In 2014, IEEE Computer Society’s then-President Dejan Milojicic and a team of nine technologists surveyed the landscape and identified 23 game-changing technologies they felt would have the biggest impact on our world by 2022. In particular, this report focused on 3D printing, big data and analytics, the open intellectual property movement, massively online open courses, security cross-cutting issues, universal memory, 3D integrated circuits, photonics, cloud computing, computational biology and bioinformatics, device and nanotechnology, sustainability, high-performance computing, the Internet of Things, life sciences, machine learning and intelligent systems, natural user interfaces, networking and inter-connectivity, quantum computing, software-defined networks, multicore, and robotics for medical care. These technologies, tied into a scenario that we call seamless intelligence, present a view of the future.

For each of the 23 technologies, there is a description of the state of the art, challenges, where we think the technology will go, and its disruption. Our position, as well as the premise that this document brings, is that technology is the enabler.
IEEE Region 2 CONGRATULATES our **IEEE 2022 Fellows** on their successful nomination and selection.

**Baltimore**
- **Mohamed Younis** for contributions to protocols, architecture, and analysis of multi-hop wireless networks
- **Webert Montlouis** for leadership in the development of radar systems

**Central Pennsylvania**
- **Clive Randall** for contributions to the formulation, processing, and characterization of electroceramics
- **Qing Wang** for contributions to polymer dielectrics for capacitive energy storage

**Cleveland**
- **Philip Neudeck** for contributions to silicon carbide electronics and crystal growth

**Columbus**
- **Eric Fosler-lussier** for contributions to spoken language technology by integrating linguistic models with machine learning
- **Yingbin Liang** for contributions to information theoretic methods for wireless systems

**Delaware Bay**
- **Cathy Wu** for contributions to computational biology and data science

**Northern Virginia**
- **Christopher Rodenbeck** for contributions to radar microsystems for ultrawideband and millimeter-wave applications
- **Thomas Clancy** for leadership in security and wireless communications

**Philadelphia**
- **Walter Cleaveland** for contributions to verification tools for finite-state and cyber-physical systems

**Pittsburgh**
- **Jerald Nespéro** for contributions to Digital AESA Radar Systems for contributions to distributed signal processing

**Upper Monongahela Subsection**
- **Anita Carleton** for leadership in the advancement of software measurement and practices
- **Soumyya Kar** for contributions to distributed signal processing

**Washington**
- **Carol Espy-Wilson** for contributions to speech enhancement and recognition
- **M Brian Blake** for contributions to integrated circuits for digital communication
- **Mark Stiles** for contributions to spintronics devices and data storage
- **Nada Golmie** for contributions to wireless technologies and standards

---

Newsletter Editor: Dr. Rhonda Farrell, ieeer2rvc@gmail.com, www.ieee.org/r2
Senior Member Elevations

IEEE Region 2 CONGRATULATES our 132 IEEE Senior Members on their successful nomination and selection.

AKRON
- Gokarna Sharma

BALTIMORE
- Julia Andrusenko, Emad Doctor, Don Clark, John Donnal, Carson Dunbar, Joseph Ernst, Jared Everett, Lawrence Grim, Jason Hodkin, Nicholas Host, James Howard, Karuna Joshi, Justin Kong, Michael Kutzer, Mark Lopresto, Chintan Patel, Christopher Ratto, Donald Schmincke, William Smith Jr., Yuji Zhang

CENTRAL PENNSYLVANIA
- Sawyer Campbell, Saptarshi Das, Satadru Dey, Weihua Guan, Arash Khoshkbar Sadigh

CINCINNATI
- Suman Bhunia, Michael Clodfelder, Christy Holland, C Koch, Miao Wang

COLUMBUS
- Qadeer Ahmed, Kavitha Bangalore, Rubao Li, Srinivasan Parthasarathy, Rajarshi Roychowdhury, Gaurav Sharma, Hongping Zhao

DAYTON
- Kelson Chabak, Brooke Hayden, Douglas Hodson, Pranav Patel, Isaac Weintraub, Feng Ye

DELWARE BAY
- Sunita Chandrasekaran

LEHIGH VALLEY
- Xiaochen Guo, Cheryl Jones, Steven King, Elizabeth Nelson, Abas Sabouni, Vijay Sontakke, Jack Trump

NORTHERN VIRGINIA

PHILADELPHIA
- Md Ali, Gourav bansal, Todd Bessemer, Frances Blanche, Paul Caronia, Hung-po Chao, Vincent Cicirello, Robert Doot, Todd Ellis, Mark Green, Frank Heleniak, Lee Hong, Joel Hypolite, Srikanth Reddy Iragamreddy, John Kaewell, Stanley Kobylarz, Vidhyanandhini Krishnasamy, David Martin, Paul McCabe, Jonathan Moore, Edward Morson, Shaun Murphy, Jeffrey Rohrbeck, Prajakta Savant, Justin Shi, Christopher Stone, Yubing Tong, Saravanarajan Venkatachalam, David Wilson, John Wolgemuth
IEEE R2 Senior Member Elevations

PITTSBURGH
• Omid Dehzangi, Tashwin Khurana, James Lagree, Shashank Laxminarayan Suresh, Thomas Schaaf, Gil Shamir, Reid Simmons, Ryan Stone

WASHINGTON
• David Balenson, Michael Cholewczynski, Arati Dasgupta, Aaron Datesman, Bilil Hasnae, Furong Huang, Mahdi Imani, Marco La Manna, Tian Lan, Anwar Mohammed, Daniel Opila, JONATHAN PELLISH, Vijayshree Rautela, Sarah Rovito, Alan Salari, Hassan Salmani, Eric Vermote, Lanier Watkins, John Xun Yang

IEEE Region 2 CONGRATULATES the 2022 IEEE Medal Recipients

IEEE Medal of Honor
• Asad M. Madni for pioneering contributions to the development and commercialization of innovative sensing and systems technologies, and for distinguished research leadership

IEEE Frances E. Allen Medal
• Webb Miller & Eugene W. Myers for pioneering contributions to sequence analysis algorithms and their applications to biosequence search, genome sequencing, and comparative genome analyses

IEEE Alexander Graham Bell Medal
• P.R. Kumar for seminal contributions to the modeling, analysis, and design of wireless networks

IEEE Mildred Dresselhaus Medal
• Anantha Chandrakasan for contributions to ultralow-power circuits and systems, and for leadership in academia and advancing diversity in the profession

IEEE Edison Medal
• Alan C. Bovik for pioneering high-impact scientific and engineering contributions leading to the perceptually optimized global streaming and sharing of visual media

IEEE Medal for Environmental and Safety Technologies
• John J. Croat & Masato Sagawa for contributions to the development of rare earth-iron-boron permanent magnets for use in high-efficiency motors, generators, and other devices

Recognition for Technical Field Awards for 2022

Newsletter Editor: Dr. Rhonda Farrell, ieeer2rvc@gmail.com, www.ieee.org/r2
IEEE Region 2 CONGRATULATES the 2022 IEEE Medal Recipients

IEEE Founders Medal
- John Brooks Slaughter for leadership and administration significantly advancing inclusion and racial diversity in the engineering profession across government, academic, and nonprofit organizations

IEEE Richard W. Hamming Medal
- Madhu Sudan for fundamental contributions to probabilistically checkable proofs and list decoding of Reed-Solomon codes

IEEE Medal for Innovations in Healthcare Technology
- James G. Fujimoto for pioneering the development and commercialization of optical coherence tomography for medical imaging and diagnostics

IEEE Jack S. Kilby Signal Processing Medal
- David L. Donoho for groundbreaking contributions to sparse signal recovery and compressed sensing

IEEE/RSE James Clerk Maxwell Medal
- Ingo Wolff for the development of numerical electromagnetic field analysis techniques to design advanced mobile and satellite communication systems

IEEE James H. Mulligan, Jr. Education Medal
- Ned Mohan for leadership in power engineering education by developing courses, textbooks, labs, and a faculty network

IEEE Jun-ichi Nishizawa Medal
- Umesh K. Mishra for contributions to the development of gallium nitride-based electronics

IEEE Robert N. Noyce Medal
- Jason (Jingsheng) Cong for fundamental contributions to electronic design automation and FPGA design methods

IEEE Dennis J. Picard Medal for Radar Technologies and Applications
- Moeness G. Amin for contributions to radar signal processing across a wide range of applications including through-the-wall imaging and health monitoring

IEEE Medal in Power Engineering
- Thomas M. Jahns for contributions to the development of high-efficiency permanent magnet machines and drives

IEEE Simon Ramo Medal
- Pravin P. Varaiya for seminal contributions to the engineering, analysis, and design of complex energy, transportation, and communication systems

IEEE John von Neumann Medal
- Deborah Estrin for leadership in mobile and wireless sensing systems technologies and applications, including personal health management.

Newsletter Editor: Dr. Rhonda Farrell, ieeer2rvc@gmail.com, www.ieee.org/r2
2022 IEEE Recognition Awards

IEEE Honorary Membership
- Calyampudi Radhakrishna (C.R.) Rao for contributions to fundamental statistical theories and their applications to engineering and science, particularly in signal processing and communications

IEEE Corporate Innovation Award
- The Argo Program for innovation in large-scale autonomous observations in oceanography with global impacts in marine and climate science and technology

IEEE Richard M. Emberson Award
- Frederick C. Mintzer for outstanding leadership of technical activities including the IEEE Collabratec and TAB technology-centric communities

IEEE Haraden Pratt Award
- Joseph V. Lillie for sustained and outstanding focus on the engagement of volunteers and staff in implementing continuous improvement of IEEE operations

IEEE Theodore W. Hissey Outstanding Young Professional Award
- Edhem Custovic for leadership in the empowerment and development of technology professionals globally

IEEE Eric Herz Outstanding Staff Member
- David Bankowski for leading the restructuring of the IEEE Data Center and ensuring its resilience and continuity of services for more than two decades satellite communication systems

IEEE - USA Special Career Resources

IEEE-USA's vision is to serve the U.S. IEEE member by being the technical professional's best resource for achieving lifelong career vitality and by providing an effective voice on policies that promote U.S. prosperity.

The goal is to provide you with the tools and resources to help you succeed.

Review it here TODAY!
Three Tips for Starting a New Job on the Right Foot

Starting a new job? In this IEEE-USA InSight article, Jacquelyn Adams offers a few tips to set you up for success from day one.

Use Your Voice to Say Something New

Discover a few tips to use your voice to say something new that goes beyond the status quo, and help make an impact with every interaction!

IEEE - USA Special Resources

Engineering Activities for the Classroom – Book 4: Robotics

In the latest e-book of his popular series, Harry T. Roman provides practical activities to introduce students to robotics.

The book offers an in-class design challenge to excite and engage, and information to help understand career paths in the field.

This e-book is Roman’s fourth in a series of engineering activities for the classroom. The first three volumes in the series deal with Telecommunications and Computers, Energy in Our World, and Engineering.

FREE DOWNLOAD FOR ALL IEEE MEMBERS.
As a premier event, **IEEE Rising Stars Global 2022** is designed to inform, excite, enthuse, and enlighten the top engineering young professionals and students. The conference brings together the most promising students and young professionals around the world to network and is inspired by each other. The program includes interactive events, competitions, technical innovation talks from industry experts, networking opportunities and professional development. The Rising Stars event consists of two tracks. One focuses on bringing together technical professionals who are experts in emerging technologies including autonomous vehicles, space, and manufacturing, cloud computing, big data, artificial intelligence, security, and IoT. The Professional track consists of technical professionals who come to enlighten and inspire attendees to succeed in an ever-changing job environment and on how to develop as leaders in their respective fields. The IEEE Rising Stars Global provides direction and perspective to performing young professionals and students.

Attendees at the event will gain insight on how best to further their careers by networking and learning from industry professionals and executives from leading international companies. Rising Stars Global attendees will leave the event with better preparation to face the challenges presented to them and armed with the appropriate contacts needed to gain the insight to be successful.

**Register Today!**

**Support Our DEI Initiatives**

IEEE’s mission to foster technological innovation and excellence to benefit humanity requires the talents and perspectives of people with different personal, cultural, and disciplinary backgrounds. IEEE is committed to advancing diversity in the technical profession, and to promoting an inclusive and equitable culture that welcomes, engages, and rewards all who contribute to the field, without regard to race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression.

*Newsletter Editor: Dr. Rhonda Farrell, ieeer2rvc@gmail.com, www.ieee.org/r2*
SUPPORT YOUR IEEE STUDENTS, YP, and WIE GROUPS

IEEE WIE is one of the world’s leaders in changing the face of engineering. Our global network connects over 20,000 members in over 100 countries to advance women in technology at all points in their lives and careers.

Our IEEE Students website has something for each of you! Visit us today to take off to the next level personally and professionally!

- Begin networking in your areas of interest and future profession
- Connect with local IEEE Sections and Volunteer Leadership
- Learn about Scholarships, Grants, and Fellowships for IEEE Student Members

Student branches are crucial to the growth and development of IEEE Student members. Student branches create a local network of students and give students the opportunity to meet and learn from fellow students, as well as faculty members and professionals in the field.

Student branches offer numerous educational, technical, and professional advantages to IEEE Student members through special projects, activities, meetings, tours, and field trips.

IEEE Young Professionals is the group of IEEE members and volunteers who have graduated from their first professional degree within the past 15 years. It is an international community, whose members are interested in elevating their professional image, expanding their global network, connecting with peers locally and giving back to their community. Since it encompasses all members from recent university graduates to experienced professionals and entrepreneurs, the group is highly diverse in what it has to offer. To join the IEEE Young Professionals community, you need to be an IEEE member - Join now.

FUTURE50 Campaign

NEW Students or RENEW Today!
IEEE Region 2 Conferences

2022 IEEE Power & Energy Society Innovative Smart Grid Technologies Conference (ISGT)

21 - 24 February 2022 | Washington DC

2022 IEEE International Conference on Robotics and Automation (ICRA)

23 - 27 May 2022 | Philadelphia, PA

2022 IEEE 34th International Conference on Microelectronic Test Structures (ICMTS)

20 - 23 March 2022 | Cleveland, Ohio

2022 IEEE International Workshop Technical Committee on Communications Quality and Reliability (CQR)

7 - 9 June 2022 | Washington DC

Newsletter Editor: Dr. Rhonda Farrell, ieeeer2rvc@gmail.com, www.ieee.org/r2
Central Area

The Central Area covers the following IEEE R2 Sections:

- Central Pennsylvania
- Erie
- Johnstown
- Pittsburgh
- West Virginia
- Susquehanna

Chair: James A. Beck

South Area

The South Area covers the following IEEE R2 Sections

- Baltimore
- Northern Virginia
- Washington D.C.

Chair: Don Herres

Happy Holidays and a very Happy 2022 New Year to you and your families!

East Area

The East Area covers the following IEEE R2 Sections

- Philadelphia
- Southern New Jersey
- Lehigh Valley
- Delaware Bay

Chair: Joseph Burns

West Area

The West Area covers the following IEEE R2 Sections

- Akron
- Cincinnati
- Cleveland
- Columbus
- Dayton
- Lima
- Youngstown

Chair: Chang Liu

Locate all the IEEE R2 vTools Events here!

Newsletter Editor: Dr. Rhonda Farrell, ieeer2rvc@gmail.com, www.ieee.org/r2
JOIN AN AFFINITY GROUP

IEEE Life Members Affinity Group

JOIN A COMMUNITY

Collaborate, Engage, and Follow Us in 2022 & Beyond!

SUPPORT OUR STUDENTS & ENTREPRENEURS

ATTEND AN R2 EVENT

IEEE MEETINGS, CONFERENCES & EVENTS

IEEE vTools

IEEE Entrepreneurship

Newsletter Editor: Dr. Rhonda Farrell, ieeer2rvc@gmail.com, www.ieee.org/r2