IEEE President's Remarks

Tom Coughlin, 2024 IEEE President & CEO

CERN

30 May 2024

ieee.org

IEEE
Advancing Technology for Humanity

My Professional Background

- Founder and president of Coughlin Associates, located in San Jose, California, and provides market and technology analysis as well as data storage, memory technology, and business consulting services
- More than 40 years of experience in the data storage industry and has been a consultant for over 20 years
- Granted six patents
- Author of *Digital Storage in Consumer Electronics: The Essential Guide*, which is in its second edition
- Regular contributor on digital storage for Forbes blog and other news outlets
- IEEE Life Fellow, Past President IEEE-USA, Past Director IEEE Region 6, General Chair of the 2011 Sections Congress and Past Chair Santa Clara Valley IEEE Section
- Also active with Storage Networking Industry Association and Society of Motion Picture and Television Engineers
- For more information on Tom Coughlin go to www.tomcoughlin.com

Imagine the Future of IEEE

Painting by Rick Guidice, courtesy NASA.

My Priorities for 2024

- Increase our retention of younger members
- Increase our engagement with industry
- Increase our outreach to the broader public
- Make investments in new products and services

Inspiring a Global Community of Innovation

Where forward-thinking technology professionals collaborate

- Discover what's next in technological innovation
- Create international standards
- Build technical communities
- Shape and share research

Our Mission

The core purpose of IEEE is to foster technological innovation and excellence for the benefit of humanity

Our Vision

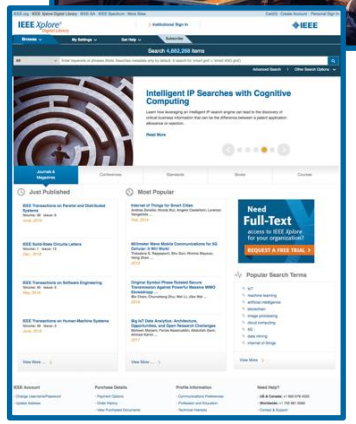
IEEE will be essential to the global technical community and to technical professionals everywhere, and be universally recognized for the contributions of technology and of technical professionals in improving global conditions

www.ieee.org

IEEE at a Glance

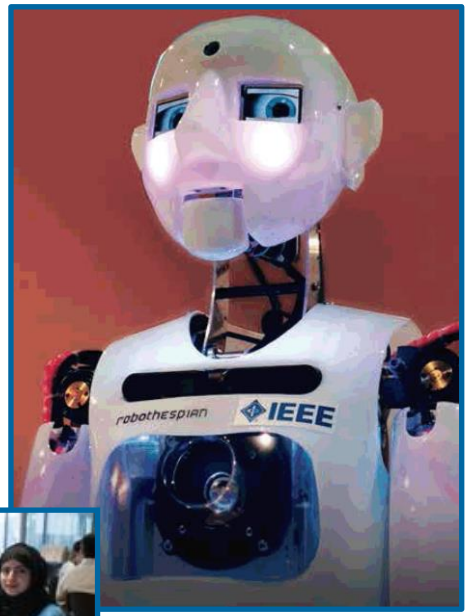
- **460,000+** members in more than **190** countries
  - More than **171,000** Student members
- **39** technical Societies and **eight** technical Councils representing the wide range of IEEE technical interests
- **6 million+** documents in the IEEE *Xplore*® digital library, with **24 million+** downloads each month
- **1,144** active standards and **1,000+** standards under development
- Publishes approximately **200** transactions, journals, and magazines
- Sponsors **2,000+** conferences in **190** countries a year
- Continuing Technology Education Resources
- Global public policy and professional ethics
- International Climate Change engagement

IEEE 140 YEARS 1884 - 2024



Climate Change

IEEE: Enabling Innovation and Technology Solutions



All figures as of December 2023

IEEE

IEEE: A Resource For Technology Decisions

- Technology of all sorts drive the world's economy.
- IEEE is the largest technical professional organization in the world.
- IEEE members are involved in all aspects of technology creation and use.
- IEEE research powers patents and IEEE creates many of the world's technical standards.
- IEEE fosters efforts in future directions, technical roadmaps and tracking megatrends.

- IEEE can inform public policy and is a resource for technical discussions.

Technical Know-How that is Broad and Deep

Access to ideas and innovations developed in other disciplines

- 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…**

The world's most successful technology leaders and organizations rely on IEEE information

Corporations

- 24 of the top 30 Semiconductor
- 8 of the top 10 IT Software and Services
- All top 10 Aerospace and Defense
- 8 of the top 10 Technology Hardware and Equipment
- 3 of the top 5 Consumer Durables (Electronics/Automotive)
- 8 of the top 10 Telecommunications

(Forbes Global 2000 Rankings, 2023)

Universities

- All the top 100 engineering schools in the US*
  (*U.S. News and World Report, Top Engineering Graduate Schools of 2023*, ranked in 2022)
- 98 of the top 100 Engineering and Technology Universities Worldwide*
  (*Times Higher Education*, Subject Ranking 2021-2022: Engineering & Technology)

* As of August 2023

Government

- Defense research and aerospace agencies
- Communications and energy labs
- Patent offices and scientific councils
- Government R&D centers in North America, Europe, Asia, and the Middle East

IEEE Xplore Digital Library

Top research organizations in the world rely on to fuel imagination and drive innovation

- IEEE journals, conference proceedings and standards plus select partner content dating as far back as 1884
- More than 6 million documents, 24 million downloads per month, and over 8 million unique users
- Over 1.2 million articles from over 200 top-cited IEEE journals, magazines, and transactions
- Over 4 million conference papers from as far back as 1936, with up to 200,000 added each year
- More than 4,900 approved and published IEEE standards
- eBook collections covering emerging topics in engineering, computer science, telecommunications, AI and more
- eLearning topics such as AI, High Performance Computing, Configuration Management, and more; plus a suite of Professional Development options now available

https://ieeexplore.ieee.org/

IEEE Publications: Quality, Trusted Resources

Latest studies reinforce that IEEE has more **top cited publications** in IEEE fields of interest than any other publisher.

Citation Ranking by Journal Impact Factor:

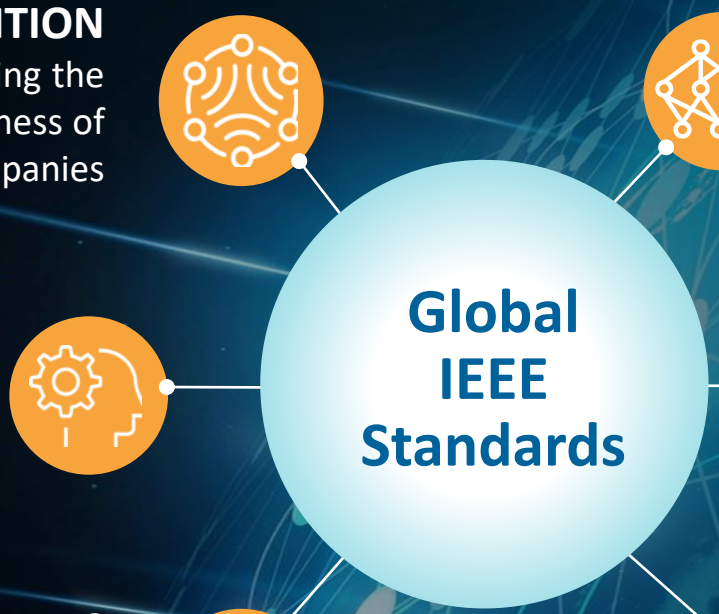
- 15 of the top 20 journals in **Electrical and Electronic Engineering**
- 10 of the top 10 journals in **Telecommunications**
- 3 of the top 5 journals in **Automation and Control Systems**
- 5 of the top 10 journals in **Computer Science, Artificial Intelligence**
- 3 of the top 5 journals in **Computer Science, Hardware & Architecture**
- The top 3 journals in **Computer Science, Cybernetics**
- 3 of the top 5 journals in **Computer Science, Information Systems**
- 2 of the top 5 journals in **Computer Science, Software Engineering**
- 3 of the top 5 journals in **Imaging Science and Photographic Technology**

Source: Journal Citation Reports (Clarivate Analytics, 2023)

IEEE Standards Association (IEEE SA)

Standards nurture, develop, and advance the building of global technologies.

- Consumers around the world enjoy the benefits of IEEE Standards:
  - Provide the bricks and mortar for a globally level playing field for innovation
  - Protect public safety, health & wellbeing
  - Contribute to a sustainable future



COMPETITION
Influencing the competitiveness of industries & companies

CONFIDENCE
Demonstrating quality to customers by meeting expectations & requirements

INNOVATION
Providing an essential platform on which new technologies & processes can build

GROWTH
Facilitating trade & economic growth

PERFORMANCE
Fine-tuning performance and improving efficiency

SUSTAINABILITY
Making technology safer, interoperable and sustainable for the future

[Learn more: standards.ieee.org](standards.ieee.org)

Technology. Standards. Innovation.

- The world is at a **critical nexus** as we strive toward the SDGs, address global challenges and realize the importance of SMEs and developing economies in technology and standards development
- The world is in a **radical transformation** in which innovative technologies cannot work in isolation
- They are based on **connected ecosystems** and function in an interconnected world where objects, machines, people and the environment are increasingly interlinked and impacted
- Standard play a pivotal role as they . . .
  - Facilitate ongoing digitalization by promoting **interoperability** and **compatibility** and **competition** in open markets
  - Make available specifics of innovations to the wider public—spurring **technical knowledge** and **generating new ideas and products**
  - Create ecosystems that **promote economies of scale** and **healthy competition**
  - Provide **leadership** in socio-technical areas, such as **environmental sustainability** and **ethical values-based design**

Standards in the Digital Economy

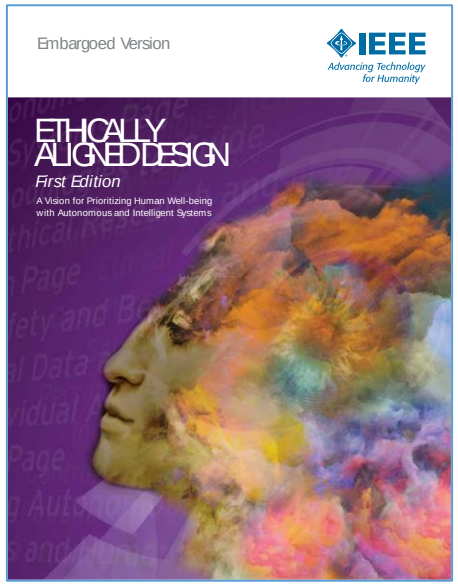
- Standards are **accelerators of change** by **promoting innovation** and helping with the uptake of new digital technologies—helping boost development of the digital economy
- They play an impactful role in addressing digital economy challenges
  - Cybersecurity
  - Privacy
  - Data resilience, governance and value chains
  - Technology ethics
  - Environmental impact
  - Human well-being
- And they do so across industries and sectors
  - Agri-food
  - Advanced manufacturing
  - Health and bioscience
  - Transportation and mobility
  - Human well-being
  - Telecommunications and more

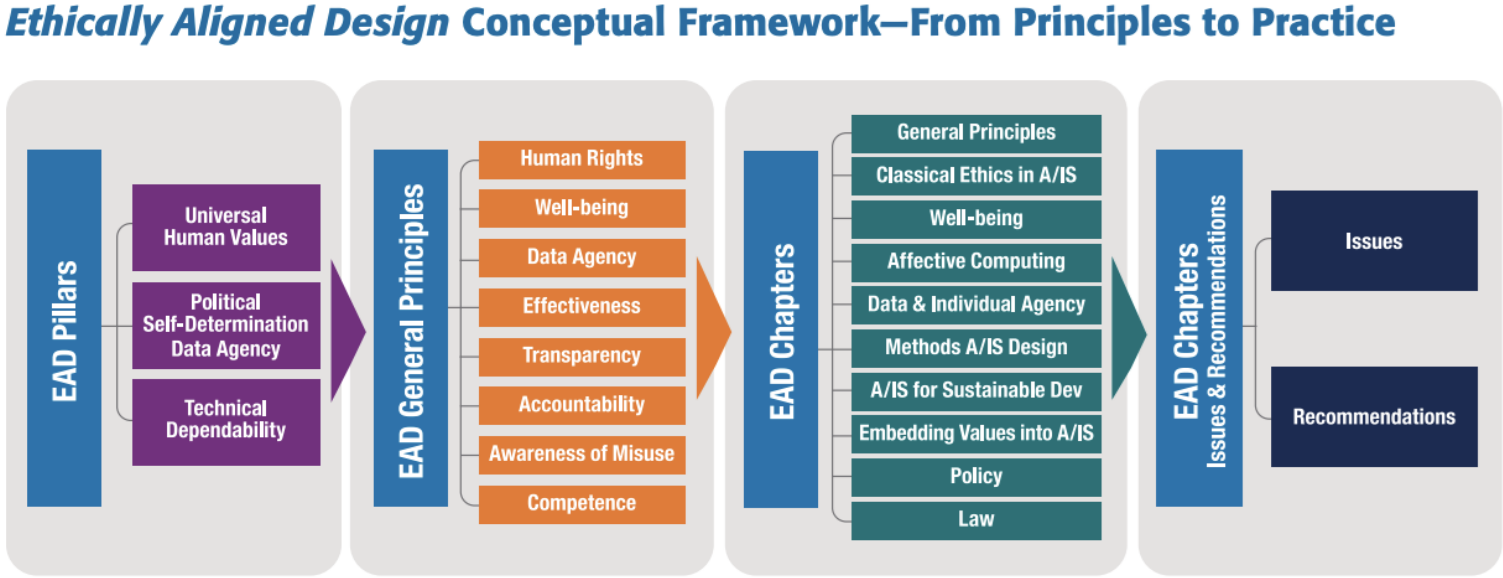
The Use of AI Systems Is Growing …

- Worldwide revenues for the artificial intelligence (AI) market, including software, hardware, and services, are forecast to grow year over year in 2021 to ~ $1,800B by 2030
- There is a conscious increase by services providers to applying AI to solve industry- and domain-specific problems for clients
- ~80M US Adults use an AI assistant in their cars at least once a month
- 50+% of companies monitor AI-created bias
- Regional and National strategies have only increased investments into horizontal and vertical-oriented AI systems – coordination across University systems and research bodies is key.

Source: IDC, Markets&Markets, O'Reilly

ETHICALLY ALIGNED DESIGN



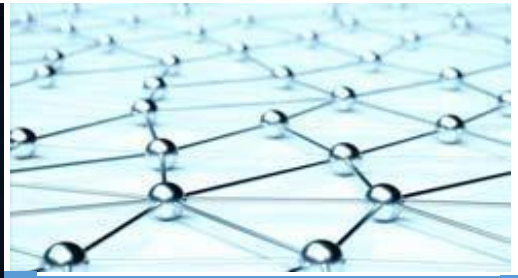


- First version released in 2016.
- Latest version released March 2019.
- Received over 500 pages of feedback.
- Written by more than 700 global thought leaders.
- Over 300 pages long – not just a list of AI Principles.
- Features hundreds of evergreen, pragmatic recommendations.
- Inspired IEEE's AIS Ethics Certification work.

- EAD,v2 used by OECD for their AI principles.
- EAD, v2 used by IBM for "Everyday Ethics for AI."
- EAD, v2 used by FLI for their AI Principles.
- EAD, v2 used by UNICEF for their Children's Data principles.
- EAD, v2 used by UNESCO for their AI Principles.
- EAD in all versions mentioned in more than three dozen academic journals, AI Principles and media since 2016

IEEE

IEEE's Path: Make the Implicit Explicit & Verifiable for the Entire AI Ecosystem



STANDARDS	CERTIFICATION	GOVERNANCE	LITERACY
Developing a growing series of standards that promote innovation, foster interoperability and honor human values. • Technical • Socio-technical	Developing metrics and processes towards the implementation of a certification methodology. • Transparency • Accountability • Algorithmic bias • Privacy • Enterprise Governance	Support responsible Artificial Intelligence Systems innovation through proper governance mechanisms for: • Business • Municipalities/ Cities • Public Sector/ Governments	Through AIE+ framework and partner ecosystem offering tools and training/education globally to support AI and AIE system literacy • Business • Municipalities/Cities • Public Sector/ Governments

https://standards.ieee.org/initiatives/artificial-intelligence-systems

Participate in the Future of Technology

Discover technical community that best match your interests

- IEEE Future Directions fosters IEEE's efforts to create new and emerging technology initiatives
- Technical Communities are focused on technology challenges or cutting-edge subject areas with direct impacts on industry

IEEE Climate Technologies Sustainability

IEEE LEO SatS

IEEE Public Safety Technology™

IEEE QUANTUM

IEEE Telepresence

IEEE Digital Privacy

IEEE Metaverse

IEEE SMART LIGHTING

IEEE SusTech Initiative

IEEE WPT

[Learn more: ieee.org/futuredirections](ieee.org/futuredirections)

IEEE Roadmaps

roadmaps.ieee.org

IEEE ROADMAPS™

Evaluate, recommend, implement technical IEEE Roadmaps

Four published, others under construction

Published roadmaps

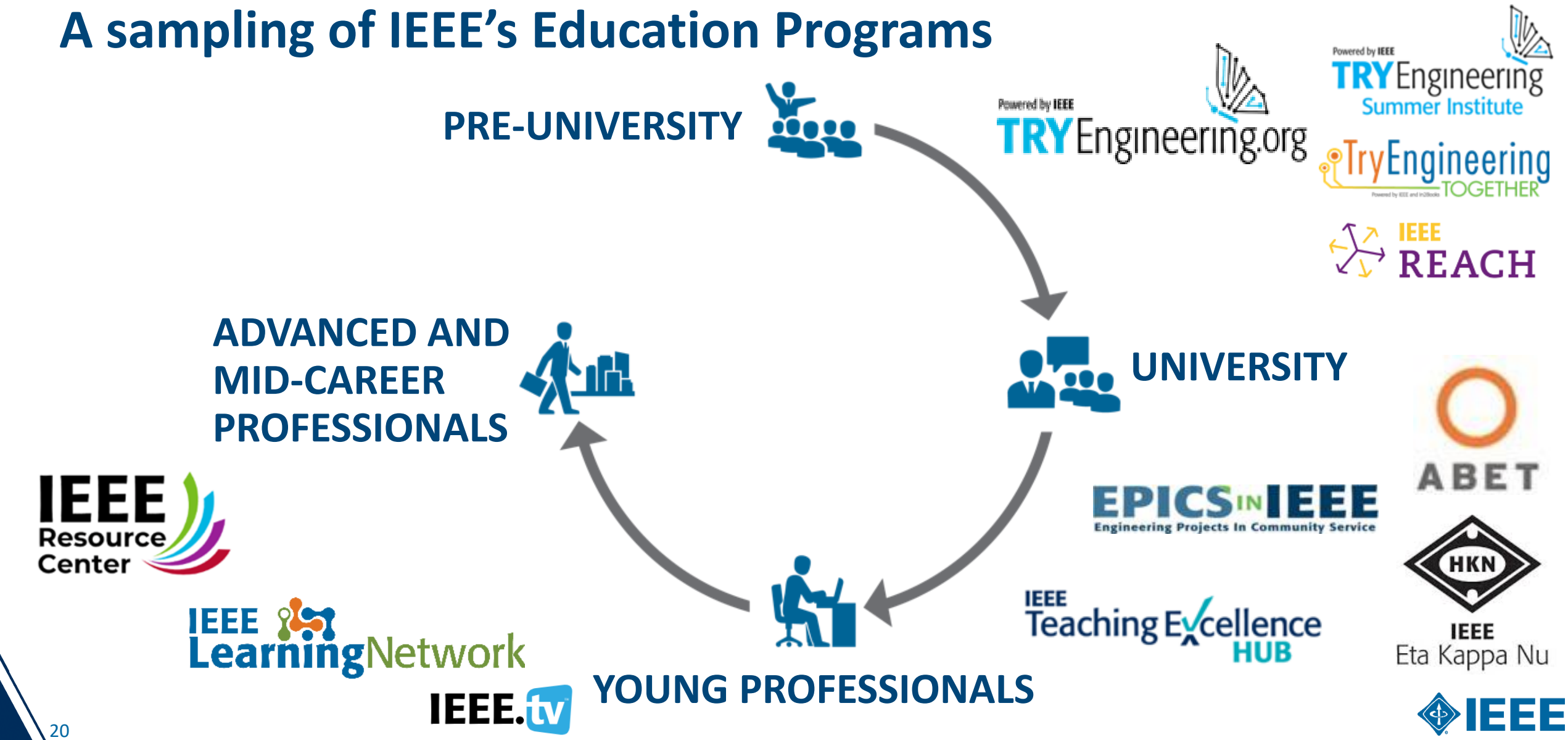
HIR
HETEROGENEOUS INTEGRATION ROADMAP

IRDS
INTERNATIONAL ROADMAP FOR DEVICES AND SYSTEMS™

ITRW
International Technology Roadmap on Wide Bandgap Semiconductors

IEEE

A sampling of IEEE's Education Programs



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Powered by IEEE TRYEngineering Summer Institute

TryEngineering TOGETHER

IEEE REACH

ABET

EPICS IN IEEE Engineering Projects In Community Service

HKN IEEE Eta Kappa Nu

IEEE Teaching Excellence HUB

IEEE Resource Center

IEEE LearningNetwork

IEEE.tv

IEEE

And so much more from so many units across IEEE…

IEEE's many units educate our community

- Magazines, books, eBooks, journals, and websites
- Conferences, short courses, and seminars
- Videos, webinars and podcasts
- Volunteer training and leadership opportunities

IEEE History Center
IEEE Human Resources
Humanitarian Activities
Life Members Committee
IEEE MGA
IEEE Alumni Program
Canadian Sections
IEEE Chicago Section
IEEE Dayton Section
IEEE France Section
IEEE Japan Sections
IEEE India Sections
IEEE Malaysia Section
IEEE Philadelphia Section
IEEE Phoenix Section
IEEE Puerto Rico/Caribbean
IEEE Region 4
IEEE Region 7
IEEE Region 9
IEEE Region 8
IEEE Region 10
San Diego Section
IEEE UKRI Section
And more..

IEEE students

IEEE youngprofessionals

The bridge to your professional career!

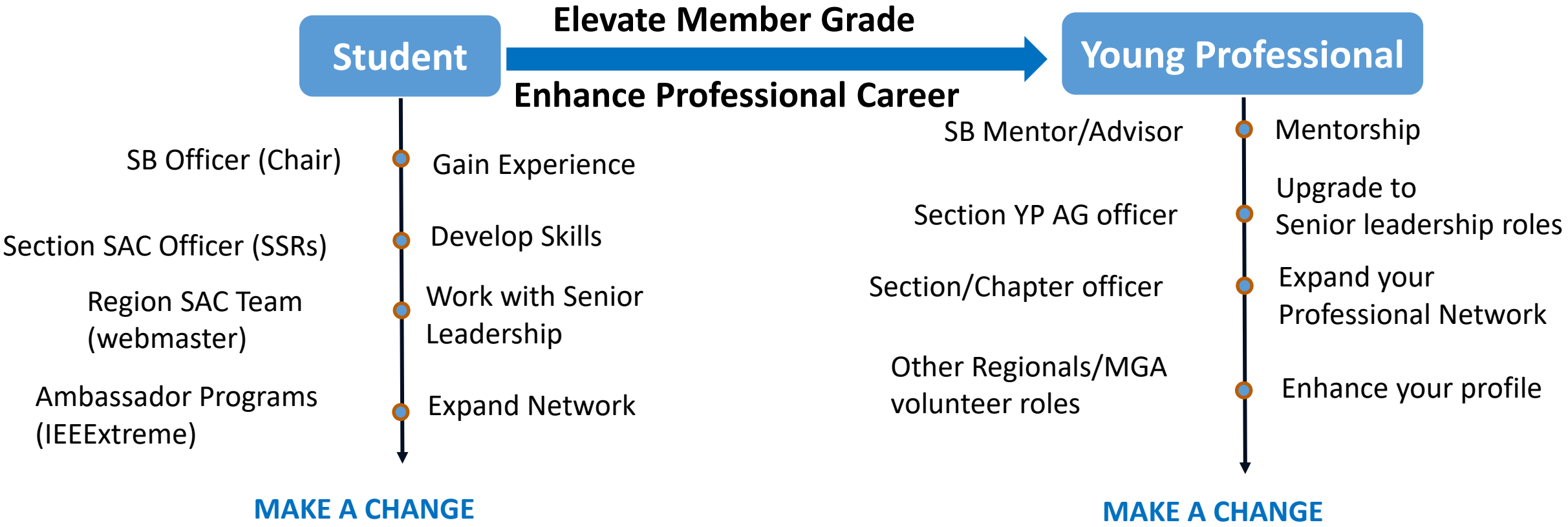
IEEE Students and YP Focus

- Connecting academia and industry by stewarding local and global IEEE Young Professionals (YP) communities that support Members at each stage of their professional journey
- Expanding professional networks of early-career practitioners and elevate their professional images
- Creating meaningful collaborative opportunities that jumpstart and advance Members' careers
- Providing pathways for leadership development that refine skills through leadership opportunities

IEEE Member Benefits

- Access to current technical information via numerous publications
- Career advancement and volunteer opportunities respective to Members' time/capacity
- Invitations to technical and non-technical events including conferences, webinars, completions, social gatherings, and more
- Networking, including high-quality mentoring experiences
- Members only Discounts on Life Insurance and a variety of products and services
- Access to the IEEE JobSite

Opportunities
Leadership Transitions



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Learn, Contribute, and Boost your Resume by Volunteering

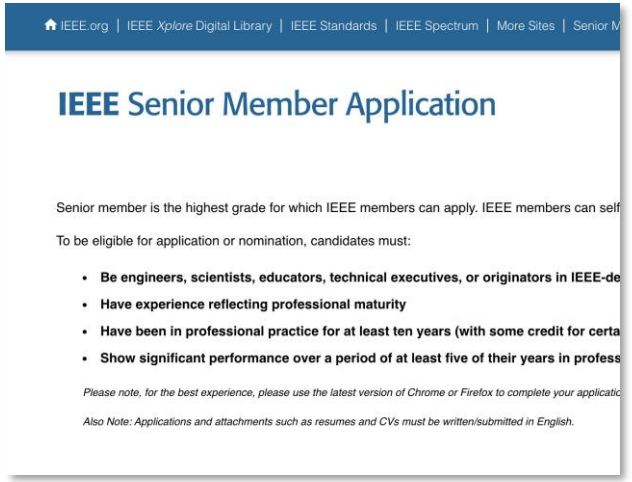
Many of the key benefits of volunteering are also skills essential to continued professional success

- Advance your knowledge in all aspects of technology and the sciences
- Help guide the evolution of your field
- Network with others from around the world
- Gain confidence and develop presentation skills
- IEEE offers a variety of volunteering opportunities suited to various needs and interests

  - Communications
  - K-12 STEM Education
  - Diversity and Inclusion
  - Employment and Career Services
  - Public Policy Committees
  - Standards Development
  - Chapter and Section Leadership
  - Society Leadership
  - Conferences and Publications

Are you a Senior Member?

- Many volunteer roles require senior membership, apply today to expand the pool and increase the diversity of available volunteers!
  - Recognition: The professional recognition of your peers for technical and professional excellence.
  - Leadership eligibility: Senior members are eligible to hold executive IEEE volunteer positions.
  - Ability to refer other candidates: Senior members can serve as a reference for other applicants for Senior membership.
  - Review panel: Senior members are invited to be on the panel to review Senior member applications.
  - Complimentary Society Membership: You may join one new IEEE Society for one year.



Apply today!

Stay Current with IEEE

The technology landscape is constantly evolving and so are IEEE products and services.

- IEEE introduces new publications to address growing areas of research that transform our lives such as AI, big data, blockchain, machine learning, nextgen wireless, renewable energy, robotics, secure computing, semiconductors and more.
- With over 250,000 new documents added each year to IEEE Xplore, coverage of all these technologies can be found in current and forthcoming publications from IEEE.
- IEEE has an active portfolio of more than 1,100 standards with more under development that standardize the internet, the metaverse, blockchain, sustainable and ethical design, and age-appropriate design

Industry Engagement – A Priority

To better serve industry by identifying and developing value added industry relevant products and services.

- New industry focus content – technical content/material for practicing engineers such as articles, videos, podcast, courses, and others
- Industry-focused non-technical skills learning – for example, Leading Technical Teams, AI Training, and Building Business Relationships
- Local Industry Affinity Groups – city, community, or company specific groups of industry professionals that come together to network and discuss relevant technical topics impacting their communities such as aerospace, energy, semiconductors, and AI

Industry Engagement – A Priority Continued

To better serve industry by identifying and developing value added industry relevant products and services.

- Career development and job fairs - developing new ways to help companies recruit high-quality workforce
- Corporate Social Responsibility (CSR) - Support for companies looking to engage in social good activities, corporate social responsibility, and environmental sustainability
- Industry events driven by industry and for industry – companies identify the technical topics and IEEE develops events addressing such topics to meet industry needs (for example, World Technology Summit and HTX)

Semiconductor Workforce Development

- Partnering to create **free global Semiconductor Job Skills Catalog website** highlighting technician and operator roles and competencies
  - **Derivative products** can be created from this, including **curriculum, assessments, and stackable credentials** (revenue opportunities)
  - Some **external partners** that may participate include Semiconductor Industry Association and SEMI Foundation
- Exploring **our conference tutorials and other IEEE training materials with micro-credentialing options** for semiconductor careers

Industry Focused Events

IEEE
Advancing Technology for Humanity

Industry Selects Topics
- Challenges
- Technology Interests
- Needs to get Product
- What they want to hear

IEEE & Industry SMEs
- Speakers on Topics
- Panels
- Research Summaries
- Studies
- Sharable Elements

Industry Events

Agenda approved by industry
- Agenda aligned to their topics
- Sessions
- Exhibitions
- Keynotes/Panels
- Networking

These are not academic or research events – there is no call for papers.

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