Inc.	1951	3569	54.7	IEEE	1951	54.7	SAE-Society of Automobile Engineers	255	7.1
24	Broadcom Ltd	1912	5299	36.1	IEEE	1912	36.1	ACM-Assoc Comput Mach	1534	28.9
25	HP Inc	1845	5073	36.4	IEEE	1845	36.4	ACM-Assoc Comput Mach	1147	22.6
26	Cortica Ltd	1833	2706	67.7	IEEE	1833	67.7	ACM-Assoc Comput Mach	296	10.9
27	Sony Group Corp	1824	3922	46.5	IEEE	1824	46.5	ACM-Assoc Comput Mach	687	17.5
28	GE Aerospace (f/k/a General	1813	3937	46.1	IEEE	1813	46.1	RELX Group (Elsevier)	408	10.4
29	OneTrust	1795	4980	36.0	ACM-Assoc Comput Mach	2238	44.9	IEEE	1795	36.0
30	Sonos Inc	1712	4411	38.8	IEEE	1712	38.8	SPIE-Int Soc Opt Engineering	399	9.0
31	Advanced Micro Devices Inc	1626	6861	23.7	ACM-Assoc Comput Mach	3248	47.3	IEEE	1626	23.7
32	HRL Laboratories LLC	1569	3796	41.3	IEEE	1569	41.3	RELX Group (Elsevier)	310	8.2
33	Cognex Corp.	1561	3743	41.7	IEEE	1561	41.7	RELX Group (Elsevier)	700	18.7
34	Cadence Design Systems Inc	1560	3410	45.7	IEEE	1560	45.7	Joint IEEE and ACM	963	28.2
35	Samsung Electronics Co Ltd	1501	3259	46.1	IEEE	1501	46.1	ACM-Assoc Comput Mach	328	10.1
36	Magic Leap Inc	1500	3369	44.5	IEEE	1500	44.5	ACM-Assoc Comput Mach	409	12.1
37	Nokia Corporation	1476	3146	46.9	IEEE	1476	46.9	ACM-Assoc Comput Mach	443	14.1
38	Honeywell International Inc.	1456	2796	52.1	IEEE	1456	52.1	RELX Group (Elsevier)	271	9.7
39	Synopsys Inc.	1442	4425	32.6	IEEE	1442	32.6	SPIE-Int Soc Opt Engineering	785	17.7

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Accenture Ltd.	1408	4417	31.9	IEEE	1408	31.9	ACM-Assoc Comput Mach	675	15.3
41	Irobot Corp	1402	2666	52.6	IEEE	1402	52.6	SPIE-Int Soc Opt Engineering	410	15.4
42	Fraunhofer Gesellschaft	1372	2482	55.3	IEEE	1372	55.3	Audio Eng Soc	535	21.6
43	eBay Inc	1343	6717	20.0	IEEE	1343	20.0	ACM-Assoc Comput Mach	952	14.2
44	Walt Disney Co.	1305	5546	23.5	ACM-Assoc Comput Mach	2620	47.2	IEEE	1305	23.5
45	Honda Motor Co. Ltd.(Honda	1291	2618	49.3	IEEE	1291	49.3	RELX Group (Elsevier)	255	9.7
46	Salesforce Inc. (f/k/a Salesfor	1285	4282	30.0	IEEE	1285	30.0	ACM-Assoc Comput Mach	744	17.4
47	Blackberry Ltd.	1274	3013	42.3	IEEE	1274	42.3	ACM-Assoc Comput Mach	332	11.0
48	Intuitive Surgical Inc.	1268	3081	41.2	IEEE	1268	41.2	The Medical Image Computing and Computer Assisted Interve	359	11.7
49	Digimarc Corp.	1260	3321	37.9	IEEE	1260	37.9	SPIE-Int Soc Opt Engineering	599	18.0
50	Applied Materials Inc.	1232	2248	54.8	IEEE	1232	54.8	AIP Publishing	117	5.2
51	RTX Corporation (f/k/a Rayt	1176	2693	43.7	IEEE	1176	43.7	SPIE-Int Soc Opt Engineering	233	8.7
52	Toyota Motor Corp	1166	2359	49.4	IEEE	1166	49.4	IEEE/CVF	230	9.7
53	NEC Corp	1096	2786	39.3	IEEE	1096	39.3	ACM-Assoc Comput Mach	429	15.4
54	Intellectual Ventures Manage	1085	5750	18.9	IEEE	1085	18.9	RELX Group (Elsevier)	622	10.8
55	Yahoo Inc	1079	6493	16.6	ACM-Assoc Comput Mach	1896	29.2	IEEE	1079	16.6
56	PHOENIX SOLUTIONS INC	1037	3214	32.3	IEEE	1037	32.3	ISCA (Int Speech Comm Association)	416	12.9
57	Palantir Technologies Inc	1026	5083	20.2	IEEE	1026	20.2	ACM-Assoc Comput Mach	1001	19.7
58	Bosch (Robert) GmbH	991	4811	20.6	IEEE	991	20.6	Springer Nature	404	8.4
59	Snap Inc	968	2610	37.1	IEEE	968	37.1	ACM-Assoc Comput Mach	444	17.0
60	Massachusetts Institute of Te	946	3046	31.1	IEEE	946	31.1	RELX Group (Elsevier)	303	9.9
61	Battelle Memorial Institute	929	1486	62.5	IEEE	929	62.5	RELX Group (Elsevier)	121	8.1
62	Dell Technologies Inc	919	2912	31.6	IEEE	919	31.6	ACM-Assoc Comput Mach	590	20.3
63	STMicroelectronics	908	1506	60.3	IEEE	908	60.3	RELX Group (Elsevier)	101	6.7
64	Nant Holdings IP Llc	905	3566	25.4	IEEE	905	25.4	Joint IEEE and ACM	895	25.1
65	MicroUnity Systems Enginee	894	1475	60.6	IEEE	894	60.6	Joint IEEE and ACM	140	9.5
66	Boeing Co. (The)	887	2713	32.7	IEEE	887	32.7	RELX Group (Elsevier)	354	13.0
67	LG Electronics Inc.	884	1394	63.4	IEEE	884	63.4	Audio Eng Soc	139	10.0
68	Columbia University	883	3080	28.7	IEEE	883	28.7	ACM-Assoc Comput Mach	473	15.4
69	Ericsson	879	1773	49.6	IEEE	879	49.6	ACM-Assoc Comput Mach	281	15.8
70	Canon Inc	878	2069	42.4	IEEE	878	42.4	RELX Group (Elsevier)	192	9.3
71	Huawei Technologies Compa	878	1955	44.9	IEEE	878	44.9	ACM-Assoc Comput Mach	270	13.8
72	The Arizona Board of Regent	873	2393	36.5	IEEE	873	36.5	RELX Group (Elsevier)	239	10.0
73	University of California	864	5465	15.8	IEEE	864	15.8	RELX Group (Elsevier)	715	13.1
74	Eagleview Technologies Inc	806	2880	28.0	IEEE	806	28.0	ACM-Assoc Comput Mach	540	18.8
75	ParkerVision Inc	795	1717	46.3	IEEE	795	46.3	IET/IEEE	491	28.6
76	State Farm Mutual Automobi	790	2494	31.7	IEEE	790	31.7	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	130	5.2
77	United Services Automobile	750	4742	15.8	Source Media	779	16.4	IEEE	750	15.8
78	Motorola Solutions Inc.	749	1221	61.3	IEEE	749	61.3	Springer Nature	78	6.4
79	STRONG FORCE TX PORT	730	1676	43.6	IEEE	730	43.6	RELX Group (Elsevier)	304	18.1
80	Mitsubishi Electric Corp	718	1453	49.4	IEEE	718	49.4	ACM-Assoc Comput Mach	281	19.3

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Tela Innovations inc	703	2317	30.3	SPIE-Int Soc Opt Engineering	882	38.1	IEEE	703	30.3
82	Baidu Inc	693	2563	27.0	IEEE	693	27.0	arXiv.org	611	23.8
83	Open Text Corp	693	2435	28.5	IEEE	693	28.5	ACM-Assoc Comput Mach	464	19.1
84	Fujitsu Limited	679	1995	34.0	IEEE	679	34.0	Joint IEEE and ACM	324	16.2
85	IP RESERVOIR LLC	666	1349	49.4	IEEE	666	49.4	ACM-Assoc Comput Mach	236	17.5
86	Experian Plc	652	5521	11.8	IEEE	652	11.8	Source Media	579	10.5
87	CapitalOne	647	2071	31.2	IEEE	647	31.2	CBS Interactive	153	7.4
88	Vantiva SA (f/k/a Technicolo	646	1305	49.5	IEEE	646	49.5	ACM-Assoc Comput Mach	124	9.5
89	Panasonic Holding Corporati	641	1495	42.9	IEEE	641	42.9	ACM-Assoc Comput Mach	146	9.8
90	Imagination Technologies Gr	604	1777	34.0	IEEE	604	34.0	ACM-Assoc Comput Mach	547	30.8
91	INDIVIDUAL PATENTER	597	2933	20.4	IEEE	597	20.4	ACM-Assoc Comput Mach	412	14.0
92	Cloud Software Group	594	1896	31.3	IEEE	594	31.3	ACM-Assoc Comput Mach	362	19.1
93	Nielsen Holdings Plc	581	5326	10.9	RELX Group (Elsevier)	1179	22.1	IEEE	581	10.9
94	Lumen Technologies Inc. (for	574	2061	27.9	ACM-Assoc Comput Mach	701	34.0	IEEE	574	27.9
95	Ant Group (ANT Financial S	565	1009	56.0	IEEE	565	56.0	RELX Group (Elsevier)	119	11.8
96	Wells Fargo & Co	564	1398	40.3	IEEE	564	40.3	ACM-Assoc Comput Mach	157	11.2
97	BT Group PLC	563	1210	46.5	IEEE	563	46.5	ACM-Assoc Comput Mach	127	10.5
98	SRI International	562	1346	41.8	IEEE	562	41.8	ACM-Assoc Comput Mach	90	6.7
99	Assa Abloy AB	554	1968	28.2	IEEE	554	28.2	ACM-Assoc Comput Mach	295	15.0
100	PME IP PTY LTD	535	1390	38.5	IEEE	535	38.5	ACM-Assoc Comput Mach	337	24.2

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Cybersecurity</i>										
1	OneTrust	9500	27272	34.8	ACM-Assoc Comput Mach	12657	46.4	IEEE	9500	34.8
2	Microsoft Corporation	7325	26354	27.8	IEEE	7325	27.8	ACM-Assoc Comput Mach	6649	25.2
3	International Business Machi	6993	24985	28.0	IEEE	6993	28.0	ACM-Assoc Comput Mach	5446	21.8
4	Alphabet Inc.	5097	15958	31.9	IEEE	5097	31.9	ACM-Assoc Comput Mach	2925	18.3
5	Cisco Systems Inc.	4773	12121	39.4	IEEE	4773	39.4	ACM-Assoc Comput Mach	2475	20.4
6	Intel Corporation	2228	5024	44.3	IEEE	2228	44.3	ACM-Assoc Comput Mach	815	16.2
7	Oracle Corporation	1999	6776	29.5	IEEE	1999	29.5	ACM-Assoc Comput Mach	1872	27.6
8	Blackberry Ltd.	1793	5278	34.0	IEEE	1793	34.0	ACM-Assoc Comput Mach	562	10.6
9	Apple Inc	1695	5454	31.1	IEEE	1695	31.1	ACM-Assoc Comput Mach	1159	21.3
10	AT&T Inc	1675	4125	40.6	IEEE	1675	40.6	ACM-Assoc Comput Mach	564	13.7
11	Columbia University	1654	7061	23.4	IEEE	1654	23.4	ACM-Assoc Comput Mach	1438	20.4
12	Amazon.com Inc.	1444	5411	26.7	IEEE	1444	26.7	ACM-Assoc Comput Mach	1136	21.0
13	Intertrust Technologies Corp	1400	7255	19.3	ACM-Assoc Comput Mach	1534	21.1	IEEE	1400	19.3
14	Massachusetts Institute of Te	1335	2312	57.7	IEEE	1335	57.7	ACM-Assoc Comput Mach	262	11.3
15	Wisteria Trading Inc	1320	2807	47.0	IEEE	1320	47.0	SPIE-Int Soc Opt Engineering	324	11.5
16	Broadcom Ltd	1308	4173	31.3	IEEE	1308	31.3	ACM-Assoc Comput Mach	1281	30.7
17	Nokia Corporation	1148	2646	43.4	IEEE	1148	43.4	ACM-Assoc Comput Mach	389	14.7
18	CENTRIPETAL NETWORK	1063	2805	37.9	IEEE	1063	37.9	ACM-Assoc Comput Mach	576	20.5
19	Cloud Software Group	1044	2912	35.9	IEEE	1044	35.9	ACM-Assoc Comput Mach	376	12.9
20	Assa Abloy AB	1040	3483	29.9	IEEE	1040	29.9	ACM-Assoc Comput Mach	630	18.1
21	X ONE INC	1036	2672	38.8	IEEE	1036	38.8	ACM-Assoc Comput Mach	522	19.5
22	STRONG FORCE TX PORT	959	2202	43.6	IEEE	959	43.6	RELX Group (Elsevier)	397	18.0
23	Softbank Corp	932	2255	41.3	IEEE	932	41.3	Virus Bulletin Ltd	261	11.6
24	Gen Digital Inc. (formerly No	923	3428	26.9	IEEE	923	26.9	ACM-Assoc Comput Mach	774	22.6
25	NXGEN PARTNERS IP LLC	912	1788	51.0	IEEE	912	51.0	Optica Publishing Group	449	25.1
26	Qualcomm Inc	904	1970	45.9	IEEE	904	45.9	ACM-Assoc Comput Mach	252	12.8
27	IP RESERVOIR LLC	902	1670	54.0	IEEE	902	54.0	ACM-Assoc Comput Mach	259	15.5
28	Juniper Networks Inc.	847	1435	59.0	IEEE	847	59.0	ACM-Assoc Comput Mach	136	9.5
29	McAfee Inc	847	3563	23.8	IEEE	847	23.8	ACM-Assoc Comput Mach	759	21.3
30	Dell Technologies Inc	801	2552	31.4	IEEE	801	31.4	ACM-Assoc Comput Mach	531	20.8
31	Palo Alto Networks	790	1748	45.2	IEEE	790	45.2	ACM-Assoc Comput Mach	325	18.6
32	Huawei Technologies Compa	780	1779	43.8	IEEE	780	43.8	ACM-Assoc Comput Mach	306	17.2
33	Headwater Partners 1 LLC	773	1595	48.5	IEEE	773	48.5	ACM-Assoc Comput Mach	383	24.0
34	Ericsson	761	1966	38.7	IEEE	761	38.7	ACM-Assoc Comput Mach	331	16.8
35	The Arizona Board of Regent	738	2167	34.1	IEEE	738	34.1	ACM-Assoc Comput Mach	493	22.8
36	Xerox Corp	701	2210	31.7	IEEE	701	31.7	ACM-Assoc Comput Mach	643	29.1
37	Ant Group (ANT Financial S	700	1318	53.1	IEEE	700	53.1	ACM-Assoc Comput Mach	99	7.5
38	Accenture Ltd.	696	1950	35.7	IEEE	696	35.7	ACM-Assoc Comput Mach	302	15.5
39	Samsung Electronics Co Ltd	667	1401	47.6	IEEE	667	47.6	ACM-Assoc Comput Mach	183	13.1

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Commvault Systems Inc.	666	1151	57.9	IEEE	666	57.9	ACM-Assoc Comput Mach	180	15.6
41	Comcast Corp	647	858	75.4	IEEE	647	75.4	ACM-Assoc Comput Mach	33	3.8
42	Sony Group Corp	635	1615	39.3	IEEE	635	39.3	ACM-Assoc Comput Mach	198	12.3
43	Verizon Communications Inc	609	1430	42.6	IEEE	609	42.6	Internet Soc/IETF-Internet Eng Task Force	144	10.1
44	Digimarc Corp.	599	1673	35.8	IEEE	599	35.8	ACM-Assoc Comput Mach	262	15.7
45	VirnetX Holding Corp	587	3631	16.2	Nokia Bell Labs	670	18.5	IEEE	587	16.2
46	Verance Corp	584	1180	49.5	IEEE	584	49.5	SPIE-Int Soc Opt Engineering	155	13.1
47	Open Text Corp	580	1589	36.5	IEEE	580	36.5	ACM-Assoc Comput Mach	285	17.9
48	BT Group PLC	569	1362	41.8	IEEE	569	41.8	ACM-Assoc Comput Mach	110	8.1
49	Wells Fargo & Co	566	1424	39.7	IEEE	566	39.7	ACM-Assoc Comput Mach	173	12.1
50	Meta Platforms Inc.(formerly	559	2641	21.2	ACM-Assoc Comput Mach	658	24.9	IEEE	559	21.2
51	NXP Semiconductors NV	531	1066	49.8	IEEE	531	49.8	International Association for Cryptologic Research (IACR)	119	11.2
52	Johnson & Johnson	528	1923	27.5	IEEE	528	27.5	RELX Group (Elsevier)	436	22.7
53	Skyhigh Security (f/k/a Skyhi	514	1530	33.6	IEEE	514	33.6	ACM-Assoc Comput Mach	301	19.7
54	CapitalOne	503	1875	26.8	IEEE	503	26.8	CBS Interactive	244	13.0
55	L3 Harris Technologies (f/k/a	503	902	55.8	IEEE	503	55.8	ACM-Assoc Comput Mach	84	9.3
56	RTX Corporation (f/k/a Rayt	494	1539	32.1	IEEE	494	32.1	ACM-Assoc Comput Mach	159	10.3
57	Fortinet Inc	490	1069	45.8	IEEE	490	45.8	ACM-Assoc Comput Mach	217	20.3
58	Hewlett Packard Enterprises	487	1305	37.3	IEEE	487	37.3	ACM-Assoc Comput Mach	297	22.8
59	III HOLDINGS 12 LLC	482	952	50.6	IEEE	482	50.6	ACM-Assoc Comput Mach	120	12.6
60	NEC Corp	479	1775	27.0	IEEE	479	27.0	ACM-Assoc Comput Mach	338	19.0
61	Sap SE	469	1830	25.6	ACM-Assoc Comput Mach	595	32.5	IEEE	469	25.6
62	HP Inc	461	1485	31.0	IEEE	461	31.0	ACM-Assoc Comput Mach	294	19.8
63	BRIGHT DATA LTD	454	2985	15.2	ACM-Assoc Comput Mach	757	25.4	IEEE	454	15.2
64	LG Electronics Inc.	415	761	54.5	IEEE	415	54.5	ACM-Assoc Comput Mach	85	11.2
65	Sonos Inc	410	1137	36.1	IEEE	410	36.1	SPIE-Int Soc Opt Engineering	109	9.6
66	THE CHAMBERLAIN GRO	405	1165	34.8	IEEE	405	34.8	International Association for Cryptologic Research (IACR)	186	16.0
67	Ricoh Co. Ltd.	398	1010	39.4	IEEE	398	39.4	ACM-Assoc Comput Mach	236	23.4
68	InterDigital Inc	386	617	62.6	IEEE	386	62.6	ACM-Assoc Comput Mach	42	6.8
69	Analog Devices Inc.	385	813	47.4	IEEE	385	47.4	ACM-Assoc Comput Mach	158	19.4
70	Salesforce Inc. (f/k/a Salesfor	380	1293	29.4	IEEE	380	29.4	LexisNexis	222	17.2
71	DropBox Inc	374	926	40.4	IEEE	374	40.4	ACM-Assoc Comput Mach	186	20.1
72	Palantir Technologies Inc	373	1894	19.7	IEEE	373	19.7	ACM-Assoc Comput Mach	295	15.6
73	Security First Corp	371	1334	27.8	ACM-Assoc Comput Mach	401	30.1	IEEE	371	27.8
74	Bank of America Corp.	370	814	45.5	IEEE	370	45.5	ACM-Assoc Comput Mach	131	16.1
75	DAMBALLA INC	370	1915	19.3	The USENIX Association	550	28.7	ACM-Assoc Comput Mach	397	20.7
76	Witricity Corp	360	678	53.1	IEEE	360	53.1	AIP Publishing	46	6.8
77	Forcepoint LLC	357	1444	24.7	IEEE	357	24.7	ACM-Assoc Comput Mach	267	18.5
78	Advanced Micro Devices Inc	356	1933	18.4	ACM-Assoc Comput Mach	994	51.4	Joint IEEE and ACM	382	19.8
79	BLUERISC INC	340	955	35.6	IEEE	340	35.6	ACM-Assoc Comput Mach	221	23.1
80	Experian Plc	338	1773	19.1	IEEE	338	19.1	Source Media	151	8.5

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Nippon Telegraph & Telepho	335	1993	16.8	International Association for Cryptologic Rese	475	23.8	IEEE	335	16.8
82	Fujitsu Limited	327	1097	29.8	IEEE	327	29.8	ACM-Assoc Comput Mach	179	16.3
83	T-Mobile USA INC	322	708	45.5	IEEE	322	45.5	ACM-Assoc Comput Mach	80	11.3
84	Extreme Networks Inc	321	853	37.6	IEEE	321	37.6	ACM-Assoc Comput Mach	146	17.1
85	Rambus Inc.	313	1090	28.7	International Association for Cryptologic Rese	360	33.0	IEEE	313	28.7
86	NCHAIN LICENSING AG	312	1095	28.5	IEEE	312	28.5	O'Reilly Media	163	14.9
87	Visa Inc	309	1041	29.7	IEEE	309	29.7	ACM-Assoc Comput Mach	159	15.3
88	PURE Storage Inc	303	1350	22.4	ACM-Assoc Comput Mach	621	46.0	IEEE	303	22.4
89	INDIVIDUAL PATENTER	296	877	33.8	IEEE	296	33.8	ACM-Assoc Comput Mach	132	15.1
90	Walmart Stores Inc	296	846	35.0	IEEE	296	35.0	CBS Interactive	79	9.3
91	FedEx Corp	295	661	44.6	IEEE	295	44.6	RELX Group (Elsevier)	88	13.3
92	Panasonic Holding Corporati	290	713	40.7	IEEE	290	40.7	ACM-Assoc Comput Mach	59	8.3
93	Yahoo Inc	289	1503	19.2	ACM-Assoc Comput Mach	301	20.0	IEEE	289	19.2
94	Proxense Llc	288	825	34.9	IEEE	288	34.9	United Business Media/UBM Tech	109	13.2
95	Empire Technology Develop	280	1002	27.9	IEEE	280	27.9	ACM-Assoc Comput Mach	200	20.0
96	SILVERBROOK RESEARC	271	529	51.2	IEEE	271	51.2	RELX Group (Elsevier)	141	26.7
97	Toshiba Corp	270	920	29.3	IEEE	270	29.3	Internet Soc/IETF-Internet Eng Task Force	121	13.2
98	BLACK HILLS MEDIA LLC	266	806	33.0	IEEE	266	33.0	Open Connectivity Foundation	144	17.9
99	WEST VIEW RESEARCH L	265	662	40.0	IEEE	265	40.0	SAE-Society of Automobile Engineers	94	14.2
100	Motorola Solutions Inc.	264	407	64.9	IEEE	264	64.9	ACM-Assoc Comput Mach	41	10.1

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Diagnosis/Surgery/Medical Instruments</i>										
1	Medtronic Inc	12372	2E+05	6.5	RELX Group (Elsevier)	31982	16.9	Wolters Kluwer	25228	13.3
2	Johnson & Johnson	10282	1E+05	10.1	RELX Group (Elsevier)	23465	23.1	Springer Nature	11616	11.4
3	Boston Scientific Corp.	6655	97762	6.8	RELX Group (Elsevier)	24006	24.6	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	12488	12.8
4	Intuitive Surgical Inc.	6336	17783	35.6	IEEE	6336	35.6	The Medical Image Computing and Computer Assisted Interv	1717	9.7
5	Dexcom Inc	6253	1E+05	5.8	RELX Group (Elsevier)	27470	25.5	Mary Ann Liebert Inc.	11073	10.3
6	Abbott Laboratories	4865	1E+05	4.3	RELX Group (Elsevier)	26325	23.5	ACS-Am Chem Soc	10301	9.2
7	Masimo Corp	3747	7773	48.2	IEEE	3747	48.2	Springer Nature	671	8.6
8	Koninklijke Philips N.V.	2817	18529	15.2	RELX Group (Elsevier)	2834	15.3	IEEE	2817	15.2
9	Mass General Brigham (form	2802	45944	6.1	Optica Publishing Group	14081	30.6	RELX Group (Elsevier)	7030	15.3
10	Massachusetts Institute of Te	2137	10760	19.9	RELX Group (Elsevier)	2146	19.9	IEEE	2137	19.9
11	Stryker Corp.	2098	17838	11.8	RELX Group (Elsevier)	3120	17.5	Springer Nature	2168	12.2
12	Intellectual Ventures Manage	1979	14396	13.7	IEEE	1979	13.7	Springer Nature	1802	12.5
13	University of California	1842	15036	12.3	RELX Group (Elsevier)	2760	18.4	IEEE	1842	12.3
14	GUIDED THERAPY SYSTE	1732	7701	22.5	IEEE	1732	22.5	RELX Group (Elsevier)	1346	17.5
15	Valencell Inc	1470	3824	38.4	IEEE	1470	38.4	RELX Group (Elsevier)	347	9.1
16	Siemens Aktiengesellschaft	1454	10304	14.1	RELX Group (Elsevier)	2163	21.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	2093	20.3
17	Vanderbilt University	1352	4059	33.3	IEEE	1352	33.3	RELX Group (Elsevier)	560	13.8
18	LivaNova Plc	1238	24305	5.1	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	5446	22.4	RELX Group (Elsevier)	4858	20.0
19	Smith & Nephew Plc.	1186	17477	6.8	RELX Group (Elsevier)	3314	19.0	Wolters Kluwer	1757	10.1
20	Virginia Tech University	1138	8095	14.1	RELX Group (Elsevier)	1785	22.1	Springer Nature	1242	15.3
21	Mevion Medical Systems Inc	1108	3563	31.1	IEEE	1108	31.1	RELX Group (Elsevier)	693	19.4
22	University of Minnesota (The	1095	4620	23.7	IEEE	1095	23.7	RELX Group (Elsevier)	943	20.4
23	Embla Medical (f/k/a Ossur h	1026	3296	31.1	IEEE	1026	31.1	RELX Group (Elsevier)	693	21.0
24	Foxconn Technology Co. Ltd.	938	2153	43.6	IEEE	938	43.6	Springer Nature	402	18.7
25	VIVAQUANT LLC	938	1909	49.1	IEEE	938	49.1	RELX Group (Elsevier)	253	13.3
26	Baxter International Inc.	932	9632	9.7	RELX Group (Elsevier)	2243	23.3	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	962	10.0
27	University of Nebraska	922	4550	20.3	IEEE	922	20.3	Springer Nature	764	16.8
28	Saluda Medical Pty Ltd	912	4905	18.6	IEEE	912	18.6	RELX Group (Elsevier)	803	16.4
29	Otto Bock Holding GmbH &	907	2861	31.7	IEEE	907	31.7	RELX Group (Elsevier)	601	21.0
30	Stanford University	904	25627	3.5	RELX Group (Elsevier)	4628	18.1	Springer Nature	4171	16.3
31	Columbia University	903	6498	13.9	RELX Group (Elsevier)	1668	25.7	IEEE	903	13.9
32	Alphabet Inc.	887	2864	31.0	IEEE	887	31.0	RELX Group (Elsevier)	313	10.9
33	The Arizona Board of Regent	824	3301	25.0	IEEE	824	25.0	RELX Group (Elsevier)	543	16.4
34	BUTTERFLY NETWORKS I	750	855	87.7	IEEE	750	87.7	Acoustical Society of America	40	4.7
35	AngioDynamics Inc.	742	6618	11.2	RELX Group (Elsevier)	1411	21.3	Springer Nature	899	13.6
36	University of Illinois	740	11042	6.7	RELX Group (Elsevier)	1543	14.0	ACS-Am Chem Soc	1480	13.4
37	Johns Hopkins University	715	4828	14.8	RELX Group (Elsevier)	808	16.7	IEEE	715	14.8
38	Maui Imaging Inc (a/k/a Mau	676	1107	61.1	IEEE	676	61.1	RELX Group (Elsevier)	152	13.7
39	University of Michigan	648	6852	9.5	RELX Group (Elsevier)	1918	28.0	IEEE	648	9.5

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	GE Aerospace (f/k/a General	621	2339	26.5	IEEE	621	26.5	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	356	15.2
41	Cleveland Clinic (and Founda	613	4052	15.1	RELX Group (Elsevier)	826	20.4	IEEE	613	15.1
42	University of Washington	537	5723	9.4	RELX Group (Elsevier)	1124	19.6	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	620	10.8
43	California Institute of Techno	503	4285	11.7	Springer Nature	571	13.3	RELX Group (Elsevier)	569	13.3
44	Otsuka Holdings Co Ltd	503	3855	13.0	RELX Group (Elsevier)	761	19.7	IEEE	503	13.0
45	HI LLC	500	2103	23.8	IEEE	500	23.8	Optica Publishing Group	376	17.9
46	Becton Dickinson and Co.	476	32557	1.5	Wolters Kluwer	8875	27.3	RELX Group (Elsevier)	5625	17.3
47	MIRAMAR LABS INC	476	1359	35.0	IEEE	476	35.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	169	12.4
48	Asahi Kasei Corp.	458	4596	10.0	Wolters Kluwer	1156	25.2	RELX Group (Elsevier)	689	15.0
49	University of Texas	458	5861	7.8	RELX Group (Elsevier)	1246	21.3	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	618	10.5
50	Nevro Corp	434	6811	6.4	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1228	18.0	Wolters Kluwer	1152	16.9
51	Samsung Electronics Co Ltd	433	1239	34.9	IEEE	433	34.9	RELX Group (Elsevier)	143	11.5
52	FACENSE LTD	432	780	55.4	IEEE	432	55.4	RELX Group (Elsevier)	67	8.6
53	INDIVIDUAL PATENTER	410	8791	4.7	RELX Group (Elsevier)	1895	21.6	Wolters Kluwer	1052	12.0
54	Globus Medical Inc	402	13756	2.9	Wolters Kluwer	5519	40.1	Springer Nature	2317	16.8
55	Case Western Reserve Univer	393	1735	22.7	IEEE	393	22.7	RELX Group (Elsevier)	243	14.0
56	Blue Sail Medical Co. Ltd.	380	1290	29.5	IEEE	380	29.5	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	180	14.0
57	Mayo Foundation for Medica	378	4920	7.7	RELX Group (Elsevier)	1130	23.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	632	12.8
58	VIRTUAL INCISION CORP	378	1571	24.1	IEEE	378	24.1	Springer Nature	256	16.3
59	BIO CONTROL MEDICAL (	376	1412	26.6	IEEE	376	26.6	Wolters Kluwer	222	15.7
60	University Health Network	373	1461	25.5	IEEE	373	25.5	RELX Group (Elsevier)	261	17.9
61	IWALK INC	372	1164	32.0	IEEE	372	32.0	RELX Group (Elsevier)	251	21.6
62	Canon Inc	370	1932	19.2	IEEE	370	19.2	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	219	11.3
63	University of Florida	367	2178	16.9	RELX Group (Elsevier)	417	19.1	IEEE	367	16.9
64	University of Pennsylvania	365	6915	5.3	RELX Group (Elsevier)	1132	16.4	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	881	12.7
65	ICU Medical Inc	359	2370	15.1	IEEE	359	15.1	Springer Nature	341	14.4
66	BLUEWIND MEDICAL LT	353	832	42.4	IEEE	353	42.4	American Physiological Society	102	12.3
67	MIRADRY INC	351	962	36.5	IEEE	351	36.5	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	116	12.1
68	Bonutti Technologies LLC	350	4386	8.0	RELX Group (Elsevier)	1156	26.4	Springer Nature	501	11.4
69	Merz GmbH & Co KGaA	345	2217	15.6	RELX Group (Elsevier)	524	23.6	IEEE	345	15.6
70	United States Department of	339	1827	18.6	RELX Group (Elsevier)	431	23.6	IEEE	339	18.6
71	HIGHLAND INSTRUMENT	338	721	46.9	IEEE	338	46.9	RELX Group (Elsevier)	84	11.7
72	Nyxoah SA	330	885	37.3	IEEE	330	37.3	RELX Group (Elsevier)	106	12.0
73	University of Pittsburgh	328	5204	6.3	RELX Group (Elsevier)	1492	28.7	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	643	12.4
74	GE Healthcare	327	1681	19.5	IEEE	327	19.5	RELX Group (Elsevier)	274	16.3
75	INNEROPTIC TECHNOLO	326	1868	17.5	IEEE	326	17.5	SPIE-Int Soc Opt Engineering	245	13.1
76	Alcon Inc	319	7632	4.2	RELX Group (Elsevier)	2081	27.3	American Medical Association	607	8.0
77	Restore3D	305	10270	3.0	Springer Nature	1727	16.8	RELX Group (Elsevier)	1288	12.5
78	University of North Carolina	302	2288	13.2	RELX Group (Elsevier)	478	20.9	IEEE	302	13.2
79	Cirrus Logic Inc.	299	498	60.0	IEEE	299	60.0	Acoustical Society of America	75	15.1
80	DISTALMOTION SA	296	508	58.3	IEEE	296	58.3	IEEE/RSJ	88	17.3

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	BTL MEDICAL TECHNOL	294	3992	7.4	RELX Group (Elsevier)	731	18.3	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	598	15.0
82	Duke University	287	2378	12.1	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	357	15.0	RELX Group (Elsevier)	333	14.0
83	KONA MEDICAL INC	286	1966	14.5	RELX Group (Elsevier)	523	26.6	IEEE	286	14.5
84	HUXLEY MEDICAL INC	283	480	59.0	IEEE	283	59.0	AIP Publishing	48	10.0
85	Hologic Inc	281	4046	6.9	RELX Group (Elsevier)	840	20.8	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	695	17.2
86	Zimmer Biomet Holdings	281	11652	2.4	RELX Group (Elsevier)	2494	21.4	Springer Nature	1773	15.2
87	PULSE BIOSCIENCES INC	277	615	45.0	IEEE	277	45.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	85	13.8
88	University of South Florida	276	1377	20.0	IEEE	276	20.0	RELX Group (Elsevier)	263	19.1
89	Deka Products LP	268	609	44.0	IEEE	268	44.0	RELX Group (Elsevier)	81	13.3
90	Align Technology Inc	263	2458	10.7	JCO - Journal of Clinical Orthodontics	341	13.9	RELX Group (Elsevier)	315	12.8
91	International Business Machi	263	1146	22.9	IEEE	263	22.9	RELX Group (Elsevier)	132	11.5
92	Washington University in St.	259	5069	5.1	RELX Group (Elsevier)	789	15.6	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	735	14.5
93	BRAINGATE CO LLC	254	675	37.6	IEEE	254	37.6	RELX Group (Elsevier)	101	15.0
94	University of Southern Califo	249	1103	22.6	IEEE	249	22.6	RELX Group (Elsevier)	160	14.5
95	Harvard University	248	3658	6.8	RELX Group (Elsevier)	523	14.3	National Institutes of Health - NIH	509	13.9
96	BTL HEALTHCARE TECH	238	3209	7.4	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	526	16.4	RELX Group (Elsevier)	464	14.5
97	Ecole Polytechnique Federale	237	1467	16.2	RELX Group (Elsevier)	258	17.6	IEEE	237	16.2
98	Victhom Laboratory Inc (for	230	644	35.7	IEEE	230	35.7	RELX Group (Elsevier)	198	30.7
99	University of Rochester	224	1440	15.6	IEEE	224	15.6	RELX Group (Elsevier)	204	14.2
100	Kardium Inc	223	1669	13.4	IEEE	223	13.4	Springer Nature	206	12.3

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Information Storage</i>										
1	Micron Technology Inc.	15647	31198	50.2	IEEE	15647	50.2	RELX Group (Elsevier)	4434	14.2
2	ZENO SEMICONDUCTOR I	7441	9871	75.4	IEEE	7441	75.4	IEEE/JPN Soc App Phys	1523	15.4
3	Western Digital Corp.	6199	12379	50.1	IEEE	6199	50.1	AIP Publishing	1299	10.5
4	International Business Machi	5011	15165	33.0	IEEE	5011	33.0	ACM-Assoc Comput Mach	2662	17.6
5	Macronix International Co. Lt	2612	4550	57.4	IEEE	2612	57.4	IEEE/JPN Soc App Phys	890	19.6
6	Broadcom Ltd	2579	3568	72.3	IEEE	2579	72.3	ACM-Assoc Comput Mach	310	8.7
7	Semiconductor Energy Labor	2385	26865	8.9	SID-Society for Information Display	9299	34.6	AIP Publishing	3327	12.4
8	ATTOPSEMI TECHNOLOG	2380	2983	79.8	IEEE	2380	79.8	IEEE/JPN Soc App Phys	364	12.2
9	Mosaid Technologies (f/k/aC	2121	2490	85.2	IEEE	2121	85.2	IEEE/JPN Soc App Phys	199	8.0
10	Rambus Inc.	1798	2907	61.9	IEEE	1798	61.9	AIP Publishing	232	8.0
11	Intel Corporation	1600	3997	40.0	IEEE	1600	40.0	Joint IEEE and ACM	765	19.1
12	INNOVATIVE SILICON SA	1580	1959	80.7	IEEE	1580	80.7	RELX Group (Elsevier)	84	4.3
13	Apple Inc	1454	2943	49.4	IEEE	1454	49.4	AIP Publishing	253	8.6
14	MONOLITHIC 3D INC	1353	2410	56.1	IEEE	1353	56.1	IEEE/JPN Soc App Phys	241	10.0
15	Seagate Technology Plc	1204	4230	28.5	IEEE	1204	28.5	AIP Publishing	924	21.8
16	Toshiba Corp	1188	2588	45.9	IEEE	1188	45.9	AIP Publishing	371	14.3
17	Infineon Technologies AG	1147	1608	71.3	IEEE	1147	71.3	AIP Publishing	96	6.0
18	Renesas Electronic Corporati	976	1338	72.9	IEEE	976	72.9	IEEE/JPN Soc App Phys	107	8.0
19	Samsung Electronics Co Ltd	885	2334	37.9	IEEE	885	37.9	Joint IEEE and ACM	247	10.6
20	Microsoft Corporation	803	3974	20.2	ACM-Assoc Comput Mach	1467	36.9	IEEE	803	20.2
21	Commvault Systems Inc.	764	1291	59.2	IEEE	764	59.2	ACM-Assoc Comput Mach	230	17.8
22	TDK Corporation	751	2731	27.5	IEEE	751	27.5	AIP Publishing	551	20.2
23	Netapp Inc	648	2879	22.5	ACM-Assoc Comput Mach	1219	42.3	IEEE	648	22.5
24	Oracle Corporation	613	2446	25.1	ACM-Assoc Comput Mach	1113	45.5	IEEE	613	25.1
25	NXP Semiconductors NV	602	874	68.9	IEEE	602	68.9	Joint IEEE and ACM	86	9.8
26	Qualcomm Inc	587	932	63.0	IEEE	587	63.0	Joint IEEE and ACM	99	10.6
27	Softbank Corp	586	1194	49.1	IEEE	586	49.1	Joint IEEE and ACM	234	19.6
28	Alphabet Inc.	536	1456	36.8	IEEE	536	36.8	ACM-Assoc Comput Mach	332	22.8
29	Advanced Micro Devices Inc	529	1287	41.1	IEEE	529	41.1	Joint IEEE and ACM	357	27.7
30	Hitachi Ltd	484	1321	36.6	IEEE	484	36.6	ACM-Assoc Comput Mach	148	11.2
31	Dell Technologies Inc	482	1326	36.3	IEEE	482	36.3	ACM-Assoc Comput Mach	310	23.4
32	Synopsys Inc.	473	862	54.9	IEEE	473	54.9	AIP Publishing	94	10.9
33	Taiwan Semiconductor Manu	451	662	68.1	IEEE	451	68.1	IEEE/JPN Soc App Phys	70	10.6
34	SK Hynix Inc	396	640	61.9	IEEE	396	61.9	Joint IEEE and ACM	58	9.1
35	Intellectual Ventures Manage	393	738	53.3	IEEE	393	53.3	ACM-Assoc Comput Mach	52	7.0
36	Microchip Technology Inc.	381	524	72.7	IEEE	381	72.7	IEEE/JPN Soc App Phys	20	3.8
37	Marvell Technology Group Lt	367	514	71.4	IEEE	367	71.4	ACM-Assoc Comput Mach	34	6.6
38	STMicroelectronics	359	568	63.2	IEEE	359	63.2	IEEE/JPN Soc App Phys	33	5.8
39	Texas Instruments Inc	345	496	69.6	IEEE	345	69.6	IEEE/JPN Soc App Phys	34	6.9

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	RADIAN MEMORY SYSTE	344	850	40.5	IEEE	344	40.5	ACM-Assoc Comput Mach	194	22.8
41	Global Foundries Inc	318	571	55.7	IEEE	318	55.7	Joint IEEE and ACM	32	5.6
42	NVIDIA Corp.	317	683	46.4	IEEE	317	46.4	Joint IEEE and ACM	150	22.0
43	Hewlett Packard Enterprises	315	1022	30.8	IEEE	315	30.8	ACM-Assoc Comput Mach	277	27.1
44	Intertrust Technologies Corp	300	1529	19.6	ACM-Assoc Comput Mach	348	22.8	IEEE	300	19.6
45	Crossbar Inc	292	1132	25.8	IEEE	292	25.8	AIP Publishing	152	13.4
46	Unisantis Electronics Ltd	292	358	81.6	IEEE	292	81.6	IEICE-Inst Elec Info Comm Eng	35	9.8
47	Massachusetts Institute of Te	291	620	46.9	IEEE	291	46.9	Springer Nature	69	11.1
48	HP Inc	290	890	32.6	IEEE	290	32.6	ACM-Assoc Comput Mach	157	17.6
49	QST HOLDINGS LLC	290	484	59.9	IEEE	290	59.9	Joint IEEE and ACM	56	11.6
50	Avid Technology Inc.	279	538	51.9	IEEE	279	51.9	ACM-Assoc Comput Mach	177	32.9
51	The Arizona Board of Regent	278	551	50.5	IEEE	278	50.5	RELX Group (Elsevier)	38	6.9
52	Sony Group Corp	273	746	36.6	IEEE	273	36.6	RELX Group (Elsevier)	71	9.5
53	Nantero Inc	259	1975	13.1	ACS-Am Chem Soc	510	25.8	AIP Publishing	416	21.1
54	Empire Technology Develop	241	508	47.4	IEEE	241	47.4	Joint IEEE and ACM	108	21.3
55	Netlist Inc	238	787	30.2	IP.Com	295	37.5	IEEE	238	30.2
56	California Institute of Techno	228	345	66.1	IEEE	228	66.1	AAAS-Am Assoc Advancement Sci	18	5.2
57	Fujitsu Limited	222	440	50.5	IEEE	222	50.5	AIP Publishing	52	11.8
58	Commissariat A L'Energie At	211	472	44.7	IEEE	211	44.7	AIP Publishing	69	14.6
59	Yonsei University	209	411	50.9	IEEE	209	50.9	Joint IEEE and ACM	75	18.2
60	Panasonic Holding Corporati	204	532	38.3	IEEE	204	38.3	Institute of Pure and Applied Physics	70	13.2
61	PURE Storage Inc	201	883	22.8	ACM-Assoc Comput Mach	331	37.5	IEEE	201	22.8
62	Kioxia Corp (formerly Toshiba	190	432	44.0	IEEE	190	44.0	The USENIX Association	79	18.3
63	Boston Scientific Corp.	171	231	74.0	IEEE	171	74.0	IEEE/JPN Soc App Phys	28	12.1
64	United Microelectronics Corp	159	324	49.1	IEEE	159	49.1	AIP Publishing	50	15.4
65	Columbia University	154	378	40.7	IEEE	154	40.7	ACM-Assoc Comput Mach	67	17.7
66	PACT XPP TECHNOLOGIE	153	270	56.7	IEEE	153	56.7	ACM-Assoc Comput Mach	25	9.3
67	INDIVIDUAL PATENTER	150	292	51.4	IEEE	150	51.4	RELX Group (Elsevier)	28	9.6
68	Kandou Bus SA	150	166	90.4	IEEE	150	90.4	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	8	4.8
69	Sap SE	148	576	25.7	IEEE	148	25.7	ACM-Assoc Comput Mach	126	21.9
70	University of California	148	611	24.2	IEEE	148	24.2	AIP Publishing	88	14.4
71	VERVAIN LLC	145	201	72.1	IEEE	145	72.1	The USENIX Association	28	13.9
72	Avalanche Technology Inc	143	652	21.9	AIP Publishing	202	31.0	IEEE	143	21.9
73	Industrial Technology Resear	141	240	58.8	IEEE	141	58.8	IEEE/JPN Soc App Phys	21	8.8
74	Huawei Technologies Compa	140	374	37.4	IEEE	140	37.4	Joint IEEE and ACM	86	23.0
75	SUNRISE MEMORY CORP	140	235	59.6	IEEE	140	59.6	IEEE/JPN Soc App Phys	71	30.2
76	KEPLER COMPUTING INC	138	205	67.3	IEEE	138	67.3	IEEE/JPN Soc App Phys	23	11.2
77	OPTICAL DEVICES LLC	135	282	47.9	IEEE	135	47.9	RELX Group (Elsevier)	45	16.0
78	Amazon.com Inc.	133	474	28.1	IEEE	133	28.1	ACM-Assoc Comput Mach	127	26.8
79	Hon Hai Precision Industry C	132	302	43.7	IEEE	132	43.7	AIP Publishing	43	14.2
80	Purdue University	127	292	43.5	IEEE	127	43.5	Joint IEEE and ACM	29	9.9

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Spin Memory	127	480	26.5	IEEE	127	26.5	AIP Publishing	101	21.0
82	R & D 3 LLC	125	125	100.0	IEEE	125	100.0			
83	University of Minnesota (The	125	663	18.9	Springer Nature	145	21.9	American Physical Society	141	21.3
84	The Texas A&M University S	124	192	64.6	IEEE	124	64.6	ACM-Assoc Comput Mach	24	12.5
85	NEC Corp	115	339	33.9	IEEE	115	33.9	AIP Publishing	71	20.9
86	MEMRAY CORP	113	265	42.6	IEEE	113	42.6	Joint IEEE and ACM	68	25.7
87	Tela Innovations inc	112	355	31.5	SPIE-Int Soc Opt Engineering	134	37.7	IEEE	112	31.5
88	Soitec SA	111	140	79.3	IEEE	111	79.3	IET/IEE	7	5.0
89	Round Rock Research LLC	105	471	22.3	RELX Group (Elsevier)	138	29.3	IEEE	105	22.3
90	Cisco Systems Inc.	92	203	45.3	IEEE	92	45.3	ACM-Assoc Comput Mach	54	26.6
91	Ecole Polytechnique Federale	89	136	65.4	IEEE	89	65.4	Joint IEEE and ACM	13	9.6
92	Nokia Corporation	87	197	44.2	IEEE	87	44.2	ACM-Assoc Comput Mach	29	14.7
93	Interuniversity MicroElectron	84	177	47.5	IEEE	84	47.5	Joint IEEE and ACM	23	13.0
94	Alibaba Group Holding Ltd	83	178	46.6	IEEE	83	46.6	Joint IEEE and ACM	36	20.2
95	Waratek Ltd. (former Warate	83	220	37.7	IEEE	83	37.7	ACM-Assoc Comput Mach	55	25.0
96	Tohoku University	79	235	33.6	IEEE	79	33.6	AIP Publishing	54	23.0
97	Centre National De La Reche	77	240	32.1	IEEE	77	32.1	AIP Publishing	53	22.1
98	SEEQC INC	75	135	55.6	IEEE	75	55.6	AIP Publishing	20	14.8
99	University of Michigan	74	202	36.6	IEEE	74	36.6	Joint IEEE and ACM	44	21.8
100	INSTON INC	72	239	30.1	IEEE	72	30.1	Springer Nature	51	21.3

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>IOT/Internet of Things</i>										
1	Apple Inc	5378	16968	31.7	IEEE	5378	31.7	ACM-Assoc Comput Mach	3281	19.3
2	SolarEdge Technologies Inc	2389	2997	79.7	IEEE	2389	79.7	WIP-Renewable Energies	174	5.8
3	STRONG FORCE IOT PORT	1387	1940	71.5	IEEE	1387	71.5	RELX Group (Elsevier)	169	8.7
4	Velatia Group	793	1074	73.8	IEEE	793	73.8	Echelon Corp	81	7.5
5	Cisco Systems Inc.	646	1374	47.0	IEEE	646	47.0	ACM-Assoc Comput Mach	210	15.3
6	Comcast Corp	609	639	95.3	IEEE	609	95.3	Procedia Social and Behavioral sci	17	2.7
7	SIPCO LLC	594	952	62.4	IEEE	594	62.4	ACM-Assoc Comput Mach	80	8.4
8	Rockwell Automation Inc	495	883	56.1	IEEE	495	56.1	ACM-Assoc Comput Mach	89	10.1
9	International Business Machi	439	1232	35.6	IEEE	439	35.6	IP.Com	146	11.9
10	AT&T Inc	397	872	45.5	IEEE	397	45.5	RELX Group (Elsevier)	62	7.1
11	Alphabet Inc.	359	772	46.5	IEEE	359	46.5	ACM-Assoc Comput Mach	130	16.8
12	Samsung Electronics Co Ltd	327	514	63.6	IEEE	327	63.6	ACM-Assoc Comput Mach	42	8.2
13	Honeywell International Inc.	318	499	63.7	IEEE	318	63.7	RELX Group (Elsevier)	31	6.2
14	STRONG FORCE TX PORT	306	679	45.1	IEEE	306	45.1	RELX Group (Elsevier)	126	18.6
15	Microsoft Corporation	272	704	38.6	IEEE	272	38.6	ACM-Assoc Comput Mach	115	16.3
16	ORIGIN WIRELESS INC	245	360	68.1	IEEE	245	68.1	American Physical Society	21	5.8
17	Johnson & Johnson	242	610	39.7	IEEE	242	39.7	RELX Group (Elsevier)	112	18.4
18	TRILLIANT NETWORKS IN	237	329	72.0	IEEE	237	72.0	RELX Group (Elsevier)	22	6.7
19	Sonos Inc	228	494	46.2	IEEE	228	46.2	SPIE-Int Soc Opt Engineering	51	10.3
20	Walmart Stores Inc	178	476	37.4	IEEE	178	37.4	CBS Interactive	47	9.9
21	GE Aerospace (f/k/a General	175	262	66.8	IEEE	175	66.8	RELX Group (Elsevier)	12	4.6
22	Palo Alto Networks	170	219	77.6	IEEE	170	77.6	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	13	5.9
23	EAGLE HARBOR HOLDIN	161	400	40.3	IEEE	161	40.3	SAE-Society of Automobile Engineers	135	33.8
24	LG Electronics Inc.	158	258	61.2	IEEE	158	61.2	International Association for Cryptologic Research (IACR)	30	11.6
25	Intel Corporation	151	262	57.6	IEEE	151	57.6	ACM-Assoc Comput Mach	42	16.0
26	Johnson Controls Internationa	151	454	33.3	IEEE	151	33.3	RELX Group (Elsevier)	105	23.1
27	State Farm Mutual Automobi	144	577	25.0	IEEE	144	25.0	IP.Com	61	10.6
28	Schneider Electric S.A.	140	1058	13.2	ISA - Instrumentation, Systems & Automation	210	19.8	IEEE	140	13.2
29	California Institute of Techno	137	246	55.7	IEEE	137	55.7	Springer Nature	19	7.7
30	III HOLDINGS 12 LLC	134	277	48.4	IEEE	134	48.4	ACM-Assoc Comput Mach	36	13.0
31	ABB Ltd	133	163	81.6	IEEE	133	81.6	RELX Group (Elsevier)	6	3.7
32	Emerson Electric Co.	122	308	39.6	IEEE	122	39.6	RELX Group (Elsevier)	87	28.2
33	AMPT LLC	121	157	77.1	IEEE	121	77.1	RELX Group (Elsevier)	8	5.1
34	Battelle Memorial Institute	118	163	72.4	IEEE	118	72.4	RELX Group (Elsevier)	8	4.9
35	Qualcomm Inc	114	183	62.3	IEEE	114	62.3	<std> VESA - Video Electronic Standards Assoc	17	9.3
36	EchoStar Corp	112	192	58.3	IEEE	112	58.3	CBS Interactive	24	12.5
37	KIP PROD P1 LP	112	210	53.3	IEEE	112	53.3	American Society of Plant Biologists	18	8.6
38	Toyota Motor Corp	112	320	35.0	IEEE	112	35.0	ACM-Assoc Comput Mach	52	16.3
39	DOMINION ENERGY TEC	110	130	84.6	IEEE	110	84.6	IET/IEE	8	6.2

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	NETWORK-1 TECHNOLOG	109	161	67.7	IEEE	109	67.7	ARES Conferences	20	12.4
41	Causam Enterprises (former	101	178	56.7	IEEE	101	56.7	Springer Nature	21	11.8
42	Siemens Aktiengesellschaft	100	173	57.8	IEEE	100	57.8	ACM-Assoc Comput Mach	12	6.9
43	Nokia Corporation	99	178	55.6	IEEE	99	55.6	ACM-Assoc Comput Mach	11	6.2
44	ASTROLINK INTERNATIO	97	117	82.9	IEEE	97	82.9	IET/IEEE	8	6.8
45	Sap SE	94	257	36.6	IEEE	94	36.6	ACM-Assoc Comput Mach	48	18.7
46	UNIVERSITY OF SAO PAU	90	167	53.9	IEEE	90	53.9	International Association for Cryptologic Research (IACR)	27	16.2
47	Amazon.com Inc.	89	271	32.8	IEEE	89	32.8	ACM-Assoc Comput Mach	51	18.8
48	Georgia Institute of Technolo	79	277	28.5	ACM-Assoc Comput Mach	120	43.3	IEEE	79	28.5
49	Adaptive Computing Enterpri	72	148	48.6	IEEE	72	48.6	ACM-Assoc Comput Mach	27	18.2
50	Alstom S.A.	72	89	80.9	IEEE	72	80.9	IET/IEEE	11	12.4
51	STATSIGNAL SYSTEMS IN	71	112	63.4	IEEE	71	63.4	ACM-Assoc Comput Mach	9	8.0
52	BORGIA/CUMMINS LLC	69	102	67.6	IEEE	69	67.6	SPIE-Int Soc Opt Engineering	17	16.7
53	MIDDLE CHART LLC	69	108	63.9	IEEE	69	63.9	Multidisciplinary Digital Publishing Institute (MDPI)	22	20.4
54	GE Vernova	66	95	69.5	IEEE	66	69.5	RELX Group (Elsevier)	10	10.5
55	Itron Inc.	66	108	61.1	IEEE	66	61.1	ACM-Assoc Comput Mach	18	16.7
56	Zebra Technologies Corp.	66	107	61.7	IEEE	66	61.7	RFID Journal/YGS Group	11	10.3
57	PASSIVELOGIC INC	65	112	58.0	IEEE	65	58.0	RELX Group (Elsevier)	14	12.5
58	SENSE LABS INC	65	404	16.1	NILM Organizing Committee	303	75.0	IEEE	65	16.1
59	TRIAX TECHNOLOGIES IN	65	107	60.7	IEEE	65	60.7	RELX Group (Elsevier)	12	11.2
60	University of California	64	1789	3.6	ACS-Am Chem Soc	507	28.3	Royal Society of Chemistry	296	16.5
61	Conviva Wireless LLC	62	113	54.9	IEEE	62	54.9	RELX Group (Elsevier)	10	8.8
62	Hewlett Packard Enterprises	62	136	45.6	IEEE	62	45.6	ACM-Assoc Comput Mach	16	11.8
63	SECURENET SOLUTIONS	62	161	38.5	IEEE	62	38.5	ACM-Assoc Comput Mach	27	16.8
64	University System of Maryla	62	66	93.9	IEEE	62	93.9	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	2	3.0
65	Aeris Communications Inc	61	84	72.6	IEEE	61	72.6	RELX Group (Elsevier)	13	15.5
66	Dexcom Inc	61	453	13.5	RELX Group (Elsevier)	94	20.8	American Diabetes Association	70	15.5
67	Dell Technologies Inc	60	138	43.5	IEEE	60	43.5	ACM-Assoc Comput Mach	27	19.6
68	Koninklijke Philips N.V.	57	231	24.7	IEEE	57	24.7	Springer Nature	28	12.1
69	CARTICA AI LTD	56	81	69.1	IEEE	56	69.1	ACM-Assoc Comput Mach	8	9.9
70	Panasonic Holding Corporati	56	79	70.9	IEEE	56	70.9	Springer Nature	4	5.1
71	Western Digital Corp.	56	68	82.4	IEEE	56	82.4	RELX Group (Elsevier)	12	17.6
72	SMART WIRES INC	55	79	69.6	IEEE	55	69.6	ACM-Assoc Comput Mach	6	7.6
73	AFERO INC	53	71	74.6	IEEE	53	74.6	United Business Media/UBM Tech	11	15.5
74	Irobot Corp	53	100	53.0	IEEE	53	53.0	SPIE-Int Soc Opt Engineering	10	10.0
75	DELTA ENERGY & COMM	52	140	37.1	IEEE	52	37.1	RELX Group (Elsevier)	35	25.0
76	Huawei Technologies Compa	52	173	30.1	ACM-Assoc Comput Mach	56	32.4	IEEE	52	30.1
77	HELLO INC	51	81	63.0	IEEE	51	63.0	ACM-Assoc Comput Mach	16	19.8
78	PTC Inc	51	130	39.2	IEEE	51	39.2	ACM-Assoc Comput Mach	21	16.2
79	Deere & Co.	47	83	56.6	IEEE	47	56.6	SPIE-Int Soc Opt Engineering	5	6.0
80	Hubbell Inc.	47	81	58.0	IEEE	47	58.0	RELX Group (Elsevier)	11	13.6

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	University of Texas	46	139	33.1	IEEE	46	33.1	RELX Group (Elsevier)	26	18.7
82	Continental AG (Germany Fe	45	65	69.2	IEEE	45	69.2	Springer Nature	4	6.2
83	University of Minnesota (The	44	52	84.6	IEEE	44	84.6	RELX Group (Elsevier)	3	5.8
84	3M Co	43	65	66.2	IEEE	43	66.2	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	8	12.3
85	Abbott Laboratories	43	485	8.9	RELX Group (Elsevier)	59	12.2	Mary Ann Liebert Inc.	53	10.9
86	Ericsson	43	133	32.3	Internet Soc/IETF-Internet Eng Task Force	56	42.1	IEEE	43	32.3
87	Fresenius Medical Care AG (f	43	64	67.2	IEEE	43	67.2	Multimed, Inc.	10	15.6
88	Schweitzer Engineering Labo	42	50	84.0	IEEE	42	84.0	ACM-Assoc Comput Mach	3	6.0
89	Commvault Systems Inc.	41	75	54.7	IEEE	41	54.7	ACM-Assoc Comput Mach	10	13.3
90	Solera Holdings Inc	41	56	73.2	IEEE	41	73.2	New York Times	4	7.1
91	PROXY INC	40	49	81.6	IEEE	40	81.6	Euromicro.org	8	16.3
92	Boeing Co. (The)	38	75	50.7	IEEE	38	50.7	RELX Group (Elsevier)	5	6.7
93	NURO INC	38	65	58.5	IEEE	38	58.5	Neural Information Processing Systems Foundation	4	6.2
94	The Arizona Board of Regent	38	90	42.2	IEEE	38	42.2	RELX Group (Elsevier)	7	7.8
95	Enphase Energy Inc	37	37	100.0	IEEE	37	100.0			
96	MAY PATENTS LTD	37	143	25.9	SAE-Society of Automobile Engineers	106	74.1	IEEE	37	25.9
97	Totalenergies SE (formerly T	37	46	80.4	IEEE	37	80.4	EPE Association	4	8.7
98	NEC Corp	36	71	50.7	IEEE	36	50.7	Optica Publishing Group	6	8.5
99	InterDigital Inc	35	68	51.5	IEEE	35	51.5	Springer Nature	4	5.9
100	THE FLORIDA INTERNATI	35	86	40.7	IEEE	35	40.7	ACM-Assoc Comput Mach	22	25.6

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Measuring, Testing and Control Devices</i>										
1	Thermo Fisher Scientific Inc	4063	22849	17.8	RELX Group (Elsevier)	7898	34.6	IEEE	4063	17.8
2	Siemens Aktiengesellschaft	3565	9294	38.4	IEEE	3565	38.4	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	2294	24.7
3	Allegro Microsystems Inc	3487	4545	76.7	IEEE	3487	76.7	RELX Group (Elsevier)	733	16.1
4	Mass General Brigham (form	3068	49628	6.2	Optica Publishing Group	18006	36.3	RELX Group (Elsevier)	6774	13.6
5	International Business Machi	2599	8041	32.3	IEEE	2599	32.3	RELX Group (Elsevier)	529	6.6
6	Honeywell International Inc.	2238	8014	27.9	IEEE	2238	27.9	RELX Group (Elsevier)	1112	13.9
7	Irobot Corp	2178	4484	48.6	IEEE	2178	48.6	SPIE-Int Soc Opt Engineering	629	14.0
8	Microsoft Corporation	1935	5461	35.4	IEEE	1935	35.4	ACM-Assoc Comput Mach	1301	23.8
9	STRONG FORCE IOT PORT	1867	2594	72.0	IEEE	1867	72.0	RELX Group (Elsevier)	220	8.5
10	FormFactor Inc	1745	3462	50.4	IEEE	1745	50.4	Springer Nature	642	18.5
11	Texas Instruments Inc	1745	2105	82.9	IEEE	1745	82.9	RELX Group (Elsevier)	74	3.5
12	SolarEdge Technologies Inc	1422	1772	80.2	IEEE	1422	80.2	WIP-Renewable Energies	116	6.5
13	Alphabet Inc.	1328	3622	36.7	IEEE	1328	36.7	ACM-Assoc Comput Mach	440	12.1
14	GE Aerospace (f/k/a General	1264	5057	25.0	IEEE	1264	25.0	RELX Group (Elsevier)	903	17.9
15	University of Minnesota (The	1263	4153	30.4	IEEE	1263	30.4	RELX Group (Elsevier)	494	11.9
16	California Institute of Techno	1104	9147	12.1	IEEE	1104	12.1	RELX Group (Elsevier)	1039	11.4
17	Illumina Inc.	1101	5355	20.6	IEEE	1101	20.6	Royal Society of Chemistry	746	13.9
18	Apple Inc	1083	2572	42.1	IEEE	1083	42.1	ACM-Assoc Comput Mach	331	12.9
19	Massachusetts Institute of Te	1003	6853	14.6	IEEE	1003	14.6	RELX Group (Elsevier)	854	12.5
20	Infineon Technologies AG	864	1429	60.5	IEEE	864	60.5	RELX Group (Elsevier)	148	10.4
21	Emerson Electric Co.	824	3065	26.9	IEEE	824	26.9	RELX Group (Elsevier)	563	18.4
22	Qualcomm Inc	770	1385	55.6	IEEE	770	55.6	RELX Group (Elsevier)	102	7.4
23	AT&T Inc	768	1710	44.9	IEEE	768	44.9	ACM-Assoc Comput Mach	110	6.4
24	NXP Semiconductors NV	756	1118	67.6	IEEE	756	67.6	RELX Group (Elsevier)	66	5.9
25	Commissariat A L'Energie At	750	2533	29.6	IEEE	750	29.6	RELX Group (Elsevier)	570	22.5
26	Amazon.com Inc.	741	1317	56.3	IEEE	741	56.3	IEEE/RSJ	66	5.0
27	SLB.com (former Schlumber	736	11258	6.5	Society of Exploration Geophysicists	2149	19.1	Society of Petroleum Engineers	1842	16.4
28	Intel Corporation	734	1839	39.9	IEEE	734	39.9	RELX Group (Elsevier)	141	7.7
29	TuSimple	716	1182	60.6	IEEE	716	60.6	arXiv.org	99	8.4
30	ABB Ltd	713	1320	54.0	IEEE	713	54.0	RELX Group (Elsevier)	164	12.4
31	Honda Motor Co. Ltd.(Honda	708	1623	43.6	IEEE	708	43.6	RELX Group (Elsevier)	147	9.1
32	Boeing Co. (The)	676	2391	28.3	IEEE	676	28.3	RELX Group (Elsevier)	322	13.5
33	Analog Devices Inc.	674	1084	62.2	IEEE	674	62.2	RELX Group (Elsevier)	80	7.4
34	Applied Materials Inc.	670	1413	47.4	IEEE	670	47.4	AIP Publishing	124	8.8
35	Johnson Controls Internationa	666	2317	28.7	RELX Group (Elsevier)	695	30.0	IEEE	666	28.7
36	STMicroelectronics	658	1102	59.7	IEEE	658	59.7	RELX Group (Elsevier)	143	13.0
37	University of Illinois	629	6439	9.8	AIP Publishing	936	14.5	RELX Group (Elsevier)	912	14.2
38	Lockheed Martin Corp.	606	9528	6.4	Springer Nature	1533	16.1	AIP Publishing	1514	15.9
39	Toyota Motor Corp	594	1496	39.7	IEEE	594	39.7	RELX Group (Elsevier)	127	8.5

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Duke University	584	3029	19.3	IEEE	584	19.3	RELX Group (Elsevier)	377	12.4
41	Battelle Memorial Institute	574	2276	25.2	IEEE	574	25.2	RELX Group (Elsevier)	530	23.3
42	RTX Corporation (f/k/a Rayt	567	1979	28.7	IEEE	567	28.7	RELX Group (Elsevier)	186	9.4
43	Samsung Electronics Co Ltd	565	1586	35.6	IEEE	565	35.6	RELX Group (Elsevier)	154	9.7
44	Midtronics Inc.	564	1271	44.4	IEEE	564	44.4	RELX Group (Elsevier)	255	20.1
45	CPG TECHNOLOGIES LLC	557	1067	52.2	IEEE	557	52.2	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	134	12.6
46	Rockwell Automation Inc	557	957	58.2	IEEE	557	58.2	RELX Group (Elsevier)	99	10.3
47	Broadcom Ltd	535	835	64.1	IEEE	535	64.1	RELX Group (Elsevier)	47	5.6
48	Intuitive Surgical Inc.	526	1543	34.1	IEEE	526	34.1	SPIE-Int Soc Opt Engineering	157	10.2
49	Industrial Technology Resear	521	1194	43.6	IEEE	521	43.6	RELX Group (Elsevier)	241	20.2
50	HEMOSONICS LLC	520	1477	35.2	IEEE	520	35.2	RELX Group (Elsevier)	247	16.7
51	University of California	476	8718	5.5	ACS-Am Chem Soc	1294	14.8	RELX Group (Elsevier)	1229	14.1
52	Koninklijke Philips N.V.	472	3652	12.9	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1130	30.9	Society of Magnetic Resonance in Medicine (SMRM)	564	15.4
53	INDIVIDUAL PATENTER	471	2734	17.2	Optica Publishing Group	713	26.1	IEEE	471	17.2
54	INTOUCH HEALTH INC	466	1289	36.2	IEEE	466	36.2	IEEE/RSJ	135	10.5
55	Nokia Corporation	465	1273	36.5	IEEE	465	36.5	Optica Publishing Group	107	8.4
56	Abbott Laboratories	464	14790	3.1	RELX Group (Elsevier)	3583	24.2	ACS-Am Chem Soc	3575	24.2
57	Synopsys Inc.	464	602	77.1	IEEE	464	77.1	Joint IEEE and ACM	47	7.8
58	Schneider Electric S.A.	454	2470	18.4	IEEE	454	18.4	RELX Group (Elsevier)	301	12.2
59	Stanford University	445	4844	9.2	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	564	11.6	RELX Group (Elsevier)	491	10.1
60	HRL Laboratories LLC	444	1032	43.0	IEEE	444	43.0	RELX Group (Elsevier)	94	9.1
61	OMNI MEDSCI INC	438	5582	7.8	Optica Publishing Group	1860	33.3	RELX Group (Elsevier)	888	15.9
62	Schweitzer Engineering Labo	433	535	80.9	IEEE	433	80.9	RELX Group (Elsevier)	31	5.8
63	University of Texas	422	2933	14.4	RELX Group (Elsevier)	436	14.9	IEEE	422	14.4
64	Bosch (Robert) GmbH	409	1477	27.7	IEEE	409	27.7	RELX Group (Elsevier)	284	19.2
65	Zebra Technologies Corp.	403	897	44.9	IEEE	403	44.9	ACM-Assoc Comput Mach	68	7.6
66	United States Navy	400	2273	17.6	IEEE	400	17.6	RELX Group (Elsevier)	282	12.4
67	Taiwan Semiconductor Manu	399	727	54.9	IEEE	399	54.9	RELX Group (Elsevier)	50	6.9
68	Advantest Corp.	388	562	69.0	IEEE	388	69.0	AIP Publishing	26	4.6
69	Teradyne Inc.	373	857	43.5	IEEE	373	43.5	ASME-Am Soc Mech Eng	130	15.2
70	The Arizona Board of Regent	357	2308	15.5	IEEE	357	15.5	RELX Group (Elsevier)	347	15.0
71	NVIDIA Corp.	349	627	55.7	IEEE	349	55.7	SAE-Society of Automobile Engineers	49	7.8
72	FARO Technologies Inc.	347	1323	26.2	IEEE	347	26.2	SPIE-Int Soc Opt Engineering	254	19.2
73	Xerox Corp	342	1427	24.0	IEEE	342	24.0	RELX Group (Elsevier)	167	11.7
74	ParkerVision Inc	332	531	62.5	IEEE	332	62.5	IET/IEE	50	9.4
75	Intellectual Ventures Manage	317	1799	17.6	IEEE	317	17.6	RELX Group (Elsevier)	181	10.1
76	General Motors Corp	314	577	54.4	IEEE	314	54.4	RELX Group (Elsevier)	62	10.7
77	Ford Motor Co.	308	810	38.0	IEEE	308	38.0	RELX Group (Elsevier)	78	9.6
78	Saudi Arabian Oil Company (	308	7376	4.2	Society of Exploration Geophysicists	1483	20.1	RELX Group (Elsevier)	1374	18.6
79	BLANDING HOVENWEEP	305	768	39.7	IEEE	305	39.7	SPIE-Int Soc Opt Engineering	116	15.1
80	Toshiba Corp	305	1066	28.6	IEEE	305	28.6	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	196	18.4

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Brain Corporation	302	704	42.9	IEEE	302	42.9	MIT Press	70	9.9
82	Ericsson	302	459	65.8	IEEE	302	65.8	ACM-Assoc Comput Mach	21	4.6
83	Advanced Micro Devices Inc	298	460	64.8	IEEE	298	64.8	RELX Group (Elsevier)	21	4.6
84	TDK Corporation	292	697	41.9	IEEE	292	41.9	RELX Group (Elsevier)	130	18.7
85	University of Southern Califo	292	900	32.4	IEEE	292	32.4	RELX Group (Elsevier)	73	8.1
86	Halliburton Co. (Holding)	285	5146	5.5	Society of Petroleum Engineers	1572	30.5	Society of Exploration Geophysicists	615	12.0
87	State Farm Mutual Automobi	285	983	29.0	IEEE	285	29.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	69	7.0
88	University of Michigan	285	1819	15.7	IEEE	285	15.7	RELX Group (Elsevier)	257	14.1
89	Purdue University	284	2386	11.9	ACS-Am Chem Soc	391	16.4	RELX Group (Elsevier)	350	14.7
90	Georgia Institute of Technolo	278	946	29.4	IEEE	278	29.4	Optica Publishing Group	116	12.3
91	HI LLC	277	2511	11.0	AIP Publishing	696	27.7	RELX Group (Elsevier)	313	12.5
92	University of Alabama	273	1161	23.5	RELX Group (Elsevier)	306	26.4	IEEE	273	23.5
93	Hitachi Ltd	271	1315	20.6	IEEE	271	20.6	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	196	14.9
94	MACAU UNIVERSITY OF	270	315	85.7	IEEE	270	85.7	RELX Group (Elsevier)	18	5.7
95	DYNEXUS TECHNOLOGY	264	386	68.4	IEEE	264	68.4	SAE-Society of Automobile Engineers	24	6.2
96	University of Nebraska	263	877	30.0	IEEE	263	30.0	RELX Group (Elsevier)	95	10.8
97	Mitsubishi Electric Corp	260	548	47.4	IEEE	260	47.4	RELX Group (Elsevier)	58	10.6
98	University of Pennsylvania	258	1429	18.1	IEEE	258	18.1	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	168	11.8
99	Canon Inc	256	2164	11.8	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	473	21.9	IEEE	256	11.8
100	HP Inc	253	1148	22.0	IEEE	253	22.0	ACS-Am Chem Soc	138	12.0

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Optics/Photography/Electrophotography</i>										
1	Qualcomm Inc	1852	5117	36.2	IEEE	1852	36.2	SID-Society for Information Display	979	19.1
2	Nokia Corporation	1503	3579	42.0	IEEE	1503	42.0	Optica Publishing Group	449	12.5
3	Mass General Brigham (form	985	15321	6.4	Optica Publishing Group	5802	37.9	RELX Group (Elsevier)	2142	14.0
4	Magic Leap Inc	810	4359	18.6	IEEE	810	18.6	ACM-Assoc Comput Mach	644	14.8
5	Alphabet Inc.	673	2489	27.0	IEEE	673	27.0	SPIE-Int Soc Opt Engineering	369	14.8
6	IDC LLC	642	1688	38.0	IEEE	642	38.0	SID-Society for Information Display	236	14.0
7	Nikon Corp.	626	4104	15.3	SPIE-Int Soc Opt Engineering	1848	45.0	SEMATECH Consortium	847	20.6
8	coherent Corp (f/k/a II-VI Inc	616	2119	29.1	IEEE	616	29.1	Optica Publishing Group	479	22.6
9	The Arizona Board of Regent	603	4749	12.7	Optica Publishing Group	1527	32.2	SPIE-Int Soc Opt Engineering	626	13.2
10	Massachusetts Institute of Te	583	3715	15.7	Optica Publishing Group	625	16.8	IEEE	583	15.7
11	Microsoft Corporation	574	2040	28.1	IEEE	574	28.1	ACM-Assoc Comput Mach	337	16.5
12	Corning Inc.	525	4528	11.6	Optica Publishing Group	943	20.8	RELX Group (Elsevier)	694	15.3
13	E-Ink Holdings Inc	432	4710	9.2	SID-Society for Information Display	2026	43.0	IEEE	432	9.2
14	Intellectual Ventures Manage	428	2039	21.0	IEEE	428	21.0	American Physical Society	277	13.6
15	ASML Holding NV	424	10950	3.9	SPIE-Int Soc Opt Engineering	4052	37.0	AIP Publishing	1810	16.5
16	Hoya Corp	421	1242	33.9	IEEE	421	33.9	AIP Publishing	255	20.5
17	California Institute of Techno	418	4959	8.4	Optica Publishing Group	1600	32.3	Springer Nature	515	10.4
18	Samsung Electronics Co Ltd	329	2316	14.2	Optica Publishing Group	426	18.4	IEEE	329	14.2
19	Tobii Ab	321	754	42.6	IEEE	321	42.6	SPIE-Int Soc Opt Engineering	120	15.9
20	Global Foundries Inc	320	1393	23.0	Optica Publishing Group	680	48.8	IEEE	320	23.0
21	International Business Machi	286	1839	15.6	SPIE-Int Soc Opt Engineering	380	20.7	IEEE	286	15.6
22	MONOLITHIC 3D INC	282	493	57.2	IEEE	282	57.2	IEEE/JPN Soc App Phys	50	10.1
23	Intel Corporation	279	939	29.7	IEEE	279	29.7	SPIE-Int Soc Opt Engineering	138	14.7
24	DIGILENS INC	276	9347	3.0	Optica Publishing Group	1862	19.9	SPIE-Int Soc Opt Engineering	1436	15.4
25	Cisco Systems Inc.	273	669	40.8	IEEE	273	40.8	Optica Publishing Group	192	28.7
26	Stanford University	272	2440	11.1	Optica Publishing Group	362	14.8	IEEE	272	11.1
27	Xperi Inc. (f/k/a Tessera Inc)	269	612	44.0	IEEE	269	44.0	SPIE-Int Soc Opt Engineering	80	13.1
28	ALENTIC MICROSCIENCE	264	985	26.8	IEEE	264	26.8	Royal Society of Chemistry	126	12.8
29	Screen Holdings Co Ltd (For	252	935	27.0	IEEE	252	27.0	RELX Group (Elsevier)	139	14.9
30	NVIDIA Corp.	230	691	33.3	IEEE	230	33.3	IET/IEE	89	12.9
31	Adobe Inc. (former Adobe Sy	219	493	44.4	IEEE	219	44.4	ACM-Assoc Comput Mach	127	25.8
32	University of California	214	2140	10.0	Optica Publishing Group	341	15.9	Springer Nature	298	13.9
33	CHEETAH OMNI LLC	213	909	23.4	Optica Publishing Group	234	25.7	IEEE	213	23.4
34	Texas Instruments Inc	213	774	27.5	IEEE	213	27.5	AIP Publishing	131	16.9
35	Lockheed Martin Corp.	188	1150	16.3	Optica Publishing Group	291	25.3	IEEE	188	16.3
36	Synopsys Inc.	186	1368	13.6	SPIE-Int Soc Opt Engineering	673	49.2	IEEE	186	13.6
37	Micron Technology Inc.	180	1683	10.7	AIP Publishing	312	18.5	RELX Group (Elsevier)	210	12.5
38	Canon Inc	169	1971	8.6	AIP Publishing	231	11.7	SPIE-Int Soc Opt Engineering	229	11.6
39	Honeywell International Inc.	168	805	20.9	IEEE	168	20.9	Optica Publishing Group	161	20.0

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	RTX Corporation (f/k/a Rayt	167	2981	5.6	Optica Publishing Group	705	23.6	SPIE-Int Soc Opt Engineering	575	19.3
41	Huawei Technologies Compa	166	421	39.4	IEEE	166	39.4	Optica Publishing Group	121	28.7
42	HP Inc	164	794	20.7	IEEE	164	20.7	Optica Publishing Group	90	11.3
43	Princeton University	163	404	40.3	IEEE	163	40.3	American Physical Society	49	12.1
44	STEYPHI SERVICES DE LL	161	458	35.2	IEEE	161	35.2	Optica Publishing Group	104	22.7
45	University of Colorado (The	158	2317	6.8	Optica Publishing Group	912	39.4	RELX Group (Elsevier)	260	11.2
46	Prysmian SPA	147	852	17.3	Optica Publishing Group	191	22.4	IEEE/OSA	150	17.6
47	Meta Platforms Inc.(formerly	146	1654	8.8	Optica Publishing Group	307	18.6	SPIE-Int Soc Opt Engineering	197	11.9
48	Lumentum Holdings Inc	140	563	24.9	IEEE	140	24.9	Optica Publishing Group	126	22.4
49	AUGMENTED VISION INC	137	1095	12.5	Optica Publishing Group	372	34.0	SPIE-Int Soc Opt Engineering	157	14.3
50	Carl-Zeiss Stiftung	135	3401	4.0	SPIE-Int Soc Opt Engineering	1173	34.5	Optica Publishing Group	638	18.8
51	Electronics and Telecommuni	134	428	31.3	IEEE	134	31.3	Optica Publishing Group	89	20.8
52	Nippon Telegraph & Telepho	133	709	18.8	Optica Publishing Group	137	19.3	IEEE	133	18.8
53	University of Texas	133	1360	9.8	Optica Publishing Group	203	14.9	AIP Publishing	195	14.3
54	VASCULAR IMAGING CO	133	281	47.3	IEEE	133	47.3	IET/IEE	80	28.5
55	CIRREX SYSTEMS LLC	131	553	23.7	IEEE	131	23.7	Optica Publishing Group	79	14.3
56	Fujitsu Limited	127	571	22.2	IEEE	127	22.2	Optica Publishing Group	87	15.2
57	Ostendo Technologies Inc	127	496	25.6	IEEE	127	25.6	ACM-Assoc Comput Mach	84	16.9
58	3M Co	119	3143	3.8	Optica Publishing Group	470	15.0	RELX Group (Elsevier)	350	11.1
59	Apple Inc	119	809	14.7	Optica Publishing Group	207	25.6	SPIE-Int Soc Opt Engineering	126	15.6
60	University of Illinois	118	809	14.6	Optica Publishing Group	160	19.8	AIP Publishing	135	16.7
61	STMicroelectronics	116	302	38.4	IEEE	116	38.4	SPIE-Int Soc Opt Engineering	42	13.9
62	Skorpios Technologies Inc	115	251	45.8	IEEE	115	45.8	Optica Publishing Group	87	34.7
63	Viavi Solutions Inc	110	612	18.0	Optica Publishing Group	117	19.1	SPIE-Int Soc Opt Engineering	115	18.8
64	Adeia Inc (f/k/a Xperi Holdin	109	232	47.0	IEEE	109	47.0	RELX Group (Elsevier)	42	18.1
65	Georgia Institute of Technolo	108	300	36.0	IEEE	108	36.0	ACS-Am Chem Soc	36	12.0
66	Applied Materials Inc.	105	598	17.6	SPIE-Int Soc Opt Engineering	167	27.9	IEEE	105	17.6
67	Xerox Corp	102	1067	9.6	ACS-Am Chem Soc	238	22.3	RELX Group (Elsevier)	125	11.7
68	University of Washington	95	917	10.4	Optica Publishing Group	139	15.2	Springer Nature	124	13.5
69	Industrial Technology Resear	93	410	22.7	IEEE	93	22.7	SPIE-Int Soc Opt Engineering	67	16.3
70	InterDigital Inc	89	581	15.3	Optica Publishing Group	165	28.4	IEEE	89	15.3
71	Columbia University	88	1024	8.6	Springer Nature	186	18.2	Optica Publishing Group	163	15.9
72	NXP Semiconductors NV	87	265	32.8	IEEE	87	32.8	AIP Publishing	39	14.7
73	ROCKLEY PHOTONICS LT	87	266	32.7	IEEE	87	32.7	Optica Publishing Group	84	31.6
74	Hewlett Packard Enterprises	86	240	35.8	IEEE	86	35.8	Optica Publishing Group	68	28.3
75	Ericsson	84	369	22.8	Optica Publishing Group	105	28.5	IEEE	84	22.8
76	Furukawa Electric Co. Ltd.	83	682	12.2	Optica Publishing Group	239	35.0	IEICE-Inst Elec Info Comm Eng	93	13.6
77	Juniper Networks Inc.	83	174	47.7	IEEE	83	47.7	Optica Publishing Group	51	29.3
78	Oracle Corporation	82	171	48.0	IEEE	82	48.0	Optica Publishing Group	40	23.4
79	Panasonic Holding Corporati	80	525	15.2	SPIE-Int Soc Opt Engineering	95	18.1	IEEE	80	15.2
80	Sumitomo Electric Industries	80	787	10.2	Optica Publishing Group	203	25.8	European Conference on Optical Communication (ECOC) Soc	99	12.6

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	BEIJING INSTITUTE OF TE	79	537	14.7	Optica Publishing Group	173	32.2	IEEE	79	14.7
82	Velocity One (f/k/a Emcore C	77	123	62.6	IEEE	77	62.6	Optica Publishing Group	9	7.3
83	Oewaves Inc	76	253	30.0	Optica Publishing Group	100	39.5	IEEE	76	30.0
84	University of North Carolina	76	544	14.0	SPIE-Int Soc Opt Engineering	82	15.1	IEEE	76	14.0
85	Commscope Holding (formerl	75	961	7.8	Optica Publishing Group	215	22.4	IEEE/OSA	181	18.8
86	Chiral Photonics Inc	69	542	12.7	SPIE-Int Soc Opt Engineering	175	32.3	Optica Publishing Group	147	27.1
87	Hong Kong University of Sci	69	151	45.7	IEEE	69	45.7	RELX Group (Elsevier)	11	7.3
88	Commissariat A L'Energie At	68	412	16.5	Optica Publishing Group	80	19.4	IEEE	68	16.5
89	Koninklijke Philips N.V.	68	747	9.1	SPIE-Int Soc Opt Engineering	156	20.9	Optica Publishing Group	92	12.3
90	NLIGHT PHOTONICS COR	68	1282	5.3	Optica Publishing Group	438	34.2	SPIE-Int Soc Opt Engineering	276	21.5
91	OmniGuide Inc	68	734	9.3	Optica Publishing Group	183	24.9	IEEE/OSA	73	9.9
92	Fujikura Ltd.	67	593	11.3	Optica Publishing Group	179	30.2	IEICE-Inst Elec Info Comm Eng	112	18.9
93	Seiko Epson Corporation	67	262	25.6	IEEE	67	25.6	SID-Society for Information Display	52	19.8
94	University of Connecticut	67	351	19.1	Optica Publishing Group	144	41.0	IEEE	67	19.1
95	HRL Laboratories LLC	66	320	20.6	IEEE	66	20.6	AIP Publishing	53	16.6
96	Johnson & Johnson	66	2219	3.0	Optica Publishing Group	441	19.9	RELX Group (Elsevier)	349	15.7
97	Cornell University	65	570	11.4	Optica Publishing Group	84	14.7	RELX Group (Elsevier)	69	12.1
98	KLA Corporation (f/k/a KLA	65	419	15.5	SPIE-Int Soc Opt Engineering	157	37.5	IEEE	65	15.5
99	OMNI MEDSCI INC	63	983	6.4	Optica Publishing Group	340	34.6	RELX Group (Elsevier)	158	16.1
100	Shin-Etsu Chemical Co. Ltd.	63	1629	3.9	SPIE-Int Soc Opt Engineering	814	50.0	Technical Association of Photopolymers	365	22.4

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Power Systems</i>										
1	SolarEdge Technologies Inc	10325	12877	80.2	IEEE	10325	80.2	WIP-Renewable Energies	843	6.5
2	Witricity Corp	4630	8909	52.0	IEEE	4630	52.0	AIP Publishing	724	8.1
3	CPG TECHNOLOGIES LLC	2696	5220	51.6	IEEE	2696	51.6	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	633	12.1
4	Energous Corporation	2002	2573	77.8	IEEE	2002	77.8	ADCOM - Advanced Computing and Communications Societ	201	7.8
5	Massachusetts Institute of Te	1741	4885	35.6	IEEE	1741	35.6	RELX Group (Elsevier)	656	13.4
6	Cirrus Logic Inc.	1725	1837	93.9	IEEE	1725	93.9	EPE Association	29	1.6
7	Flex Ltd (f/k/aFlextronics Intl	1667	1810	92.1	IEEE	1667	92.1	United Business Media/UBM Tech	79	4.4
8	ABB Ltd	1648	2185	75.4	IEEE	1648	75.4	EPE Association	68	3.1
9	Totalenergies SE (formerly T	1487	1726	86.2	IEEE	1487	86.2	IET/IEE	54	3.1
10	Rockwell Automation Inc	1357	1519	89.3	IEEE	1357	89.3	EPE Association	41	2.7
11	GE Aerospace (f/k/a General	1202	2061	58.3	IEEE	1202	58.3	RELX Group (Elsevier)	237	11.5
12	MOJO MOBILITY INC	1181	1551	76.1	IEEE	1181	76.1	RELX Group (Elsevier)	129	8.3
13	AMPT LLC	1175	1542	76.2	IEEE	1175	76.2	RELX Group (Elsevier)	93	6.0
14	Murata Manufacturing Co. Lt	1164	1462	79.6	IEEE	1164	79.6	RELX Group (Elsevier)	76	5.2
15	Renesas Electronic Corporati	1047	1231	85.1	IEEE	1047	85.1	IEEE/JPN Soc App Phys	31	2.5
16	Texas Instruments Inc	981	1168	84.0	IEEE	981	84.0	RELX Group (Elsevier)	37	3.2
17	Analog Devices Inc.	957	1283	74.6	IEEE	957	74.6	RELX Group (Elsevier)	142	11.1
18	Vicor Corp	947	1183	80.1	IEEE	947	80.1	Center for Power Electronics Systems (Virginia Tech)	44	3.7
19	SYNQOR INC	859	984	87.3	IEEE	859	87.3	Penton/IPC, Inc.	45	4.6
20	Infineon Technologies AG	842	970	86.8	IEEE	842	86.8	EPE Association	21	2.2
21	NUCURRENT INC	760	945	80.4	IEEE	760	80.4	Wireless Power Consortium	59	6.2
22	University of California	628	3513	17.9	ACS-Am Chem Soc	657	18.7	IEEE	628	17.9
23	NXP Semiconductors NV	592	728	81.3	IEEE	592	81.3	IET/IEE	19	2.6
24	Intel Corporation	583	705	82.7	IEEE	583	82.7	Joint IEEE and ACM	18	2.6
25	STMicroelectronics	573	729	78.6	IEEE	573	78.6	RELX Group (Elsevier)	34	4.7
26	Qualcomm Inc	534	682	78.3	IEEE	534	78.3	RELX Group (Elsevier)	38	5.6
27	Battelle Memorial Institute	495	2729	18.1	RELX Group (Elsevier)	596	21.8	IEEE	495	18.1
28	Qorvo	449	502	89.4	IEEE	449	89.4	European Microwave Association	16	3.2
29	International Business Machi	447	1091	41.0	IEEE	447	41.0	RELX Group (Elsevier)	144	13.2
30	Enphase Energy Inc	425	463	91.8	IEEE	425	91.8	IET/IEE	9	1.9
31	RTX Corporation (f/k/a Rayt	425	1479	28.7	IEEE	425	28.7	NASA-National Aeronautics and Space Admin	166	11.2
32	Industrial Technology Resear	420	902	46.6	IEEE	420	46.6	RELX Group (Elsevier)	223	24.7
33	Delta Electronics Inc	393	442	88.9	IEEE	393	88.9	Korean Institute of Power Electronics	15	3.4
34	Causam Enterprises (former	361	675	53.5	IEEE	361	53.5	Springer Nature	103	15.3
35	Alstom S.A.	318	424	75.0	IEEE	318	75.0	IET/IEE	32	7.5
36	Huawei Technologies Compa	312	368	84.8	IEEE	312	84.8	RELX Group (Elsevier)	9	2.4
37	Tigo Energy Inc	312	495	63.0	IEEE	312	63.0	WIP-Renewable Energies	137	27.7
38	Apple Inc	308	1610	19.1	RELX Group (Elsevier)	334	20.7	IEEE	308	19.1
39	Irobot Corp	305	599	50.9	IEEE	305	50.9	SPIE-Int Soc Opt Engineering	92	15.4

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Siemens Aktiengesellschaft	305	456	66.9	IEEE	305	66.9	RELX Group (Elsevier)	42	9.2
41	California Institute of Techno	298	3738	8.0	RELX Group (Elsevier)	1055	28.2	ACS-Am Chem Soc	603	16.1
42	Power Integrations Inc.	288	423	68.1	IEEE	288	68.1	Penton/IPC, Inc.	52	12.3
43	THE FLORIDA INTERNATI	284	457	62.1	IEEE	284	62.1	RELX Group (Elsevier)	40	8.8
44	TAE TECHNOLOGIES INC	282	463	60.9	IEEE	282	60.9	AIP Publishing	58	12.5
45	GE Vernova	270	489	55.2	IEEE	270	55.2	Wireless Power Consortium	59	12.1
46	The Arizona Board of Regent	266	1479	18.0	RELX Group (Elsevier)	316	21.4	ACS-Am Chem Soc	305	20.6
47	Honeywell International Inc.	263	852	30.9	IEEE	263	30.9	RELX Group (Elsevier)	233	27.3
48	Samsung Electronics Co Ltd	251	2348	10.7	RELX Group (Elsevier)	641	27.3	ACS-Am Chem Soc	426	18.1
49	University of Illinois	250	1102	22.7	RELX Group (Elsevier)	381	34.6	IEEE	250	22.7
50	Eaton Corp.	249	355	70.1	IEEE	249	70.1	RELX Group (Elsevier)	37	10.4
51	Powwermat Technologies Ltd	247	265	93.2	IEEE	247	93.2	AIP Publishing	11	4.2
52	Schneider Electric S.A.	242	315	76.8	IEEE	242	76.8	IET/IEE	11	3.5
53	Hitachi Ltd	233	400	58.3	IEEE	233	58.3	IET/IEE	49	12.3
54	Koch Industries Inc	230	300	76.7	IEEE	230	76.7	RELX Group (Elsevier)	13	4.3
55	Virginia Tech University	230	277	83.0	IEEE	230	83.0	RELX Group (Elsevier)	20	7.2
56	Advanced Energy Industries I	228	287	79.4	IEEE	228	79.4	RELX Group (Elsevier)	18	6.3
57	Broadcom Ltd	204	250	81.6	IEEE	204	81.6	AIP Publishing	10	4.0
58	On Semiconductor Corporati	203	244	83.2	IEEE	203	83.2	Penton/IPC, Inc.	6	2.5
59	Utah State University	202	329	61.4	IEEE	202	61.4	ACS-Am Chem Soc	31	9.4
60	University of Alabama	196	246	79.7	IEEE	196	79.7	IET/IEE	11	4.5
61	University of Washington	193	1085	17.8	RELX Group (Elsevier)	319	29.4	IEEE	193	17.8
62	Semiconductor Energy Labor	191	4682	4.1	SID-Society for Information Display	941	20.1	RELX Group (Elsevier)	679	14.5
63	Alphabet Inc.	190	287	66.2	IEEE	190	66.2	ACM-Assoc Comput Mach	15	5.2
64	Hong Kong University of Sci	185	344	53.8	IEEE	185	53.8	RELX Group (Elsevier)	57	16.6
65	Microchip Technology Inc.	185	229	80.8	IEEE	185	80.8	IEICE-Inst Elec Info Comm Eng	9	3.9
66	Vestas Wind Systems A/S	183	381	48.0	IEEE	183	48.0	RELX Group (Elsevier)	53	13.9
67	Boeing Co. (The)	182	526	34.6	IEEE	182	34.6	RELX Group (Elsevier)	80	15.2
68	Microsoft Corporation	182	487	37.4	IEEE	182	37.4	ACM-Assoc Comput Mach	94	19.3
69	University of Michigan	179	786	22.8	IEEE	179	22.8	RELX Group (Elsevier)	153	19.5
70	University of Florida	175	410	42.7	IEEE	175	42.7	RELX Group (Elsevier)	58	14.1
71	University of Wisconsin (WI	172	253	68.0	IEEE	172	68.0	RELX Group (Elsevier)	14	5.5
72	Tesla Motors Inc	170	299	56.9	IEEE	170	56.9	RELX Group (Elsevier)	34	11.4
73	General Motors Corp	169	1342	12.6	RELX Group (Elsevier)	419	31.2	ACS-Am Chem Soc	192	14.3
74	Mosaid Technologies (f/k/aC	165	194	85.1	IEEE	165	85.1	Joint IEEE and ACM	15	7.7
75	R2 SEMICONDUCTOR INC	164	167	98.2	IEEE	164	98.2	European Microwave Association	2	1.2
76	Commissariat A L'Energie At	163	829	19.7	RELX Group (Elsevier)	307	37.0	IEEE	163	19.7
77	Mitsubishi Electric Corp	160	216	74.1	IEEE	160	74.1	IET/IEE	27	12.5
78	AT&T Inc	159	333	47.7	IEEE	159	47.7	AIP Publishing	18	5.4
79	Toshiba Corp	154	828	18.6	RELX Group (Elsevier)	335	40.5	IEEE	154	18.6
80	University of Colorado (The	150	438	34.2	IEEE	150	34.2	RELX Group (Elsevier)	55	12.6

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Koninklijke Philips N.V.	149	288	51.7	IEEE	149	51.7	Wireless Power Consortium	24	8.3
82	Midtronics Inc.	148	337	43.9	IEEE	148	43.9	RELX Group (Elsevier)	64	19.0
83	Schweitzer Engineering Labo	147	151	97.4	IEEE	147	97.4	IET/IEE	3	2.0
84	Silicon Laboratories Inc	145	164	88.4	IEEE	145	88.4	SAE-Society of Automobile Engineers	12	7.3
85	University of Minnesota (The	144	279	51.6	IEEE	144	51.6	RELX Group (Elsevier)	40	14.3
86	UT-Battelle LLC	139	1127	12.3	RELX Group (Elsevier)	309	27.4	ACS-Am Chem Soc	184	16.3
87	Panasonic Holding Corporati	136	1461	9.3	RELX Group (Elsevier)	451	30.9	Electrochemical Society, Inc.	316	21.6
88	O2Micro International Ltd.	134	197	68.0	IEEE	134	68.0	Texas Instruments	21	10.7
89	University of Hong Kong	133	157	84.7	IEEE	133	84.7	IET/IEE	9	5.7
90	SMART WIRES INC	132	181	72.9	IEEE	132	72.9	Research & Reviews	11	6.1
91	Charles Stark Draper Laborat	130	234	55.6	IEEE	130	55.6	AIP Publishing	26	11.1
92	INFINITE POWER SOLUTI	130	1398	9.3	RELX Group (Elsevier)	317	22.7	AIP Publishing	309	22.1
93	University of Texas	129	1087	11.9	RELX Group (Elsevier)	249	22.9	IEEE	129	11.9
94	Mediatek Inc.	128	139	92.1	IEEE	128	92.1	IET/IEE	4	2.9
95	Bosch (Robert) GmbH	126	1414	8.9	RELX Group (Elsevier)	361	25.5	Electrochemical Society, Inc.	267	18.9
96	Western Digital Corp.	126	161	78.3	IEEE	126	78.3	McGraw Hill	16	9.9
97	TDK Corporation	124	406	30.5	IEEE	124	30.5	RELX Group (Elsevier)	84	20.7
98	Toyota Motor Corp	119	2196	5.4	RELX Group (Elsevier)	779	35.5	ACS-Am Chem Soc	311	14.2
99	Marvell Technology Group Lt	118	154	76.6	IEEE	118	76.6	Texas Instruments	17	11.0
100	LANCIUM LLC	116	261	44.4	IEEE	116	44.4	RELX Group (Elsevier)	64	24.5

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Robotics and Intelligent Manufacturing</i>										
1	Intuitive Surgical Inc.	7217	18633	38.7	IEEE	7217	38.7	The Medical Image Computing and Computer Assisted Interv	2112	11.3
2	Irobot Corp	6048	11892	50.9	IEEE	6048	50.9	SPIE-Int Soc Opt Engineering	1584	13.3
3	Alphabet Inc.	2078	4469	46.5	IEEE	2078	46.5	IEEE/RSJ	295	6.6
4	Applied Materials Inc.	1489	2537	58.7	IEEE	1489	58.7	AIP Publishing	144	5.7
5	INTOUCH HEALTH INC	1392	3838	36.3	IEEE	1392	36.3	IEEE/RSJ	403	10.5
6	Johnson & Johnson	1268	6492	19.5	RELX Group (Elsevier)	1500	23.1	IEEE	1268	19.5
7	Stryker Corp.	1112	3411	32.6	IEEE	1112	32.6	Springer Nature	512	15.0
8	Vanderbilt University	989	1801	54.9	IEEE	989	54.9	RELX Group (Elsevier)	139	7.7
9	University of Nebraska	959	4216	22.7	IEEE	959	22.7	Springer Nature	725	17.2
10	Massachusetts Institute of Te	859	2445	35.1	IEEE	859	35.1	RELX Group (Elsevier)	383	15.7
11	Brain Corporation	838	2146	39.0	IEEE	838	39.0	MIT Press	237	11.0
12	Microsoft Corporation	820	2221	36.9	IEEE	820	36.9	ACM-Assoc Comput Mach	432	19.5
13	Honda Motor Co. Ltd.(Honda	808	1988	40.6	IEEE	808	40.6	RELX Group (Elsevier)	226	11.4
14	International Business Machi	600	1909	31.4	IEEE	600	31.4	ACM-Assoc Comput Mach	222	11.6
15	TELADOC HEALTH INC	492	1412	34.8	IEEE	492	34.8	IEEE/RSJ	136	9.6
16	Amazon.com Inc.	482	868	55.5	IEEE	482	55.5	SAGE Publications Ltd	41	4.7
17	Siemens Aktiengesellschaft	473	1069	44.2	IEEE	473	44.2	RELX Group (Elsevier)	121	11.3
18	PDF Solutions	393	599	65.6	IEEE	393	65.6	SPIE-Int Soc Opt Engineering	134	22.4
19	Johns Hopkins University	391	950	41.2	IEEE	391	41.2	RELX Group (Elsevier)	68	7.2
20	Samsung Electronics Co Ltd	361	590	61.2	IEEE	361	61.2	IEEE/RSJ	44	7.5
21	GECKO ROBOTICS INC	358	697	51.4	IEEE	358	51.4	IEEE/RSJ	107	15.4
22	VIRTUAL INCISION CORP	342	1408	24.3	IEEE	342	24.3	Springer Nature	229	16.3
23	Walmart Stores Inc	335	913	36.7	IEEE	335	36.7	CBS Interactive	90	9.9
24	SARCOS CORP	313	1008	31.1	IEEE	313	31.1	RELX Group (Elsevier)	129	12.8
25	Boeing Co. (The)	303	777	39.0	IEEE	303	39.0	RELX Group (Elsevier)	113	14.5
26	Boston Dynamics Inc	295	624	47.3	IEEE	295	47.3	IEEE/RSJ	115	18.4
27	HRL Laboratories LLC	285	601	47.4	IEEE	285	47.4	RELX Group (Elsevier)	57	9.5
28	Toyota Motor Corp	277	629	44.0	IEEE	277	44.0	IEEE/RSJ	53	8.4
29	FedEx Corp	275	291	94.5	IEEE	275	94.5	IEEE/RSJ	10	3.4
30	Sony Group Corp	275	494	55.7	IEEE	275	55.7	IEEE/RSJ	94	19.0
31	MACAU UNIVERSITY OF	267	292	91.4	IEEE	267	91.4	Springer Nature	5	1.7
32	The Arizona Board of Regent	265	829	32.0	IEEE	265	32.0	RELX Group (Elsevier)	113	13.6
33	NVIDIA Corp.	249	523	47.6	IEEE	249	47.6	SAE-Society of Automobile Engineers	32	6.1
34	Otto Bock Holding GmbH &	249	795	31.3	IEEE	249	31.3	RELX Group (Elsevier)	166	20.9
35	MEDROBOTICS CORP	243	704	34.5	IEEE	243	34.5	Springer Nature	173	24.6
36	Emerson Electric Co.	233	771	30.2	IEEE	233	30.2	RELX Group (Elsevier)	163	21.1
37	SIPCO LLC	221	355	62.3	IEEE	221	62.3	ACM-Assoc Comput Mach	29	8.2
38	Cadence Design Systems Inc	203	481	42.2	IEEE	203	42.2	Joint IEEE and ACM	161	33.5
39	Magic Leap Inc	189	345	54.8	IEEE	189	54.8	arXiv.org	32	9.3

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Koch Industries Inc	188	241	78.0	IEEE	188	78.0	IET/IEE	10	4.1
41	ABB Ltd	186	302	61.6	IEEE	186	61.6	RELX Group (Elsevier)	31	10.3
42	Honeywell International Inc.	179	422	42.4	IEEE	179	42.4	RELX Group (Elsevier)	89	21.1
43	Rockwell Automation Inc	176	326	54.0	IEEE	176	54.0	RELX Group (Elsevier)	40	12.3
44	University of Pennsylvania	173	312	55.4	IEEE	173	55.4	IEEE/RSJ	23	7.4
45	Softbank Corp	170	297	57.2	IEEE	170	57.2	ASME-Am Soc Mech Eng	55	18.5
46	GE Aerospace (f/k/a General	169	409	41.3	IEEE	169	41.3	RELX Group (Elsevier)	54	13.2
47	Johnson Controls Internationa	169	550	30.7	RELX Group (Elsevier)	170	30.9	IEEE	169	30.7
48	Fanuc Ltd.	166	344	48.3	IEEE	166	48.3	RELX Group (Elsevier)	44	12.8
49	Harvard University	162	648	25.0	IEEE	162	25.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	83	12.8
50	Intel Corporation	162	319	50.8	IEEE	162	50.8	ACM-Assoc Comput Mach	33	10.3
51	Bonutti Technologies LLC	159	1276	12.5	RELX Group (Elsevier)	309	24.2	Springer Nature	199	15.6
52	L3 Harris Technologies (f/k/a	156	243	64.2	IEEE	156	64.2	Society of Petroleum Engineers	16	6.6
53	Align Technology Inc	154	1342	11.5	JCO - Journal of Clinical Orthodontics	228	17.0	SAGE Publications Ltd	167	12.4
54	Cimpress NV	153	371	41.2	IEEE	153	41.2	RELX Group (Elsevier)	103	27.8
55	University of California	153	373	41.0	IEEE	153	41.0	IEEE/RSJ	31	8.3
56	FASTBRICK IP PTY LTD	151	307	49.2	IEEE	151	49.2	RELX Group (Elsevier)	74	24.1
57	ICOSYSTEM CORP	150	198	75.8	IEEE	150	75.8	IET/IEE	10	5.1
58	STRONG FORCE TX PORT	150	349	43.0	IEEE	150	43.0	RELX Group (Elsevier)	62	17.8
59	OneTrust	144	435	33.1	ACM-Assoc Comput Mach	211	48.5	IEEE	144	33.1
60	NEURALA INC	143	294	48.6	IEEE	143	48.6	MIT Press	30	10.2
61	Immersion Corp.	142	396	35.9	IEEE	142	35.9	ASME-Am Soc Mech Eng	32	8.1
62	INDIVIDUAL PATENTER	141	330	42.7	IEEE	141	42.7	Springer Nature	22	6.7
63	Deere & Co.	140	303	46.2	IEEE	140	46.2	Springer Nature	30	9.9
64	Battelle Memorial Institute	138	364	37.9	IEEE	138	37.9	ACS-Am Chem Soc	48	13.2
65	LG Electronics Inc.	137	190	72.1	IEEE	137	72.1	IEEE/RSJ	10	5.3
66	Canon Inc	134	294	45.6	IEEE	134	45.6	RELX Group (Elsevier)	25	8.5
67	University of Washington	129	337	38.3	IEEE	129	38.3	RELX Group (Elsevier)	25	7.4
68	IWALK INC	127	396	32.1	IEEE	127	32.1	RELX Group (Elsevier)	82	20.7
69	Walt Disney Co.	127	350	36.3	IEEE	127	36.3	ACM-Assoc Comput Mach	106	30.3
70	SRI International	126	331	38.1	IEEE	126	38.1	SPIE-Int Soc Opt Engineering	54	16.3
71	Teradyne Inc.	126	330	38.2	IEEE	126	38.2	ASME-Am Soc Mech Eng	41	12.4
72	MONOLITHIC 3D INC	125	225	55.6	IEEE	125	55.6	IEEE/JPN Soc App Phys	24	10.7
73	SPHERO INC	125	129	96.9	IEEE	125	96.9	American Automatic Control Council (AACC)	2	1.6
74	NANOTRONICS IMAGING	123	388	31.7	IEEE	123	31.7	arXiv.org	90	23.2
75	ROY-G-BIV CORP	120	279	43.0	IEEE	120	43.0	Technical Publications Co.	30	10.8
76	University of Southern Califo	120	196	61.2	IEEE	120	61.2	Springer Nature	16	8.2
77	University of South Florida	119	261	45.6	IEEE	119	45.6	IEEE/RSJ	25	9.6
78	Advanced Micro Devices Inc	116	227	51.1	IEEE	116	51.1	Springer Nature	27	11.9
79	Xerox Corp	116	358	32.4	IEEE	116	32.4	ACM-Assoc Comput Mach	50	14.0
80	University of Minnesota (The	115	267	43.1	IEEE	115	43.1	Springer Nature	31	11.6

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Zebra Technologies Corp.	113	230	49.1	IEEE	113	49.1	ACM-Assoc Comput Mach	17	7.4
82	Broadcom Ltd	112	206	54.4	IEEE	112	54.4	RELX Group (Elsevier)	38	18.4
83	Toshiba Corp	112	192	58.3	IEEE	112	58.3	IEEE/RSJ	10	5.2
84	Taiwan Semiconductor Manu	110	214	51.4	IEEE	110	51.4	RELX Group (Elsevier)	23	10.7
85	Bosch (Robert) GmbH	108	341	31.7	IEEE	108	31.7	Springer Nature	40	11.7
86	REALTIME ROBOTICS INC	108	236	45.8	IEEE	108	45.8	Springer Nature	48	20.3
87	DISTALMOTION SA	106	188	56.4	IEEE	106	56.4	IEEE/RSJ	32	17.0
88	Tela Innovations inc	105	273	38.5	IEEE	105	38.5	SPIE-Int Soc Opt Engineering	96	35.2
89	Ecole Polytechnique Federale	102	375	27.2	IEEE	102	27.2	Springer Nature	64	17.1
90	BOSTON POLARIMETRICS	100	209	47.8	IEEE	100	47.8	SPIE-Int Soc Opt Engineering	25	12.0
91	Intellectual Ventures Manage	100	518	19.3	IEEE	100	19.3	RELX Group (Elsevier)	59	11.4
92	American Express Co.	96	323	29.7	IEEE	96	29.7	The USENIX Association	39	12.1
93	TuSimple	96	162	59.3	IEEE	96	59.3	arXiv.org	15	9.3
94	Industrial Technology Resear	95	181	52.5	IEEE	95	52.5	RELX Group (Elsevier)	25	13.8
95	Sap SE	94	352	26.7	IEEE	94	26.7	RELX Group (Elsevier)	59	16.8
96	Panasonic Holding Corporati	89	222	40.1	IEEE	89	40.1	RELX Group (Elsevier)	15	6.8
97	RTX Corporation (f/k/a Rayt	89	289	30.8	IEEE	89	30.8	RELX Group (Elsevier)	41	14.2
98	Tokyo Electron Limited	89	223	39.9	IEEE	89	39.9	SPIE-Int Soc Opt Engineering	23	10.3
99	Stanford University	86	184	46.7	IEEE	86	46.7	IEEE/CVF	14	7.6
100	HP Inc	85	212	40.1	IEEE	85	40.1	ACM-Assoc Comput Mach	29	13.7

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Semiconductors/Solid-State Devices/Electronics</i>										
1	MONOLITHIC 3D INC	26813	47510	56.4	IEEE	26813	56.4	IEEE/JPN Soc App Phys	4840	10.2
2	Micron Technology Inc.	19436	74483	26.1	IEEE	19436	26.1	RELX Group (Elsevier)	13999	18.8
3	Semiconductor Energy Labor	13159	2E+05	6.6	SID-Society for Information Display	66552	33.3	AIP Publishing	28474	14.3
4	International Business Machi	10232	25386	40.3	IEEE	10232	40.3	AIP Publishing	3651	14.4
5	Taiwan Semiconductor Manu	8909	28399	31.4	IEEE	8909	31.4	AIP Publishing	8083	28.5
6	Qorvo	8685	11589	74.9	IEEE	8685	74.9	RELX Group (Elsevier)	565	4.9
7	Tela Innovations inc	5187	17059	30.4	SPIE-Int Soc Opt Engineering	6246	36.6	IEEE	5187	30.4
8	Macronix International Co. Lt	4892	9310	52.5	IEEE	4892	52.5	IEEE/JPN Soc App Phys	1816	19.5
9	ASM International N.V.	4588	55912	8.2	RELX Group (Elsevier)	9864	17.6	AIP Publishing	9144	16.4
10	Intel Corporation	4564	9573	47.7	IEEE	4564	47.7	AIP Publishing	1294	13.5
11	Wolfspeed Inc. (formerly Cre	4390	11992	36.6	IEEE	4390	36.6	AIP Publishing	2543	21.2
12	Western Digital Corp.	4183	9072	46.1	IEEE	4183	46.1	AIP Publishing	1226	13.5
13	Murata Manufacturing Co. Lt	4128	5493	75.2	IEEE	4128	75.2	RELX Group (Elsevier)	208	3.8
14	Infineon Technologies AG	3471	6677	52.0	IEEE	3471	52.0	AIP Publishing	803	12.0
15	Chipbond Technology Corp	2902	3631	79.9	IEEE	2902	79.9	RELX Group (Elsevier)	268	7.4
16	On Semiconductor Corporati	2781	4110	67.7	IEEE	2781	67.7	RELX Group (Elsevier)	321	7.8
17	Renesas Electronic Corporati	2714	5210	52.1	IEEE	2714	52.1	AIP Publishing	684	13.1
18	NXP Semiconductors NV	2704	5307	51.0	IEEE	2704	51.0	AIP Publishing	806	15.2
19	University of Illinois	2690	27994	9.6	AIP Publishing	5560	19.9	ACS-Am Chem Soc	4545	16.2
20	Applied Materials Inc.	2619	12904	20.3	IEEE	2619	20.3	AIP Publishing	2535	19.6
21	Adeia Inc (f/k/a Xperi Holdin	2565	6531	39.3	IEEE	2565	39.3	RELX Group (Elsevier)	1060	16.2
22	PDF Solutions	2335	3702	63.1	IEEE	2335	63.1	SPIE-Int Soc Opt Engineering	843	22.8
23	Global Foundries Inc	2264	4418	51.2	IEEE	2264	51.2	AIP Publishing	516	11.7
24	Amberwave Inc	2148	6296	34.1	IEEE	2148	34.1	AIP Publishing	1864	29.6
25	ZENO SEMICONDUCTOR I	1968	2609	75.4	IEEE	1968	75.4	IEEE/JPN Soc App Phys	378	14.5
26	Toshiba Corp	1878	5021	37.4	IEEE	1878	37.4	AIP Publishing	861	17.1
27	Broadcom Ltd	1752	5418	32.3	IEEE	1752	32.3	SMTA-Surface Mount Technology Association	992	18.3
28	Texas Instruments Inc	1687	2980	56.6	IEEE	1687	56.6	AIP Publishing	293	9.8
29	Samsung Electronics Co Ltd	1652	12825	12.9	AIP Publishing	2327	18.1	ACS-Am Chem Soc	2116	16.5
30	United Microelectronics Corp	1523	3171	48.0	IEEE	1523	48.0	AIP Publishing	451	14.2
31	STMicroelectronics	1375	3379	40.7	IEEE	1375	40.7	RELX Group (Elsevier)	507	15.0
32	Qualcomm Inc	1364	2727	50.0	IEEE	1364	50.0	AIP Publishing	231	8.5
33	University of California	1349	17974	7.5	AIP Publishing	3742	20.8	ACS-Am Chem Soc	2408	13.4
34	Analog Devices Inc.	1236	1824	67.8	IEEE	1236	67.8	RELX Group (Elsevier)	109	6.0
35	California Institute of Techno	1221	9134	13.4	AIP Publishing	1400	15.3	RELX Group (Elsevier)	1385	15.2
36	coherent Corp (f/k/a Il-VI Inc	1196	4036	29.6	IEEE	1196	29.6	AIP Publishing	647	16.0
37	Commissariat A L'Energie At	1151	5729	20.1	AIP Publishing	1239	21.6	IEEE	1151	20.1
38	Massachusetts Institute of Te	1128	8211	13.7	AIP Publishing	1608	19.6	IEEE	1128	13.7
39	HRL Laboratories LLC	1079	2443	44.2	IEEE	1079	44.2	AIP Publishing	419	17.2

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Advanced Micro Devices Inc	947	1512	62.6	IEEE	947	62.6	AIP Publishing	118	7.8
41	Mevion Medical Systems Inc	904	2859	31.6	IEEE	904	31.6	RELX Group (Elsevier)	555	19.4
42	Apple Inc	833	2177	38.3	IEEE	833	38.3	AIP Publishing	277	12.7
43	Xperi Inc. (f/k/a Tesseria Inc)	803	2987	26.9	IEEE	803	26.9	AIP Publishing	600	20.1
44	SolarEdge Technologies Inc	773	970	79.7	IEEE	773	79.7	WIP-Renewable Energies	86	8.9
45	Fujitsu Limited	753	2088	36.1	IEEE	753	36.1	AIP Publishing	282	13.5
46	Lam Research Corp.	739	5757	12.8	AIP Publishing	1364	23.7	IEEE	739	12.8
47	Crossbar Inc	738	2870	25.7	IEEE	738	25.7	RELX Group (Elsevier)	389	13.6
48	Synopsys Inc.	695	1468	47.3	IEEE	695	47.3	AIP Publishing	271	18.5
49	Unisantis Electronics Ltd	677	838	80.8	IEEE	677	80.8	Institute of Pure and Applied Physics	53	6.3
50	Panasonic Holding Corporati	650	3755	17.3	AIP Publishing	702	18.7	IEEE	650	17.3
51	Michigan State University	590	7204	8.2	Optica Publishing Group	1532	21.3	AIP Publishing	1103	15.3
52	Hong Kong University of Sci	584	1342	43.5	IEEE	584	43.5	AIP Publishing	246	18.3
53	Korvus Inc.	568	7410	7.7	AIP Publishing	2154	29.1	Institute of Pure and Applied Physics	1511	20.4
54	ACORN SEMI LLC	563	3508	16.0	AIP Publishing	1282	36.5	RELX Group (Elsevier)	630	18.0
55	AMS Osram (former AMS A	562	4244	13.2	AIP Publishing	954	22.5	IEEE	562	13.2
56	The Arizona Board of Regent	543	5883	9.2	AIP Publishing	1012	17.2	RELX Group (Elsevier)	921	15.7
57	Interuniversity MicroElectron	542	1838	29.5	IEEE	542	29.5	AIP Publishing	310	16.9
58	ARTILUX INC	533	1090	48.9	IEEE	533	48.9	Optica Publishing Group	175	16.1
59	Thermo Fisher Scientific Inc	526	2820	18.7	RELX Group (Elsevier)	885	31.4	IEEE	526	18.7
60	Cubic Corporation	507	703	72.1	IEEE	507	72.1	The International Society of Infrared, Millimeter, and Terahert	44	6.3
61	Mass General Brigham (form	489	7620	6.4	Optica Publishing Group	2845	37.3	RELX Group (Elsevier)	1055	13.8
62	Nantero Inc	477	7073	6.7	ACS-Am Chem Soc	2124	30.0	AIP Publishing	1486	21.0
63	Aisin Corporation (Aisin Seki	472	3372	14.0	Optica Publishing Group	1208	35.8	IEEE	472	14.0
64	Rocket Lab USA Inc	470	954	49.3	IEEE	470	49.3	RELX Group (Elsevier)	151	15.8
65	Industrial Technology Resear	464	1687	27.5	IEEE	464	27.5	RELX Group (Elsevier)	301	17.8
66	INNOVATIVE SILICON SA	453	556	81.5	IEEE	453	81.5	RELX Group (Elsevier)	24	4.3
67	Hon Hai Precision Industry C	450	2824	15.9	AIP Publishing	589	20.9	IEEE	450	15.9
68	GE Aerospace (f/k/a General	446	1438	31.0	IEEE	446	31.0	AIP Publishing	212	14.7
69	JCET Group Co. Ltd. (f/k/a Ji	421	562	74.9	IEEE	421	74.9	International Microelectronics And Packaging Society	61	10.9
70	United States Navy	412	2349	17.5	AIP Publishing	565	24.1	IEEE	412	17.5
71	Silicon Genesis Corporation	410	1457	28.1	IEEE	410	28.1	AIP Publishing	271	18.6
72	Allegro Microsystems Inc	408	595	68.6	IEEE	408	68.6	RELX Group (Elsevier)	79	13.3
73	Vishay Intertechnology Inc.	404	555	72.8	IEEE	404	72.8	RELX Group (Elsevier)	34	6.1
74	Soitec SA	399	2045	19.5	AIP Publishing	547	26.7	IEEE	399	19.5
75	ACORN TECHNOLOGIES I	377	1780	21.2	AIP Publishing	528	29.7	IEEE	377	21.2
76	Sony Group Corp	377	1834	20.6	IEEE	377	20.6	AIP Publishing	348	19.0
77	TDK Corporation	377	2016	18.7	AIP Publishing	511	25.3	IEEE	377	18.7
78	Totalenergies SE (formerly T	377	746	50.5	IEEE	377	50.5	RELX Group (Elsevier)	95	12.7
79	RTX Corporation (f/k/a Rayt	376	1759	21.4	IEEE	376	21.4	AIP Publishing	267	15.2
80	Sin-American Silicon	376	1862	20.2	IEEE	376	20.2	AIP Publishing	372	20.0

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	SiOnyx Inc	364	2377	15.3	AIP Publishing	659	27.7	RELX Group (Elsevier)	370	15.6
82	Electronics and Telecommuni	363	1110	32.7	IEEE	363	32.7	AIP Publishing	232	20.9
83	Atomera Inc (Formerly Mears	359	883	40.7	IEEE	359	40.7	American Physical Society	135	15.3
84	Georgia Institute of Technolo	351	1065	33.0	IEEE	351	33.0	RELX Group (Elsevier)	151	14.2
85	University of Wisconsin (WI	347	1846	18.8	AIP Publishing	496	26.9	IEEE	347	18.8
86	Seoul Semiconductor Co Ltd	340	3322	10.2	AIP Publishing	1194	35.9	RELX Group (Elsevier)	447	13.5
87	Power Integrations Inc.	339	559	60.6	IEEE	339	60.6	AIP Publishing	63	11.3
88	Xtrion NV	339	3577	9.5	ACS-Am Chem Soc	569	15.9	AIP Publishing	567	15.9
89	Mitsubishi Electric Corp	335	784	42.7	IEEE	335	42.7	AIP Publishing	82	10.5
90	Columbia University	331	4221	7.8	AIP Publishing	1488	35.3	MRS-Materials Research Soc	443	10.5
91	Xerox Corp	327	1914	17.1	AIP Publishing	495	25.9	IEEE	327	17.1
92	Bosch (Robert) GmbH	321	583	55.1	IEEE	321	55.1	RELX Group (Elsevier)	98	16.8
93	Sanan Optoelectronics Techn	321	1446	22.2	AIP Publishing	550	38.0	US Dept of Energy	392	27.1
94	Microchip Technology Inc.	320	528	60.6	IEEE	320	60.6	AIP Publishing	41	7.8
95	Honeywell International Inc.	310	2840	10.9	ACS-Am Chem Soc	488	17.2	AIP Publishing	352	12.4
96	Lockheed Martin Corp.	303	1599	18.9	Optica Publishing Group	346	21.6	IEEE	303	18.9
97	University of Michigan	302	2194	13.8	AIP Publishing	524	23.9	IEEE	302	13.8
98	ZENA TECHNOLOGIES IN	299	1350	22.1	IEEE	299	22.1	ACS-Am Chem Soc	282	20.9
99	Northrop Grumman Corp	291	784	37.1	IEEE	291	37.1	AIP Publishing	152	19.4
100	Hitachi Ltd	287	1043	27.5	IEEE	287	27.5	AIP Publishing	231	22.1

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Smart Grid/Smart Meters/Energy Infrastructure</i>										
1	SolarEdge Technologies Inc	2631	3301	79.7	IEEE	2631	79.7	WIP-Renewable Energies	189	5.7
2	Velatia Group	793	1074	73.8	IEEE	793	73.8	Echelon Corp	81	7.5
3	TRILLIANT NETWORKS IN	227	313	72.5	IEEE	227	72.5	RELX Group (Elsevier)	20	6.4
4	Honeywell International Inc.	218	279	78.1	IEEE	218	78.1	Pearson Education	15	5.4
5	SIPCO LLC	147	230	63.9	IEEE	147	63.9	ACM-Assoc Comput Mach	19	8.3
6	California Institute of Techno	137	246	55.7	IEEE	137	55.7	RELX Group (Elsevier)	19	7.7
7	AMPT LLC	121	157	77.1	IEEE	121	77.1	RELX Group (Elsevier)	8	5.1
8	Battelle Memorial Institute	117	158	74.1	IEEE	117	74.1	RELX Group (Elsevier)	8	5.1
9	DOMINION ENERGY TEC	117	137	85.4	IEEE	117	85.4	IET/IEE	8	5.8
10	ABB Ltd	110	132	83.3	IEEE	110	83.3	IET/IEE	4	3.0
11	International Business Machi	105	197	53.3	IEEE	105	53.3	IP.Com	19	9.6
12	Causam Enterprises (former	101	178	56.7	IEEE	101	56.7	Springer Nature	21	11.8
13	ASTROLINK INTERNATIO	97	117	82.9	IEEE	97	82.9	IET/IEE	8	6.8
14	GE Aerospace (f/k/a General	88	138	63.8	IEEE	88	63.8	RELX Group (Elsevier)	11	8.0
15	Alstom S.A.	72	89	80.9	IEEE	72	80.9	IET/IEE	11	12.4
16	Witricity Corp	71	137	51.8	IEEE	71	51.8	AIP Publishing	10	7.3
17	GE Vernova	65	94	69.1	IEEE	65	69.1	RELX Group (Elsevier)	10	10.6
18	SENSE LABS INC	64	383	16.7	NILM Organizing Committee	285	74.4	IEEE	64	16.7
19	University System of Maryla	62	66	93.9	IEEE	62	93.9	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	2	3.0
20	Itron Inc.	59	96	61.5	IEEE	59	61.5	ACM-Assoc Comput Mach	18	18.8
21	SMART WIRES INC	55	79	69.6	IEEE	55	69.6	ACM-Assoc Comput Mach	6	7.6
22	Enphase Energy Inc	52	54	96.3	IEEE	52	96.3	EPE Association	2	3.7
23	Hubbell Inc.	48	83	57.8	IEEE	48	57.8	ACM-Assoc Comput Mach	10	12.0
24	University of Minnesota (The	44	52	84.6	IEEE	44	84.6	RELX Group (Elsevier)	3	5.8
25	University of Texas	44	119	37.0	IEEE	44	37.0	RELX Group (Elsevier)	23	19.3
26	Qualcomm Inc	41	60	68.3	IEEE	41	68.3	Emerald Group Publishing Ltd	4	6.7
27	3M Co	40	50	80.0	IEEE	40	80.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	5	10.0
28	DELTA ENERGY & COMM	40	107	37.4	IEEE	40	37.4	RELX Group (Elsevier)	27	25.2
29	Schweitzer Engineering Labo	37	43	86.0	IEEE	37	86.0	Multidisciplinary Digital Publishing Institute (MDPI)	1	2.3
30	Totalenergies SE (formerly T	37	46	80.4	IEEE	37	80.4	EPE Association	4	8.7
31	University of California	36	1006	3.6	ACS-Am Chem Soc	285	28.3	Royal Society of Chemistry	168	16.7
32	Rockwell Automation Inc	33	44	75.0	IEEE	33	75.0	AIAA - American Institute of Aeronautics and Astronautics	4	9.1
33	Siemens Aktiengesellschaft	33	49	67.3	IEEE	33	67.3	RELX Group (Elsevier)	2	4.1
34	Georgia Institute of Technolo	29	85	34.1	ACM-Assoc Comput Mach	47	55.3	IEEE	29	34.1
35	STEM INC	28	30	93.3	IEEE	28	93.3	Mcgraw Hill	1	3.3
36	LS Electric co. Ltd. (f/k/aLSI	26	35	74.3	IEEE	26	74.3	IET/IEE	4	11.4
37	Microsoft Corporation	26	56	46.4	IEEE	26	46.4	ACM-Assoc Comput Mach	10	17.9
38	ENERGY TECHNOLOGY G	25	29	86.2	IEEE	25	86.2	RELX Group (Elsevier)	2	6.9
39	Tigo Energy Inc	25	37	67.6	IEEE	25	67.6	WIP-Renewable Energies	9	24.3

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Johnson & Johnson	23	108	21.3	RELX Group (Elsevier)	27	25.0	IEEE	23	21.3
41	SPARQ SYSTEMS INC	23	29	79.3	IEEE	23	79.3	RELX Group (Elsevier)	3	10.3
42	Signify NV	21	25	84.0	IEEE	21	84.0	Technical Research Centre of Finland	1	4.0
43	TAE TECHNOLOGIES INC	21	440	4.8	AIP Publishing	211	48.0	American Physical Society	68	15.5
44	University of Georgia	21	38	55.3	IEEE	21	55.3	ACM-Assoc Comput Mach	6	15.8
45	Empire Technology Develop	20	22	90.9	IEEE	20	90.9	Condé Nast	2	9.1
46	Schneider Electric S.A.	20	49	40.8	IEEE	20	40.8	Siemens Aktiengesellschaft	14	28.6
47	TEMPORAL POWER LTD	20	26	76.9	IEEE	20	76.9	NASA-National Aeronautics and Space Admin	2	7.7
48	Accenture Ltd.	19	25	76.0	IEEE	19	76.0	A B B Corporate Management Services AG	4	16.0
49	Commscope Holding (formerl	19	19	100.0	IEEE	19	100.0			
50	Ecole Polytechnique Federale	19	24	79.2	IEEE	19	79.2	RELX Group (Elsevier)	3	12.5
51	Mitsubishi Electric Corp	19	20	95.0	IEEE	19	95.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1	5.0
52	Xerox Corp	19	33	57.6	IEEE	19	57.6	RELX Group (Elsevier)	4	12.1
53	Industrial Technology Resear	18	23	78.3	IEEE	18	78.3	RELX Group (Elsevier)	2	8.7
54	Intellectual Ventures Manage	18	30	60.0	IEEE	18	60.0	RELX Group (Elsevier)	6	20.0
55	Alphabet Inc.	17	51	33.3	IEEE	17	33.3	ACM-Assoc Comput Mach	14	27.5
56	Johnson Controls Internationa	17	64	26.6	RELX Group (Elsevier)	17	26.6	IEEE	17	26.6
57	Landis & Gyr AG	16	16	100.0	IEEE	16	100.0			
58	Massachusetts Institute of Te	16	22	72.7	IEEE	16	72.7	AMER SOC NAVAL ENG INC	4	18.2
59	New Jersey Institute of Techn	16	16	100.0	IEEE	16	100.0			
60	CLEAN POWER RESEARC	15	40	37.5	RELX Group (Elsevier)	22	55.0	IEEE	15	37.5
61	Indian Institutes of Technolog	14	16	87.5	IEEE	14	87.5	ACM-Assoc Comput Mach	1	6.3
62	King Fahd University of Petr	14	17	82.4	IEEE	14	82.4	United Business Media/UBM Tech	3	17.6
63	ENEDYM INC	13	18	72.2	IEEE	13	72.2	SAE-Society of Automobile Engineers	1	5.6
64	Sony Group Corp	13	45	28.9	SID-Society for Information Display	24	53.3	IEEE	13	28.9
65	Taiwan Semiconductor Manu	13	19	68.4	IEEE	13	68.4	Electrostatic Discharge Association	6	31.6
66	United States of America Dep	13	38	34.2	IEEE	13	34.2	Optica Publishing Group	7	18.4
67	NANOTECH ENERGY INC	12	409	2.9	ACS-Am Chem Soc	116	28.4	Royal Society of Chemistry	69	16.9
68	The Arizona Board of Regent	12	17	70.6	IEEE	12	70.6	RELX Group (Elsevier)	2	11.8
69	THE FLORIDA INTERNATI	12	25	48.0	IEEE	12	48.0	The USENIX Association	4	16.0
70	Toshiba Corp	12	23	52.2	IEEE	12	52.2	RELX Group (Elsevier)	4	17.4
71	EI ELECTRONICS LLC	11	28	39.3	IEEE	11	39.3	The USENIX Association	5	17.9
72	EL ELECTRONICS LLC	11	24	45.8	IEEE	11	45.8	The USENIX Association	4	16.7
73	Fortive Corporation	11	17	64.7	IEEE	11	64.7	RELX Group (Elsevier)	5	29.4
74	University of Hong Kong	11	13	84.6	IEEE	11	84.6	RELX Group (Elsevier)	2	15.4
75	Alliance for Sustainable Ener	10	12	83.3	IEEE	10	83.3	Electric Power Research Institute	1	8.3
76	BRITISH COLUMBIA HYD	10	11	90.9	IEEE	10	90.9	Springer Nature	1	9.1
77	Nokia Corporation	10	20	50.0	IEEE	10	50.0	ACM-Assoc Comput Mach	3	15.0
78	Nth Degree Technologies Wo	10	102	9.8	Springer Nature	18	17.6	Optica Publishing Group	12	11.8
79	Panasonic Holding Corporati	10	15	66.7	IEEE	10	66.7	IEICE-Inst Elec Info Comm Eng	2	13.3
80	Roche Holding Ltd.	10	10	100.0	IEEE	10	100.0			

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	DEPSYS SA	9	9	100.0	IEEE	9	100.0			
82	Digimarc Corp.	9	9	100.0	IEEE	9	100.0			
83	Eaton Corp.	9	13	69.2	IEEE	9	69.2	IET/IEE	2	15.4
84	Energous Corporation	9	12	75.0	IEEE	9	75.0	The European Association on Antennas and Propagation (Eur	1	8.3
85	Foxconn Interconnect Techno	9	34	26.5	ACM-Assoc Comput Mach	16	47.1	IEEE	9	26.5
86	Halliburton Co. (Holding)	9	10	90.0	IEEE	9	90.0	RELX Group (Elsevier)	1	10.0
87	Northeastern University (Bost	9	13	69.2	IEEE	9	69.2	International Network for Scientific Information Publication (I	2	15.4
88	University of Missouri	9	10	90.0	IEEE	9	90.0	Summit Technical Media	1	10.0
89	KOOLBRIDGE SOLAR INC	8	8	100.0	IEEE	8	100.0			
90	RTX Corporation (f/k/a Rayt	8	19	42.1	IEEE	8	42.1	RELX Group (Elsevier)	4	21.1
91	State Grid Corp of China	8	11	72.7	IEEE	8	72.7	ACM-Assoc Comput Mach	1	9.1
92	SUNVERGE ENERGY INC	8	12	66.7	IEEE	8	66.7	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	4	33.3
93	Boeing Co. (The)	7	15	46.7	IEEE	7	46.7	AIAA - American Institute of Aeronautics and Astronautics	1	6.7
94	Clemson University	7	9	77.8	IEEE	7	77.8	ACS-Am Chem Soc	1	11.1
95	CURRENT TECHNOLOGIE	7	12	58.3	IEEE	7	58.3	Hewlett-Packard Company	2	16.7
96	Intel Corporation	7	11	63.6	IEEE	7	63.6	RELX Group (Elsevier)	3	27.3
97	OPEN ACCESS TECHNOL	7	7	100.0	IEEE	7	100.0			
98	POWER TAGGING TECHN	7	8	87.5	IEEE	7	87.5	IET/IEE	1	12.5
99	Semikron Danfoss A/S	7	7	100.0	IEEE	7	100.0			
100	TACTILIS SDN BHD	7	7	100.0	IEEE	7	100.0			

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Solar/Photovoltaic</i>										
1	SolarEdge Technologies Inc	5531	6915	80.0	IEEE	5531	80.0	WIP-Renewable Energies	470	6.8
2	AMPT LLC	1129	1454	77.6	IEEE	1129	77.6	RELX Group (Elsevier)	80	5.5
3	Totalenergies SE (formerly T	643	1054	61.0	IEEE	643	61.0	RELX Group (Elsevier)	122	11.6
4	University of Illinois	515	5655	9.1	AIP Publishing	1071	18.9	ACS-Am Chem Soc	1018	18.0
5	Rocket Lab USA Inc	486	988	49.2	IEEE	486	49.2	RELX Group (Elsevier)	154	15.6
6	Tigo Energy Inc	475	748	63.5	IEEE	475	63.5	WIP-Renewable Energies	207	27.7
7	California Institute of Techno	338	2006	16.8	IEEE	338	16.8	AIP Publishing	309	15.4
8	Taiwan Semiconductor Manu	330	1611	20.5	AIP Publishing	578	35.9	IEEE	330	20.5
9	International Business Machi	313	1599	19.6	RELX Group (Elsevier)	337	21.1	IEEE	313	19.6
10	Xtrion NV	266	2891	9.2	AIP Publishing	536	18.5	ACS-Am Chem Soc	517	17.9
11	Sanan Optoelectronics Techn	265	816	32.5	US Dept of Energy	399	48.9	IEEE	265	32.5
12	Tesla Motors Inc	237	597	39.7	IEEE	237	39.7	WIP-Renewable Energies	97	16.2
13	Emcore Corp.	236	467	50.5	IEEE	236	50.5	US Dept of Energy	76	16.3
14	Hanergy Holding Group Ltd	171	455	37.6	IEEE	171	37.6	AIP Publishing	72	15.8
15	Array Photonics Inc. (f/k/a So	169	888	19.0	AIP Publishing	275	31.0	RELX Group (Elsevier)	214	24.1
16	Alliance for Sustainable Ener	166	1326	12.5	RELX Group (Elsevier)	238	17.9	AIP Publishing	238	17.9
17	Xerox Corp	153	511	29.9	IEEE	153	29.9	RELX Group (Elsevier)	96	18.8
18	SEMPRIUS INC	150	1692	8.9	AIP Publishing	319	18.9	ACS-Am Chem Soc	307	18.1
19	Boeing Co. (The)	146	331	44.1	IEEE	146	44.1	RELX Group (Elsevier)	68	20.5
20	Beamreach Solar Inc	135	626	21.6	RELX Group (Elsevier)	207	33.1	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	135	21.6
21	CLEAN POWER RESEARC	133	352	37.8	RELX Group (Elsevier)	191	54.3	IEEE	133	37.8
22	The Arizona Board of Regent	111	545	20.4	RELX Group (Elsevier)	140	25.7	IEEE	111	20.4
23	Massachusetts Institute of Te	94	841	11.2	RELX Group (Elsevier)	154	18.3	AIP Publishing	113	13.4
24	LG Electronics Inc.	93	266	35.0	IEEE	93	35.0	AIP Publishing	48	18.0
25	University of California	85	1805	4.7	ACS-Am Chem Soc	413	22.9	RELX Group (Elsevier)	251	13.9
26	First Solar Inc	82	479	17.1	RELX Group (Elsevier)	206	43.0	IEEE	82	17.1
27	5N Plus Inc	80	208	38.5	IEEE	80	38.5	RELX Group (Elsevier)	45	21.6
28	Applied Materials Inc.	79	243	32.5	IEEE	79	32.5	WIP-Renewable Energies	51	21.0
29	Advanced Energy Industries I	78	85	91.8	IEEE	78	91.8	IET/IEE	4	4.7
30	STION CORP	77	671	11.5	RELX Group (Elsevier)	225	33.5	AIP Publishing	146	21.8
31	Witricity Corp	72	136	52.9	IEEE	72	52.9	AIP Publishing	11	8.1
32	ACORN SEMI LLC	71	474	15.0	AIP Publishing	184	38.8	RELX Group (Elsevier)	107	22.6
33	Solyndra Inc	68	358	19.0	RELX Group (Elsevier)	117	32.7	IEEE	68	19.0
34	NANOSOLAR INC	61	838	7.3	RELX Group (Elsevier)	242	28.9	Electrochemical Society, Inc.	105	12.5
35	Texas Instruments Inc	60	77	77.9	IEEE	60	77.9	Texas Instruments	4	5.2
36	DuPont de Nemours Inc.	57	309	18.4	RELX Group (Elsevier)	94	30.4	IEEE	57	18.4
37	ZENA TECHNOLOGIES IN	55	240	22.9	IEEE	55	22.9	ACS-Am Chem Soc	49	20.4
38	United States Navy	53	200	26.5	IEEE	53	26.5	RELX Group (Elsevier)	32	16.0
39	Compagnie de Saint-Gobain	50	207	24.2	IEEE	50	24.2	SPIE-Int Soc Opt Engineering	44	21.3

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Dartmouth College	48	93	51.6	IEEE	48	51.6	RELX Group (Elsevier)	18	19.4
41	Lockheed Martin Corp.	48	210	22.9	IEEE	48	22.9	AIP Publishing	34	16.2
42	MAXEON SOLAR PTE LTD	47	129	36.4	IEEE	47	36.4	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	27	20.9
43	Ignis Innovation Inc	46	68	67.6	IEEE	46	67.6	SID-Society for Information Display	16	23.5
44	SUNIVA INC	45	88	51.1	IEEE	45	51.1	WIP-Renewable Energies	12	13.6
45	University of Toledo	45	197	22.8	RELX Group (Elsevier)	91	46.2	IEEE	45	22.8
46	University of Minnesota (The	44	108	40.7	IEEE	44	40.7	AIP Publishing	25	23.1
47	University of Michigan	41	461	8.9	AIP Publishing	111	24.1	ACS-Am Chem Soc	77	16.7
48	Commissariat A L'Energie At	38	283	13.4	RELX Group (Elsevier)	104	36.7	ACS-Am Chem Soc	41	14.5
49	Honeywell International Inc.	38	1086	3.5	ACS-Am Chem Soc	406	37.4	RELX Group (Elsevier)	206	19.0
50	Semiconductor Energy Labor	37	617	6.0	SID-Society for Information Display	224	36.3	AIP Publishing	88	14.3
51	Ostendo Technologies Inc	35	97	36.1	IEEE	35	36.1	RELX Group (Elsevier)	29	29.9
52	4POWER LLC	34	66	51.5	IEEE	34	51.5	AIP Publishing	18	27.3
53	University of Alabama	33	145	22.8	IEEE	33	22.8	Springer Nature	30	20.7
54	SOLARWORLD INNOVATI	32	101	31.7	IEEE	32	31.7	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	19	18.8
55	Industrial Technology Resear	31	215	14.4	RELX Group (Elsevier)	55	25.6	IEEE	31	14.4
56	Teijin Ltd.	30	86	34.9	IEEE	30	34.9	WIP-Renewable Energies	24	27.9
57	GE Aerospace (f/k/a General	29	281	10.3	ACS-Am Chem Soc	83	29.5	RELX Group (Elsevier)	39	13.9
58	Toshiba Corp	29	215	13.5	AIP Publishing	37	17.2	RELX Group (Elsevier)	32	14.9
59	AMI RESAERCH & DEVEL	28	73	38.4	IEEE	28	38.4	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	9	12.3
60	Interuniversity MicroElectron	28	130	21.5	RELX Group (Elsevier)	33	25.4	IEEE	28	21.5
61	Koch Industries Inc	28	327	8.6	RELX Group (Elsevier)	129	39.4	AIP Publishing	84	25.7
62	On Semiconductor Corporati	28	127	22.0	IEEE	28	22.0	AIP Publishing	25	19.7
63	The National Aeronautical an	28	208	13.5	Springer Nature	29	13.9	IEEE	28	13.5
64	King Abdullah University of	26	366	7.1	ACS-Am Chem Soc	98	26.8	Royal Society of Chemistry	53	14.5
65	Fraunhofer Gesellschaft	25	96	26.0	RELX Group (Elsevier)	25	26.0	IEEE	25	26.0
66	Hanwha Solutions (Hhanwha	25	83	30.1	IEEE	25	30.1	AIP Publishing	19	22.9
67	Imperial College	25	69	36.2	IEEE	25	36.2	AIP Publishing	16	23.2
68	Nth Degree Technologies Wo	25	256	9.8	Springer Nature	47	18.4	Optica Publishing Group	32	12.5
69	Enphase Energy Inc	24	28	85.7	IEEE	24	85.7	EPE Association	2	7.1
70	INDIVIDUAL PATENTER	24	162	14.8	AIP Publishing	24	14.8	IEEE	24	14.8
71	Panasonic Holding Corporati	23	198	11.6	AIP Publishing	42	21.2	RELX Group (Elsevier)	33	16.7
72	PRECURSOR ENERGETIC	23	1095	2.1	ACS-Am Chem Soc	481	43.9	RELX Group (Elsevier)	237	21.6
73	Qualcomm Inc	23	66	34.8	IEEE	23	34.8	SID-Society for Information Display	11	16.7
74	Solopower Inc	23	213	10.8	RELX Group (Elsevier)	101	47.4	AIP Publishing	43	20.2
75	FLISOM AG	22	133	16.5	RELX Group (Elsevier)	55	41.4	Springer Nature	23	17.3
76	Toyota Motor Corp	22	118	18.6	Optica Publishing Group	22	18.6	IEEE	22	18.6
77	TRANS ASTRONAUTICA C	22	346	6.4	AIAA - American Institute of Aeronautics and	80	23.1	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	48	13.9
78	City University of Hong Kon	21	54	38.9	IEEE	21	38.9	IET/IEEE	12	22.2
79	Hon Hai Precision Industry C	21	185	11.4	RELX Group (Elsevier)	36	19.5	AIP Publishing	25	13.5
80	MICROLINK DEVICES INC	21	48	43.8	IEEE	21	43.8	AIP Publishing	15	31.3

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Shin-Etsu Chemical Co. Ltd.	21	80	26.3	IEEE	21	26.3	RELX Group (Elsevier)	18	22.5
82	SMA Solar Technology AG	21	23	91.3	IEEE	21	91.3	IET/IEE	1	4.3
83	ZHEJIANG JINKO SOLAR	21	103	20.4	RELX Group (Elsevier)	33	32.0	IEEE	21	20.4
84	Catholic University Leuven	20	57	35.1	IEEE	20	35.1	RELX Group (Elsevier)	13	22.8
85	Georgia Institute of Technolo	19	80	23.8	IEEE	19	23.8	RELX Group (Elsevier)	13	16.3
86	Stanford University	19	214	8.9	ACS-Am Chem Soc	35	16.4	AIP Publishing	34	15.9
87	University of New Mexico	19	61	31.1	IEEE	19	31.1	RELX Group (Elsevier)	14	23.0
88	ATHENAEUM LLC	18	104	17.3	RELX Group (Elsevier)	30	28.8	IEEE	18	17.3
89	BEIJING APOLLO DING R	18	86	20.9	RELX Group (Elsevier)	27	31.4	IEEE	18	20.9
90	Rensselaer Polytechnic Instit	18	75	24.0	IEEE	18	24.0	AIP Publishing	17	22.7
91	SWIFT SOLAR INC	18	175	10.3	Springer Nature	44	25.1	RELX Group (Elsevier)	37	21.1
92	The Helmholtz Association	18	109	16.5	RELX Group (Elsevier)	33	30.3	IEEE	18	16.5
93	1366 TECHNOLOGIES INC	17	93	18.3	RELX Group (Elsevier)	49	52.7	IEEE	17	18.3
94	ASCENT SOLAR TECHNO	17	52	32.7	IEEE	17	32.7	RELX Group (Elsevier)	13	25.0
95	New Jersey Institute of Techn	17	33	51.5	IEEE	17	51.5	RELX Group (Elsevier)	10	30.3
96	Reliance Industries Ltd	17	42	40.5	IEEE	17	40.5	WIP-Renewable Energies	11	26.2
97	University of Oklahoma	17	271	6.3	AIP Publishing	103	38.0	RELX Group (Elsevier)	43	15.9
98	VERLIY LIFE SCIENCES L	17	38	44.7	IEEE	17	44.7	RELX Group (Elsevier)	4	10.5
99	Columbia University	16	246	6.5	ACS-Am Chem Soc	99	40.2	Springer Nature	24	9.8
100	Ecole Polytechnique Federale	16	169	9.5	ACS-Am Chem Soc	48	28.4	RELX Group (Elsevier)	26	15.4

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Telecom and Other Communications</i>										
1	AT&T Inc	31666	67218	47.1	IEEE	31666	47.1	RELX Group (Elsevier)	3545	5.3
2	Qualcomm Inc	28931	39300	73.6	IEEE	28931	73.6	ACM-Assoc Comput Mach	1258	3.2
3	Microsoft Corporation	18140	39708	45.7	IEEE	18140	45.7	ACM-Assoc Comput Mach	7627	19.2
4	Broadcom Ltd	17676	29413	60.1	IEEE	17676	60.1	ACM-Assoc Comput Mach	4536	15.4
5	REARDEN LLC	13472	15683	85.9	IEEE	13472	85.9	IET/IEE	400	2.6
6	Cisco Systems Inc.	12346	27942	44.2	IEEE	12346	44.2	ACM-Assoc Comput Mach	4371	15.6
7	Nokia Corporation	12159	20672	58.8	IEEE	12159	58.8	Optica Publishing Group	1453	7.0
8	Ericsson	12006	17863	67.2	IEEE	12006	67.2	Internet Soc/IETF-Internet Eng Task Force	1356	7.6
9	Huawei Technologies Compa	11525	16603	69.4	IEEE	11525	69.4	ACM-Assoc Comput Mach	736	4.4
10	Intel Corporation	10123	16027	63.2	IEEE	10123	63.2	ACM-Assoc Comput Mach	1230	7.7
11	InterDigital Inc	9968	13511	73.8	IEEE	9968	73.8	IET/IEE	558	4.1
12	International Business Machi	9741	26323	37.0	IEEE	9741	37.0	ACM-Assoc Comput Mach	4120	15.7
13	Alphabet Inc.	9315	22004	42.3	IEEE	9315	42.3	ACM-Assoc Comput Mach	3297	15.0
14	Samsung Electronics Co Ltd	9297	14883	62.5	IEEE	9297	62.5	ACM-Assoc Comput Mach	768	5.2
15	Apple Inc	9279	20659	44.9	IEEE	9279	44.9	ACM-Assoc Comput Mach	2859	13.8
16	ParkerVision Inc	8679	16850	51.5	IEEE	8679	51.5	IET/IEE	3697	21.9
17	Marvell Technology Group Lt	8094	10113	80.0	IEEE	8094	80.0	ACM-Assoc Comput Mach	335	3.3
18	Personalized Media Commun	7797	45216	17.2	Society of Motion Picture and Television Engi	13661	30.2	IEEE	7797	17.2
19	Panasonic Holding Corporati	6554	9562	68.5	IEEE	6554	68.5	IEICE-Inst Elec Info Comm Eng	1204	12.6
20	Massachusetts Institute of Te	6410	12463	51.4	IEEE	6410	51.4	Optica Publishing Group	847	6.8
21	Sony Group Corp	6361	10869	58.5	IEEE	6361	58.5	ACM-Assoc Comput Mach	716	6.6
22	Murata Manufacturing Co. Lt	6301	8185	77.0	IEEE	6301	77.0	RELX Group (Elsevier)	246	3.0
23	Fractus SA	6082	10910	55.7	IEEE	6082	55.7	IET/IEE	1443	13.2
24	LG Electronics Inc.	5999	8439	71.1	IEEE	5999	71.1	ATSC Std	706	8.4
25	Commscope Holding (formerl	5635	8286	68.0	IEEE	5635	68.0	IET/IEE	261	3.1
26	NXP Semiconductors NV	4315	5568	77.5	IEEE	4315	77.5	IET/IEE	132	2.4
27	Nippon Telegraph & Telepho	4236	8175	51.8	IEEE	4236	51.8	IEICE-Inst Elec Info Comm Eng	947	11.6
28	Rambus Inc.	4203	5769	72.9	IEEE	4203	72.9	IEEE/JPN Soc App Phys	315	5.5
29	ADAPTIX INC	4169	4751	87.7	IEEE	4169	87.7	IET/IEE	150	3.2
30	Comcast Corp	4032	6056	66.6	IEEE	4032	66.6	ACM-Assoc Comput Mach	455	7.5
31	Blackberry Ltd.	4005	7455	53.7	IEEE	4005	53.7	International Association for Cryptologic Research (IACR)	412	5.5
32	University of Minnesota (The	3865	4704	82.2	IEEE	3865	82.2	ACM-Assoc Comput Mach	97	2.1
33	RTX Corporation (f/k/a Rayt	3693	7134	51.8	IEEE	3693	51.8	Optica Publishing Group	423	5.9
34	Columbia University	3494	6137	56.9	IEEE	3494	56.9	ACM-Assoc Comput Mach	633	10.3
35	Tobii Ab	3429	7531	45.5	IEEE	3429	45.5	SPIE-Int Soc Opt Engineering	1081	14.4
36	Xperi Inc. (f/k/a Tessera Inc)	3404	8863	38.4	IEEE	3404	38.4	SPIE-Int Soc Opt Engineering	858	9.7
37	L3 Harris Technologies (f/k/a	3380	5337	63.3	IEEE	3380	63.3	RELX Group (Elsevier)	230	4.3
38	Fujitsu Limited	3377	6975	48.4	IEEE	3377	48.4	Optica Publishing Group	678	9.7
39	Analog Devices Inc.	3364	4462	75.4	IEEE	3364	75.4	ACM-Assoc Comput Mach	130	2.9

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	NEC Corp	3351	6503	51.5	IEEE	3351	51.5	ACM-Assoc Comput Mach	478	7.4
41	Electronics and Telecommuni	3177	4346	73.1	IEEE	3177	73.1	IET/IEE	167	3.8
42	Texas Instruments Inc	3136	3905	80.3	IEEE	3136	80.3	IET/IEE	99	2.5
43	CPG TECHNOLOGIES LLC	3058	5898	51.8	IEEE	3058	51.8	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	743	12.6
44	Mosaid Technologies (f/k/aC	2958	4943	59.8	IEEE	2958	59.8	Primedia Business Magazines & Media Inc.	257	5.2
45	CONSTELLATION DESIGN	2951	3587	82.3	IEEE	2951	82.3	IET/IEE	131	3.7
46	SUN PATENT TRUST	2855	3881	73.6	IEEE	2855	73.6	IEICE-Inst Elec Info Comm Eng	747	19.2
47	Industrial Technology Resear	2792	3811	73.3	IEEE	2792	73.3	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	173	4.5
48	STMicroelectronics	2735	3701	73.9	IEEE	2735	73.9	RELX Group (Elsevier)	119	3.2
49	Advanced Micro Devices Inc	2660	7121	37.4	ACM-Assoc Comput Mach	2697	37.9	IEEE	2660	37.4
50	Infineon Technologies AG	2616	3785	69.1	IEEE	2616	69.1	Multidisciplinary Digital Publishing Institute (MDPI)	104	2.7
51	GE Aerospace (f/k/a General	2600	4437	58.6	IEEE	2600	58.6	RELX Group (Elsevier)	505	11.4
52	University of California	2566	4646	55.2	IEEE	2566	55.2	Springer Nature	278	6.0
53	Fraunhofer Gesellschaft	2553	3653	69.9	IEEE	2553	69.9	RELX Group (Elsevier)	202	5.5
54	Corning Inc.	2440	4149	58.8	IEEE	2440	58.8	IET/IEE	326	7.9
55	Honeywell International Inc.	2397	5229	45.8	IEEE	2397	45.8	Optica Publishing Group	399	7.6
56	Renesas Electronic Corporati	2376	3690	64.4	IEEE	2376	64.4	IET/IEE	219	5.9
57	Viasat	2372	3634	65.3	IEEE	2372	65.3	AIAA - American Institute of Aeronautics and Astronautics	267	7.3
58	Amazon.com Inc.	2354	7845	30.0	IEEE	2354	30.0	ACM-Assoc Comput Mach	1499	19.1
59	Mitsubishi Electric Corp	2318	3999	58.0	IEEE	2318	58.0	IEICE-Inst Elec Info Comm Eng	313	7.8
60	GENGHISCOMM HOLDIN	2301	2810	81.9	IEEE	2301	81.9	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	73	2.6
61	Semiconductor Energy Labor	2281	29209	7.8	SID-Society for Information Display	10788	36.9	AIP Publishing	3547	12.1
62	California Institute of Techno	2276	5011	45.4	IEEE	2276	45.4	Optica Publishing Group	469	9.4
63	Vantiva SA (f/k/a Technicolo	2254	3669	61.4	IEEE	2254	61.4	SPIE-Int Soc Opt Engineering	229	6.2
64	OneTrust	2205	6299	35.0	ACM-Assoc Comput Mach	2865	45.5	IEEE	2205	35.0
65	Toshiba Corp	2188	3653	59.9	IEEE	2188	59.9	IEICE-Inst Elec Info Comm Eng	246	6.7
66	Softbank Corp	2165	3817	56.7	IEEE	2165	56.7	ACM-Assoc Comput Mach	335	8.8
67	Dolby Laboratories Inc	2107	4015	52.5	IEEE	2107	52.5	SPIE-Int Soc Opt Engineering	385	9.6
68	Motorola Solutions Inc.	2033	3046	66.7	IEEE	2033	66.7	ACM-Assoc Comput Mach	195	6.4
69	SIPCO LLC	2020	3338	60.5	IEEE	2020	60.5	ACM-Assoc Comput Mach	286	8.6
70	The Arizona Board of Regent	1962	3857	50.9	IEEE	1962	50.9	ACM-Assoc Comput Mach	409	10.6
71	Mediatek Inc.	1938	2227	87.0	IEEE	1938	87.0	IEEE/JPN Soc App Phys	57	2.6
72	HRL Laboratories LLC	1923	3558	54.0	IEEE	1923	54.0	IET/IEE	223	6.3
73	Silicon Laboratories Inc	1915	2539	75.4	IEEE	1915	75.4	RELX Group (Elsevier)	120	4.7
74	Oracle Corporation	1880	4952	38.0	IEEE	1880	38.0	ACM-Assoc Comput Mach	898	18.1
75	Kandou Bus SA	1877	2131	88.1	IEEE	1877	88.1	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	71	3.3
76	Boeing Co. (The)	1856	3685	50.4	IEEE	1856	50.4	RELX Group (Elsevier)	141	3.8
77	Verizon Communications Inc	1853	3777	49.1	IEEE	1853	49.1	Internet Soc/IETF-Internet Eng Task Force	408	10.8
78	Intellectual Ventures Manage	1851	4873	38.0	IEEE	1851	38.0	Optica Publishing Group	269	5.5
79	Juniper Networks Inc.	1838	3277	56.1	IEEE	1838	56.1	ACM-Assoc Comput Mach	234	7.1
80	NXGEN PARTNERS IP LLC	1807	3863	46.8	IEEE	1807	46.8	Optica Publishing Group	993	25.7

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Koninklijke Philips N.V.	1739	3306	52.6	IEEE	1739	52.6	ACM-Assoc Comput Mach	233	7.0
82	Qorvo	1689	2271	74.4	IEEE	1689	74.4	European Microwave Association	92	4.1
83	Tencent Holding Ltd	1686	2443	69.0	IEEE	1686	69.0	SPIE-Int Soc Opt Engineering	222	9.1
84	NVIDIA Corp.	1684	3323	50.7	IEEE	1684	50.7	ACM-Assoc Comput Mach	344	10.4
85	University of Washington	1660	3080	53.9	IEEE	1660	53.9	ACM-Assoc Comput Mach	417	13.5
86	Adeia Inc (f/k/a Xperi Holdin	1635	5367	30.5	IEEE	1635	30.5	ACM-Assoc Comput Mach	530	9.9
87	Digimarc Corp.	1619	3951	41.0	IEEE	1619	41.0	SPIE-Int Soc Opt Engineering	496	12.6
88	Micron Technology Inc.	1586	2473	64.1	IEEE	1586	64.1	RELX Group (Elsevier)	161	6.5
89	Cubic Corporation	1549	2131	72.7	IEEE	1549	72.7	The International Society of Infrared, Millimeter, and Terahert	109	5.1
90	ByteDance Ltd	1521	2057	73.9	IEEE	1521	73.9	SPIE-Int Soc Opt Engineering	204	9.9
91	HP Inc	1510	3256	46.4	IEEE	1510	46.4	ACM-Assoc Comput Mach	416	12.8
92	Hon Hai Precision Industry C	1500	3149	47.6	IEEE	1500	47.6	SID-Society for Information Display	459	14.6
93	Canon Inc	1474	2721	54.2	IEEE	1474	54.2	ACM-Assoc Comput Mach	191	7.0
94	Hewlett Packard Enterprises	1446	3139	46.1	IEEE	1446	46.1	ACM-Assoc Comput Mach	569	18.1
95	Quarterhill Inc	1409	1938	72.7	IEEE	1409	72.7	WiMAX Forum	61	3.1
96	RPX Corp	1366	2559	53.4	IEEE	1366	53.4	IEEE/OSA	234	9.1
97	Xerox Corp	1363	3778	36.1	IEEE	1363	36.1	ACM-Assoc Comput Mach	862	22.8
98	BT Group PLC	1342	2403	55.8	IEEE	1342	55.8	ACM-Assoc Comput Mach	201	8.4
99	ORIGIN WIRELESS INC	1331	2030	65.6	IEEE	1331	65.6	American Physical Society	129	6.4
100	TABULA INC	1316	3559	37.0	ACM-Assoc Comput Mach	1349	37.9	IEEE	1316	37.0

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Virtual/Augmented Reality</i>										
1	Microsoft Corporation	3866	10608	36.4	IEEE	3866	36.4	ACM-Assoc Comput Mach	2587	24.4
2	Magic Leap Inc	2619	9478	27.6	IEEE	2619	27.6	ACM-Assoc Comput Mach	1261	13.3
3	Meta Platforms Inc.(formerly	1693	7088	23.9	IEEE	1693	23.9	ACM-Assoc Comput Mach	1349	19.0
4	Apple Inc	1605	4670	34.4	IEEE	1605	34.4	ACM-Assoc Comput Mach	958	20.5
5	Alphabet Inc.	1280	3973	32.2	IEEE	1280	32.2	ACM-Assoc Comput Mach	896	22.6
6	Immersion Corp.	1005	2937	34.2	IEEE	1005	34.2	ACM-Assoc Comput Mach	340	11.6
7	UltraLeap Holdings Limited (	679	1889	35.9	IEEE	679	35.9	ACM-Assoc Comput Mach	386	20.4
8	Sony Group Corp	642	1451	44.2	IEEE	642	44.2	ACM-Assoc Comput Mach	247	17.0
9	Snap Inc	482	1331	36.2	IEEE	482	36.2	RELX Group (Elsevier)	213	16.0
10	Qualcomm Inc	416	1023	40.7	IEEE	416	40.7	ACM-Assoc Comput Mach	208	20.3
11	ONPOINT MEDICAL INC	412	1939	21.2	IEEE	412	21.2	RELX Group (Elsevier)	293	15.1
12	Nant Holdings IP Llc	375	975	38.5	IEEE	375	38.5	ACM-Assoc Comput Mach	195	20.0
13	International Business Machi	373	1539	24.2	IEEE	373	24.2	ACM-Assoc Comput Mach	297	19.3
14	The Arizona Board of Regent	362	2430	14.9	Optica Publishing Group	718	29.5	IEEE	362	14.9
15	Lincoln Electric Holdings Inc	329	2045	16.1	ACM-Assoc Comput Mach	504	24.6	IEEE	329	16.1
16	Tobii Ab	298	631	47.2	IEEE	298	47.2	ACM-Assoc Comput Mach	108	17.1
17	InterDigital Inc	284	751	37.8	IEEE	284	37.8	ACM-Assoc Comput Mach	189	25.2
18	Samsung Electronics Co Ltd	274	668	41.0	IEEE	274	41.0	ACM-Assoc Comput Mach	121	18.1
19	Intellectual Ventures Manage	265	812	32.6	IEEE	265	32.6	ACM-Assoc Comput Mach	173	21.3
20	AT&T Inc	253	639	39.6	IEEE	253	39.6	ACM-Assoc Comput Mach	183	28.6
21	Adobe Inc. (former Adobe Sy	239	995	24.0	ACM-Assoc Comput Mach	474	47.6	IEEE	239	24.0
22	P4TENTS1 LLC	239	534	44.8	IEEE	239	44.8	ACM-Assoc Comput Mach	79	14.8
23	Intel Corporation	228	564	40.4	IEEE	228	40.4	ACM-Assoc Comput Mach	140	24.8
24	Massachusetts Institute of Te	179	704	25.4	IEEE	179	25.4	Springer Nature	81	11.5
25	MIDDLE CHART LLC	178	268	66.4	IEEE	178	66.4	Multidisciplinary Digital Publishing Institute (MDPI)	47	17.5
26	University of North Carolina	168	580	29.0	IEEE	168	29.0	ACM-Assoc Comput Mach	152	26.2
27	Nokia Corporation	154	385	40.0	IEEE	154	40.0	ACM-Assoc Comput Mach	66	17.1
28	Purdue University	143	630	22.7	ACM-Assoc Comput Mach	357	56.7	IEEE	143	22.7
29	Walt Disney Co.	139	395	35.2	IEEE	139	35.2	ACM-Assoc Comput Mach	109	27.6
30	AUGMENTED VISION INC	137	1095	12.5	Optica Publishing Group	372	34.0	SPIE-Int Soc Opt Engineering	157	14.3
31	Ostendo Technologies Inc	134	513	26.1	IEEE	134	26.1	ACM-Assoc Comput Mach	94	18.3
32	NVIDIA Corp.	130	529	24.6	ACM-Assoc Comput Mach	150	28.4	IEEE	130	24.6
33	Shure Inc	123	203	60.6	IEEE	123	60.6	RELX Group (Elsevier)	16	7.9
34	BRAINGATE CO LLC	120	308	39.0	IEEE	120	39.0	RELX Group (Elsevier)	45	14.6
35	Autodesk Inc.	117	649	18.0	ACM-Assoc Comput Mach	379	58.4	IEEE	117	18.0
36	Medtronic Inc	115	244	47.1	IEEE	115	47.1	Springer Nature	30	12.3
37	Stanford University	114	463	24.6	IEEE	114	24.6	Springer Nature	63	13.6
38	3D Systems Corp.	113	246	45.9	IEEE	113	45.9	ACM-Assoc Comput Mach	62	25.2
39	Digimarc Corp.	110	257	42.8	IEEE	110	42.8	ACM-Assoc Comput Mach	40	15.6

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Intuitive Surgical Inc.	106	275	38.5	IEEE	106	38.5	The Medical Image Computing and Computer Assisted Interv	35	12.7
41	INDIVIDUAL PATENTER	103	488	21.1	RELX Group (Elsevier)	115	23.6	IEEE	103	21.1
42	Bosch (Robert) GmbH	101	181	55.8	IEEE	101	55.8	European Conference on Computer Vision-Google/Microsoft	13	7.2
43	D3D TECHNOLOGIES INC	94	221	42.5	IEEE	94	42.5	RELX Group (Elsevier)	20	9.0
44	Honda Motor Co. Ltd.(Honda	94	204	46.1	IEEE	94	46.1	RELX Group (Elsevier)	18	8.8
45	University of Connecticut	93	631	14.7	Optica Publishing Group	227	36.0	IEEE	93	14.7
46	Cortica Ltd	91	139	65.5	IEEE	91	65.5	ACM-Assoc Comput Mach	22	15.8
47	Amazon.com Inc.	89	322	27.6	ACM-Assoc Comput Mach	110	34.2	IEEE	89	27.6
48	Toyota Motor Corp	86	237	36.3	IEEE	86	36.3	ACM-Assoc Comput Mach	38	16.0
49	Empire Technology Develop	85	250	34.0	IEEE	85	34.0	ACM-Assoc Comput Mach	27	10.8
50	ELECTRONIC SCRIPTING	84	217	38.7	IEEE	84	38.7	Joint IEEE and ACM	41	18.9
51	UMAJIN INC	83	167	49.7	IEEE	83	49.7	ACM-Assoc Comput Mach	79	47.3
52	Huawei Technologies Compa	82	185	44.3	IEEE	82	44.3	ACM-Assoc Comput Mach	39	21.1
53	Johns Hopkins University	77	139	55.4	IEEE	77	55.4	Joint IEEE and ACM	22	15.8
54	ULTIMATEPOINTER LLC	77	214	36.0	ACM-Assoc Comput Mach	94	43.9	IEEE	77	36.0
55	HRL Laboratories LLC	76	207	36.7	IEEE	76	36.7	ACM-Assoc Comput Mach	20	9.7
56	Canon Inc	75	235	31.9	IEEE	75	31.9	Joint IEEE and ACM	43	18.3
57	STRONG FORCE TX PORT	73	167	43.7	IEEE	73	43.7	RELX Group (Elsevier)	29	17.4
58	RealD	71	140	50.7	IEEE	71	50.7	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	13	9.3
59	GoPro Inc	69	125	55.2	IEEE	69	55.2	ACM-Assoc Comput Mach	17	13.6
60	TANGIS CORP	69	438	15.8	Joint IEEE and ACM	222	50.7	ACM-Assoc Comput Mach	75	17.1
61	Cox Enterprises Inc	68	127	53.5	IEEE	68	53.5	ACM-Assoc Comput Mach	16	12.6
62	ARTILUX INC	66	128	51.6	IEEE	66	51.6	Optica Publishing Group	20	15.6
63	Ericsson	66	149	44.3	IEEE	66	44.3	ACM-Assoc Comput Mach	25	16.8
64	BUTTERFLY NETWORKS I	65	76	85.5	IEEE	65	85.5	Acoustical Society of America	4	5.3
65	University of Wisconsin (WI	64	232	27.6	ACM-Assoc Comput Mach	109	47.0	IEEE	64	27.6
66	APPLIED RESEARCH ASS	63	134	47.0	IEEE	63	47.0	SPIE-Int Soc Opt Engineering	22	16.4
67	Cornell University	63	218	28.9	ACM-Assoc Comput Mach	92	42.2	IEEE	63	28.9
68	Korvus Inc.	63	332	19.0	SAGE Publications Ltd	84	25.3	IEEE	63	19.0
69	Cisco Systems Inc.	62	166	37.3	IEEE	62	37.3	The USENIX Association	28	16.9
70	Siemens Aktiengesellschaft	57	157	36.3	IEEE	57	36.3	Joint IEEE and ACM	31	19.7
71	Lockheed Martin Corp.	54	237	22.8	IEEE	54	22.8	SPIE-Int Soc Opt Engineering	43	18.1
72	ORCAM TECHNOLOGIES	54	64	84.4	IEEE	54	84.4	Springer Nature	4	6.3
73	Johnson & Johnson	53	178	29.8	IEEE	53	29.8	RELX Group (Elsevier)	46	25.8
74	EYEDAPTIC INC	52	61	85.2	IEEE	52	85.2	Wolters Kluwer	6	9.8
75	HI LLC	51	250	20.4	IEEE	51	20.4	RELX Group (Elsevier)	40	16.0
76	Boeing Co. (The)	50	139	36.0	IEEE	50	36.0	ACM-Assoc Comput Mach	17	12.2
77	City University of Hong Kon	49	249	19.7	ACM-Assoc Comput Mach	122	49.0	IEEE	49	19.7
78	Ohio State University	49	104	47.1	IEEE	49	47.1	ACM-Assoc Comput Mach	16	15.4
79	Honeywell International Inc.	48	131	36.6	IEEE	48	36.6	RELX Group (Elsevier)	14	10.7
80	Vantiva SA (f/k/a Technicolo	48	86	55.8	IEEE	48	55.8	Springer Nature	7	8.1

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	L'Oreal S.A.	47	75	62.7	IEEE	47	62.7	ACM-Assoc Comput Mach	5	6.7
82	UNIVERSIDADE DE COIM	47	82	57.3	IEEE	47	57.3	SPIE-Int Soc Opt Engineering	4	4.9
83	National Cheng Kung Univer	46	54	85.2	IEEE	46	85.2	Multidisciplinary Digital Publishing Institute (MDPI)	2	3.7
84	PUPIL LABS GMBH	46	99	46.5	IEEE	46	46.5	ACM-Assoc Comput Mach	42	42.4
85	Nio Co. Ltd	45	108	41.7	IEEE	45	41.7	CBS Interactive	21	19.4
86	Surefire LLC	44	55	80.0	IEEE	44	80.0	IEEE/OSA	11	20.0
87	University of Central Florida	44	89	49.4	IEEE	44	49.4	ACM-Assoc Comput Mach	17	19.1
88	Stryker Corp.	43	230	18.7	Mosby Inc.	44	19.1	IEEE	43	18.7
89	Xperi Inc. (f/k/a Tessera Inc)	43	112	38.4	IEEE	43	38.4	SPIE-Int Soc Opt Engineering	16	14.3
90	BERTEC CORP	42	69	60.9	IEEE	42	60.9	Springer Nature	9	13.0
91	FACENSE LTD	42	110	38.2	IEEE	42	38.2	ACM-Assoc Comput Mach	14	12.7
92	Harvard University	42	214	19.6	IEEE	42	19.6	Springer Nature	33	15.4
93	SRI International	42	91	46.2	IEEE	42	46.2	RELX Group (Elsevier)	9	9.9
94	HP Inc	41	134	30.6	ACM-Assoc Comput Mach	47	35.1	IEEE	41	30.6
95	Koninklijke Philips N.V.	41	128	32.0	IEEE	41	32.0	ACM-Assoc Comput Mach	18	14.1
96	Duke University	40	131	30.5	IEEE	40	30.5	Springer Nature	26	19.8
97	TIPPING POINT MEDICAL	40	102	39.2	IEEE	40	39.2	RELX Group (Elsevier)	8	7.8
98	Comcast Corp	39	120	32.5	IEEE	39	32.5	ACM-Assoc Comput Mach	30	25.0
99	EMERGE NOW INC	39	129	30.2	ACM-Assoc Comput Mach	39	30.2	IEEE	39	30.2
100	Fujitsu Limited	38	93	40.9	IEEE	38	40.9	ACM-Assoc Comput Mach	15	16.1

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
<i>Wind Energy</i>										
1	Vestas Wind Systems A/S	444	955	46.5	IEEE	444	46.5	AWEA-American Wind Energy Association	78	8.2
2	GE Aerospace (f/k/a General	285	686	41.5	IEEE	285	41.5	RELX Group (Elsevier)	93	13.6
3	University of Nebraska	167	222	75.2	IEEE	167	75.2	RELX Group (Elsevier)	28	12.6
4	ABB Ltd	146	249	58.6	IEEE	146	58.6	AAAS-Am Assoc Advancement Sci	12	4.8
5	Enercon GmbH	110	169	65.1	IEEE	110	65.1	RELX Group (Elsevier)	21	12.4
6	The Arizona Board of Regent	95	141	67.4	IEEE	95	67.4	RELX Group (Elsevier)	10	7.1
7	Siemens Energy Ag (formerly	81	170	47.6	IEEE	81	47.6	RELX Group (Elsevier)	16	9.4
8	Siemens Aktiengesellschaft	65	119	54.6	IEEE	65	54.6	RELX Group (Elsevier)	15	12.6
9	SolarEdge Technologies Inc	62	77	80.5	IEEE	62	80.5	WIP-Renewable Energies	7	9.1
10	GE Vernova	47	121	38.8	IEEE	47	38.8	RELX Group (Elsevier)	24	19.8
11	Ingeteam Corporation SA	46	78	59.0	IEEE	46	59.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	6	7.7
12	NORTH CHINA ELECTRIC	45	57	78.9	IEEE	45	78.9	Institution of Engineering and Technology	4	7.0
13	University of Alabama	34	42	81.0	IEEE	34	81.0	IET/IEE	6	14.3
14	Rensselaer Polytechnic Instit	25	30	83.3	IEEE	25	83.3	AIAA - American Institute of Aeronautics and Astronautics	2	6.7
15	University of New Brunswick	25	27	92.6	IEEE	25	92.6	AIAA - American Institute of Aeronautics and Astronautics	1	3.7
16	BEIJING GOLDWIND SCIE	22	36	61.1	IEEE	22	61.1	RELX Group (Elsevier)	7	19.4
17	Tigo Energy Inc	22	34	64.7	IEEE	22	64.7	WIP-Renewable Energies	9	26.5
18	MOIXA ENERGY HOLDIN	20	22	90.9	IEEE	20	90.9	ACM-Assoc Comput Mach	2	9.1
19	National Cheng Kung Univer	18	19	94.7	IEEE	18	94.7	IET/IEE	1	5.3
20	INDIVIDUAL PATENTER	17	38	44.7	IEEE	17	44.7	ASME-Am Soc Mech Eng	7	18.4
21	UWM Research Foundation	17	19	89.5	IEEE	17	89.5	RELX Group (Elsevier)	1	5.3
22	Nordex SE	16	24	66.7	IEEE	16	66.7	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	4	16.7
23	INVENTUS HOLDINGS LL	15	28	53.6	IEEE	15	53.6	RELX Group (Elsevier)	4	14.3
24	NRG SYSTEMS INC	14	24	58.3	IEEE	14	58.3	RELX Group (Elsevier)	4	16.7
25	University of South Florida	14	14	100.0	IEEE	14	100.0			
26	UPTAKE TECHNOLOGIES	14	17	82.4	IEEE	14	82.4	RELX Group (Elsevier)	2	11.8
27	Fujitsu Limited	13	14	92.9	IEEE	13	92.9	RELX Group (Elsevier)	1	7.1
28	University of Calgary	13	16	81.3	IEEE	13	81.3	IET/IEE	1	6.3
29	King Fahd University of Petr	12	30	40.0	IEEE	12	40.0	RELX Group (Elsevier)	8	26.7
30	REARDEN POWER LLC	12	12	100.0	IEEE	12	100.0			
31	UNIVERSITY OF ZAGREB	12	14	85.7	IEEE	12	85.7	China Electrochemical Society	1	7.1
32	SPARQ SYSTEMS INC	11	14	78.6	IEEE	11	78.6	IET/IEE	2	14.3
33	TechnipFMC	11	15	73.3	IEEE	11	73.3	Mcgraw Hill	1	6.7
34	Woodward Inc	10	10	100.0	IEEE	10	100.0			
35	Zhejiang University	10	13	76.9	IEEE	10	76.9	RELX Group (Elsevier)	1	7.7
36	IDENTIFLIGHT INTERNAT	9	17	52.9	IEEE	9	52.9	Massachusetts Institute of Technology	6	35.3
37	Kite Gen Research Srl	9	21	42.9	IEEE	9	42.9	RELX Group (Elsevier)	7	33.3
38	PRENAV INC	9	11	81.8	IEEE	9	81.8	RELX Group (Elsevier)	2	18.2
39	State Grid Corp of China	9	14	64.3	IEEE	9	64.3	Power System Technology Press	2	14.3

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
40	Hitachi Ltd	8	13	61.5	IEEE	8	61.5	Hitachi Ltd.	3	23.1
41	RTX Corporation (f/k/a Rayt	8	26	30.8	IEEE	8	30.8	RELX Group (Elsevier)	4	15.4
42	US WIND TECHNOLOGY L	8	16	50.0	IEEE	8	50.0	RELX Group (Elsevier)	4	25.0
43	GENEDICS CLEAN ENERG	7	63	11.1	RELX Group (Elsevier)	49	77.8	IEEE	7	11.1
44	Honeywell International Inc.	7	15	46.7	IEEE	7	46.7	Multidisciplinary Digital Publishing Institute (MDPI)	2	13.3
45	Imperial College	7	15	46.7	IEEE	7	46.7	RELX Group (Elsevier)	2	13.3
46	Alliance for Sustainable Ener	6	45	13.3	RELX Group (Elsevier)	8	17.8	SAGE Publications Ltd	7	15.6
47	Alphabet Inc.	6	20	30.0	IEEE	6	30.0	ASME-Am Soc Mech Eng	3	15.0
48	GENEDICS LLC	6	47	12.8	RELX Group (Elsevier)	35	74.5	AAAS-Am Assoc Advancement Sci	6	12.8
49	LS Electric co. Ltd. (f/k/aLSI	6	10	60.0	IEEE	6	60.0	RELX Group (Elsevier)	2	20.0
50	Medtronic Inc	6	7	85.7	IEEE	6	85.7	Springer Nature	1	14.3
51	Mitsubishi Heavy Industries	6	58	10.3	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	29	50.0	ASME-Am Soc Mech Eng	13	22.4
52	OKINAWA INSTITUTE OF	6	28	21.4	RELX Group (Elsevier)	7	25.0	IEEE	6	21.4
53	University System of Maryla	6	86	7.0	RELX Group (Elsevier)	41	47.7	IOP Publishing	8	9.3
54	GREEN ENERGY CORP	5	5	100.0	IEEE	5	100.0			
55	NEC Corp	5	6	83.3	IEEE	5	83.3	Institute of Electrical Engineers of Japan	1	16.7
56	RHEINISCH-WESTFALISC	5	5	100.0	IEEE	5	100.0			
57	ROPE ROBOTICS APS	5	5	100.0	IEEE	5	100.0			
58	University of Western Ontari	5	5	100.0	IEEE	5	100.0			
59	XINJIANG GOLDWIND SCI	5	10	50.0	IEEE	5	50.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	2	20.0
60	Alstom S.A.	4	6	66.7	IEEE	4	66.7	A B B Corporate Management Services AG	2	33.3
61	CHARGEPOINT INC	4	4	100.0	IEEE	4	100.0			
62	COMBINED ENERGIES LL	4	5	80.0	IEEE	4	80.0	RELX Group (Elsevier)	1	20.0
63	HYPER TECH RESEARCH	4	4	100.0	IEEE	4	100.0			
64	KK WIND SOLUTIONS A/S	4	4	100.0	IEEE	4	100.0			
65	NORTHERN POWER SYST	4	5	80.0	IEEE	4	80.0	PennWell Publishing Co.	1	20.0
66	POWER ENABLE SOLUTIO	4	6	66.7	IEEE	4	66.7	IET/IEEE	1	16.7
67	UNIVERSIDAD PUBLICA	4	5	80.0	IEEE	4	80.0	Instrument Society of America	1	20.0
68	AB SKF	3	3	100.0	IEEE	3	100.0			
69	AGILE WIND POWER AG	3	10	30.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	4	40.0	IEEE	3	30.0
70	Baker Hughes Inc.	3	3	100.0	IEEE	3	100.0			
71	Corteva Agriscience(former	3	24	12.5	RELX Group (Elsevier)	7	29.2	IEEE	3	12.5
72	Doosan Enerbility (former Do	3	4	75.0	IEEE	3	75.0	IET/IEEE	1	25.0
73	EMPIRE MAGNETICS INC	3	3	100.0	IEEE	3	100.0			
74	FLOWER TURBINES INC	3	19	15.8	RELX Group (Elsevier)	6	31.6	Natl Acad Sciences	6	31.6
75	HanWha Ocean (f/k/a Daewo	3	5	60.0	IEEE	3	60.0	ISA - Instrumentation, Systems & Automation Society	1	20.0
76	HARMONY TURBINES IN	3	6	50.0	IEEE	3	50.0	SAGE Publications Ltd	1	16.7
77	HUANENG GROUP R & D	3	6	50.0	IEEE	3	50.0	IET/IEEE	1	16.7
78	Huawei Technologies Compa	3	3	100.0	IEEE	3	100.0			
79	Institut Francais du Petrole (I	3	21	14.3	IOP Publishing	5	23.8	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	4	19.0
80	International Business Machi	3	18	16.7	RELX Group (Elsevier)	9	50.0	IP.Com	4	22.2

Appendix B: Top 100 Organizations That Cite IEEE; (2005-2024 Patents by Category)

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Intertrust Technologies Corp	3	3	100.0	IEEE	3	100.0			
82	Korea Electric Power Corp	3	8	37.5	RELX Group (Elsevier)	4	50.0	IEEE	3	37.5
83	Microsoft Corporation	3	5	60.0	IEEE	3	60.0	New York Times	1	20.0
84	Nanyang Technological Univ	3	3	100.0	IEEE	3	100.0			
85	National Yang Ming Chiao T	3	7	42.9	IEEE	3	42.9	IOP Publishing	2	28.6
86	PITT-OHIO EXPRESS LLC	3	7	42.9	RELX Group (Elsevier)	3	42.9	IEEE	3	42.9
87	SAMAYS INNOVACIONES	3	5	60.0	IEEE	3	60.0	RELX Group (Elsevier)	1	20.0
88	Schweitzer Engineering Labo	3	3	100.0	IEEE	3	100.0			
89	University of Florida	3	52	5.8	AIP Publishing	12	23.1	ACS-Am Chem Soc	9	17.3
90	University of Wisconsin (WI	3	3	100.0	IEEE	3	100.0			
91	ADVANCED MAGNET LA	2	2	100.0	IEEE	2	100.0			
92	Apple Inc	2	2	100.0	IEEE	2	100.0			
93	Boeing Co. (The)	2	17	11.8	NASA-National Aeronautics and Space Admi	5	29.4	AIAA - American Institute of Aeronautics and Astronautics	4	23.5
94	Bosch (Robert) GmbH	2	2	100.0	IEEE	2	100.0			
95	Consiglio Nazionale Delle Ri	2	2	100.0	IEEE	2	100.0			
96	CREATING MOORE LLC	2	5	40.0	IEEE	2	40.0	Springer Nature	1	20.0
97	Emerson Electric Co.	2	6	33.3	RELX Group (Elsevier)	3	50.0	IEEE	2	33.3
98	FLORIDA POWER & LIGH	2	3	66.7	IEEE	2	66.7	IET/IEE	1	33.3
99	GLOBAL ENERGYCONCE	2	4	50.0	IEEE	2	50.0	PCIM (Power Conversion, Intelligent Motion)	1	25.0
100	HAWAIIAN ELECTRIC CO	2	4	50.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	2	50.0	IEEE	2	50.0

Appendix C: Top Organizations from All Categories Combined

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
1	Microsoft Corporation	74180	231978	32.0	IEEE	74180	32.0	ACM-Assoc Comput Mach	63219	27.3
2	International Business Machi	70281	230868	30.4	IEEE	70281	30.4	ACM-Assoc Comput Mach	38909	16.9
3	Apple Inc	54281	168630	32.2	IEEE	54281	32.2	ACM-Assoc Comput Mach	35493	21.0
4	Qualcomm Inc	41262	65465	63.0	IEEE	41262	63.0	ACM-Assoc Comput Mach	2828	4.3
5	Micron Technology Inc.	40038	116222	34.4	IEEE	40038	34.4	RELX Group (Elsevier)	19193	16.5
6	Alphabet Inc.	39377	118054	33.4	IEEE	39377	33.4	ACM-Assoc Comput Mach	20471	17.3
7	AT&T Inc	37385	81353	46.0	IEEE	37385	46.0	ACM-Assoc Comput Mach	5651	6.9
8	Intel Corporation	32922	66541	49.5	IEEE	32922	49.5	ACM-Assoc Comput Mach	7270	10.9
9	MONOLITHIC 3D INC	29818	52893	56.4	IEEE	29818	56.4	IEEE/JPN Soc App Phys	5389	10.2
10	Broadcom Ltd	29063	54128	53.7	IEEE	29063	53.7	ACM-Assoc Comput Mach	8454	15.6
11	Samsung Electronics Co Ltd	21684	56975	38.1	IEEE	21684	38.1	RELX Group (Elsevier)	3822	6.7
12	Semiconductor Energy Labor	19668	284843	6.9	SID-Society for Information Display	96633	33.9	AIP Publishing	38753	13.6
13	Cisco Systems Inc.	18857	46361	40.7	IEEE	18857	40.7	ACM-Assoc Comput Mach	8060	17.4
14	Nokia Corporation	18267	35806	51.0	IEEE	18267	51.0	ACM-Assoc Comput Mach	2385	6.7
15	Massachusetts Institute of Te	15704	56726	27.7	IEEE	15704	27.7	RELX Group (Elsevier)	6110	10.8
16	Huawei Technologies Compa	15154	24655	61.5	IEEE	15154	61.5	ACM-Assoc Comput Mach	1826	7.4
17	SolarEdge Technologies Inc	14763	18445	80.0	IEEE	14763	80.0	WIP-Renewable Energies	1249	6.8
18	REARDEN LLC	14054	16507	85.1	IEEE	14054	85.1	IET/IEE	411	2.5
19	Ericsson	14039	22271	63.0	IEEE	14039	63.0	Internet Soc/IETF-Internet Eng Task Force	1638	7.4
20	Medtronic Inc	13417	198632	6.8	RELX Group (Elsevier)	33961	17.1	Wolters Kluwer	25722	12.9
21	Sony Group Corp	12654	26465	47.8	IEEE	12654	47.8	ACM-Assoc Comput Mach	2631	9.9
22	Western Digital Corp.	12601	26712	47.2	IEEE	12601	47.2	AIP Publishing	2625	9.8
23	Murata Manufacturing Co. Lt	12483	16416	76.0	IEEE	12483	76.0	RELX Group (Elsevier)	607	3.7
24	Siemens Aktiengesellschaft	12336	37542	32.9	IEEE	12336	32.9	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	5274	14.0
25	Oracle Corporation	12216	47336	25.8	ACM-Assoc Comput Mach	14479	30.6	IEEE	12216	25.8
26	Johnson & Johnson	11369	109136	10.4	RELX Group (Elsevier)	24942	22.9	Springer Nature	12228	11.2
27	InterDigital Inc	11226	16699	67.2	IEEE	11226	67.2	ACM-Assoc Comput Mach	763	4.6
28	Infineon Technologies AG	11070	18177	60.9	IEEE	11070	60.9	AIP Publishing	1008	5.5
29	Taiwan Semiconductor Manu	11010	32362	34.0	IEEE	11010	34.0	AIP Publishing	8264	25.5
30	Qorvo	10994	14714	74.7	IEEE	10994	74.7	RELX Group (Elsevier)	613	4.2
31	OneTrust	10839	30943	35.0	ACM-Assoc Comput Mach	14261	46.1	IEEE	10839	35.0
32	Adobe Inc. (former Adobe Sy	10663	30762	34.7	IEEE	10663	34.7	ACM-Assoc Comput Mach	8572	27.9
33	NXP Semiconductors NV	10241	16034	63.9	IEEE	10241	63.9	AIP Publishing	953	5.9
34	Personalized Media Commun	10144	60161	16.9	Society of Motion Picture and Television Engi	18103	30.1	IEEE	10144	16.9
35	ParkerVision Inc	10129	19790	51.2	IEEE	10129	51.2	IET/IEE	4431	22.4
36	Panasonic Holding Corporati	10106	21705	46.6	IEEE	10106	46.6	RELX Group (Elsevier)	1698	7.8
37	Amazon.com Inc.	9907	34620	28.6	IEEE	9907	28.6	ACM-Assoc Comput Mach	7647	22.1
38	Marvell Technology Group Lt	9736	12748	76.4	IEEE	9736	76.4	ACM-Assoc Comput Mach	565	4.4
39	Xperi Inc. (f/k/a Tessera Inc)	9535	23666	40.3	IEEE	9535	40.3	ACM-Assoc Comput Mach	1702	7.2
40	ZENO SEMICONDUCTOR I	9494	12602	75.3	IEEE	9494	75.3	IEEE/JPN Soc App Phys	1926	15.3

Appendix C: Top Organizations from All Categories Combined

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
41	Texas Instruments Inc	9445	13648	69.2	IEEE	9445	69.2	RELX Group (Elsevier)	570	4.2
42	Advanced Micro Devices Inc	9313	26510	35.1	IEEE	9313	35.1	ACM-Assoc Comput Mach	9051	34.1
43	Intuitive Surgical Inc.	9061	24880	36.4	IEEE	9061	36.4	The Medical Image Computing and Computer Assisted Interv	2424	9.7
44	University of California	9036	63422	14.2	IEEE	9036	14.2	RELX Group (Elsevier)	8475	13.4
45	GE Aerospace (f/k/a General	8962	23159	38.7	IEEE	8962	38.7	RELX Group (Elsevier)	3028	13.1
46	Honeywell International Inc.	8600	26356	32.6	IEEE	8600	32.6	RELX Group (Elsevier)	2727	10.3
47	STMicroelectronics	8547	14453	59.1	IEEE	8547	59.1	RELX Group (Elsevier)	1116	7.7
48	Koninklijke Philips N.V.	8200	37606	21.8	IEEE	8200	21.8	RELX Group (Elsevier)	4874	13.0
49	LG Electronics Inc.	8163	12633	64.6	IEEE	8163	64.6	ATSC Std	732	5.8
50	Renesas Electronic Corporati	7828	12783	61.2	IEEE	7828	61.2	AIP Publishing	851	6.7
51	Macronix International Co. Lt	7818	14380	54.4	IEEE	7818	54.4	IEEE/JPN Soc App Phys	2817	19.6
52	Rambus Inc.	7803	11642	67.0	IEEE	7803	67.0	IEEE/JPN Soc App Phys	671	5.8
53	Columbia University	7786	29990	26.0	IEEE	7786	26.0	RELX Group (Elsevier)	2828	9.4
54	Mass General Brigham (form	7782	123720	6.3	Optica Publishing Group	42252	34.2	RELX Group (Elsevier)	17723	14.3
55	Toshiba Corp	7666	18253	42.0	IEEE	7666	42.0	AIP Publishing	1458	8.0
56	Fujitsu Limited	7521	18358	41.0	IEEE	7521	41.0	ACM-Assoc Comput Mach	1270	6.9
57	The Arizona Board of Regent	7333	29405	24.9	IEEE	7333	24.9	RELX Group (Elsevier)	3269	11.1
58	University of Minnesota (The	7315	17799	41.1	IEEE	7315	41.1	RELX Group (Elsevier)	1883	10.6
59	RTX Corporation (f/k/a Rayt	7241	39056	18.5	IEEE	7241	18.5	NASA-National Aeronautics and Space Admin	5814	14.9
60	Intellectual Ventures Manage	7162	34813	20.6	IEEE	7162	20.6	Springer Nature	3180	9.1
61	NVIDIA Corp.	7162	18202	39.3	IEEE	7162	39.3	ACM-Assoc Comput Mach	3525	19.4
62	Boston Scientific Corp.	7143	99493	7.2	RELX Group (Elsevier)	24255	24.4	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	12632	12.7
63	California Institute of Techno	7072	41858	16.9	IEEE	7072	16.9	RELX Group (Elsevier)	5096	12.2
64	Tobii Ab	7011	14575	48.1	IEEE	7011	48.1	SPIE-Int Soc Opt Engineering	1784	12.2
65	Analog Devices Inc.	6877	9768	70.4	IEEE	6877	70.4	RELX Group (Elsevier)	459	4.7
66	Tela Innovations inc	6774	21887	30.9	SPIE-Int Soc Opt Engineering	7940	36.3	IEEE	6774	30.9
67	Commvault Systems Inc.	6768	11866	57.0	IEEE	6768	57.0	ACM-Assoc Comput Mach	2115	17.8
68	NEC Corp	6759	16029	42.2	IEEE	6759	42.2	ACM-Assoc Comput Mach	1571	9.8
69	Irobot Corp	6631	13296	49.9	IEEE	6631	49.9	SPIE-Int Soc Opt Engineering	1847	13.9
70	Dexcom Inc	6593	111739	5.9	RELX Group (Elsevier)	28354	25.4	Mary Ann Liebert Inc.	11512	10.3
71	Blackberry Ltd.	6479	13344	48.6	IEEE	6479	48.6	ACM-Assoc Comput Mach	1162	8.7
72	CPG TECHNOLOGIES LLC	6467	12485	51.8	IEEE	6467	51.8	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1548	12.4
73	Commscope Holding (formerl	6228	10166	61.3	IEEE	6228	61.3	IET/IEE	295	2.9
74	Fraunhofer Gesellschaft	6198	11491	53.9	IEEE	6198	53.9	Audio Eng Soc	1322	11.5
75	HP Inc	6170	18543	33.3	IEEE	6170	33.3	ACM-Assoc Comput Mach	3166	17.1
76	Abbott Laboratories	6166	136057	4.5	RELX Group (Elsevier)	31574	23.2	ACS-Am Chem Soc	15258	11.2
77	Fractus SA	6131	10972	55.9	IEEE	6131	55.9	IET/IEE	1444	13.2
78	Canon Inc	6105	20579	29.7	IEEE	6105	29.7	RELX Group (Elsevier)	1859	9.0
79	Mosaid Technologies (f/k/aC	6045	8776	68.9	IEEE	6045	68.9	IEEE/JPN Soc App Phys	289	3.3
80	HRL Laboratories LLC	6007	14530	41.3	IEEE	6007	41.3	RELX Group (Elsevier)	1121	7.7

Appendix C: Top Organizations from All Categories Combined

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
81	Magna International Inc.	5979	11607	51.5	IEEE	5979	51.5	SAE-Society of Automobile Engineers	961	8.3
82	Dolby Laboratories Inc	5924	11452	51.7	IEEE	5924	51.7	Audio Eng Soc	1319	11.5
83	Xerox Corp	5855	20923	28.0	IEEE	5855	28.0	ACM-Assoc Comput Mach	3339	16.0
84	University of Illinois	5743	52729	10.9	AIP Publishing	8352	15.8	ACS-Am Chem Soc	7387	14.0
85	Nippon Telegraph & Telepho	5732	12798	44.8	IEEE	5732	44.8	IEICE-Inst Elec Info Comm Eng	1285	10.0
86	Industrial Technology Resear	5698	10985	51.9	IEEE	5698	51.9	RELX Group (Elsevier)	1166	10.6
87	Ricoh Co. Ltd.	5234	12276	42.6	IEEE	5234	42.6	ACM-Assoc Comput Mach	1858	15.1
88	Meta Platforms Inc.(formerly	5233	21917	23.9	IEEE	5233	23.9	ACM-Assoc Comput Mach	4292	19.6
89	Cadence Design Systems Inc	5201	12182	42.7	IEEE	5201	42.7	Joint IEEE and ACM	3874	31.8
90	Witricity Corp	5094	9789	52.0	IEEE	5094	52.0	AIP Publishing	792	8.1
91	Thermo Fisher Scientific Inc	5047	29486	17.1	RELX Group (Elsevier)	9658	32.8	IEEE	5047	17.1
92	Adeia Inc (f/k/a Xperi Holdin	4964	13810	35.9	IEEE	4964	35.9	RELX Group (Elsevier)	1377	10.0
93	Softbank Corp	4883	10391	47.0	IEEE	4883	47.0	ACM-Assoc Comput Mach	1010	9.7
94	Comcast Corp	4840	8281	58.4	IEEE	4840	58.4	ACM-Assoc Comput Mach	1065	12.9
95	Electronics and Telecommuni	4801	8244	58.2	IEEE	4801	58.2	RELX Group (Elsevier)	344	4.2
96	Sap SE	4744	20998	22.6	ACM-Assoc Comput Mach	7051	33.6	IEEE	4744	22.6
97	ASM International N.V.	4712	57518	8.2	RELX Group (Elsevier)	10131	17.6	AIP Publishing	9400	16.3
98	Applied Materials Inc.	4711	17560	26.8	IEEE	4711	26.8	AIP Publishing	2876	16.4
99	Boeing Co. (The)	4690	14348	32.7	IEEE	4690	32.7	RELX Group (Elsevier)	1506	10.5
100	Wolfspeed Inc. (formerly Cre	4590	12392	37.0	IEEE	4590	37.0	AIP Publishing	2577	20.8
101	Synopsys Inc.	4580	11898	38.5	IEEE	4580	38.5	SPIE-Int Soc Opt Engineering	1668	14.0
102	Mitsubishi Electric Corp	4557	8664	52.6	IEEE	4557	52.6	ACM-Assoc Comput Mach	717	8.3
103	L3 Harris Technologies (f/k/a	4461	7669	58.2	IEEE	4461	58.2	RELX Group (Elsevier)	385	5.0
104	ADAPTIX INC	4411	5020	87.9	IEEE	4411	87.9	IET/IEE	159	3.2
105	Dell Technologies Inc	4366	12564	34.8	IEEE	4366	34.8	ACM-Assoc Comput Mach	2378	18.9
106	Sonos Inc	4329	11543	37.5	IEEE	4329	37.5	SPIE-Int Soc Opt Engineering	1294	11.2
107	Magic Leap Inc	4279	14398	29.7	IEEE	4279	29.7	ACM-Assoc Comput Mach	1791	12.4
108	Allegro Microsystems Inc	4004	5322	75.2	IEEE	4004	75.2	RELX Group (Elsevier)	837	15.7
109	On Semiconductor Corporati	4003	5845	68.5	IEEE	4003	68.5	RELX Group (Elsevier)	361	6.2
110	Vantiva SA (f/k/a Technicolo	3899	6952	56.1	IEEE	3899	56.1	SPIE-Int Soc Opt Engineering	464	6.7
111	Commissariat A L'Energie At	3850	12879	29.9	IEEE	3850	29.9	RELX Group (Elsevier)	2165	16.8
112	Masimo Corp	3804	8050	47.3	IEEE	3804	47.3	Springer Nature	692	8.6
113	Global Foundries Inc	3710	8273	44.8	IEEE	3710	44.8	Optica Publishing Group	871	10.5
114	Digimarc Corp.	3669	9463	38.8	IEEE	3669	38.8	SPIE-Int Soc Opt Engineering	1327	14.0
115	Toyota Motor Corp	3589	10543	34.0	IEEE	3589	34.0	RELX Group (Elsevier)	1396	13.2
116	Hon Hai Precision Industry C	3559	11479	31.0	IEEE	3559	31.0	SID-Society for Information Display	1313	11.4
117	Immersion Corp.	3530	10443	33.8	IEEE	3530	33.8	ACM-Assoc Comput Mach	1131	10.8
118	Hewlett Packard Enterprises	3510	9677	36.3	IEEE	3510	36.3	ACM-Assoc Comput Mach	2161	22.3
119	Bosch (Robert) GmbH	3494	13229	26.4	IEEE	3494	26.4	RELX Group (Elsevier)	1237	9.4
120	Honda Motor Co. Ltd.(Honda	3451	8074	42.7	IEEE	3451	42.7	RELX Group (Elsevier)	882	10.9

Appendix C: Top Organizations from All Categories Combined

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
121	ABB Ltd	3437	5134	66.9	IEEE	3437	66.9	RELX Group (Elsevier)	304	5.9
122	INDIVIDUAL PATENTER	3432	21681	15.8	IEEE	3432	15.8	RELX Group (Elsevier)	3226	14.9
123	Hitachi Ltd	3430	11125	30.8	IEEE	3430	30.8	ACM-Assoc Comput Mach	1111	10.0
124	Motorola Solutions Inc.	3429	5790	59.2	IEEE	3429	59.2	ACM-Assoc Comput Mach	348	6.0
125	Stanford University	3420	42146	8.1	RELX Group (Elsevier)	6061	14.4	Springer Nature	5821	13.8
126	Cirrus Logic Inc.	3364	4322	77.8	IEEE	3364	77.8	RELX Group (Elsevier)	142	3.3
127	Corning Inc.	3294	12678	26.0	IEEE	3294	26.0	RELX Group (Elsevier)	1812	14.3
128	University of Washington	3207	16305	19.7	IEEE	3207	19.7	RELX Group (Elsevier)	2282	14.0
129	Lockheed Martin Corp.	3166	20948	15.1	IEEE	3166	15.1	Springer Nature	2299	11.0
130	United States Navy	2975	10257	29.0	IEEE	2975	29.0	RELX Group (Elsevier)	1035	10.1
131	SUN PATENT TRUST	2969	4003	74.2	IEEE	2969	74.2	IEICE-Inst Elec Info Comm Eng	750	18.7
132	CONSTELLATION DESIGN	2951	3587	82.3	IEEE	2951	82.3	IET/IEE	131	3.7
133	Chipbond Technology Corp	2945	3684	79.9	IEEE	2945	79.9	RELX Group (Elsevier)	272	7.4
134	TABULA INC	2903	7826	37.1	IEEE	2903	37.1	ACM-Assoc Comput Mach	2898	37.0
135	III HOLDINGS 12 LLC	2854	5597	51.0	IEEE	2854	51.0	ACM-Assoc Comput Mach	686	12.3
136	IP RESERVOIR LLC	2778	5458	50.9	IEEE	2778	50.9	ACM-Assoc Comput Mach	928	17.0
137	University of Michigan	2777	15608	17.8	RELX Group (Elsevier)	2873	18.4	IEEE	2777	17.8
138	Accenture Ltd.	2714	8328	32.6	IEEE	2714	32.6	ACM-Assoc Comput Mach	1358	16.3
139	Cortica Ltd	2708	4016	67.4	IEEE	2708	67.4	ACM-Assoc Comput Mach	457	11.4
140	Emerson Electric Co.	2707	8156	33.2	IEEE	2707	33.2	RELX Group (Elsevier)	1135	13.9
141	Rockwell Automation Inc	2697	3974	67.9	IEEE	2697	67.9	RELX Group (Elsevier)	258	6.5
142	MicroUnity Systems Enginee	2674	4461	59.9	IEEE	2674	59.9	Joint IEEE and ACM	407	9.1
143	Juniper Networks Inc.	2636	5014	52.6	IEEE	2636	52.6	ACM-Assoc Comput Mach	510	10.2
144	Tencent Holding Ltd	2625	4540	57.8	IEEE	2625	57.8	ACM-Assoc Comput Mach	270	5.9
145	University of Texas	2607	16040	16.3	RELX Group (Elsevier)	2612	16.3	IEEE	2607	16.3
146	PDF Solutions	2576	4104	62.8	IEEE	2576	62.8	SPIE-Int Soc Opt Engineering	913	22.2
147	Salesforce Inc. (f/k/a Salesfor	2551	10122	25.2	IEEE	2551	25.2	ACM-Assoc Comput Mach	1242	12.3
148	Verizon Communications Inc	2531	5805	43.6	IEEE	2531	43.6	Internet Soc/IETF-Internet Eng Task Force	551	9.5
149	coherent Corp (f/k/a II-VI Inc	2530	8411	30.1	IEEE	2530	30.1	Optica Publishing Group	1384	16.5
150	Stryker Corp.	2521	20673	12.2	RELX Group (Elsevier)	3666	17.7	Springer Nature	2544	12.3
151	Battelle Memorial Institute	2510	8852	28.4	IEEE	2510	28.4	RELX Group (Elsevier)	1560	17.6
152	The Texas A&M University S	2478	4412	56.2	IEEE	2478	56.2	RELX Group (Elsevier)	376	8.5
153	STRONG FORCE IOT PORT	2436	3364	72.4	IEEE	2436	72.4	RELX Group (Elsevier)	292	8.7
154	Viasat	2419	3808	63.5	IEEE	2419	63.5	AIAA - American Institute of Aeronautics and Astronautics	267	7.0
155	Microchip Technology Inc.	2414	3643	66.3	IEEE	2414	66.3	ACM-Assoc Comput Mach	184	5.1
156	Mediatek Inc.	2397	2856	83.9	IEEE	2397	83.9	IEEE/JPN Soc App Phys	72	2.5
157	ATTOPSEMI TECHNOLOG	2380	2983	79.8	IEEE	2380	79.8	IEEE/JPN Soc App Phys	364	12.2
158	Silicon Laboratories Inc	2360	3145	75.0	IEEE	2360	75.0	RELX Group (Elsevier)	142	4.5
159	Energous Corporation	2353	3018	78.0	IEEE	2353	78.0	ADCOM - Advanced Computing and Communications Societ	232	7.7
160	BT Group PLC	2320	4712	49.2	IEEE	2320	49.2	ACM-Assoc Comput Mach	431	9.1

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161	GENGHISCOMM HOLDIN	2306	2819	81.8	IEEE	2306	81.8	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	73	2.6
162	Cubic Corporation	2269	3223	70.4	IEEE	2269	70.4	The International Society of Infrared, Millimeter, and Terahert	164	5.1
163	Walt Disney Co.	2238	8565	26.1	ACM-Assoc Comput Mach	3581	41.8	IEEE	2238	26.1
164	TDK Corporation	2229	7708	28.9	IEEE	2229	28.9	AIP Publishing	1211	15.7
165	SIPCO LLC	2224	3660	60.8	IEEE	2224	60.8	ACM-Assoc Comput Mach	312	8.5
166	Empire Technology Develop	2216	6634	33.4	IEEE	2216	33.4	Joint IEEE and ACM	1020	15.4
167	Vanderbilt University	2204	8077	27.3	IEEE	2204	27.3	RELX Group (Elsevier)	1061	13.1
168	PACT XPP TECHNOLOGIE	2197	3831	57.3	IEEE	2197	57.3	ACM-Assoc Comput Mach	371	9.7
169	Seagate Technology Plc	2166	6711	32.3	IEEE	2166	32.3	AIP Publishing	1229	18.3
170	Kandou Bus SA	2155	2444	88.2	IEEE	2155	88.2	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	86	3.5
171	Amberwave Inc	2148	6296	34.1	IEEE	2148	34.1	AIP Publishing	1864	29.6
172	Totalenergies SE (formerly T	2145	3388	63.3	IEEE	2145	63.3	RELX Group (Elsevier)	300	8.9
173	RPX Corp	2101	4448	47.2	IEEE	2101	47.2	ACM-Assoc Comput Mach	314	7.1
174	Georgia Institute of Technolo	2097	6374	32.9	IEEE	2097	32.9	RELX Group (Elsevier)	711	11.2
175	Lenovo Group Ltd	2096	3587	58.4	IEEE	2096	58.4	ACM-Assoc Comput Mach	351	9.8
176	University of South Florida	2088	6878	30.4	IEEE	2088	30.4	RELX Group (Elsevier)	1018	14.8
177	Interuniversity MicroElectron	2057	4863	42.3	IEEE	2057	42.3	AIP Publishing	434	8.9
178	United Microelectronics Corp	2041	4193	48.7	IEEE	2041	48.7	AIP Publishing	598	14.3
179	INNOVATIVE SILICON SA	2033	2515	80.8	IEEE	2033	80.8	RELX Group (Elsevier)	108	4.3
180	Ignis Innovation Inc	2023	2856	70.8	IEEE	2023	70.8	SID-Society for Information Display	462	16.2
181	Mevion Medical Systems Inc	2012	6425	31.3	IEEE	2012	31.3	RELX Group (Elsevier)	1249	19.4
182	NXGEN PARTNERS IP LLC	2002	4534	44.2	IEEE	2002	44.2	Optica Publishing Group	1207	26.6
183	Nielsen Holdings Plc	1993	14445	13.8	RELX Group (Elsevier)	2557	17.7	IEEE	1993	13.8
184	Purdue University	1993	10624	18.8	IEEE	1993	18.8	RELX Group (Elsevier)	1427	13.4
185	Seiko Epson Corporation	1978	5743	34.4	IEEE	1978	34.4	RELX Group (Elsevier)	453	7.9
186	Fujifilm Business Innovation	1955	8298	23.6	IEEE	1955	23.6	ACM-Assoc Comput Mach	1221	14.7
187	Cognex Corp.	1899	4643	40.9	IEEE	1899	40.9	RELX Group (Elsevier)	797	17.2
188	Netapp Inc	1880	10103	18.6	ACM-Assoc Comput Mach	4322	42.8	IEEE	1880	18.6
189	Flex Ltd (f/k/aFlextronics Intl	1872	2675	70.0	IEEE	1872	70.0	CBS Interactive	340	12.7
190	INTOUCH HEALTH INC	1863	5149	36.2	IEEE	1863	36.2	IEEE/RSJ	539	10.5
191	Illumina Inc.	1856	9683	19.2	IEEE	1856	19.2	Springer Nature	1106	11.4
192	SK Hynix Inc	1854	3270	56.7	IEEE	1854	56.7	Joint IEEE and ACM	207	6.3
193	eBay Inc	1827	8631	21.2	IEEE	1827	21.2	ACM-Assoc Comput Mach	1290	14.9
194	Yahoo Inc	1822	10599	17.2	ACM-Assoc Comput Mach	3113	29.4	IEEE	1822	17.2
195	Palantir Technologies Inc	1815	9325	19.5	IEEE	1815	19.5	ACM-Assoc Comput Mach	1730	18.6
196	TuSimple	1814	3006	60.3	IEEE	1814	60.3	arXiv.org	247	8.2
197	Cloud Software Group	1812	5228	34.7	IEEE	1812	34.7	ACM-Assoc Comput Mach	975	18.6
198	Johnson Controls Internationa	1785	6235	28.6	IEEE	1785	28.6	RELX Group (Elsevier)	1540	24.7
199	FormFactor Inc	1763	3523	50.0	IEEE	1763	50.0	Springer Nature	648	18.4
200	Lumen Technologies Inc. (for	1759	4673	37.6	IEEE	1759	37.6	ACM-Assoc Comput Mach	1128	24.1

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201	Ford Motor Co.	1740	4703	37.0	IEEE	1740	37.0	RELX Group (Elsevier)	494	10.5
202	Virginia Tech University	1737	9324	18.6	RELX Group (Elsevier)	1841	19.7	IEEE	1737	18.6
203	Zebra Technologies Corp.	1735	3545	48.9	IEEE	1735	48.9	ACM-Assoc Comput Mach	245	6.9
204	GUIDED THERAPY SYSTE	1732	7701	22.5	IEEE	1732	22.5	RELX Group (Elsevier)	1346	17.5
205	State Farm Mutual Automobi	1727	5235	33.0	IEEE	1727	33.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	288	5.5
206	University of Southern Califo	1712	9240	18.5	IEEE	1712	18.5	ACS-Am Chem Soc	1212	13.1
207	GoPro Inc	1697	3484	48.7	IEEE	1697	48.7	ACM-Assoc Comput Mach	312	9.0
208	BAE Systems Plc.	1692	3639	46.5	IEEE	1692	46.5	SPIE-Int Soc Opt Engineering	434	11.9
209	Baidu Inc	1691	5401	31.3	IEEE	1691	31.3	arXiv.org	1166	21.6
210	ByteDance Ltd	1689	2556	66.1	IEEE	1689	66.1	SPIE-Int Soc Opt Engineering	206	8.1
211	Wisteria Trading Inc	1681	3517	47.8	IEEE	1681	47.8	SPIE-Int Soc Opt Engineering	403	11.5
212	University of North Carolina	1678	8144	20.6	IEEE	1678	20.6	RELX Group (Elsevier)	1100	13.5
213	University of Florida	1616	6362	25.4	IEEE	1616	25.4	RELX Group (Elsevier)	987	15.5
214	University of Nebraska	1596	7113	22.4	IEEE	1596	22.4	Springer Nature	1086	15.3
215	Valencell Inc	1594	4145	38.5	IEEE	1594	38.5	RELX Group (Elsevier)	368	8.9
216	Northrop Grumman Corp	1570	3759	41.8	IEEE	1570	41.8	Optica Publishing Group	290	7.7
217	Johns Hopkins University	1562	10063	15.5	IEEE	1562	15.5	RELX Group (Elsevier)	1437	14.3
218	T-Mobile USA INC	1562	3481	44.9	IEEE	1562	44.9	ACM-Assoc Comput Mach	326	9.4
219	University of Wisconsin (WI	1556	9374	16.6	IEEE	1556	16.6	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1208	12.9
220	Open Text Corp	1555	4868	31.9	IEEE	1555	31.9	ACM-Assoc Comput Mach	957	19.7
221	Quarterhill Inc	1555	2186	71.1	IEEE	1555	71.1	AT & T	61	2.8
222	Hong Kong University of Sci	1551	4080	38.0	IEEE	1551	38.0	AIP Publishing	371	9.1
223	BUTTERFLY NETWORKS I	1530	1685	90.8	IEEE	1530	90.8	Acoustical Society of America	44	2.6
224	Brain Corporation	1523	4394	34.7	IEEE	1523	34.7	MIT Press	574	13.1
225	Cornell University	1490	9120	16.3	IEEE	1490	16.3	RELX Group (Elsevier)	1237	13.6
226	United States of America Dep	1482	6170	24.0	IEEE	1482	24.0	RELX Group (Elsevier)	770	12.5
227	SRI International	1481	4632	32.0	IEEE	1481	32.0	RELX Group (Elsevier)	384	8.3
228	UltraLeap Holdings Limited (	1481	4273	34.7	IEEE	1481	34.7	ACM-Assoc Comput Mach	833	19.5
229	Intertrust Technologies Corp	1477	7736	19.1	ACM-Assoc Comput Mach	1624	21.0	IEEE	1477	19.1
230	Thales	1475	3225	45.7	IEEE	1475	45.7	ACM-Assoc Comput Mach	257	8.0
231	Gen Digital Inc. (formerly No	1471	5270	27.9	IEEE	1471	27.9	ACM-Assoc Comput Mach	1258	23.9
232	Snap Inc	1463	4366	33.5	IEEE	1463	33.5	ACM-Assoc Comput Mach	812	18.6
233	Orange	1457	2226	65.5	IEEE	1457	65.5	ACM-Assoc Comput Mach	103	4.6
234	PURE Storage Inc	1413	6419	22.0	ACM-Assoc Comput Mach	2612	40.7	IEEE	1413	22.0
235	Align Technology Inc	1391	12206	11.4	JCO - Journal of Clinical Orthodontics	1751	14.3	RELX Group (Elsevier)	1482	12.1
236	AMPT LLC	1386	1810	76.6	IEEE	1386	76.6	RELX Group (Elsevier)	108	6.0
237	ORIGIN WIRELESS INC	1382	2084	66.3	IEEE	1382	66.3	American Physical Society	129	6.2
238	City University of Hong Kon	1364	3326	41.0	IEEE	1364	41.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	294	8.8
239	General Motors Corp	1336	3702	36.1	IEEE	1336	36.1	RELX Group (Elsevier)	599	16.2
240	Ant Group (ANT Financial S	1332	2591	51.4	IEEE	1332	51.4	RELX Group (Elsevier)	205	7.9

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241	CapitalOne	1332	4743	28.1	IEEE	1332	28.1	CBS Interactive	382	8.1
242	Schneider Electric S.A.	1328	5805	22.9	IEEE	1328	22.9	RELX Group (Elsevier)	632	10.9
243	UATC LLC	1328	2250	59.0	IEEE	1328	59.0	IEEE/CVF	247	11.0
244	Headwater Partners 1 LLC	1326	2725	48.7	IEEE	1326	48.7	ACM-Assoc Comput Mach	620	22.8
245	P4TENTS1 LLC	1323	2923	45.3	IEEE	1323	45.3	ACM-Assoc Comput Mach	433	14.8
246	Assa Abloy AB	1318	4838	27.2	IEEE	1318	27.2	ACM-Assoc Comput Mach	731	15.1
247	Smith & Nephew Plc.	1301	17966	7.2	RELX Group (Elsevier)	3400	18.9	Wolters Kluwer	1768	9.8
248	United States Army	1301	5919	22.0	IEEE	1301	22.0	AIP Publishing	581	9.8
249	LivaNova Plc	1260	24451	5.2	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	5469	22.4	RELX Group (Elsevier)	4895	20.0
250	Dassault Systemes SA	1251	10050	12.4	RELX Group (Elsevier)	1443	14.4	IEEE	1251	12.4
251	Duke University	1240	7353	16.9	IEEE	1240	16.9	RELX Group (Elsevier)	819	11.1
252	MOJO MOBILITY INC	1236	1622	76.2	IEEE	1236	76.2	RELX Group (Elsevier)	135	8.3
253	QST HOLDINGS LLC	1227	2104	58.3	IEEE	1227	58.3	Joint IEEE and ACM	233	11.1
254	PME IP PTY LTD	1219	3148	38.7	IEEE	1219	38.7	ACM-Assoc Comput Mach	771	24.5
255	NETWORK-1 TECHNOLOG	1217	3352	36.3	IEEE	1217	36.3	ACM-Assoc Comput Mach	742	22.1
256	Kyocera Corp.	1211	4968	24.4	IEEE	1211	24.4	AIP Publishing	858	17.3
257	Math Works Inc (The)	1209	3059	39.5	IEEE	1209	39.5	ACM-Assoc Comput Mach	580	19.0
258	Nant Holdings IP Llc	1205	4410	27.3	IEEE	1205	27.3	ACM-Assoc Comput Mach	945	21.4
259	Imagination Technologies Gr	1197	2922	41.0	IEEE	1197	41.0	ACM-Assoc Comput Mach	705	24.1
260	State University of New York	1175	5036	23.3	IEEE	1175	23.3	RELX Group (Elsevier)	629	12.5
261	PHOENIX SOLUTIONS INC	1173	3668	32.0	IEEE	1173	32.0	ISCA (Int Speech Comm Association)	472	12.9
262	SLB.com (former Schlumber	1166	16566	7.0	Society of Petroleum Engineers	3832	23.1	Society of Exploration Geophysicists	2494	15.1
263	United Services Automobile	1163	6554	17.7	IEEE	1163	17.7	Source Media	928	14.2
264	Wells Fargo & Co	1141	2950	38.7	IEEE	1141	38.7	ACM-Assoc Comput Mach	343	11.6
265	University of Pennsylvania	1138	10823	10.5	RELX Group (Elsevier)	1553	14.3	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	1156	10.7
266	Charles Stark Draper Laborat	1131	3339	33.9	IEEE	1131	33.9	RELX Group (Elsevier)	303	9.1
267	X ONE INC	1130	2923	38.7	IEEE	1130	38.7	ACM-Assoc Comput Mach	571	19.5
268	ViaPath Technologies (f/k/a	1124	2319	48.5	IEEE	1124	48.5	Springer Nature	175	7.5
269	University of Alabama	1123	4161	27.0	IEEE	1123	27.0	RELX Group (Elsevier)	717	17.2
270	Teledyne Technologies Incor	1120	2722	41.1	IEEE	1120	41.1	SPIE-Int Soc Opt Engineering	340	12.5
271	Velatia Group	1120	1502	74.6	IEEE	1120	74.6	Echelon Corp	113	7.5
272	Crossbar Inc	1118	4323	25.9	IEEE	1118	25.9	AIP Publishing	581	13.4
273	Ecole Polytechnique Federale	1108	4347	25.5	IEEE	1108	25.5	Springer Nature	508	11.7
274	Michigan State University	1105	9912	11.1	Optica Publishing Group	1828	18.4	AIP Publishing	1326	13.4
275	Ohio State University	1104	4324	25.5	IEEE	1104	25.5	RELX Group (Elsevier)	652	15.1
276	Carnegie Mellon University	1100	4711	23.3	IEEE	1100	23.3	RELX Group (Elsevier)	551	11.7
277	Baxter International Inc.	1098	10525	10.4	RELX Group (Elsevier)	2356	22.4	IEEE	1098	10.4
278	Avaya LLC (f/k/a Avaya Inc/	1097	2757	39.8	IEEE	1097	39.8	ACM-Assoc Comput Mach	370	13.4
279	Harvard University	1097	16713	6.6	Springer Nature	2292	13.7	RELX Group (Elsevier)	1970	11.8
280	Agency for Science Technolo	1090	3451	31.6	IEEE	1090	31.6	RELX Group (Elsevier)	446	12.9

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
281	Washington University in St.	1086	8691	12.5	RELX Group (Elsevier)	1222	14.1	IEEE	1086	12.5
282	CENTRIPETAL NETWORK	1071	2816	38.0	IEEE	1071	38.0	ACM-Assoc Comput Mach	576	20.5
283	Technion - Israel Institute of	1071	3446	31.1	IEEE	1071	31.1	RELX Group (Elsevier)	431	12.5
284	EchoStar Corp	1067	1952	54.7	IEEE	1067	54.7	RELX Group (Elsevier)	139	7.1
285	Verance Corp	1064	2166	49.1	IEEE	1064	49.1	SPIE-Int Soc Opt Engineering	287	13.3
286	Vicor Corp	1051	1320	79.6	IEEE	1051	79.6	Penton/IPC, Inc.	51	3.9
287	NUCURRENT INC	1042	1296	80.4	IEEE	1042	80.4	Wireless Power Consortium	81	6.3
288	HI LLC	1035	5473	18.9	IEEE	1035	18.9	AIP Publishing	960	17.5
289	Embla Medical (f/k/a Ossur h	1026	3299	31.1	IEEE	1026	31.1	RELX Group (Elsevier)	693	21.0
290	IDC LLC	1026	2714	37.8	IEEE	1026	37.8	SID-Society for Information Display	386	14.2
291	Korea Advanced Institute for	1026	2695	38.1	IEEE	1026	38.1	RELX Group (Elsevier)	201	7.5
292	New Jersey Institute of Techn	1024	2546	40.2	IEEE	1024	40.2	RELX Group (Elsevier)	423	16.6
293	Synaptics Inc.	1024	2084	49.1	IEEE	1024	49.1	ACM-Assoc Comput Mach	148	7.1
294	Eagleview Technologies Inc	1023	4235	24.2	IEEE	1023	24.2	ACM-Assoc Comput Mach	680	16.1
295	Nikon Corp.	1022	5400	18.9	SPIE-Int Soc Opt Engineering	2066	38.3	IEEE	1022	18.9
296	Northwestern University	1021	10609	9.6	ACS-Am Chem Soc	1607	15.1	RELX Group (Elsevier)	1409	13.3
297	AMS Osrām (former AMS A	1016	5188	19.6	IEEE	1016	19.6	AIP Publishing	1012	19.5
298	VerintSys	1016	6561	15.5	International Data Group	1438	21.9	ACM-Assoc Comput Mach	1166	17.8
299	STRONG FORCE TX PORT	1012	2297	44.1	IEEE	1012	44.1	RELX Group (Elsevier)	411	17.9
300	REALTIME DATA LLC	1011	3081	32.8	IEEE	1011	32.8	IBM Corp.	474	15.4
301	Skyworks Solutions Inc	1000	1416	70.6	IEEE	1000	70.6	Summit Technical Media	53	3.7
302	Here Global BV	981	2214	44.3	IEEE	981	44.3	ACM-Assoc Comput Mach	262	11.8
303	Cleveland Clinic (and Founda	973	5934	16.4	RELX Group (Elsevier)	1169	19.7	IEEE	973	16.4
304	Fortinet Inc	972	1903	51.1	IEEE	972	51.1	ACM-Assoc Comput Mach	292	15.3
305	Unisantīs Electronics Ltd	970	1197	81.0	IEEE	970	81.0	Institute of Pure and Applied Physics	53	4.4
306	Northeastern University (Bost	965	2648	36.4	IEEE	965	36.4	RELX Group (Elsevier)	256	9.7
307	Synergy Microwave Corp	963	1174	82.0	IEEE	963	82.0	Horizon House Publications	66	5.6
308	Experian Plc	960	7062	13.6	IEEE	960	13.6	Source Media	652	9.2
309	Ciena Corp	955	2381	40.1	IEEE	955	40.1	Optica Publishing Group	486	20.4
310	Foxconn Technology Co. Ltd.	952	2219	42.9	IEEE	952	42.9	Springer Nature	410	18.5
311	Maxlinear Inc	948	1200	79.0	IEEE	948	79.0	ACM-Assoc Comput Mach	49	4.1
312	Centre National De La Reche	943	7053	13.4	RELX Group (Elsevier)	1631	23.1	IEEE	943	13.4
313	VIVAQUANT LLC	938	1909	49.1	IEEE	938	49.1	RELX Group (Elsevier)	253	13.3
314	Schweitzer Engineering Labo	935	1227	76.2	IEEE	935	76.2	ACM-Assoc Comput Mach	70	5.7
315	University System of Maryla	935	7334	12.7	RELX Group (Elsevier)	1253	17.1	IEEE	935	12.7
316	TRILLIANT NETWORKS IN	929	1286	72.2	IEEE	929	72.2	RELX Group (Elsevier)	82	6.4
317	McAfee Inc	926	3983	23.2	IEEE	926	23.2	ACM-Assoc Comput Mach	831	20.9
318	EXEGY INC	920	1805	51.0	IEEE	920	51.0	ACM-Assoc Comput Mach	314	17.4
319	New York University	919	7343	12.5	RELX Group (Elsevier)	933	12.7	IEEE	919	12.5
320	ARTILUX INC	918	1847	49.7	IEEE	918	49.7	Optica Publishing Group	303	16.4

Appendix C: Top Organizations from All Categories Combined

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
321	Otto Bock Holding GmbH &	915	2873	31.8	IEEE	915	31.8	RELX Group (Elsevier)	602	21.0
322	Saluda Medical Pty Ltd	912	4907	18.6	IEEE	912	18.6	RELX Group (Elsevier)	803	16.4
323	Princeton University	904	6964	13.0	AIP Publishing	1195	17.2	IEEE	904	13.0
324	Voxer Llc	904	1426	63.4	IEEE	904	63.4	International Data Group	83	5.8
325	Walmart Stores Inc	903	2926	30.9	IEEE	903	30.9	ACM-Assoc Comput Mach	325	11.1
326	JPMorgan	897	6779	13.2	Source Media	1182	17.4	IEEE	897	13.2
327	E-Ink Holdings Inc	885	10585	8.4	SID-Society for Information Display	4264	40.3	Korean Information Display Society (KIDS)	1104	10.4
328	SRC Computers Inc.	882	1004	87.8	IEEE	882	87.8	Springer Nature	39	3.9
329	KLA Corporation (f/k/a KLA	880	5994	14.7	SPIE-Int Soc Opt Engineering	1922	32.1	IEEE	880	14.7
330	Airbus SE	879	2217	39.6	IEEE	879	39.6	RELX Group (Elsevier)	276	12.4
331	Alibaba Group Holding Ltd	875	1954	44.8	IEEE	875	44.8	ACM-Assoc Comput Mach	219	11.2
332	Tel Aviv University	870	4111	21.2	IEEE	870	21.2	RELX Group (Elsevier)	725	17.6
333	Palo Alto Networks	869	1921	45.2	IEEE	869	45.2	ACM-Assoc Comput Mach	345	18.0
334	HTC Corporation	866	1605	54.0	IEEE	866	54.0	ACM-Assoc Comput Mach	82	5.1
335	Visa Inc	866	3239	26.7	IEEE	866	26.7	ACM-Assoc Comput Mach	386	11.9
336	Realtek Semiconductor Corp.	859	1024	83.9	IEEE	859	83.9	Springer Nature	21	2.1
337	SYNQOR INC	859	984	87.3	IEEE	859	87.3	Penton/IPC, Inc.	45	4.6
338	NUMENTA INC	851	3542	24.0	Numenta Inc.	1265	35.7	IEEE	851	24.0
339	Aptiv Plc (former Delphi Aut	838	1366	61.3	IEEE	838	61.3	ACM-Assoc Comput Mach	73	5.3
340	3M Co	834	27190	3.1	RELX Group (Elsevier)	3722	13.7	Wolters Kluwer	3516	12.9
341	Lam Research Corp.	833	6300	13.2	AIP Publishing	1538	24.4	IEEE	833	13.2
342	Otsuka Holdings Co Ltd	817	5718	14.3	RELX Group (Elsevier)	1161	20.3	IEEE	817	14.3
343	Maui Imaging Inc (a/k/a Mau	816	1339	60.9	IEEE	816	60.9	RELX Group (Elsevier)	182	13.6
344	Autodesk Inc.	814	6417	12.7	ACM-Assoc Comput Mach	3509	54.7	IEEE	814	12.7
345	SAS Institute	809	3303	24.5	IEEE	809	24.5	RELX Group (Elsevier)	464	14.0
346	GE Healthcare	800	3321	24.1	IEEE	800	24.1	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	506	15.2
347	Nantero Inc	798	9687	8.2	ACS-Am Chem Soc	2821	29.1	AIP Publishing	2044	21.1
348	Midtronics Inc.	790	1787	44.2	IEEE	790	44.2	RELX Group (Elsevier)	357	20.0
349	Seoul National University	782	2131	36.7	IEEE	782	36.7	ACM-Assoc Comput Mach	185	8.7
350	COMSovereign Holding Cor	768	1119	68.6	IEEE	768	68.6	IET/IEE	119	10.6
351	Round Rock Research LLC	768	2195	35.0	IEEE	768	35.0	RELX Group (Elsevier)	356	16.2
352	Aisin Corporation (Aisin Seki	765	5227	14.6	Optica Publishing Group	1981	37.9	IEEE	765	14.6
353	Korvus Inc.	760	9053	8.4	AIP Publishing	2523	27.9	Institute of Pure and Applied Physics	1770	19.6
354	University of Virginia (and P	759	3629	20.9	IEEE	759	20.9	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	565	15.6
355	Eastman Kodak Company	758	3349	22.6	IEEE	758	22.6	AIP Publishing	360	10.7
356	ZTE Microelectronics Techno	758	1530	49.5	IEEE	758	49.5	Optica Publishing Group	222	14.5
357	Causam Enterprises (former	756	1289	58.7	IEEE	756	58.7	Springer Nature	186	14.4
358	MegaChips Corp	755	1049	72.0	IEEE	755	72.0	American Physical Society	69	6.6
359	National Yang Ming Chiao T	754	1620	46.5	IEEE	754	46.5	RELX Group (Elsevier)	132	8.1
360	University of Pittsburgh	750	7260	10.3	RELX Group (Elsevier)	1750	24.1	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	812	11.2

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rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
361	Uber Technologies Inc	748	1571	47.6	IEEE	748	47.6	ACM-Assoc Comput Mach	132	8.4
362	AngioDynamics Inc.	747	6660	11.2	RELX Group (Elsevier)	1418	21.3	Springer Nature	900	13.5
363	ASML Holding NV	746	14884	5.0	SPIE-Int Soc Opt Engineering	5743	38.6	AIP Publishing	2464	16.6
364	Agilent Technologies Inc	745	2801	26.6	IEEE	745	26.6	RELX Group (Elsevier)	416	14.9
365	Knowles Corp	745	1536	48.5	IEEE	745	48.5	RELX Group (Elsevier)	188	12.2
366	North Carolina State Universi	743	3467	21.4	IEEE	743	21.4	RELX Group (Elsevier)	553	16.0
367	HEMOSONICS LLC	741	2000	37.1	IEEE	741	37.1	RELX Group (Elsevier)	311	15.6
368	Yageo Corporation	740	1105	67.0	IEEE	740	67.0	IET/IEE	202	18.3
369	Becton Dickinson and Co.	739	36558	2.0	Wolters Kluwer	8938	24.4	RELX Group (Elsevier)	6127	16.8
370	EDGE 3 TECHNOLOGIES I	730	1148	63.6	IEEE	730	63.6	RELX Group (Elsevier)	67	5.8
371	Bank of America Corp.	728	2016	36.1	IEEE	728	36.1	ACM-Assoc Comput Mach	293	14.5
372	Halliburton Co. (Holding)	724	9821	7.4	Society of Petroleum Engineers	3662	37.3	RELX Group (Elsevier)	738	7.5
373	National Taiwan University	724	1532	47.3	IEEE	724	47.3	AIP Publishing	132	8.6
374	University of Connecticut	724	3382	21.4	IEEE	724	21.4	Optica Publishing Group	566	16.7
375	Case Western Reserve Univer	720	2924	24.6	IEEE	720	24.6	RELX Group (Elsevier)	399	13.6
376	Denso Corp	718	1541	46.6	IEEE	718	46.6	RELX Group (Elsevier)	124	8.0
377	Asahi Kasei Corp.	716	8153	8.8	RELX Group (Elsevier)	1775	21.8	Wolters Kluwer	1173	14.4
378	FACENSE LTD	715	1325	54.0	IEEE	715	54.0	RELX Group (Elsevier)	110	8.3
379	United States Air Force	715	2580	27.7	IEEE	715	27.7	RELX Group (Elsevier)	280	10.9
380	MIPS Tech LLC (f/k/a Wave	711	2395	29.7	IEEE	711	29.7	ACM-Assoc Comput Mach	482	20.1
381	STATS LLC	707	1409	50.2	IEEE	707	50.2	RELX Group (Elsevier)	110	7.8
382	Continental AG (Germany Fe	704	1280	55.0	IEEE	704	55.0	RELX Group (Elsevier)	87	6.8
383	Extreme Networks Inc	703	1810	38.8	IEEE	703	38.8	ACM-Assoc Comput Mach	297	16.4
384	Aerospace Corp.	695	1890	36.8	IEEE	695	36.8	RELX Group (Elsevier)	281	14.9
385	ICU Medical Inc	695	4109	16.9	IEEE	695	16.9	Springer Nature	557	13.6
386	M/A-COM Technology Solut	693	1328	52.2	IEEE	693	52.2	AIP Publishing	200	15.1
387	BRIGHT DATA LTD	692	4688	14.8	ACM-Assoc Comput Mach	1151	24.6	IEEE	692	14.8
388	Advantest Corp.	685	958	71.5	IEEE	685	71.5	AIP Publishing	37	3.9
389	TELADOC HEALTH INC	685	1975	34.7	IEEE	685	34.7	IEEE/RSJ	192	9.7
390	IDEMIA	682	1603	42.5	IEEE	682	42.5	RELX Group (Elsevier)	159	9.9
391	Deere & Co.	681	1922	35.4	IEEE	681	35.4	Springer Nature	222	11.6
392	Power Integrations Inc.	671	1055	63.6	IEEE	671	63.6	AIP Publishing	64	6.1
393	Blue Sail Medical Co. Ltd.	670	2244	29.9	IEEE	670	29.9	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	318	14.2
394	D-Wave Quantum Inc. (forme	667	5084	13.1	American Physical Society	1523	30.0	IEEE	667	13.1
395	THE CHAMBERLAIN GRO	661	1890	35.0	IEEE	661	35.0	International Association for Cryptologic Research (IACR)	256	13.5
396	University of Notre Dame Du	661	1688	39.2	IEEE	661	39.2	RELX Group (Elsevier)	152	9.0
397	THE FLORIDA INTERNATI	656	1942	33.8	IEEE	656	33.8	RELX Group (Elsevier)	261	13.4
398	Saudi Arabian Oil Company (	653	12192	5.4	RELX Group (Elsevier)	2355	19.3	Society of Petroleum Engineers	2218	18.2
399	NEWVALUEXCHANGE LT	652	1858	35.1	IEEE	652	35.1	ACM-Assoc Comput Mach	420	22.6
400	PixelWorks Inc	651	1019	63.9	IEEE	651	63.9	SPIE-Int Soc Opt Engineering	112	11.0

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401	SILVERBROOK RESEARC	647	1853	34.9	IEEE	647	34.9	Springer Nature	417	22.5
402	Mayo Foundation for Medica	645	6748	9.6	RELX Group (Elsevier)	1342	19.9	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	869	12.9
403	National University of Ireland	644	1274	50.5	IEEE	644	50.5	RELX Group (Elsevier)	103	8.1
404	F5 Networks Inc	640	3244	19.7	IEEE	640	19.7	ACM-Assoc Comput Mach	622	19.2
405	Carl-Zeiss Stiftung	628	10043	6.3	Optica Publishing Group	2130	21.2	SPIE-Int Soc Opt Engineering	1877	18.7
406	PLUSN LLC	626	856	73.1	IEEE	626	73.1	IET/IEE	78	9.1
407	Tigo Energy Inc	619	975	63.5	IEEE	619	63.5	WIP-Renewable Energies	269	27.6
408	DropBox Inc	616	1580	39.0	IEEE	616	39.0	ACM-Assoc Comput Mach	399	25.3
409	Keysight Technologies	615	1204	51.1	IEEE	615	51.1	ACM-Assoc Comput Mach	104	8.6
410	Swiss Federal Institute of Tec	614	2229	27.5	ACM-Assoc Comput Mach	691	31.0	IEEE	614	27.5
411	Soitec SA	611	2337	26.1	IEEE	611	26.1	AIP Publishing	553	23.7
412	University of Colorado (The	608	5758	10.6	Optica Publishing Group	1374	23.9	RELX Group (Elsevier)	763	13.3
413	Allstate Corp	606	1718	35.3	IEEE	606	35.3	ACM-Assoc Comput Mach	154	9.0
414	University of Utah	605	4141	14.6	RELX Group (Elsevier)	645	15.6	IEEE	605	14.6
415	University of Central Florida	604	3081	19.6	IEEE	604	19.6	Optica Publishing Group	291	9.4
416	Vestas Wind Systems A/S	603	1276	47.3	IEEE	603	47.3	RELX Group (Elsevier)	116	9.1
417	HeartFlow Inc	601	6196	9.7	Springer Nature	1387	22.4	RELX Group (Elsevier)	1304	21.0
418	Yonsei University	598	1354	44.2	IEEE	598	44.2	ACM-Assoc Comput Mach	104	7.7
419	Tata Sons Ltd	595	1644	36.2	IEEE	595	36.2	ACM-Assoc Comput Mach	170	10.3
420	Teradyne Inc.	592	1223	48.4	IEEE	592	48.4	ASME-Am Soc Mech Eng	150	12.3
421	ACORN TECHNOLOGIES I	591	2047	28.9	IEEE	591	28.9	AIP Publishing	528	25.8
422	University of Rochester	591	3333	17.7	IEEE	591	17.7	Optica Publishing Group	440	13.2
423	FARO Technologies Inc.	588	2064	28.5	IEEE	588	28.5	SPIE-Int Soc Opt Engineering	391	18.9
424	VirnetX Holding Corp	587	3631	16.2	Nokia Bell Labs	670	18.5	IEEE	587	16.2
425	King Fahd University of Petr	585	1918	30.5	IEEE	585	30.5	RELX Group (Elsevier)	463	24.1
426	King Abdullah University of	582	3485	16.7	IEEE	582	16.7	ACS-Am Chem Soc	446	12.8
427	AB Initio Technology LLC	579	2031	28.5	ACM-Assoc Comput Mach	624	30.7	IEEE	579	28.5
428	OMNI MEDSCI INC	578	7959	7.3	Optica Publishing Group	2702	33.9	RELX Group (Elsevier)	1252	15.7
429	Drexel University	576	4729	12.2	RELX Group (Elsevier)	1031	21.8	AIP Publishing	677	14.3
430	MACAU UNIVERSITY OF	574	834	68.8	IEEE	574	68.8	RELX Group (Elsevier)	74	8.9
431	MULTI-TECH SYSTEMS IN	569	816	69.7	IEEE	569	69.7	ACM-Assoc Comput Mach	44	5.4
432	Eaton Corp.	568	857	66.3	IEEE	568	66.3	RELX Group (Elsevier)	64	7.5
433	General Dynamics Corp	568	1248	45.5	IEEE	568	45.5	American Physical Society	213	17.1
434	University of Massachusetts	568	3442	16.5	IEEE	568	16.5	RELX Group (Elsevier)	409	11.9
435	The National Aeronautical an	565	2967	19.0	IEEE	565	19.0	AIAA - American Institute of Aeronautics and Astronautics	438	14.8
436	Will Semiconductor Co. Ltd	565	1397	40.4	IEEE	565	40.4	Optica Publishing Group	319	22.8
437	ACORN SEMI LLC	563	3508	16.0	AIP Publishing	1282	36.5	RELX Group (Elsevier)	630	18.0
438	Nanyang Technological Univ	560	3393	16.5	RELX Group (Elsevier)	575	16.9	IEEE	560	16.5
439	ECOLE DE TECHBOLOGIE	557	722	77.1	IEEE	557	77.1	SPIE-Int Soc Opt Engineering	55	7.6
440	Delta Electronics Inc	556	771	72.1	IEEE	556	72.1	SPIE-Int Soc Opt Engineering	20	2.6

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441	UT-Battelle LLC	555	4059	13.7	RELX Group (Elsevier)	745	18.4	IEEE	555	13.7
442	GE Vernova	552	984	56.1	IEEE	552	56.1	RELX Group (Elsevier)	92	9.3
443	Deka Products LP	550	1255	43.8	IEEE	550	43.8	RELX Group (Elsevier)	135	10.8
444	Pennsylvania State University	547	3841	14.2	RELX Group (Elsevier)	636	16.6	IEEE	547	14.2
445	Roche Holding Ltd.	546	10316	5.3	RELX Group (Elsevier)	2252	21.8	ACS-Am Chem Soc	1244	12.1
446	Twitter Inc	544	1098	49.5	IEEE	544	49.5	ACM-Assoc Comput Mach	163	14.8
447	Netflix Inc	541	994	54.4	IEEE	541	54.4	ACM-Assoc Comput Mach	109	11.0
448	Khalifa University of Science	539	951	56.7	IEEE	539	56.7	RELX Group (Elsevier)	77	8.1
449	Skyhigh Security (f/k/a Skyhi	539	1607	33.5	IEEE	539	33.5	ACM-Assoc Comput Mach	319	19.9
450	SAMBANOVIA SYSTEMS I	535	937	57.1	IEEE	535	57.1	Joint IEEE and ACM	152	16.2
451	Viavi Solutions Inc	534	1778	30.0	IEEE	534	30.0	Optica Publishing Group	245	13.8
452	ISCO International Llc	533	538	99.1	IEEE	533	99.1	RELX Group (Elsevier)	1	0.2
453	BLANDING HOVENWEEP	530	1420	37.3	IEEE	530	37.3	SPIE-Int Soc Opt Engineering	201	14.2
454	Intellective AI Inc (f/k/a Omn	530	635	83.5	IEEE	530	83.5	International Association for Pattern Recognition (IAPR)	65	10.2
455	Nintendo Co. Ltd.	529	2871	18.4	ACM-Assoc Comput Mach	628	21.9	IEEE	529	18.4
456	LIGHTMATTER INC	527	2537	20.8	Springer Nature	586	23.1	IEEE	527	20.8
457	A10 Networks Inc	523	1001	52.2	IEEE	523	52.2	Joint IEEE and ACM	112	11.2
458	Hexagon AB	515	1311	39.3	IEEE	515	39.3	ACM-Assoc Comput Mach	119	9.1
459	Brown University Research F	514	1935	26.6	IEEE	514	26.6	RELX Group (Elsevier)	202	10.4
460	Technische Universitat Berlin	514	921	55.8	IEEE	514	55.8	AIP Publishing	107	11.6
461	EAGLE HARBOR HOLDIN	512	877	58.4	IEEE	512	58.4	SAE-Society of Automobile Engineers	162	18.5
462	Hologic Inc	509	5585	9.1	RELX Group (Elsevier)	1008	18.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	911	16.3
463	Kioxia Corp (formerly Toshiba	509	1314	38.7	IEEE	509	38.7	The USENIX Association	166	12.6
464	Commonwealth Scientific an	508	1200	42.3	IEEE	508	42.3	RELX Group (Elsevier)	133	11.1
465	Spotify AB	506	1242	40.7	IEEE	506	40.7	ACM-Assoc Comput Mach	161	13.0
466	CREATIVE KINGDOMS LL	505	1698	29.7	IEEE	505	29.7	ACM-Assoc Comput Mach	457	26.9
467	William Marsh Rice Universi	505	2813	18.0	IEEE	505	18.0	ACS-Am Chem Soc	381	13.5
468	Porsche Automobil Holding S	503	983	51.2	IEEE	503	51.2	RELX Group (Elsevier)	91	9.3
469	INNOPHASE INC	500	559	89.4	IEEE	500	89.4	European Microwave Association	24	4.3
470	DIVEPLANE CORP	499	1962	25.4	IEEE	499	25.4	Springer Nature	247	12.6
471	Charter Communications Inc	498	1154	43.2	IEEE	498	43.2	DOCSIS Std - Cable Labs	98	8.5
472	Mitre Corp	498	1091	45.6	IEEE	498	45.6	Springer Nature	62	5.7
473	ST-Ericsson SA (Patents split	498	608	81.9	IEEE	498	81.9	IET/IEEE	15	2.5
474	Hoya Corp	497	1570	31.7	IEEE	497	31.7	AIP Publishing	309	19.7
475	Naver Corp.	497	1211	41.0	IEEE	497	41.0	ACM-Assoc Comput Mach	192	15.9
476	Ostendo Technologies Inc	496	2019	24.6	IEEE	496	24.6	SPIE-Int Soc Opt Engineering	242	12.0
477	KEPLER COMPUTING INC	495	1201	41.2	IEEE	495	41.2	AIP Publishing	176	14.7
478	Cambricon Technologies Co	493	1495	33.0	IEEE	493	33.0	ACM-Assoc Comput Mach	463	31.0
479	Catholic University Leuven	493	1340	36.8	IEEE	493	36.8	RELX Group (Elsevier)	140	10.4
480	BLUERISC INC	488	1386	35.2	IEEE	488	35.2	ACM-Assoc Comput Mach	311	22.4

Appendix C: Top Organizations from All Categories Combined

rank	assignee	# IEEE Refs	Total Science Refs	% IEEE Refs	Top Referenced Organization	# Refs	% Refs	2nd Most Referenced Organization	# Refs	% Refs
481	Rocket Lab USA Inc	487	1003	48.6	IEEE	487	48.6	RELX Group (Elsevier)	154	15.4
482	Sumitomo Electric Industries	487	3142	15.5	IEEE	487	15.5	AIP Publishing	431	13.7
483	Enphase Energy Inc	486	532	91.4	IEEE	486	91.4	IET/IEE	9	1.7
484	University of Toronto	486	2032	23.9	IEEE	486	23.9	ACM-Assoc Comput Mach	177	8.7
485	ZENA TECHNOLOGIES IN	478	2156	22.2	IEEE	478	22.2	ACS-Am Chem Soc	442	20.5
486	Comtech Telecommunication	477	643	74.2	IEEE	477	74.2	ACM-Assoc Comput Mach	28	4.4
487	MIRAMAR LABS INC	476	1359	35.0	IEEE	476	35.0	John Wiley & Sons/Wiley-Verlag/Wiley-Liss	169	12.4
488	Via Technologies Inc.	476	996	47.8	IEEE	476	47.8	Joint IEEE and ACM	153	15.4
489	ROCKLEY PHOTONICS LT	473	1579	30.0	Optica Publishing Group	499	31.6	IEEE	473	30.0
490	CARTICA AI LTD	472	733	64.4	IEEE	472	64.4	ACM-Assoc Comput Mach	86	11.7
491	DIGITAL GLOBAL SYSTE	471	471	100.0	IEEE	471	100.0			
492	Rohde & Schwarz GmbH &	470	822	57.2	IEEE	470	57.2	ATSC Std	144	17.5
493	Koch Industries Inc	467	1467	31.8	IEEE	467	31.8	RELX Group (Elsevier)	266	18.1
494	Guangdong Oujia Holdings C	464	737	63.0	IEEE	464	63.0	RELX Group (Elsevier)	60	8.1
495	SiOnyx Inc	464	3002	15.5	AIP Publishing	830	27.6	RELX Group (Elsevier)	471	15.7
496	3D Systems Corp.	463	1028	45.0	IEEE	463	45.0	ACM-Assoc Comput Mach	256	24.9
497	Pulse Link Inc	463	555	83.4	IEEE	463	83.4	Springer Nature	21	3.8
498	Conduent Inc	459	1448	31.7	IEEE	459	31.7	RELX Group (Elsevier)	145	10.0
499	Tokyo Electron Limited	459	3542	13.0	RELX Group (Elsevier)	494	13.9	AIP Publishing	482	13.6
500	ALENTIC MICROSCIENCE	458	1702	26.9	IEEE	458	26.9	Royal Society of Chemistry	217	12.7