

# Recent standardization activities and Future Directions of IEEE

Oct. 1 2019

**Kishik PARK, Ph.D.**  
Member of IEEE SA BOG



The world's largest professional association

Advancing Technology  
for Humanity

*Global Reach*

420,000  
Members



160 Countries



117,000 Student  
Members



46 Technical Societies and Councils



*Technical Breath*

1,800 Annual Conferences



4,000,000  
Technical Documents



190  
Top-cited Periodicals



1,275 Active Standards



*Social Impact*

Global Public Policy



Global Humanitarian Efforts



Continuing Education & Certification



Ethics in Technology



# IEEE Vision and Goals

## MISSION

We foster technological innovation and excellence for [the benefit of humanity](#).

## VISION

We will be essential to the [global](#) technical community and to the technical professionals everywhere, and be universally recognized for the contributions of technology and of technical professionals in improving global conditions.

## CORE VALUES

- ❖ Trust
- ❖ Growth and Nurturing
- ❖ [Global Community Building](#)
- ❖ [Integrity](#) in Action
- ❖ Service to Humanity
- ❖ Partnership Growth & Nurturing

# IEEE Vision and Goals

## 2015-2020 Goals

Expand and enable **dynamic, nimble, flexible, diverse** communities to help individuals from around the world to share, collaborate, network, debate, and engage with one another

Provide technically vital forums for the discussion, development, and dissemination of authoritative knowledge related to traditional technologies while focusing more of our resources toward serving the professionals working on **emerging and disruptive** technologies.

Lead **humanitarian efforts** around the world to use technology to solve the world's most challenging problems.

Leverage IEEE's technology-related insight to provide governments, NGOs, and other organizations and the public with **innovative, practical recommendations** to address public policy issues.

# IEEE Standards Association (IEEE-SA)

## Vision

Be recognized as a preferred global provider of high-quality, **market-relevant technology standards** and of services that promote their universal adoption



## Mission

Enable and promote the collaborative application of technical knowledge to **advance economic and social well-being through the development of technical standards** and related activities

**IEEE standards span a broad spectrum of technologies, such as:**

- Aerospace Electronics
- Broadband Over Power Lines
- Broadcast Technology
- Clean Technology
- Cognitive Radio
- Design Automation
- Electromagnetic Compatibility
- Green Technology
- Ethernet/WLAN
- Medical Device Communications
- Nanotechnology
- Organic Components

- **1,250** IEEE standards are active as of 2018, **100+** of which were approved
- **700** standards projects were under development
- Nearly **20,000** IEEE-SA Individual Members and **174** IEEE-SA Corporate Members



# IEEE-SA Takes a Lifecycle Approach

*IEEE-SA nurtures, develops, and advances global technologies through a unique lifecycle approach:*



## Open Environment and Proven Processes

- Pre-standards work includes IEEE-SA Industry Connections program

***Example: Industry Connections Security Group***

- Proven development process for producing successful and pervasive global standards

***Example: IEEE 802.11™ "Wi-Fi®"***

- Market-implementation work includes IEEE Conformity Assessment Program (ICAP)

***Example: IEEE 1588™ Conformity Alliance***

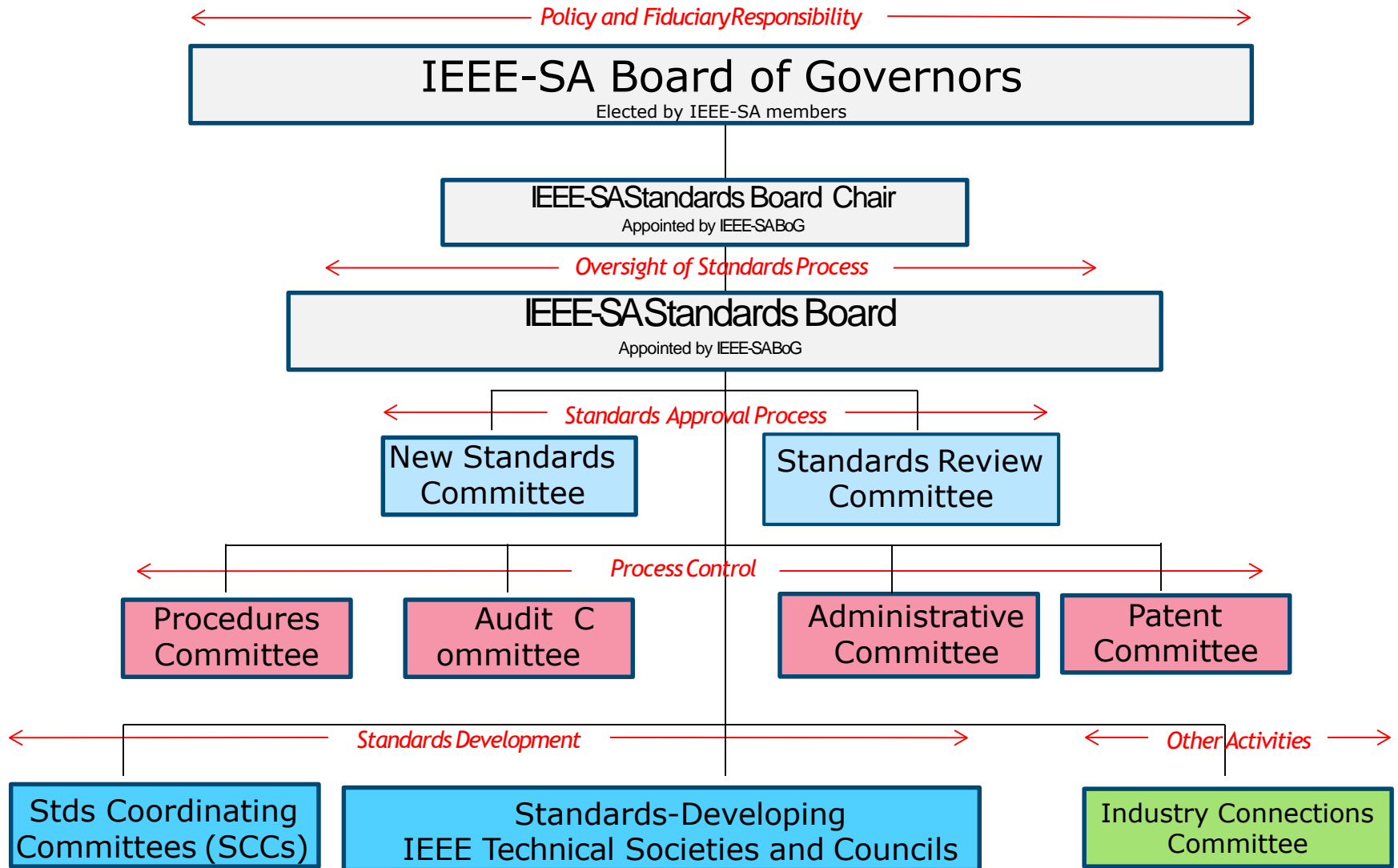
# Close Engagement with Industry

## IEEE-SA Corporate Program

- Influence technology development
  - Incubate new technologies, standards and related services in a rapidly changing environment
  - Shape the direction of technology and its market place applications
- Drive the development of corporate standards
  - Gain advanced knowledge by engaging in corporate standards projects
- Network with global thought leaders



# IEEE-SA Organization





## IEEE-SA Presence

- Globally recognized standards
- 1,250 active standards
- 700 standards under development
- 6896 individual members and approximately 20,000 standards developers from every continent
- 174 corporate members



## IEEE-SA Strengths

- Leverages the breadth of 40+ technical areas
- 100+ Smart Grid standards
- Flagship transport layer standards in communications (IEEE 802)
- 400-500 standards focused on the power and energy sector, etc.
- Independent global community
- Open standards development process

# IEEE-SA Values

**Five principles guide  
IEEE standards development  
and ensure adherence to requirements for  
international standardization**

Consensus

Due process

**Openness**

Right of  
appeal

Balance

## To ensure

- **Collaboration and community building**
- **Global and timely market relevance**
- **Technical integrity and excellence**

# IEEE SA Major Practices

IEEE SA is organized around 6 practice areas to respond to industry drivers

IoT and  
Infrastructure

Telecom and  
Connectivity

Energy

Mobility

Lifesciences

Healthcare

# What is the IEEE Future Directions

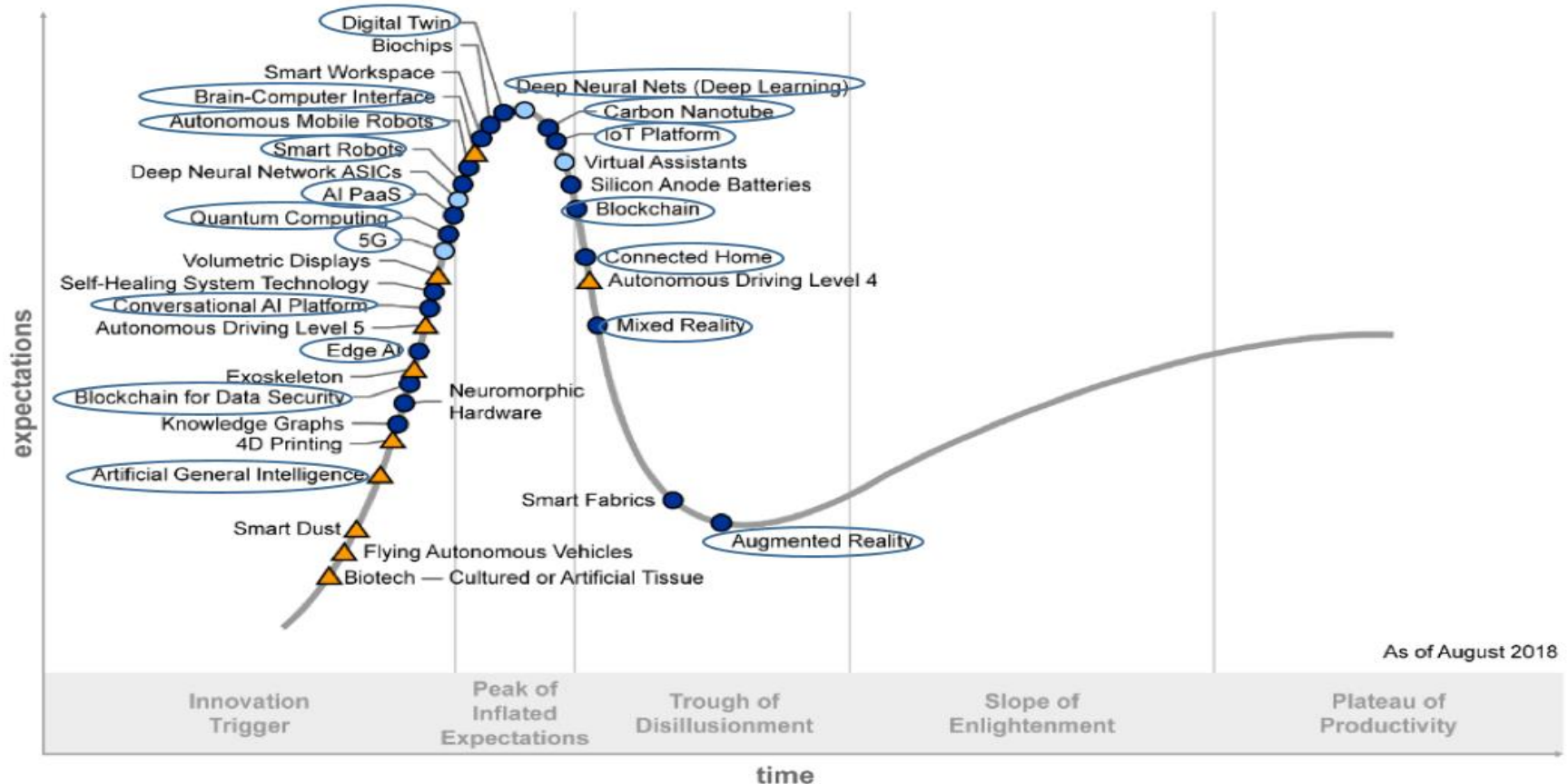
- Anticipates the direction of new and emerging technologies and world challenges that IEEE can impact
- Coordinates resources across an unmatched array of IEEE technical expertise globally
- Scouts out and nurtures ways IEEE as a whole can provide an impact through its broad and deep volunteer base
- Bridges across IEEE Operating Units (OUs) to ride fast-rising waves of innovation
- Provides a valuable collaborative view and fosters engagement, enabling IEEE OUs to develop new offerings



## “GOALS”

- Actively engage Future Directions Committee to ensure success of its initiatives from incubation to transition
- Promote and enable incubator projects

# Emerging Technologies and IEEE Coverage



Plateau will be reached:

- less than 2 years
- 2 to 5 years
- 5 to 10 years
- ▲ more than 10 years
- ⊗ obsolete before plateau

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## 2019 Future Directions Coverage



IEEE  
Quantum



IEEE TAB Ad Hoc  
Roadmaps Strategy  
and Governance  
(IRSG)



## Graduated Initiatives



[ieee.org/futuredirections](http://ieee.org/futuredirections)

# Emerging Technologies – Hype Cycle vs IEEE

## FDC Initiatives

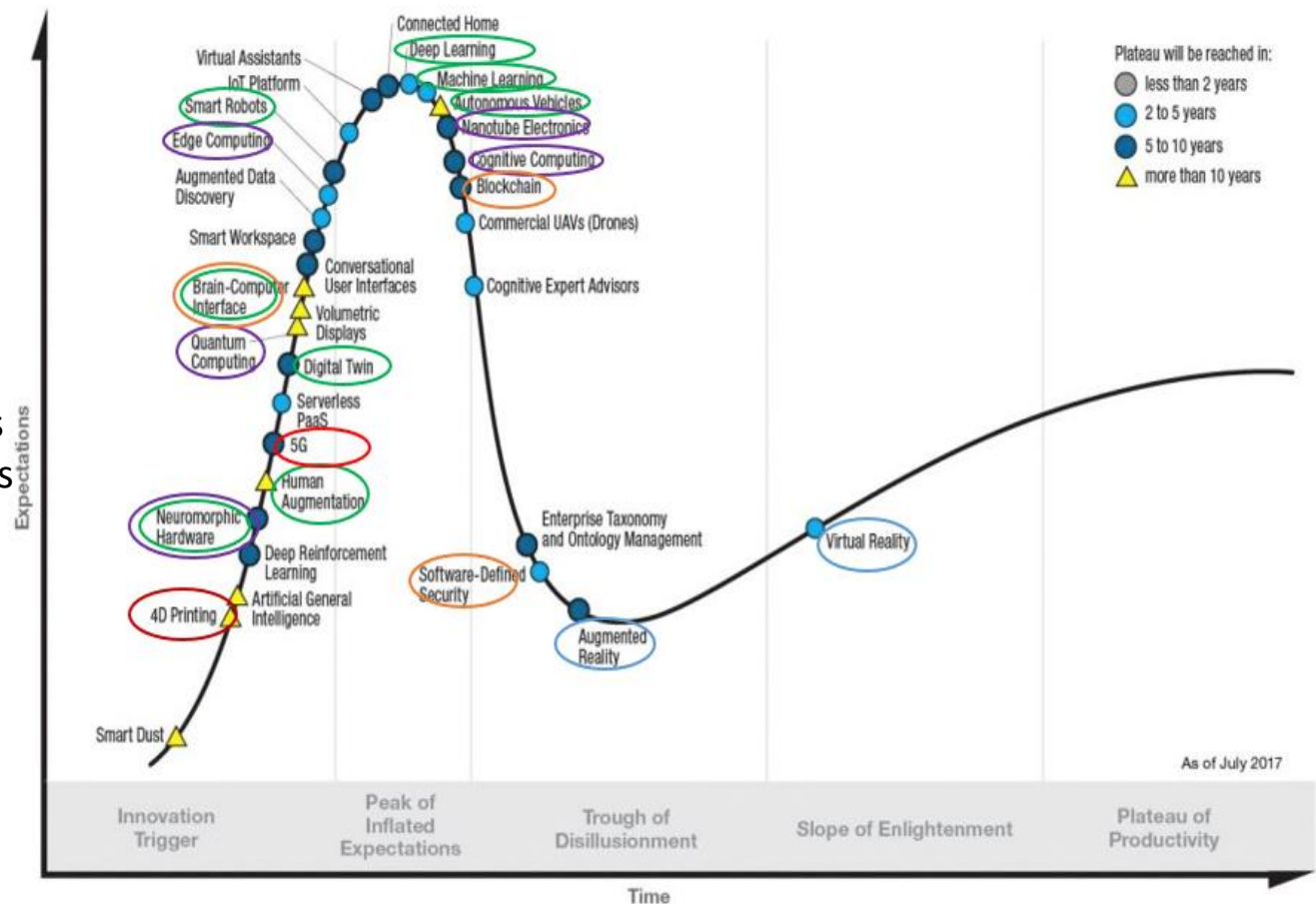
### Coverage

- ✓ Big Data
- ✓ Blockchain
- ✓ Brain
- ✓ CyberSecurity
- ✓ Digital Reality
- ✓ Green ICT
- ✓ 5G
- ✓ Rebooting Computing
- ✓ Symbiotic Autonomous Sys
- ✓ Software Defined Networks

\*2018 Gartner Hype Cycle report released mid summer

August 2018

### Gartner Hype Cycle for Emerging Technologies, 2017



# Emerging FDC Activities



[ieee.org/futuredirections](http://ieee.org/futuredirections)

**IEEE Future Directions Newsletter**

ISSUE 15 | July 2018

**In This Issue:**

- [What's Happening in IEEE Future Directions?](#)
- [IEEE Future Directions Technology Time Machine 2018 \(TTM 2018\)](#)
- [Technology Policy and Ethics](#)
- [Current Activities in our Technical Communities](#)
- [IEEE Future Directions Events and Activities](#)
- [Submission/Subscribe Information](#)

**What's Happening in IEEE Future Directions?**

During the June 2018 IEEE TAB Meeting Series, **Roberto Saracco**, Chair - Industry Advisory Board, (a committee comprised of industry executive leaders reporting to the Future Directions Committee), presented a thought-provoking discussion on future industry trends and the associated big engineering challenges, including green engineering end to end, rethinking cities, addressing climate change, increasing agriculture yield, and many more. View his presentation at [this link](#), and keep up with technology trends through [Roberto's daily blog](#).

To address some of these engineering challenges and future technology trends, IEEE Future Directions (FD) has implemented a **three-pronged model for funding opportunities** within FD. To this end, FD seeks to identify, develop and promote projects that are value-added for IEEE and its members, bringing together multiple societies and councils to provide broad and deep perspective on a particular topic or technology. These projects range from short-term activities to reach a specific goal to three-year initiatives aiming to engage cross-collaboration among industry, academia, and government striving to develop and deploy various future technologies. Three types of **project models** have been identified with the following goals:

1. **Incubator:** Encourage quick small scale out-of-the-box projects with an identified end goal.
2. **Small project:** Assess value and community support for pursuing activities in a specific arena.
3. **Full initiative:** Support development of a new technology or application that will provide value to new and existing IEEE members, attract new IEEE members, and generate revenue through cross-IEEE activities.

[Read more.](#)

One of the many technology trends highlighted in Roberto's presentation included the future of virtual and augmented reality (AR/VR). IEEE Future Directions is excited to

**IEEE Future Directions Communities**

- IEEE 5G
- IEEE BigData
- IEEE Blockchain
- IEEE brain
- IEEE CLOUD COMPUTING
- IEEE CYBER SECURITY
- IEEE Digital Reality

# Selected IEEE Future Directions Initiative

## Cyber Security

### Purpose & Scope:

Build on IEEE's long-standing and world-leading technical activities in cybersecurity to significantly improve S&P technology, community and workforce over 3-5 years



The IEEE CSD will gather software security expertise from industry, academia, and government. The CSD provides guidance on:

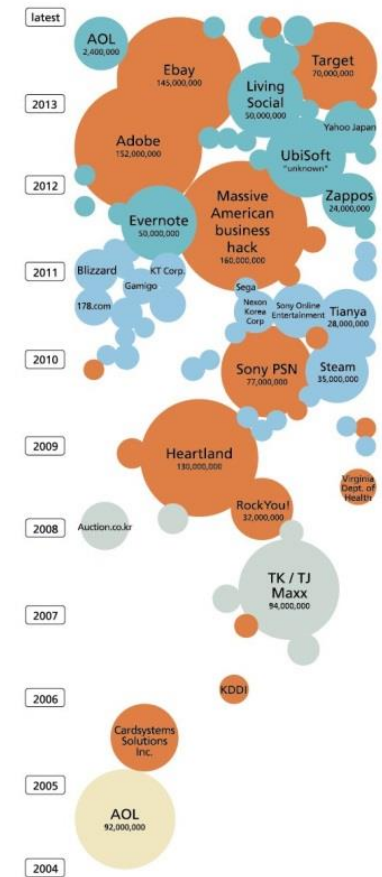
- Recognizing **software system designs** that are likely vulnerable to compromise.
- Designing and building software systems with strong, identifiable security properties.

### Sample IEEE Standards: Malware MetaData Exchange Format (MMDEF) XML schema

- V1.2: Describes files containing malware, as well as clean files
- MMDEF-B: Describes behavioral aspects of malware

### Industry Connections Security Group (ICSG) & IEEE Anti-Malware Support Service (AMSS)

- Provides shared services supporting the entire computer security industry
- Enables individual security companies and the industry as a whole to respond more effectively and efficiently to contemporary malware threats







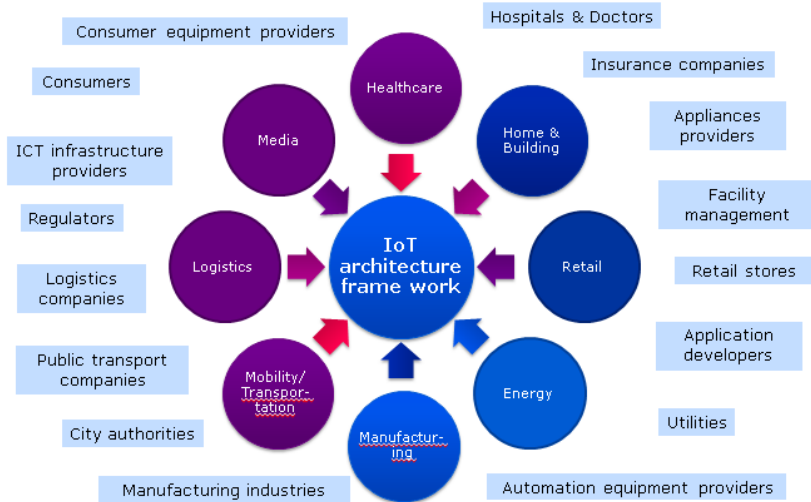
# Selected IEEE Future Directions Initiative

## Internet of Things

### Purpose & Scope:

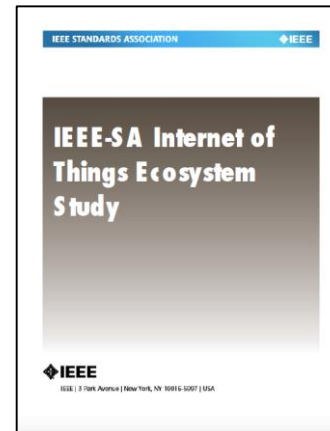
The Internet of Things (IoT) is a computing concept where all things, including every physical object, can be connected, making those objects intelligent, programmable and capable of interacting with humans.

### IoT Application Domains & Stakeholders\*



### Sample IEEE Standards:

- IEEE **802** family, IEEE **1901**, IEEE **1905.1**, IEEE **2030.5**
- IEEE **P2413** - Standard for an Architectural Framework for the Internet of Things (IoT)



Click the image to download the IEEE-SA IoT Ecosystem Study

### Participating IEEE Societies:



# Selected IEEE Future Directions Initiative

## Internet of Things



### IEEE P2413 “Standard for an Architectural Framework for the IoT”

#### Project Goals

- **Accelerate the growth of the IoT Market** by enabling cross-domain interaction and platform unification through increased system compatibility, interoperability and functional exchangeability
- Define an IoT architecture framework that covers the architectural needs of the various IoT Application Domains
- Increase the **transparency of system architectures** to support system benchmarking, safety, and security assessments
- Reduce industry fragmentation and create a critical mass of multi-stakeholder activities around the world
- Leverage the existing body of work

#### Member Entities

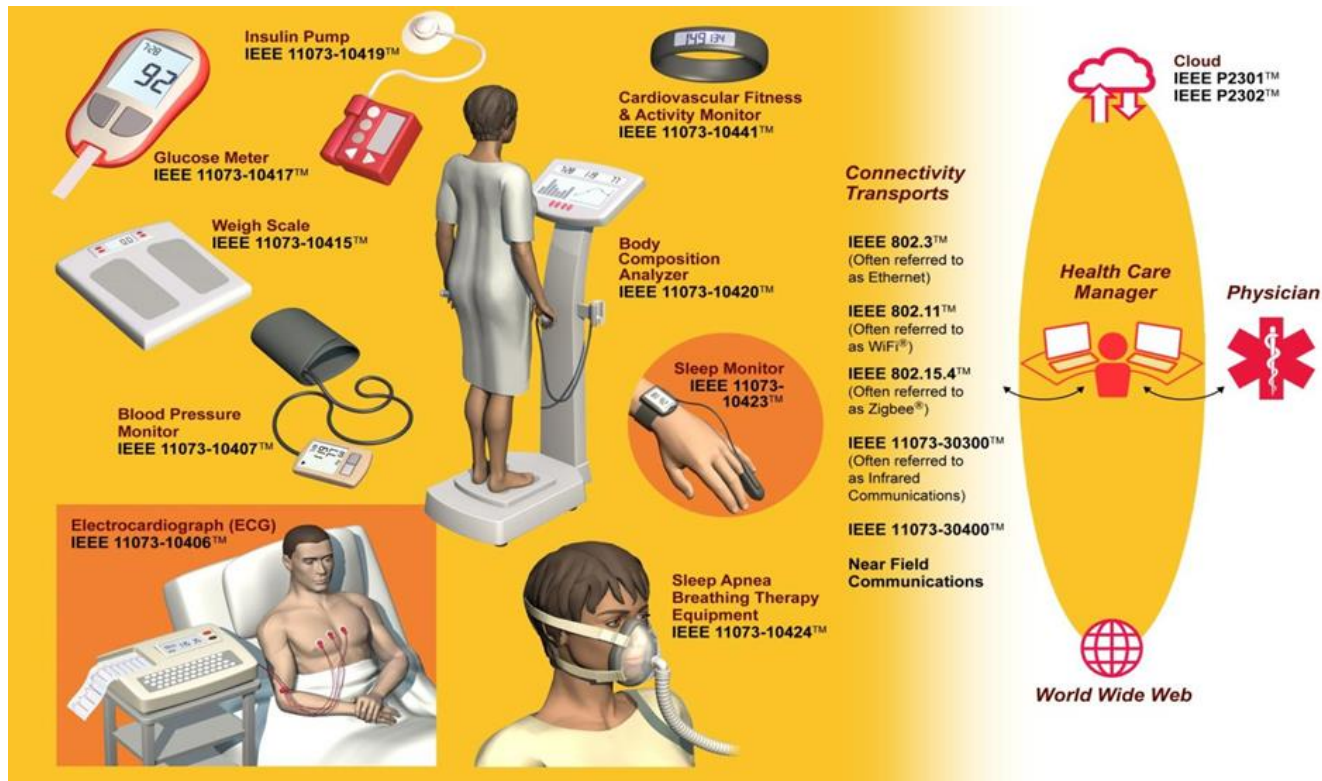
- Alcatel-Lucent
- Cisco Systems
- dZhON Pty. Ltd.
- Emerson
- Electric Power Research Institute (EPRI)
- General Electric
- Hitachi, Ltd.
- Honeywell International
- Huawei Technologies
- Infocomm Development Authority (IDA)
- Institute for Information Industry (III)
- NIST
- Qualcomm Inc.
- Renesas
- Rockwell Automation
- Schneider Electric
- Siemens AG
- STMicroelectronics
- Toshiba Corporation
- Wipro
- Yokogawa Electric Corporation

# Selected IEEE Future Directions Initiative

## Life Science\*

### Purpose & Scope:

Work at the intersection of the Life Sciences with Electrical Engineering, Computer Engineering, Computer Sciences, Physics and Mathematics with particular focus on **health care, computational biology, image/signal processing, and genomics/proteomics**



### Sample IEEE Standards:

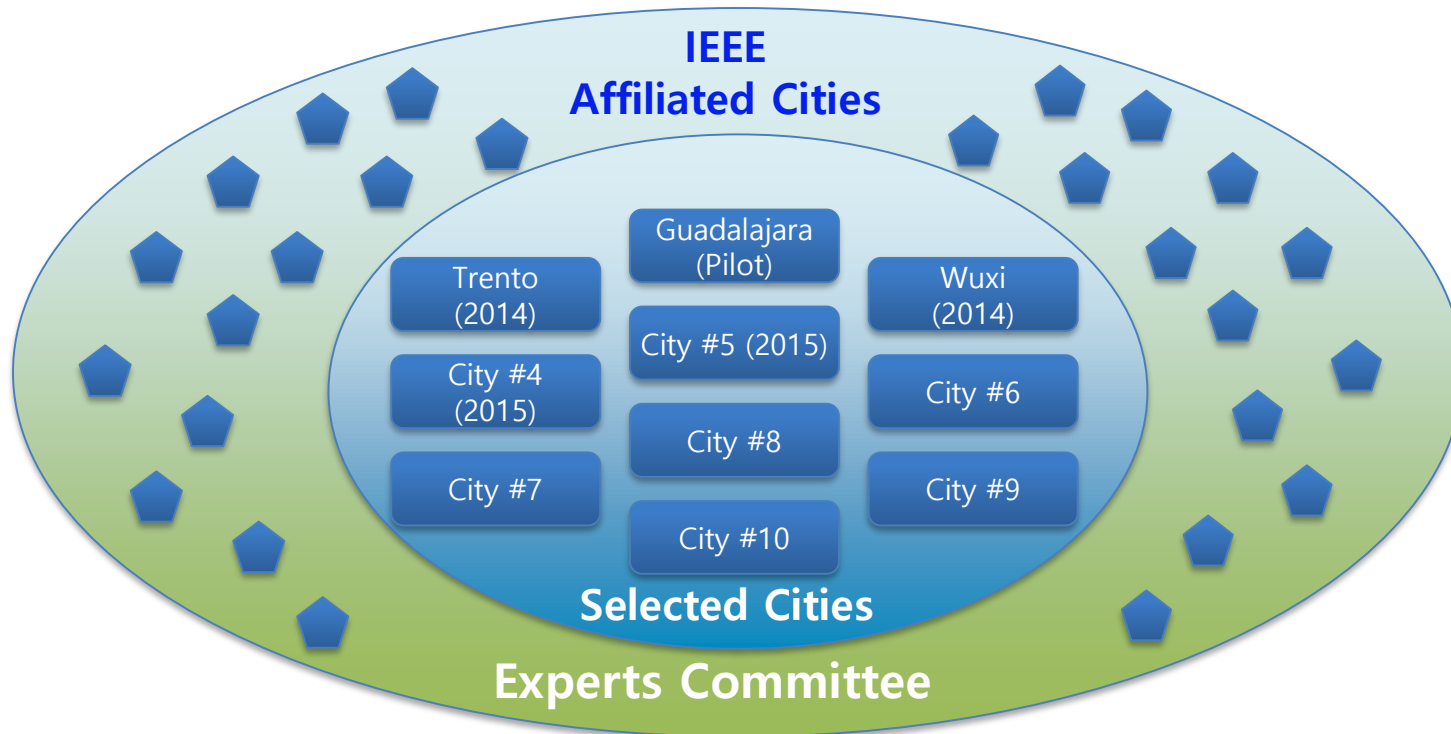
- ISO/IEEE 11073 series Health Informatics-Medical / Health Device Communication Standards
- IEEE P3333 series of projects, including 3D representation of medical images

# Selected IEEE Future Directions Initiative

## Smart Cities

### Purpose & Scope:

Collaborate to share knowledge, experience and good practices with a special focus on technology professionals. Involve governments, universities, industries and local IEEE volunteers



Good Practices – Knowledge – MOOCs – White Papers- Conferences

# Selected IEEE Future Directions Initiative

## Smart Grids

### Purpose & Scope:

A next-generation electrical power system that is typified by the increased use of communications and information technology in the **generation, delivery and consumption of electrical energy.**

IEEE Std 2030-2011  
IEEE Guide for Smart Grid Interoperability of Energy Technology and Information Technology Operation with the Electric Power System (EPS), End-Use Applications, and Loads

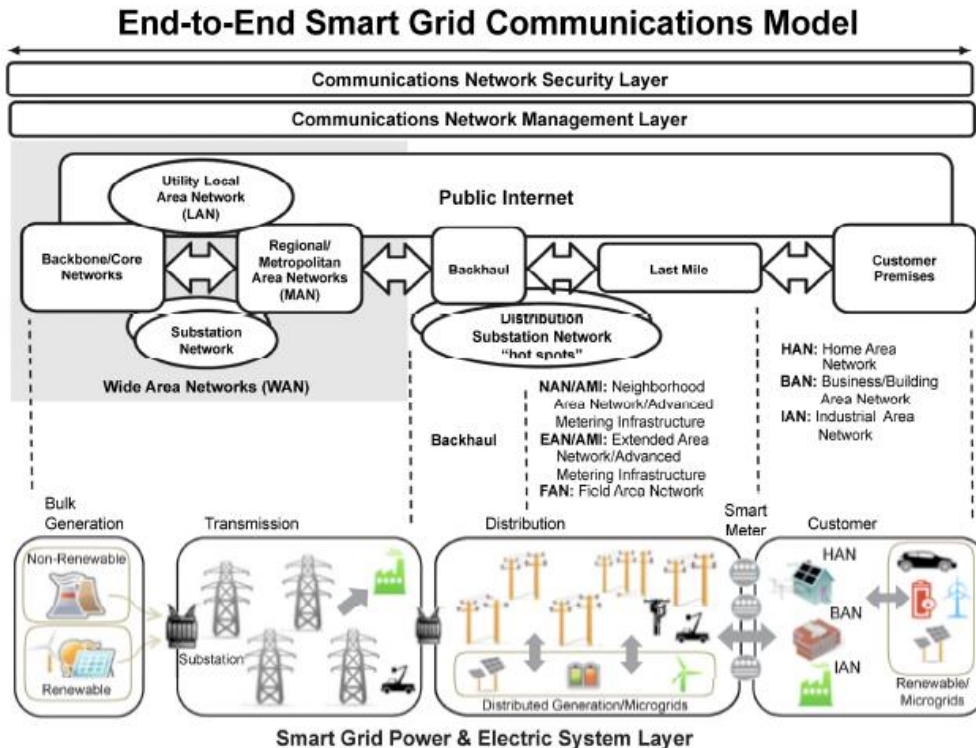
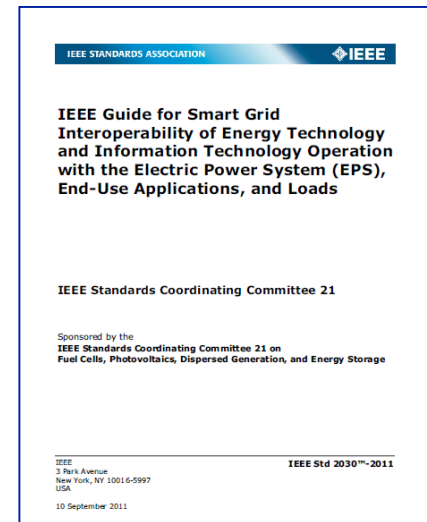


Figure 7-1—End-to-end smart grid communications model

### Sample IEEE Standards:



IEEE 2030 standards family were the industry's first guidelines for smart grid interoperability cross-discipline




# IEEE Internet Initiative

- IEEE is **a unique platform bringing together policy makers and technology developers**
- Internet Initiative focuses on Internet governance, cybersecurity, and privacy
- Brings to bear IEEE's technical expertise, international perspective, and respected collaboration processes, to help:
  - Inform and improve the state of knowledge and debate on Internet related policy issues, and provide possible technology solutions to challenges
  - Improve Internet governance, based on an understanding of the underlying scientific and technological constraints and potential
- Engages and coordinates with a range of technical and policy bodies
- Promotes values that are vital to the industrialized and an increasingly connected world:
  - **Transparency**
  - **Openness**
  - **Transnational cooperation**
  - **Protection of Privacy**
  - **Bottom-up development**

# EAD, First Edition

- Iteration from and culmination of EADv1 and EADv2, produced in December 2016 and December 2017
- EADv1 and EADv2 received over 500 pages in aggregate of global feedback which was considered by Committees
- **All 1150+ members** were invited to edit / critique latest version of committee drafts in summer of 2018
- Editing Committee, chaired by Karen Bartleson, IEEE 2017 President, and co-chaired by Eileen Lach, are in final stages of editing EAD1ed.
- EAD1ed. Was launched at SXSW interactive conference in **March, 2019**, where IEEE-SA Managing Director(Konstantinos Karachalios) was also appearing on a panel.

 *EAD: Ethically Aligned Design*

**Thank You!!**

**Any Questions?**

# Bio Data



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## Personal Details :

Dr. Kishik PARK was educated at Seoul National University, in the Rep. of Korea, where he obtained a first class honours degree of B.A. in 1982 and M.A. in 1984 respectively. And he got Ph.D. Degree in the field of Telecommunications Policy in 1995. In 2004, he has got another Ph.D. Degree majoring in Internet QoS, Computer Science at Paichai University.

He joined ETRI (Electronics and Telecommunications Research Institute) in 1984, and he is currently working as a Principal Researcher of Technology Commercialization Div. He has more than 30 year research experience in various divisions of ETRI including Info-Communications Technology Division(Vice-President), IT Strategy Research Division(Vice-President), Information & Telecommunications Technology Division(Vice-President), and Protocol Engineering Center (Managing Director), etc.

He has been actively serving as a Member of IEEE SA BOG including its subcommittees now. He has served as Vice Chairman of ITU-T Review Committee after the 8 year **Chairmanship of ITU SG3** and the 8 year VC of TSAG (Telecommunications Standardization Advisory Group) since 1996 internationally as well as serving as a Advisory Board Member of ASTAP (Asia-pacific STAndardization Program) regionally.

Currently, Dr. Park has been leading Green ICT Forum Korea as President. He has carried out various important roles such as a member of National R&D Evaluation committee, a Member of National Telecom. Standardization Committee of Korea, and the manager of W3C Korean Office, the Chairman of the 9th GSC (Global Standards collaboration), the President of IPv6 Forum Korea, the Chairman of the KRnet 2004 Operation Committee, and the Secretary General of Asia IT Ministers' Conference.

In addition, he wrote and edited many books as well as published more than 150 papers including many SCI/SSCI ones, and received the National Orders of Industrial Merit in 2000 and 2008 respectively.