



IEEE: The Force Behind Innovation

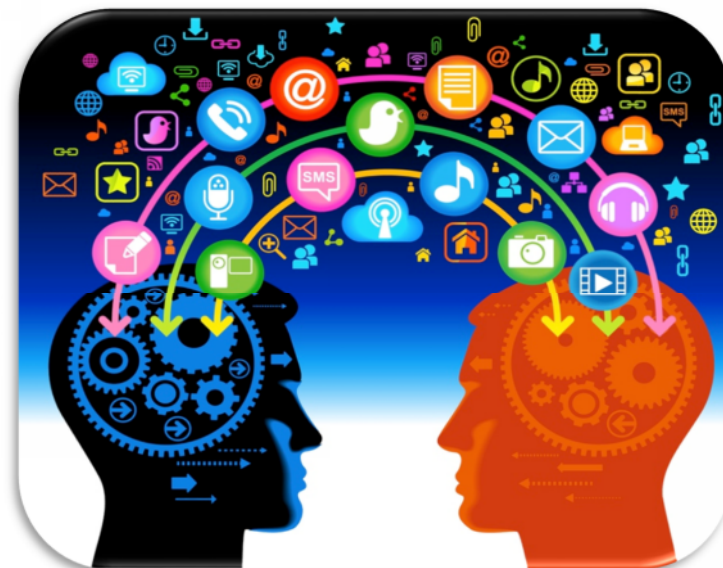
IEEE Central Tennessee Section
07 February 2018
Joseph V. Lillie, IEEE Treasurer



The Fuel of IEEE: Mission & Vision

IEEE is where forward-thinking technology professionals come together to **discover the next technological innovation, develop international standards, form communities, and share research and educate**, in the spirit of collaboration.

- **Our Mission**
The core purpose of IEEE is to foster technological innovation and excellence for the benefit of humanity.
- **Our Vision**
IEEE will be essential to the global technical community and to technical professionals everywhere, and be universally recognized for the contributions of technology and of technical professionals in improving global conditions.



IEEE Today at a Glance

Global Reach



423,000+
Members



39
Technical
Societies



160
Countries

Technical Breadth

1,800
Annual Conferences



4,000,000+
Technical Documents



170+
Top-cited Periodicals



1,160+
Active Standards



Industry Relies on IEEE

Whenever technology happens, IEEE is there.



9 of Top 10
Communications Equipment Companies Worldwide



All Top 10
Aerospace and Defense Companies Worldwide



7 of Top 10
Telecommunication Companies Worldwide



9 of Top 10
Automobile Manufacturers Worldwide



9 of Top 10
Computer Hardware Companies Worldwide



98 of Top 100
Engineering and Technology Universities Worldwide



28 of Top 29
Semiconductor Companies Worldwide

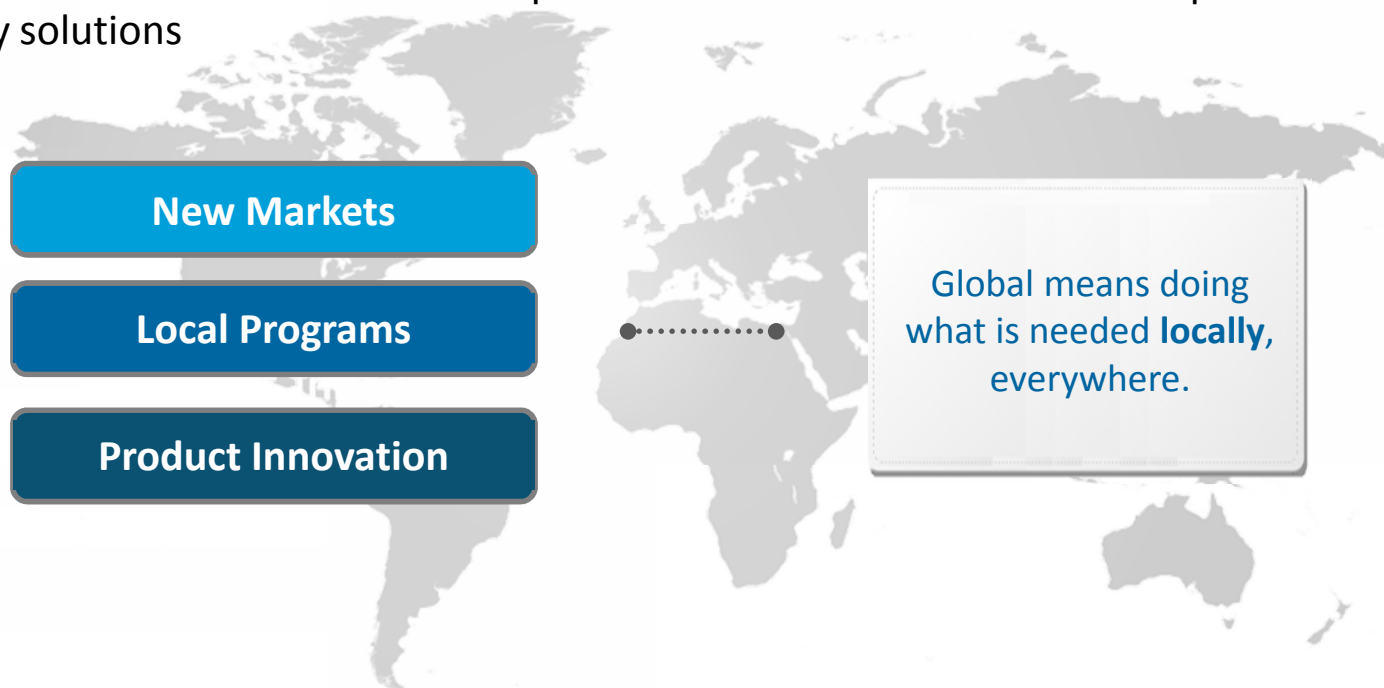


All Top 100
Engineering Universities in the United States

Expanding Global Outreach

New technology connections

- IEEE collaborations around the world inspire innovation for those who develop and deliver technology solutions



IEEE: An Organizational Matrix

Self-organizing communities

Geographic Sections

- Local colleague community
- Cross-and inter-disciplinary networking through local Section, Chapter, Student Branch activities
- Local professional and technical activities

Global Technical Societies & Councils


- International member coalitions of shared technical areas and fields of interests
- Sponsor and organize conferences, workshops tutorials, seminars, etc.
- Develop publications





IEEE Membership By Region


Total Membership


421,355

 R1 to 6 — **194,167**

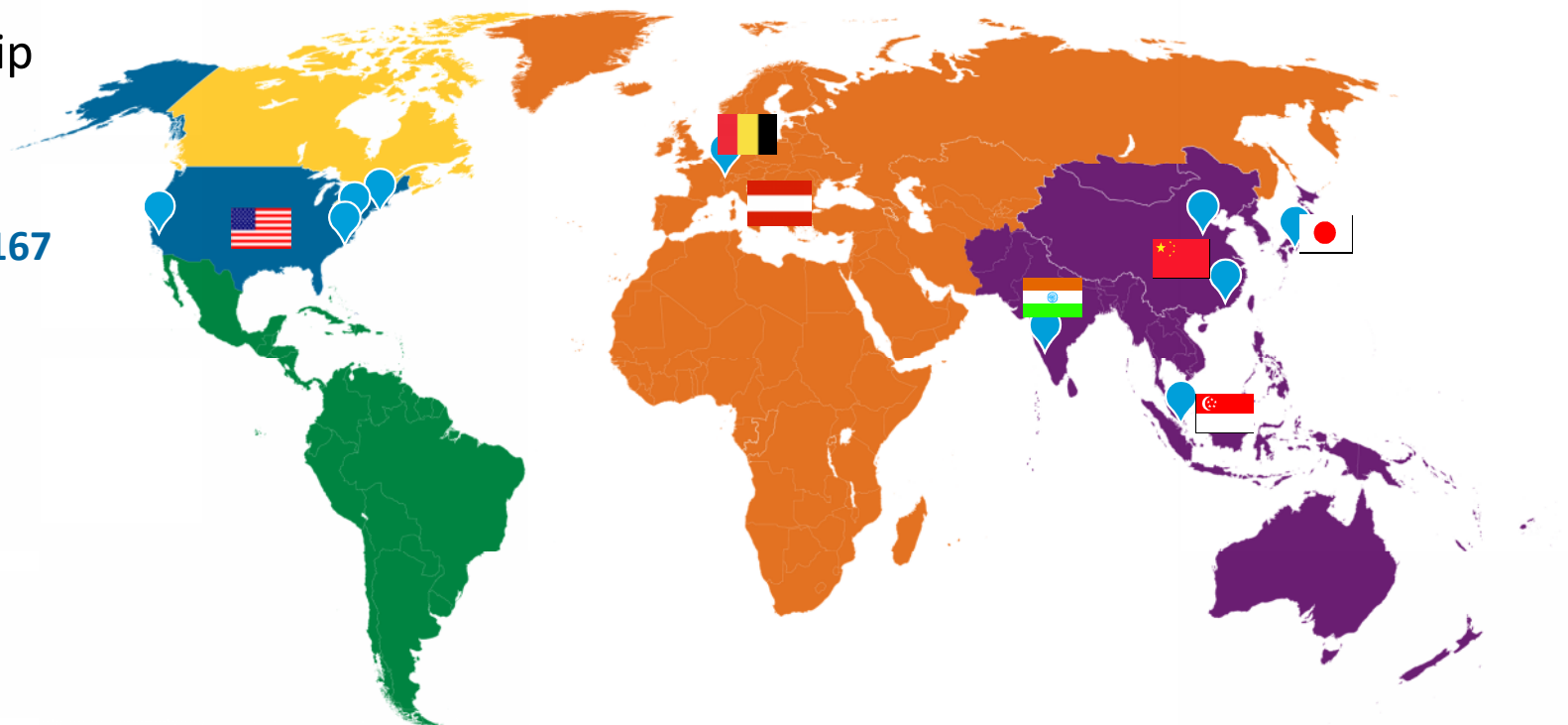
 R7 — **17,163**

 R8 — **77,883**

 R9 — **18,569**

 R10 — **113,573**

 IEEE Offices



Technical Expertise that is Broad and Deep

Electrical and electronic engineering, computer science, and beyond:

- Aerospace
- Biomedical Engineering
- Broadcasting
- Circuits
- Communications
- Computing
- Control and Automation
- Electronics
- Environment
- Industrial systems
- Information Technology
- Internet of Things
- Life Sciences
- Nanotechnology
- Optics
- Power and Energy
- Robotics and AI
- Semiconductors
- Smart Cities
- Smart Grid
- Transportation and Vehicles
- **And more...**

Technical Communities—*Future Directions*

IEEE focuses on what's next, enabling innovation and the creation of new technologies.

- Big Data
- Green ICT
- Smart Cities
- Smart Materials
- Cybersecurity
- Internet of Things
- Smart Grid
- Software Defined Networks
- Cloud Computing
- Life Science
- Transportation Electrification



Future Directions Initiative

An innovation engine

- Fostering cooperative efforts in emerging topics among Societies, Councils, and industry

MATURITY LEVEL



IEEE Smart
Materials



Our Value to Companies and Industry

IEEE strives to address the needs of companies and individuals, while providing value to the technology industry as a whole through IEEE products, services, and information.

IEEE Standards



IEEE is one of the leading producers of standards in the world, and we work hard to ensure comprehensive and global standards.

IEEE Standards Association

IEEE Standards drive the functionality, capability, and interoperability of a range of products and services that affect the way people live, work, and communicate.

Individual membership

6,879 individual members in 90 countries

Corporate Memberships

187 member corporations in 23 countries

Standards Developers

~20,000 participants;
all interested parties are welcome

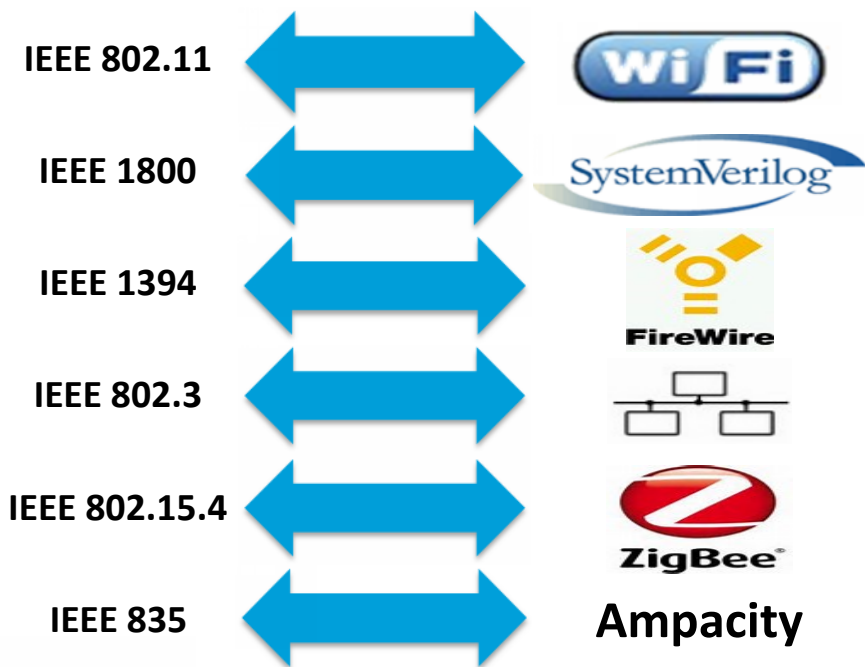


IEEE Standards

IEEE nurtures, develops, and advances the building of global technologies.

- Consumers around the world enjoy the benefits of IEEE Standards.
- Standards provide the bricks and mortar for a globally level playing field for innovation.
- 1100+ active standards
- 500+ under development

Are you familiar with any IEEE Standards?



IEEE Standards in Real Life

Advancing the Technologies for Connected Vehicles through Consensus Building

Transportation Electrification
IEEE 2030™ and its related standards are the first all-encompassing standards series providing alternative approaches and best practices for achieving smart grid interoperability.

IEEE 1547™ Series
A series of standards for distributed power to maximize the benefits of interconnection.

IEEE P1562™
Standard for array and battery sizing.

IEEE 1901™ Series
Standards relating to broadband connectivity over electric power lines.

Intelligent Transportation Systems
IEEE 1609™
A family of standards defining the architecture, services and standard interfaces for secure vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) wireless communications.

IEEE 1616™
Standards for motor vehicle event data recorders.

IEEE 802.11™
WLAN to support communication between vehicles and the roadside and between vehicles while operating at speeds up to a minimum of 200 km/h for communication ranges up to 1000 meters.

And more...
IEEE Standards Coordinating Committee on Transportation (SCC42) leads the coordination of IEEE standardization activities for technologies related to transportation.

Traffic Safety
IEEE 1512™
Multiple standards for traffic safety and emergency communication.

Smart Rail
A wide range of standards relating to electric rail operation including IEEE 11-2000, IEEE 16-2004™, IEEE P1653.1™, IEEE P1791™, IEEE P1833™, IEEE P1833.1™, IEEE P1884, IEEE P1887™, IEEE P1896™, IEEE P2408™, IEEE 1536™, IEEE 1558™, IEEE 1568™, IEEE 1570™, IEEE 1629™, IEEE 1629.1™, IEEE 1630™, IEEE 1653™ series, and IEEE 1698™. As well as a series of standards relating to communication for rail transit systems, including IEEE 1473™, IEEE 1474™, IEEE 1475™, IEEE 1476™, IEEE 1477™, IEEE 1482.1™, and IEEE 1483™.

Connectivity
IEEE 802.3
Defining the physical layer and data link layer's media access control of wired Ethernet, in local area networks and wide area network applications.

IEEE 802.15™
Wireless personal area networks allows the use of wearable and other short-range wireless devices (such as health monitors).

IEEE 802.20™ Series
Communications standards for connecting vehicles to 802 systems.

Improving The Environment Through Green Technology Consensus Building

Green Community Network
IEEE 1888
IEEE P1888.1
IEEE P1888.2
IEEE P1888.3
IEEE P1888.4

Convergence of Smart Home and Building Architectures

DC in the Home

Environmental Product Assessment
IEEE 1680
IEEE 1680.1
IEEE 1680.2
IEEE 1680.3
IEEE 1680.4
IEEE 1680.5

Smart Metering
IEEE 3001.5
IEEE P3005.7
IEEE 1377
IEEE 1701
IEEE 1703
IEEE P1704
IEEE P1705

Smart Grid
IEEE 1547 Series
IEEE 2030 Series
IEEE P1909.1

Smart Energy Data Repository Systems & Components for Energy Routers

Energy-Efficient Communications Networking (WAN/MAN/LAN)
IEEE 802.1 Series IEEE 1815
IEEE 802.11 IEEE 1901 Series
IEEE 802.16 IEEE 802.3 Series
IEEE 802.22 IEEE 802.15.4
IEEE P1804.1

Renewable Energy Generation
IEEE PC57.159 IEEE 1561
IEEE P60076-16 IEEE 1562
IEEE 937 IEEE P1595
IEEE 1013 IEEE 1661
IEEE 1361 IEEE P1797
IEEE 1526 IEEE P1843

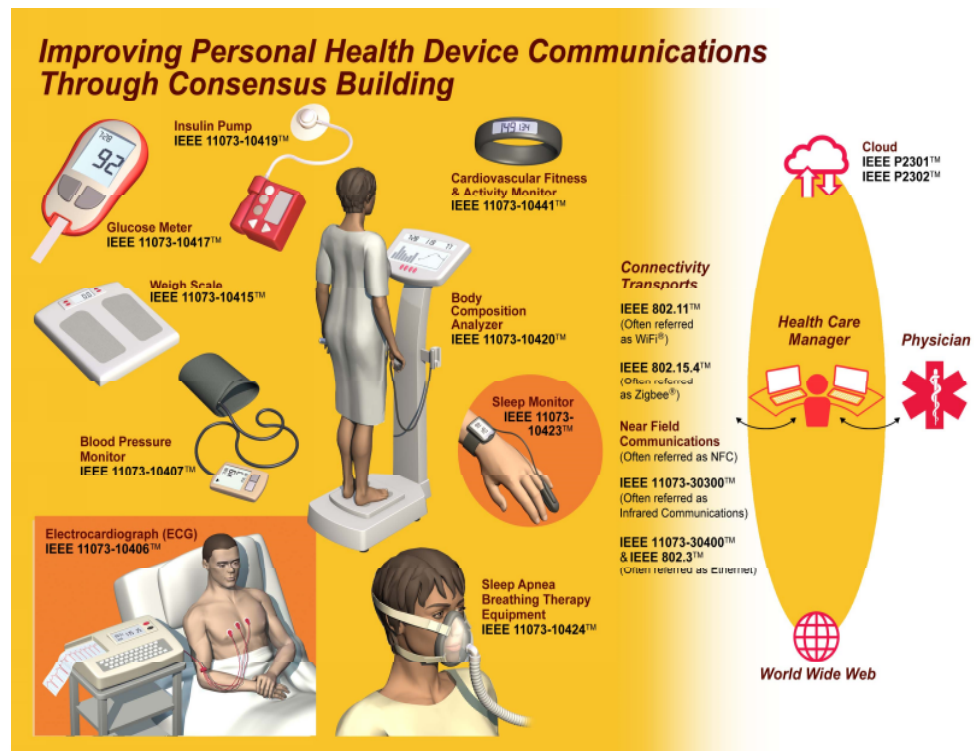
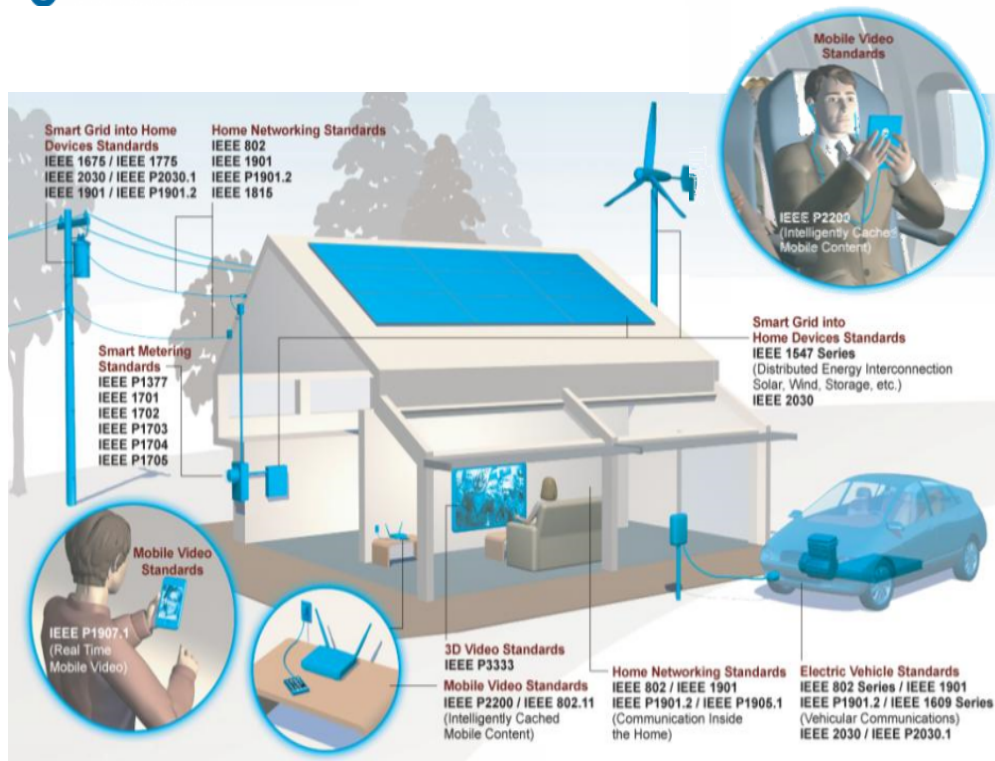
Energy Efficiency
IEEE 1621
IEEE 1801
IEEE P1889
IEEE P2030.5
IEEE P1823
IEEE P1843

LAN

MAN

WAN

IEEE Standards in Real Life



IEEE Information

IEEE produces a wide range of quality publications that make the exchange of technical knowledge and information possible among technology professionals.

The World Benefits from IEEE Information

Technology leaders rely on IEEE publications and tutorials

SIX NEW IN 2017



IEEE Journals, Transactions, and Magazines — Top-cited in the fields of electrical engineering and computing, over 180 in all.

NOW 1,500+
ANNUAL TITLES!



IEEE Conference Proceedings — Cutting-edge papers presented at IEEE conferences globally.

SMART GRID,
NESC®, 802



IEEE Standards— Quality product and technology standards used by worldwide industries and companies to ensure safety, drive technology and develop markets.

MORE COURSES,
NEW SERIES



IEEE Educational Courses — Over 400 IEEE educational online learning courses, plus IEEE English for Engineering.

2,000+ EBOOKS



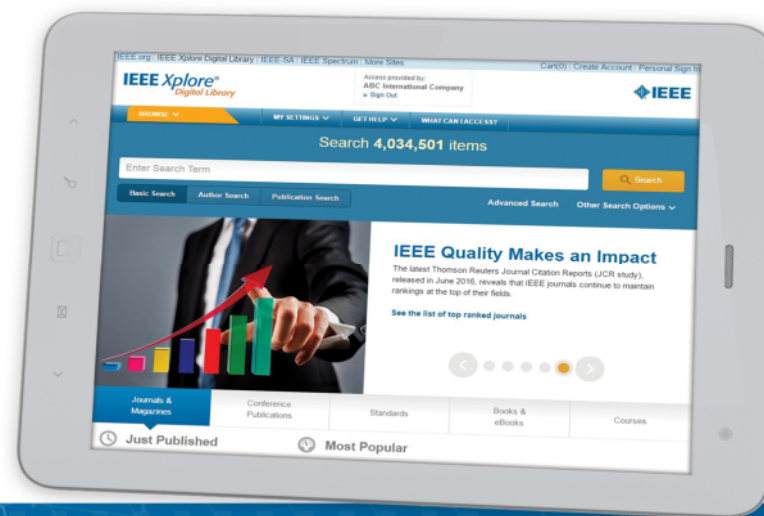
eBooks Collections — Three eBooks collections now available: 2,000+ eBooks from IEEE-Wiley eBooks Library, MIT Press eBooks Library, and Morgan & Claypool Synthesis eBooks Library.

IEEE Xplore® Digital Library

The IEEE Xplore is your gateway to trusted research—journals, conference proceedings, standards, eBooks, and education courses—to help you fuel imagination, build from previous research, and inspire new ideas.

- Powerful search tools
- User-friendly interface
- Nearly 4 million full-text articles and papers
- Users download more than 8 million documents per month

IEEE Xplore®
Digital Library



Why IEEE? *Publications*

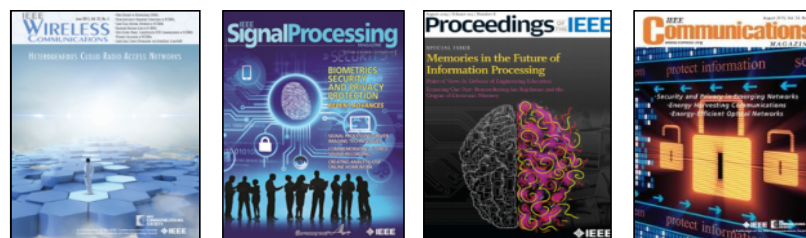
Quality makes an impact—the top-cited publications in the field are in IEEE *Xplore*.

IEEE Publishes:

- **22 of the top 25** journals in Electrical and Electronic Engineering
- **14 of the top 15** journals in Telecommunications
- **3 of the top 5** journals in Computer Science, Hardware & Architecture
Computer Science, Cybernetics Automation & Control Systems Artificial Intelligence
- **2 of the top 5** journals in Imaging Science & Photographic Technology

IEEE Journals are:

- **#1** in Automation and Control, Artificial Intelligence, Computer Hardware, Cybernetics, Information Systems, Manufacturing Engineering, Theory and Methods, and Telecommunications
- **#2** in Electrical Engineering
- **#3** in Aerospace Engineering



The Thomson Reuters Journal Citation Reports presents quantifiable statistical data that provides a systematic, objective way to evaluate the world's leading journals. Based on the 2015 study released June 2016. More info: www.ieee.org/citations

Why IEEE? *Publications, Standards & eBooks*

The technology landscape is constantly evolving—**stay current on the latest breakthroughs** with IEEE publications.

- IEEE's existing publications provide coverage of the latest technical developments that shape the world. And each year, IEEE introduces new publications to address growing areas of research, such as Internet of Things, Big Data, Cloud Computing, Renewable Energy, Cognitive Computing, 5G, Sustainable Computing, Autonomous Vehicles, and more.
 - New journal and magazine titles
 - New conferences titles
 - New and revised standards
 - New eBooks and eLearning titles
 - New tools to discover them all



Why IEEE? *Education Courses*

IEEE course series are taught by experts in technology—expand your skill set with the **latest education courses**.



Cloud Computing
(34 courses)



Fundamentals for Technical Professionals (9 courses)



Transportation
(9 courses)



Cyber Security
(11 courses)

Course Series *Coming Soon*:

- Ethical Hacking
- Internet of Things
- Project Management
- And more!

Try Any of Five *Free* Courses:

(limited time only)

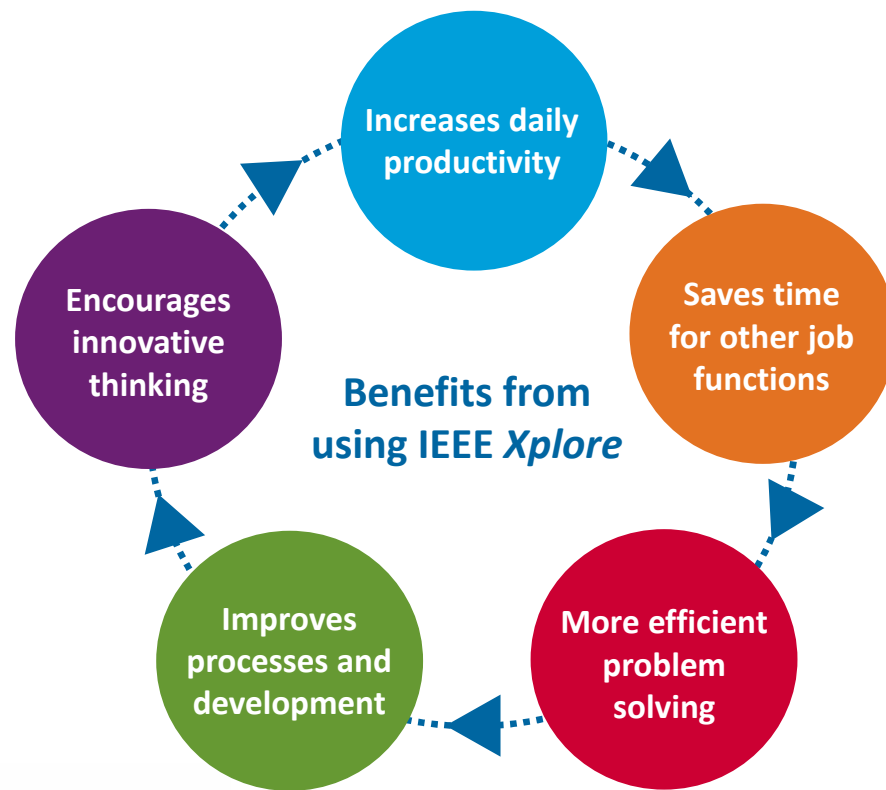
- Cyber Security Fundamentals
- Fundamentals on Patent Protection
- Cloud Computing I: An Introduction
- Sustainable Green Engineering
- Engineering Ethics

How can IEEE *Xplore*[®] Improve your ROI?

IEEE *Xplore* can save time and money by helping companies bring products to market sooner.

Improve ROI with Smarter Research

- Organizations receive measurable returns on investments when their researchers use the IEEE *Xplore* digital library.
- IEEE *Xplore* initiates a cycle of interrelated process improvements, product innovations, and business savings.



Improve ROI: Benefits of using IEEE *Xplore*

Keep Up-to-Date & Accelerate Research

- IEEE *Xplore* allows for smarter, more efficient research projects.

TOP THREE USER BENEFITS OF IEEE *Xplore*:

Stay
Up-To-Date

Avoid
reinventing
the wheel

Increased
Productivity

Accelerate R&D to Increase ROI

- There are many business advantages of using IEEE *Xplore*.

TOP THREE MANAGEMENT BENEFITS OF IEEE *Xplore*:

Save Time
and Money

Encourage
Innovative
Thinking

Increased
Productivity

Lost time affects your bottom line

- The faster you can successfully complete your research, development, and testing—and get your products to market, the higher your ROI will be.



IEEE and Patents

IEEE helps organizations meet the demands of today's economy by providing access to the most innovative and relevant research to build the products of tomorrow.



“

The patent system added the fuel of interest to the fire of genius.

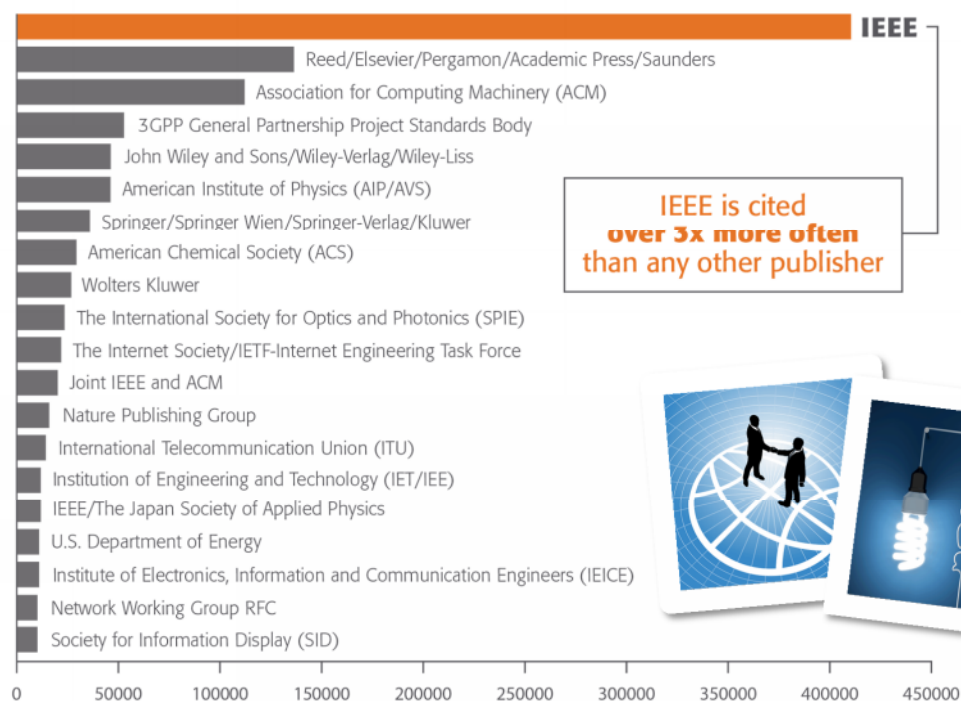
- Abraham Lincoln (The only U.S. President to obtain a patent)

IEEE Research Powers New Patents

IEEE is the most-cited publisher in new patents from top patenting organizations.

A study of the top 40 patenting organizations ranks IEEE #1 again

- Over 3x more citations than any other publisher
- Patent referencing to IEEE increased 896% since 1997
- The importance of sci-tech literature in patents is rising
- IEEE research is increasingly valuable to innovators



1790 Analytics LLC performed an in-depth analysis of the science references from top patenting firms.

InnovationQ Plus, Powered by IEEE and IP.com

InnovationQ Plus indexes IEEE full-text publications alongside one of the largest global patent literature databases in the industry.

- 3M+ documents from IEEE journals, conferences, and standards
- Global database of 70M+ patents and applications
- IP.com's proprietary Prior Art Database
- Invention disclosures of licensable technology from universities
- Other non-patent literature including Pub Med and IETF



IEEE Products & Services

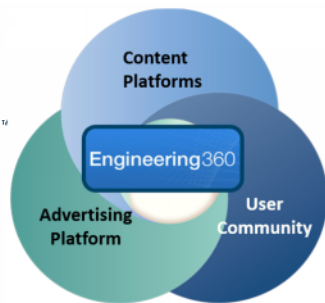
IEEE provides many products and services designed to help companies and engineers succeed.



IEEE GlobalSpec & Engineering360 Platform

The Engineering360 Platform delivers a unique information experience, comprised of:

- **News & Analysis** – authoritative content, including industry/market news and perspectives, analysis, insights and critical information, driven by a seasoned editorial staff
- **Products & Suppliers** – more than 122 million parts from suppliers across industrial sectors, searchable by specification
- **Standards Directory** – access to metadata and abstracts for 1.6 million standards documents
- **Reference Library** – a gateway to more than 95M engineering documents, including technical articles, reports, publications, patents, and e-books
- **Engineering Community** – an established online community in the engineering/industrial space, offering forums, blogs and related resources



IEEE GlobalSpec At-A-Glance

- More than 8 million registered users
- 95 million technical documents
- 200+ million datasheets
- 220 million indexed technical webpages
- 1,100+ annual newsletter editions
- 200,000+ suppliers
- 82,000 product announcements
- 63,000 digitized catalogs
- 835 specification guides

IEEE Collabratec™ | Bright Minds. Bright Ideas.

IEEE Collabratec is an integrated online community where technology professionals can network, collaborate, and create—all in one central hub:

- Connect with global technology professionals by location, technical interests, or career pursuits
- Access research and collaborative authoring tools
- Establish a professional identity to showcase key accomplishments



IEEE Entrepreneurship & IEEE N3XT



IEEE Entrepreneurship is a public community for technology startups, young professionals, investors and venture capital organizations.

- Facilitates discussions regarding technology entrepreneurship, marketization, manufacturing, investment, and beyond
- Engages IEEE audiences with an entrepreneurial interest
- Inspires a global entrepreneurship ecosystem within IEEE
- Delivers a global connection locally to the IEEE entrepreneurship community



N3XT embodies the spirit of future technological development by using the root of the word “next”, and the numeral “3” to represent the three event pillars of ideas, innovation, and inspiration.

- By bringing together the technical entrepreneur community, IEEE N3XTevents will foster collaboration and innovation, as well as provide encouragement and skills building to entrepreneurs looking to make their mark.

How Entrepreneurship Works in IEEE

Horizontal member and volunteer experience across a vertical IEEE organization



IEEE Education

IEEE offers a wide range of learning and career-enhancement opportunities within engineering sciences, research, and other technology areas.



IEEE Educational Programs and Resources

IEEE programs open eyes to the possibilities of today's and tomorrow's technologies.

Enabling students and professionals to achieve their goals with:

- Career Preparation
- Continuing Education
- Pre-University Programs
- Professional Certification
- Teacher In-Service Program (TISP)



TryEngineering.org
TryComputing.org
TryNano.org

Training for Industry Professionals

Over 400 IEEE Continuing Education online courses help industry professionals stay up-to-date on the latest technologies.

- Increase attendance at your trainings and meetings by offering career advancement opportunities with IEEE certificates
- Participants and attendees of IEEE-sponsored events can earn:
 - Continuing Education Units (CEU)
 - Professional Development Hours (PDH)
 - Certificates of Participation



New 2017 IEEE Programs

Available Now:

- Hacking Your Company: Ethical Solutions to Defeat Cyber Attacks
- Cyber Security for Today's Environment

Coming Soon:

- The IEEE Guide to the Internet of Things
- NESC Standards Courses
- The IEEE Wake-Up Radio Road Map
- Artificial Intelligence and Ethics in Design
- Autonomous Vehicles

Benefiting the Global Society

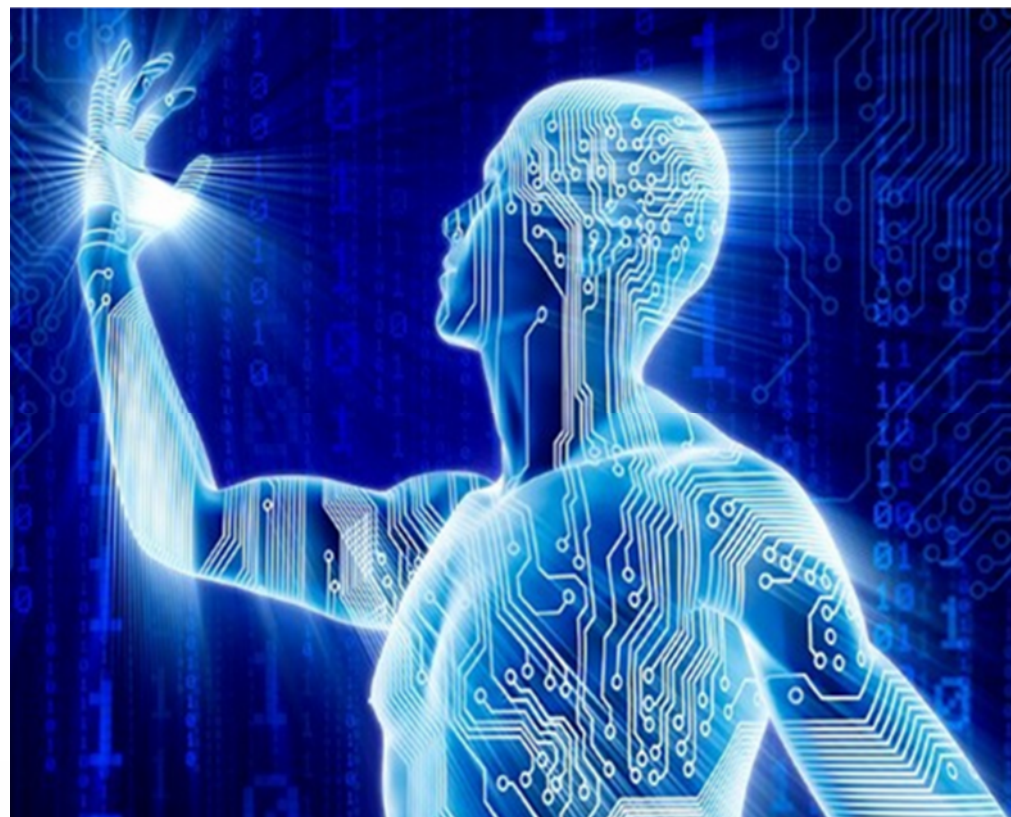


IEEE touches everyone in their everyday lives because technology touches everyone.

Global Public Policy

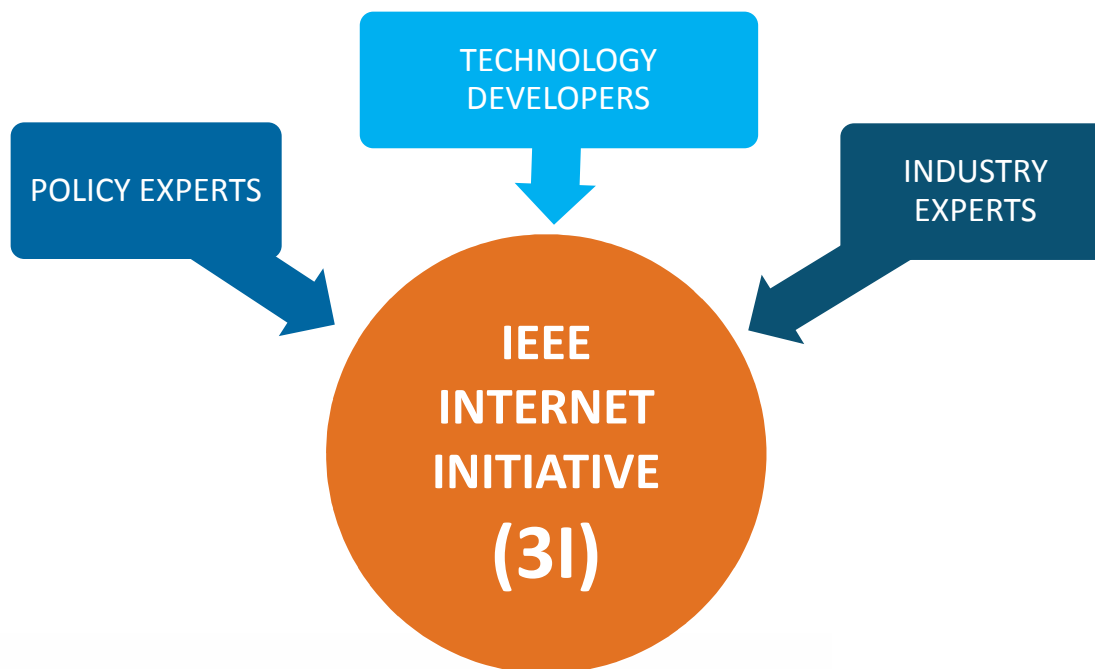
International collaboration across the ethics landscape:

- IEEE Global Public Policy Committee
- IEEE TechEthics™
- The Global Initiative for Ethical Considerations in the Design of Autonomous Systems
- The Society on Social Implications of Technology (SSIT)



Public Policy Spotlight: *IEEE Internet Initiative (3I)*

Provide a collaborative platform in the areas of Internet governance, cybersecurity, and privacy



IEEE Spotlight: *Improving Quality of Life*

Through humanitarian efforts supported by the IEEE Foundation—like IEEE Smart Village—technology is applied to improve conditions for people around the globe.



Pranav Mehrota (left), IEEE Smart Village volunteer, assisting with solar panels and a local energy entrepreneur.

Ladakh, India 2013.
Photo credit: Paras Loomba.



Paul Lacourciere with Sirona Cares introducing proper use of the portable battery kit to energy entrepreneurs.

Haiti, 2015
Photo credit: Ray Larsen.

IEEE is Focused on Industry

From trend papers and specialized societies to expert summits and custom training, IEEE is invested in the tech industry.

Industry Summit

IEEE Industry Summit on the Future of Computing

Join IEEE as we convene great thinkers around the discussion of what we should expect as we enter a new era of computing.

- Learn how to best prepare your business for the next 10 years.
- See how to be at the leading edge for the following 20 years and beyond.
- Hear from trailblazers in hardware, software, low energy, and high performance computing.
- Walk away with ideas, insight, and the keys to innovation.



Software Industry Offerings

Rock Stars

- Series of one-day, intimate events in US, Singapore, China
- Top-level industry speakers for C-level attendees
- Topics include Cybersecurity, Big Data, Software-Defined Environments

Custom Corporate Training

- Mix and match courses, webinars, magazines, newsletters, corporate events
- Sample topics: Big Data Analytics, Software Design & Development, Cybersecurity, Project Management, Soft Skills



Software Industry Offerings

NEW! Cybersecurity Arsenal

- Art of Hacking courses
 - Partnership with Not So Secure
- Penetration testing service
- Mobile security courses
 - Partnership with Codiscope
- IEEE Security & Privacy magazine
- Security conferences
- Rock Star events
- Reports and briefings
- Webinars
- And more from IEEE Cybersecurity Initiative

Software Engineering Certifications

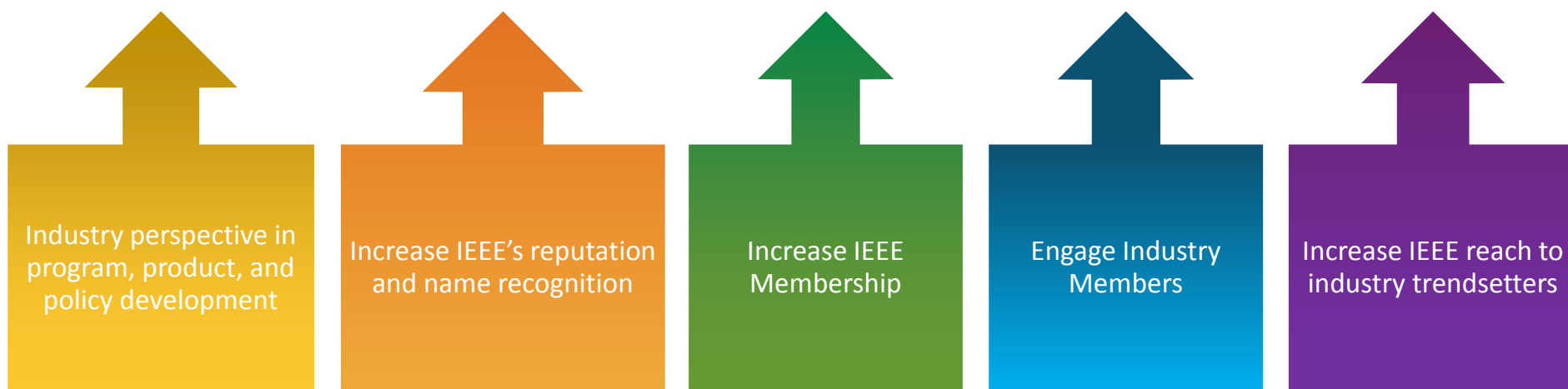
- Based on IEEE-CS Software Engineering Body of Knowledge (SWEBOK®), ISO TR19759 global standard
- Used by Northrop Grumman, Siemens, US DOD



IEEE Corporate Partnerships

Strategic value to industry and IEEE

GROUND UP INDUSTRY ENGAGEMENT



Elements of the Corporate Package

Customizable menu

Business Development

- Networking
- Business Intelligence
- Emerging Market Development

IEEE Xplore Digital Library

- Access to more than four million documents
- Document delivered in PDF and HTML
- 184 IEEE journals, magazines, and transactions
- 26 IET journals and magazines, 20+ IET conference titles
- Proceedings from 1,500+ IEEE and IET annual conferences

Public Visibility

- Thought Leadership
- Foundation Leadership
- Branding

Workforce Development

- Membership Management
- IEEE Social Good Activities
- Professional Development
- Retention & Recruitment

IEEE–Boeing Corporate Partnership

- Since 2005, IEEE and The Boeing Company have worked together in four areas of mutual interest through a multi-year Memorandum of Understanding and yearly Relationships Agreements:
 - Workforce Development
 - Technical Advocacy
 - Corporate Social Responsibility
 - Volunteerism
- A collaborative project by IEEE and The Boeing Company to develop and deliver Boeing-centric professional development opportunities for Boeing employees:
 - Four webinars and two onsite seminars
 - Led by IEEE Corporate Activities
 - Staff lead: *Kathleen Weeks*,
Senior Corporate Development Manager

Industry Engagement: Other Activities

Trend Papers Targeted at Industry

- Smart Cities, 5G draft documents

Foster IEEE Fellows from Industry

- Encourage deserving leaders from industry to get nominated
- Improve the current processes to appeal to industry

Second Generation Analytics

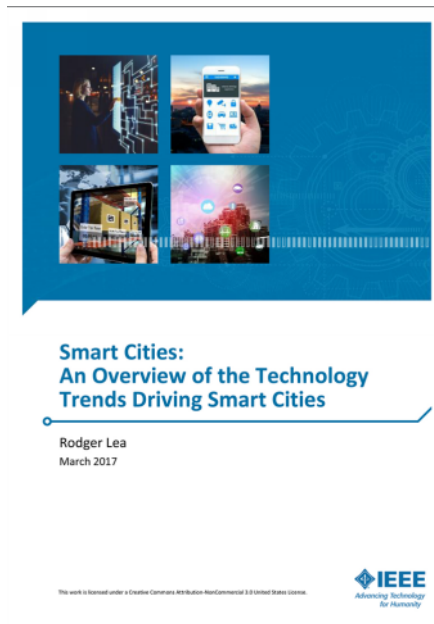
- Open source implementation of the analytics engine for IEEE *Xplore*
- Personalization of access

Industry Summits

- New computing models beyond Moore's law (rebooting computing)
- Silicon Valley event for CxO and professionals

Industry Segmentation

- Most accessed publications (solid state circuits, 370K; Electron devices, 152K)
- Corporate subscribers with most access: Intel, Huawei, TI, Samsung, etc.
- Top keywords: mathematical model (4K), computational modeling, standards





Questions?

