



*Advancing Technology
for Humanity*

2022 Annual Report

REFLECT. RENEW.

REIMAGINE.

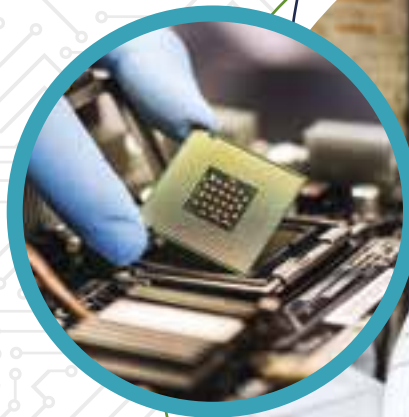




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COVER MIDDLE IMAGE: Attendees of the 2022 IEEE International Conference on Robotics and Automation (ICRA) held in Philadelphia, PA

OPPOSITE FROM TOP TO BOTTOM: Student participating in the Spatial Extent Monitoring of Coastal Sunny-Day Flooding Project where students prepared, mounted and deployed the first camera module prototype at Carolina Beach, NC

IEEE Day participants

Students and professionals from the IEEE Uganda Section renovate an existing solar power system at a community school with 400 students for a project funded by the IEEE Humanitarian Activities Committee and IEEE Special Interest Group on Humanitarian Technology (SIGHT)



REFLECT. RENEW. REIMAGINE.

Through the strength and resilience of our members and volunteers, IEEE has remained a strong and agile community, even when faced with unprecedented challenges. In 2022, we celebrated being fully reopened and were once again able to connect with our members and volunteers through in-person events across the globe. It is a testament to the unwavering dedication of the members of our organization that we were able to reflect and overcome obstacles and emerge strong.

IEEE's success is rooted in the amazing legacy of our members and volunteers and their exceptional accomplishments. As we move forward, this is an opportune time to renew our commitment to them. IEEE enables members of the worldwide engineering and technology community to forge bonds with one another in exciting and innovative ways, making IEEE their

professional home. We understand that our members and volunteers are the backbone of IEEE, and we will continue to work tirelessly to ensure they have everything they need to thrive and reach their full potential throughout their careers.

We are also reimagining new and better ways to tackle the problems facing our world. The future is full of opportunities, and it is up to us to seize them and make our planet a better place. We are excited to be a part of this new era of growth and vitality for IEEE, and we look forward to joining with all of you, as you embrace IEEE as your professional home, to help build a brighter and more connected future for the betterment of humanity.



ABOVE LEFT: Participants in a workshop held in Guayaquil, Ecuador, learn hands-on training at a nearby SIGHT funded project

BOTTOM: 2022 ICRA attendees





K. J. RAY LIU
*2022 IEEE President
and CEO*

MESSAGE FROM THE IEEE PRESIDENT AND CHIEF EXECUTIVE OFFICER

IEEE is the professional home for the engineering and technology community worldwide, including engineers, scientists, practitioners, entrepreneurs and students. Our members are experts from the highest echelons of academia, industry and government, and they work and study in every vital area of technology.

2022 was memorable for IEEE in many ways. We REFLECTED and strived through the pandemic to RENEW and reopen after two years of closure, and accomplished a tremendous amount in a challenging year that offered great opportunity to REIMAGINE and pilot various models, services, products and solutions to meet the diverse set of our members' needs. As IEEE President, I was able to see our amazing organization from a lens that is both inspiring and humbling. The sphere of knowledge, innovation and collegiality that comprises IEEE is vast and inclusive. I am honored to be part of this great technological, entrepreneurial enterprise.

IEEE's core purpose is to foster technological innovation and excellence for the benefit of humanity. IEEE is committed to scientific and technical discovery and innovation that improves our standards of living and helps us care for each other and for our planet. In particular in 2022, we began to develop a cross-IEEE strategy to synchronize and guide IEEE's response to changes in the global climate, and how IEEE can play a leading role to address the causes, mitigate the impact and adapt to climate change.

At IEEE, we know that the advancement of scientific and technical knowledge has always been the engine that drives the quality of life for every citizen of this planet. Progress in engineering, technology and science is a global endeavor with worldwide implications, guided best by a diverse and inclusive community of engineers, technologists, researchers and entrepreneurs with a goal of developing and sharing innovative solutions for the benefit of all.

I am proud to say that IEEE has a long history of supporting diversity, equity, and inclusion. As an organization, we work actively to draw individuals from traditionally under-represented backgrounds into the technology and engineering community worldwide. For example, IEEE Women in Engineering has encouraged increased gender diversity in STEM fields for more than 25 years. And several IEEE operating units have taken steps to increase the geographic diversity of their membership, leadership, and recognitions. There is still more work to be done to ensure that all members of the technology and engineering community can pursue their work without bias, with the ability



to participate at their full capacity and their perspectives fully welcome by all. We must also encourage individuals with technical talent and interest to pursue professional careers, no matter who they are, where they came from, or what language they speak. Everyone has unique wisdom to offer. We must pursue these goals because our fields are improved by the free flow of ideas that only a diverse community of thinkers provides. IEEE will continue to foster an innovative environment for technologists to work together for the greater global public good without boundaries.

Throughout my presidency, I took every opportunity possible to engage IEEE's next generation—our students and young professionals. I highlighted this community in the IEEE as Your Professional Home campaign and I explored new opportunities to communicate with our students and young professionals, including via widespread social media. I also held in-person engagements in Japan, Mexico and Tunisia. And I am very pleased to report that student membership grew more than 15% worldwide in 2022, an unprecedented double-digit increase.

In an ever-changing and uncertain world, IEEE—our professional home—is always here for our members, as well as for humanity and for our shared future. By remaining true to our central values—fostering technological innovation and excellence for the benefit of humanity—I'm certain that IEEE's future will be very bright indeed.

Sincerely,



K. J. Ray Liu

2022 IEEE President and CEO



Sophia (Sophie) Muirhead Named New IEEE Executive Director and Chief Operating Officer

In September 2022, Sophie Muirhead was selected as the new IEEE Executive Director and COO, replacing Stephen P. Welby on 1 January 2023. Sophie had been an instrumental member of the IEEE senior leadership for the previous three years as General Counsel and Chief Compliance Officer. During that time, she oversaw the evolution of contracting processes; navigated export controls, sanctions and other compliance regulations; made significant contributions to our Standards, Finance and Publishing protocols; and supported Stephen in mitigating the effects of a global pandemic. Prior to joining IEEE in 2019, Sophie was the senior vice president, chief legal officer and corporate secretary at The Conference Board, an economic think tank and global business membership organization.



FROM LEFT TO RIGHT: Sophie Muirhead, K. J. Ray Liu, Stephen Welby

IEEE BY THE NUMBERS

5,833,876

Total Documents

265,420,564

Total Usage*

222,106

New Conference Papers

81,921

New Journal and Magazine Articles

126

Standards Approved for Publication

IEEE Xplore[®]
Digital Library

*PDF downloads and HTML views

427,780

TOTAL MEMBERS

Top 5 Countries for Members



153,689
UNITED STATES



72,650
INDIA



35,354
CHINA



14,209
CANADA



13,845
JAPAN

145,328

STUDENT MEMBERS

Top 5 Countries for Student Members



52,480
INDIA



21,096
UNITED STATES



14,515
CHINA



5,971
TUNISIA



2,939
CANADA

10

Regions Worldwide

SECTIONS

344

STUDENT BRANCHES

3,689

CHAPTERS

2,700

2,008

IEEE Sponsored
Conferences

534,000

Conference
Attendees

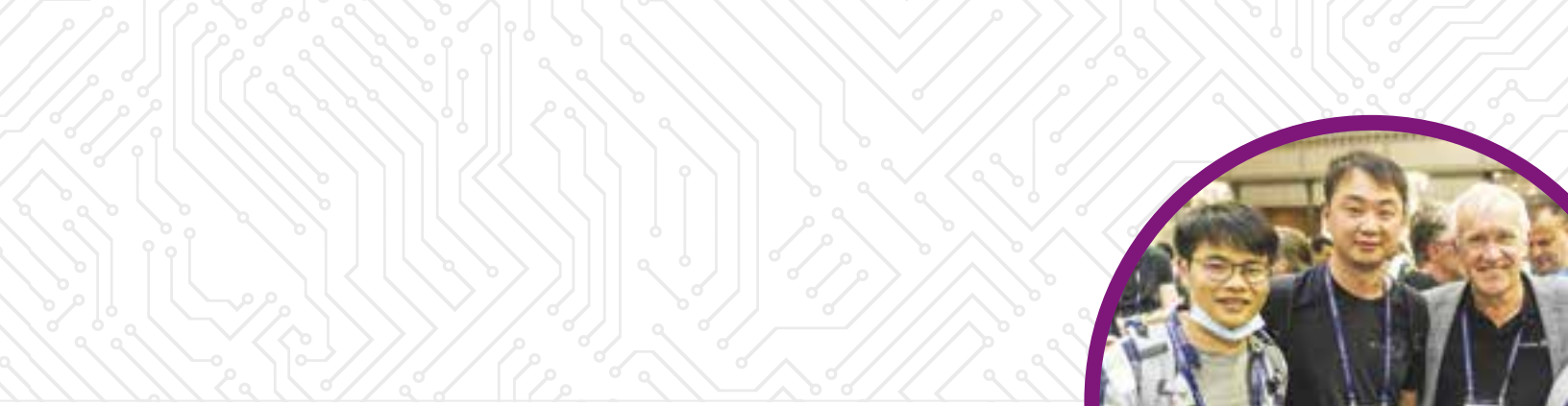
IEEE SOCIETY MEMBERSHIPS

5,715	IEEE Aerospace and Electronic Systems Society
9,680	IEEE Antennas and Propagation Society
1,414	IEEE Broadcast Technology Society
10,807	IEEE Circuits and Systems Society
30,232	IEEE Communications Society
8,853	IEEE Computational Intelligence Society
53,157	IEEE Computer Society
3,102	IEEE Consumer Technology Society
8,520	IEEE Control Systems Society
1,882	IEEE Dielectrics and Electrical Insulation Society
3,601	IEEE Education Society
3,548	IEEE Electromagnetic Compatibility Society
11,048	IEEE Electron Devices Society
2,571	IEEE Electronics Packaging Society
10,959	IEEE Engineering in Medicine and Biology Society
5,665	IEEE Geoscience and Remote Sensing Society
13,301	IEEE Industry Applications Society
9,983	IEEE Industrial Electronics Society
3,842	IEEE Information Theory Society
3,819	IEEE Instrumentation and Measurement Society
2,457	IEEE Intelligent Transportation Systems Society
2,629	IEEE Magnetics Society
12,129	IEEE Microwave Theory and Technology Society
3,074	IEEE Nuclear and Plasma Sciences Society

OPPOSITE TOP: 2022 ICRA attendees

BOTTOM LEFT: Conference attendees at the opening reception of the 2022 IEEE Power & Energy Society Transmission & Distribution Conference and Exposition (IEEE PES T&D) held in New Orleans, LA

BOTTOM RIGHT: Attendees of the IEEE WIE International Leadership Summit in Beijing



- 1,751** IEEE Oceanic Engineering Society
- 8,771** IEEE Photonics Society
- 41,176** IEEE Power & Energy Society
- 12,274** IEEE Power Electronics Society
- 734** IEEE Product Safety Engineering Society
- 565** IEEE Professional Communication Society
- 1,587** IEEE Reliability Society
- 16,577** IEEE Robotics and Automation Society
- 19,164** IEEE Signal Processing Society
- 1,664** IEEE Society on Social Implications of Technology
- 11,266** IEEE Solid-State Circuits Society
- 4,732** IEEE Systems, Man, and Cybernetics Society
- 2,595** IEEE Technology and Engineering Management Society
- 2,106** IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society
- 6,888** IEEE Vehicular Technology Society

- 353,838** **TOTAL SOCIETY MEMBERSHIPS**

50% of IEEE Members Belonged to One or More Societies in 2022





TOP (from left): 2014 IEEE President Roberto de Marca, 2022 General Counsel and Chief Compliance Officer Sophie Muirhead, 2022 IEEE President K. J. Ray Liu, 2022 IEEE Executive Director Stephen Welby and 2022 IEEE President-elect Saifur Rahman at the IEEE November Meeting Series

MIDDLE: Members, volunteers, speakers and attendees of the 2022 IEEE Women In Engineering International Leadership Conference (WIE ILC) in San Diego, CA

BOTTOM (from left): Irena Atov, 2022-2023 IEEE Awards Board Presentation and Publicity Chair, with IEEE Vision Innovation and Challenges (VIC) Summit speaker, Harry Kloor



RE-ENERGIZED FOR A BRIGHT FUTURE

After a successful reimagining of our events during the pandemic, IEEE continued to reconnect through in-person meetings across the globe through our diverse conferences, publications, technology standards and professional and educational activities. IEEE's vast network of expert technical professionals at all stages of their careers and from a variety of disciplines—industry, academia, public service and more—came together to collaborate on projects that promote innovation and progress for society.

TOP LEFT: IEEE Day participants

TOP RIGHT: IEEE PES T&D speaker
Hanna Grene

BOTTOM: 2022 IEEE-HKN President
Jim Conrad (2nd back from left)
with members of the Kappa
Psi Chapter (University of California,
San Diego) at the 2022 IEEE-HKN
Student Leadership Conference in
Charlotte, NC





IEEE PRESIDENT K. J. RAY LIU TRAVELS GLOBALLY TO ENGAGE WITH MEMBERS AND VOLUNTEERS

IEEE President K. J. Ray Liu was on the move this year, engaging with members across the globe. Among his many travels, President Liu participated in the IEEE/Robotics Society of Japan International Conference on Intelligent Robots and Systems 2022 in Kyoto, Japan. He also attended the IEEE Student and Young Professional Congress 2022 in Tunis, Tunisia, and addressed the IEEE Mexico Section Congress in Acapulco, Mexico, as part of the 100th anniversary celebrations of the Mexico Section.



TOP LEFT: 2022 IEEE President K. J. Ray Liu

TOP CENTER: Attendees of the IEEE Student and Young Professionals Congress in Tunis, Tunisia

TOP RIGHT: IEEE President K. J. Ray Liu participated in IEEE IROS 2022 held in Kyoto, Japan, and met with Japan Council and Japanese volunteer leaders such as Professor Yoshiaki Nakano, University of Tokyo and 2021–2022 IEEE Tokyo Section Chair (pictured left)

MIDDLE: IEEE President K. J. Ray Liu at a Region 9 meeting

BOTTOM: Attendees at the IEEE Mexico Section Congress held in Acapulco, Mexico

TRYENGINEERING SUMMER INSTITUTE TAKES TEENS ON TECH-FUELED ADVENTURES

After two years of COVID-19, attendance at this year's IEEE TryEngineering Summer Institute grew exponentially. The tech-focused summer camp gives teens an opportunity to explore engineering disciplines through hands-on design challenges, field trips, industry speakers and more. Students also took behind-the-scenes tours of places like Boeing, Space Center Houston and the Apollo Mission Control facility. Thirty students were able to attend tuition-free thanks to generous donations from numerous IEEE societies and others to the IEEE Educational Activities Scholarship Fund, created through the IEEE Foundation. The camp was organized in 10-day sessions over the course of the summer and held on four campuses: Rice University in Texas, the University of Pennsylvania, the University of San Diego and Vaughn College of Aeronautics and Technology in New York.



TOP: IEEE TryEngineering Summer Institute (TESI) students in a classroom

MIDDLE: TESI students at the Apollo Mission Control Center in Houston, Texas

BOTTOM: TESI instructor Jordan Burton (left) with students



IEEE WELCOMES INDUSTRY EXPERTS IN INDIA

IEEE welcomed representatives from the All India Council for Technical Education (AICTE) to discuss recent activities to support their collaborative efforts addressing technical education in India, including faculty education programs and accreditation.



IEEE WIE LEADERSHIP SUMMIT IN BEIJING CELEBRATES DIVERSITY

The 2022 IEEE Women in Engineering Beijing Leadership Summit, under the theme of "Diversity, Inclusion, Breaking Boundaries," was co-hosted by the IEEE WIE Beijing Affinity Group and Beijing Women's Association for Science and Technology. Discussion topics included the development of women in the fields of science and technology such as metaverse, chip ecology, power and energy and smart cities, as well as a young generation forum.





IEEE CONFERENCES FUEL RECOVERY

IEEE conferences helped lead the post-pandemic recovery with impressive in-person attendance and vibrant exhibit halls indicating a strong appetite for face-to-face engagement and immersive experiences. The robust participation in these events reflects an unwavering commitment to innovation and underscores the enduring importance of fostering collaboration and exploration in the technical community.



106
Countries



2,008
Conferences



534,000
Attendees

OPPOSITE LEFT (from left): Professor Anil Sahasrabudhe (Past Chairman, AICTE) Pramod Kumar and Buddha Chandrashekhar (Chief Coordinating Officer, AICTE) in a meeting to discuss the existing agreement and activities between IEEE and AICTE

OPPOSITE BOTTOM: Attendees of the 2022 IEEE Women in Engineering Beijing Leadership Summit

TOP: Attendees of the 2022 IEEE PES T&D Conference and Exposition held in New Orleans, LA



ENERGY EXPERTS CONVERGE FOR IEEE PES T&D CONFERENCE AND EXPOSITION

Energy professionals from around the world flocked to the IEEE Power & Energy Society Transmission and Distribution Conference and Exposition (IEEE PES T&D) in New Orleans, LA, to hear insights from the best minds in power and energy and to help shape the future design and development of a reliable, resilient grid. Highlights from the show included a technical program, an expansive exhibit floor hosting a wide display of next-generation energy solutions and special features, including the all-new Smart Cities Pavilion and Innovation Stages.

LEFT (from left): IEEE PES volunteers Carl Segner, Wayne Bishop and Joseph Svachula at the 2022 IEEE PES T&D Conference and Exposition

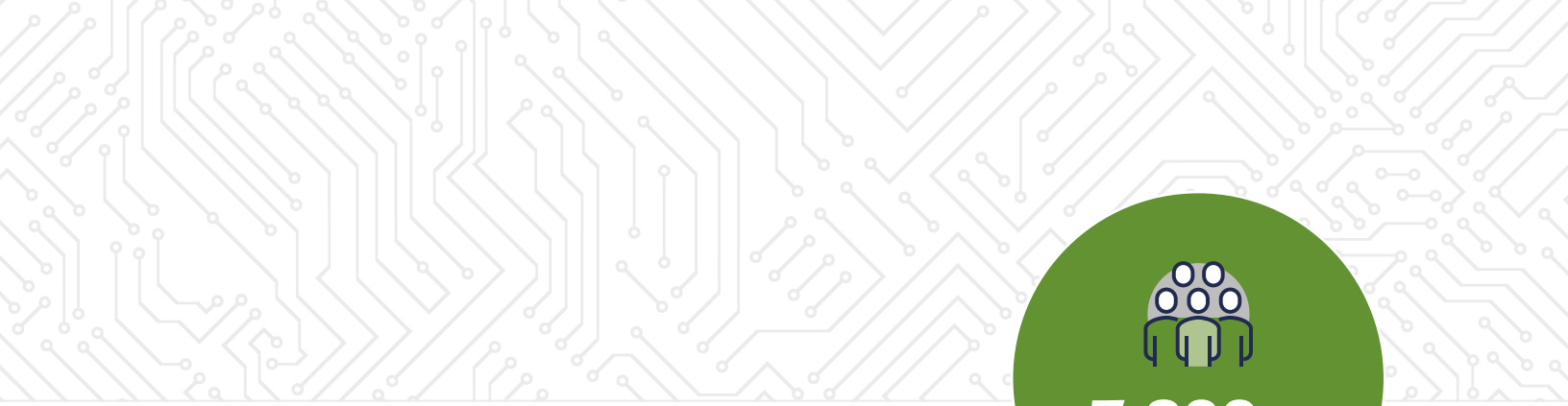
RIGHT: Participants in the High School Power Challenge demonstrate their energy focused project to judges at the 2022 IEEE PES T&D Conference and Exposition



9,800+
Attendees



660
Exhibitors



ICRA BACK BETTER THAN EVER

The IEEE International Conference on Robotics and Automation (ICRA) was held in-person for the first time in three years, in Philadelphia, PA. From scaling AI the human way to NASA robots on Mars to next generation farm robots, the event featured workshops that explored the many ways in which robotics and automation are changing the future of work.



LEFT: ICRA 2022 attendees
RIGHT: Robot demonstration at ICRA 2022

STUDENT LEADERSHIP CONFERENCE RETURNS TO IN-PERSON

The IEEE-Eta Kappa Nu (IEEE-HKN) Student Leadership Conference, held in Charlotte, NC, returned to in-person with record attendance. Students from 54 chapters and five different countries participated in the event. Funding provided by the Samueli Foundation, a private foundation run by IEEE Fellow Henry Samueli and his wife Susan, to the IEEE Foundation helped offset registration and travel costs for the chapters.



TOP LEFT: Leaders of the IEEE-HKN Gamma Theta Chapter (Missouri Science & Technology) were presented key chapter recognition at the 2022 IEEE-HKN Student Leadership Conference

TOP RIGHT: IEEE-HKN Epsilon Mu Chapter Members from the University of Texas, Arlington, at the 2022 IEEE-HKN Student Leadership Conference in Charlotte, NC

MIDDLE: Members of the IEEE-HKN Mu Rho Chapter from Valparaiso University celebrate being at the 2022 IEEE-HKN Student Leadership Conference

BOTTOM: IEEE-HKN members gathered at the 2022 IEEE June Meeting Series in Bellevue, WA to welcome and congratulate the new professional member inductees

IEEE STEPS UP CLIMATE CHANGE EFFORTS

Sustainability has become a hot-button issue throughout the entire IEEE community, igniting a passionate desire to create a better and more eco-friendly future. In 2022, IEEE sent a delegation to the United Nations Climate Change Conference (COP27) in Sharm El-Sheikh, Egypt. Here they presented technology solutions to address climate change mitigation and adaptation in the pursuit of an equitable, sustainable and climate-resilient future.

Furthering its efforts, IEEE created the IEEE Climate Change Collection, a repository of over 7,000 articles from the IEEE *Xplore* digital library about the causes and solutions for climate change. The collection is featured on a website, climate-change.ieee.org, dedicated to highlighting the various efforts around the organization. IEEE is also collaborating with other engineering and technology societies globally to identify areas of collaboration and solutions for addressing climate change.

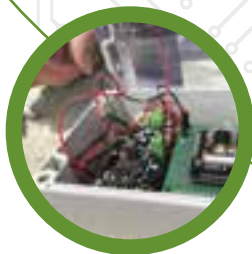
A collaborative effort from IEEE Technical Activities brought together volunteers involved in 40 different societies to contribute to four major initiatives in key areas affecting climate change. These included wildfire prevention and mitigation, management of food and water supplies, workforce development and sustainable technologies, including e-waste management.

Work progressed in the IEEE Standards Association Planet Positive 2030 initiative, which blends the perspectives of technologists, economists, sociologists, educators, policy-makers and others to identify sustainable technology solutions to reduce greenhouse gas emissions and significantly increase the regeneration and resilience of the earth's ecosystems. Insights from the initiative will be shared in a future report that will provide actionable recommendations to inspire public and private sector decision-makers.



TOP: Entrance to COP 27

BOTTOM: Member of a research team installing low-cost water-level sensors in storm drains to better understand flooding



STUDENT TEAMS TACKLE ENVIRONMENTAL SUSTAINABILITY CHALLENGES

The EPICS in IEEE Environmental Competition, made possible by the United Engineering Foundation (UEF) and supported by IEEE Foundation donor-supported programs, empowered IEEE student teams from across the United States to tackle sustainability challenges. Student projects ranged from a robot that collects litter from a local lake to nitrogen-sensing drones for understanding air quality. These projects provide students with hands-on learning and community engagement experiences crucial for professional skills development.



IEEE FUTURE DIRECTIONS SUPPORTS GROUNDBREAKING PROJECTS IN EMERGING TECHNOLOGIES

IEEE Future Directions anticipates and identifies the direction of new and emerging technologies. This year, IEEE Future Directions provided broad and deep perspectives on two new technology areas. The first area is IEEE Public Safety Technology which explores how new technologies can enhance the effectiveness of public safety personnel and promote their well-being. The second area is IEEE Digital Privacy which advocates for the protection of digital privacy for individuals.



TOP: Camera prototype being deployed at Carolina Beach, NC as part of the "The Spatial Extent Monitoring of Coastal Sunny-Day Flooding Project"

TOP LEFT: As part of the "Measuring Nitrogen Level in Carmans River by using a Conductive Polymer-Based Sensor Project" from the New York Institute of Technology, students learned the procedures for fabricating polymer sensors.

TOP CENTER: The Lake Litter EPICS in IEEE team from Arizona State University displays its robot prototype in Phoenix, AZ. The goal of the floating robot is to remove trash from streams and lakes.

BOTTOM (from left): Stephen T.C. Wong, Houston Methodist and Weill Cornell Medical College, and May D. Wang, Georgia Institute of Technology and Emory University, at a gathering of expert speakers at the 2022 IEEE Engineering in Medicine and Biology Society International Conference on Biomedical and Health Informatics Conference.

OPPOSITE BOTTOM: IEEE Next G Summit attendees

EXPLORING ADVANCEMENTS IN 5G AND 6G TECHNOLOGY

There continues to be a significant increase in enthusiasm and effort around the push to 6G technology and beyond among academics and industry. The IEEE Future Networks World Forum focused on 6G Mobile Networks, which included a panel discussion on Sustainable Intelligent Next G Systems. During the discussion, global experts shared updates from their respective countries. Additionally, the forum had a keynote speech that highlighted 6G's role in immersive telepresence. Throughout the year, IEEE Future Networks also explored how 5G and Beyond technologies can be used to address the needs of the first responder community and support defense use cases.



MOVE ASSISTS NATURAL DISASTER VICTIMS

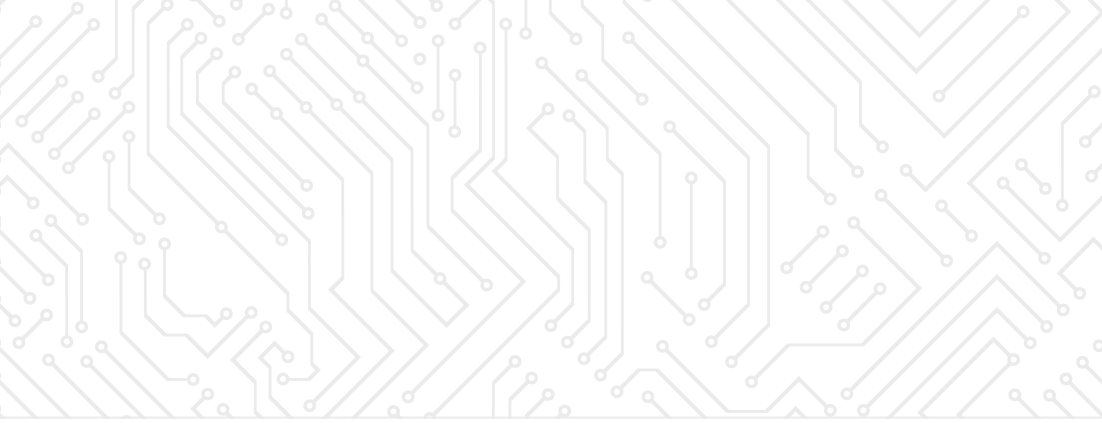
Since 2016, MOVE volunteers, part of the IEEE-USA initiative, have aided more than a quarter million natural disaster victims by providing them with communications, computers and power solutions. In 2022, MOVE responded to three disaster events, including flooding in Kentucky, a wildfire in California and Hurricane Ian in Florida. In addition to these deployments, MOVE held more than a dozen events at venues such as the Atlanta Science Festival and the IEEE Global Humanitarian Technology Conference to raise public awareness of the program.

Also in 2022, IEEE initiated its global expansion of the program, MOVE International, into India and Puerto Rico, which are frequently affected by severe storms. Activities included disaster awareness training workshops for IEEE volunteers and students. Instead of the response truck that has been used in the United States, the program is investigating using smaller vehicles based on country preferences and requirements. In Puerto Rico, a modular model was developed, utilizing solar powered generators and radio sets in transportable cases, since roads are often blocked during disaster events.



TOP: MOVE truck volunteers Walt Burns (left) and David Wright in Ft. Myers, FL

BOTTOM: The MOVE truck on site at the Heights Early Learning and Education Center in Ft. Myers, FL, provides relief workers, agencies and clients access to resources on the Internet



IEEE HAC/SIGHT PROJECTS PROGRAM FUNDS HUMANITARIAN EFFORTS WORLDWIDE

The IEEE Humanitarian Activities Committee (HAC) and its programs, including the Special Interest Group on Humanitarian Technology (SIGHT), bring together dedicated volunteers who are focused on delivering humanitarian technology solutions and life-changing programs across the globe. Key projects included:

- **IEEE Ecuador Section** rehabilitated a data network for 60 local schools over the course of three years, providing internet access to 4,500 students. The team also implemented a STEM training program for over 400 students and provided basic training for schools to maintain their internet networks.
- **IEEE Indonesia Section** used its funding to provide an on-grid rooftop photovoltaic power plant for the Disabled Children Care Home in Jakarta. The project helped to reduce overhead expenses for the home and enabled it to use the extra funds to benefit the children.
- **IEEE Malaysia Section** implemented a renewable energy hydroponic agricultural system in a low-resource urban community. Residents learned about smart agriculture techniques and were able to consume and sell the crops produced via the system.
- **IEEE Uganda Section** renovated a solar power system at a community school that had fallen into disrepair due to a lack of maintenance. The school's 400 students now benefit from lighted classrooms and dormitories with power.



TOP: An IEEE Uganda Section volunteer works to install a solar energy system for a community health center

MIDDLE: Volunteers from the IEEE Sarawak Subsection in Malaysia plan the installation of a smart solar lighting and surveillance system for a coastal fishing village to monitor and understand crocodile habits

BOTTOM: Team members from the IEEE Malaysia Section harvest crops and prepare seedlings from an intelligent and renewable energy hydroponic agricultural system that volunteers built for a low-resource urban community





TOP AND CENTER: The IEEE Your Professional Home campaign featured members and volunteers from different points of their career journey



ELEVATING ENGAGEMENT

IEEE members and volunteers are committed to addressing emerging challenges and promoting technological innovation for the betterment of society. In 2022, IEEE renewed its efforts to connect with the global engineering and technical community by raising awareness of its crucial role in advancing technologies of the future and by positioning itself as “Your Professional Home” for the engineering and technology community worldwide.



TOP LEFT: IEEE Fellow Ayanna Howard speaking at ICRA 2022

TOP RIGHT: TryEngineering Summer Institute students at the Saturn V Rocket historical landmark in Houston, TX

BOTTOM: IEEE Day participants



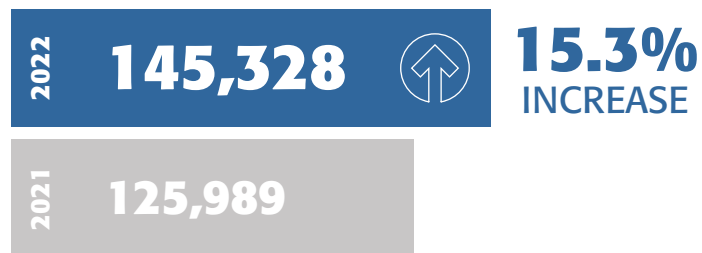
MEMBERSHIP GROWTH FUELS LONG-TERM SUCCESS

IEEE enjoyed an impressive spike in membership in 2022, with members and students returning after the pandemic. Overall, membership grew 4.4% compared to the previous year with total membership of 427,780, now exceeding pre-pandemic levels. Most significantly, student members are returning to IEEE in droves, with worldwide student membership up 15.3% over 2021.

Total Membership



Student Membership





YOUR PROFESSIONAL HOME CAMPAIGN PROMOTES LIFELONG LEARNING

Whether you are just starting out or at the very height of your career, inspiration, passion, creativity and collaboration are the stepping stones of your professional path. This is why IEEE is Your Professional Home.

The campaign highlights how the IEEE community can help members and volunteers learn, share, teach and network throughout their lifetimes, no matter where they may be on their career journey. As part of the campaign, professionals from different industries and backgrounds shared their personal experiences and described why IEEE is their professional home.

“Due to my membership with IEEE, I truly became aware of the impact that I can create.”

— IEEE Senior Member Ana Cigarán Romero discussed how IEEE has provided her with opportunities to collaborate on public service initiatives in a video that was part of the IEEE Your Professional Home campaign.





IEEE DAY SPARKS OVER 950 GLOBAL EVENTS

IEEE Day, which celebrates the first time engineers and IEEE members gathered to share their technical ideas in 1884, inspired more than 950 worldwide events across all 10 Regions, covering 200 Sections and 240 student branches.

IEEEEXTREME SETS NEW PARTICIPATION RECORD

IEEEExtreme is a global challenge in which thousands of teams of IEEE student members—advised and proctored by an IEEE member—compete in a 24-hour time span to solve a set of real-world programming problems. IEEEExtreme 16.0 was the most popular to date. For context, the first competition in 2006 had a global participation of 44 teams and 150 contestants.



TOP: IEEE Day participants

MIDDLE: IEEE Day participants

BOTTOM: IEEEExtreme 16.0 participants

OPPOSITE TOP: IEEE Life Fellow Lisa Su, WIE ILC keynote speaker, and 2022 WIE Committee Chair Jenifer Castillo

OPPOSITE MIDDLE AND BOTTOM: Various members, volunteers, speakers and attendees of the 2022 WIE ILC

IEEE WOMEN IN ENGINEERING CELEBRATES 25TH ANNIVERSARY

IEEE Women in Engineering (WIE) facilitates the recruitment and retention of women in technical disciplines around the world and works to inspire girls to pursue a career in engineering. Year-long celebrations highlighted the amazing progress and achievements made by great women in STEM. WIE kicked off its 25th anniversary with a virtual panel that featured past WIE chairs explaining why they joined the group and shared their experiences. On International Women's Day in March, WIE held a 12-hour virtual marathon showcasing each IEEE region's diversity and inclusion efforts.

Additionally, at the 2022 IEEE WIE International Leadership Conference (WIE ILC) in San Diego, CA, WIE innovators actively showcased their work and competed to present in a dedicated session.





MEMBERS AND VOLUNTEERS COME TOGETHER FOR INAUGURAL IEEE EDUCATION WEEK CELEBRATION

IEEE members across the globe united in April for the inaugural IEEE Education Week, designed to highlight the diverse educational opportunities available through IEEE that help advance technical careers, wherever they may be in their career journey. Events included live webinars, virtual resources and special offers. There was even a daily online quiz where participants could test their knowledge and earn a digital badge.

TOP: 2022 IEEE Education Week participants from Hijli College, Kharagpur in West Bengal, India

BOTTOM: 2022 IEEE Education Week participants

EDUCATION WEEK BY THE NUMBERS:

225

Events

102

Educational Resources

90

Volunteer Ambassadors

23

Countries

65

Operating Units, Regions, Sections and Technical Society Partners

IEEE MEMBERS SHARE TECHNOLOGY CAREER INSIGHTS IN *FORTUNE* MAGAZINE

As part of a series exploring different technology-related careers, six different IEEE members were featured in the education section of *Fortune* magazine, which receives 8.5 million unique visitors per month. These members discussed emerging career options and trends in areas including cybersecurity, data science, tech ethics and more.



IEEE PRESIDENT'S SOCIAL MEDIA CHANNELS ENGAGE WITH THE GLOBAL TECHNICAL COMMUNITY

IEEE President K. J. Ray Liu launched new social media channels on Twitter, Facebook, Instagram and LinkedIn specifically tailored to provide the IEEE President a way to connect with the global technical community. The channels feature posts covering the President's travels from around the world and connecting with members and volunteers. The channels communicate the President's personal insights with the global IEEE community.





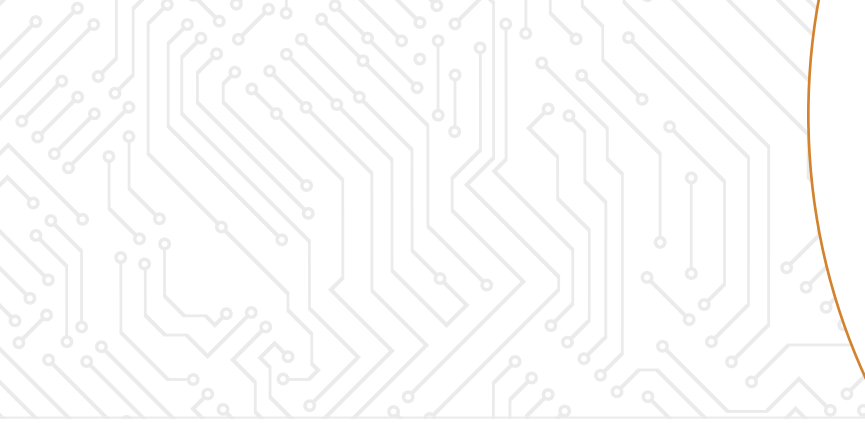
160+

Transformative
Journals

HYBRID JOURNAL PORTFOLIO TO TRANSITION TO “TRANSFORMATIVE JOURNAL” STATUS

Representing a major step in IEEE’s continued support and commitment to open science, IEEE pledged to make its entire collection of hybrid journals, which publish both open access (OA) and subscription-based content, “Transformative Journals” under Plan S. This means that any authors receiving research grants from Coalition S, a group of research funders, will be compliant with Plan S requirements when publishing their research articles in any IEEE fully open access or hybrid journals. Under this criteria, a Transformative Journal is a subscription/hybrid journal that is committed to eventually transition to a fully OA journal over time. In addition, it is required to gradually increase the share of OA content and offset subscription income from payments for publishing services.





IEEE SIGNS NEW TRANSFORMATIVE READ AND PUBLISH AGREEMENTS WITH KEY INSTITUTIONS

IEEE continued to expand its transformative read and publish open access offerings, signing new unlimited read and publish open access agreements allowing researchers at the participating institutions to have their articles accessible to all. In August, IEEE signed a four-year read and publish agreement to enable researchers across the 10 campus University of California (UC) system to publish open access in IEEE's 200 leading journals and magazines. IEEE also signed a three-year read and publish open access agreement with the Conferenza dei Rettori delle Università Italiane (CRUI), the association of state and non-state Italian universities. Under this new agreement, all researchers from the participating 54 Italian institutions are now able to publish open access articles in journals and magazines produced by IEEE.

For a full list of institutional partners, visit: open.ieee.org/for-institutions/institutional-partners





MIDDLE: Katherine Anarde and her research team install low-cost water-level sensors in storm drains to better understand how often floods are occurring outside of extreme storms, and what causes them as part of an EPICS program

BOTTOM: IEEE Day participants

OPPOSITE TOP: TryEngineering Summer Institute students on a trip to LaGuardia Airport in Queens, NY



SHAPING TOMORROW

In 2022, IEEE had the privilege of collaborating with and supporting those who share our commitment to creating a better world. Through our partnerships with governments and other agents of change, we were able to strengthen our organization and advance our mission of making a positive impact on the future.



COLLABORATION WITH EUROPEAN COMMISSION PROMOTES ADVANCEMENT OF AI REGULATION

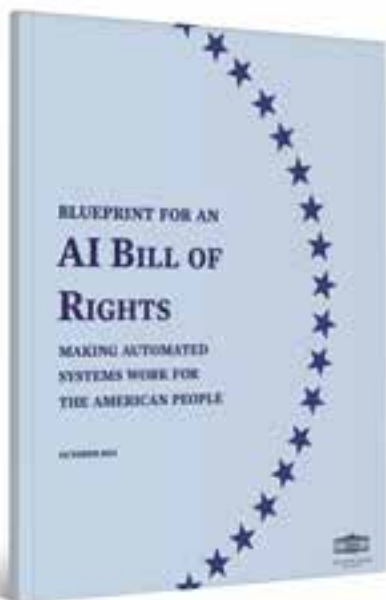
The ongoing dialogue between the IEEE Standards Association and the European Commission provided a valuable and insightful exchange of information, as both parties discussed the relevance and applicability of IEEE standards and standards-related activities in support of regulating AI. IEEE, valued as a neutral source in these discussions, has been instrumental in identifying areas where IEEE standards can play a critical role in supporting the development and implementation of AI regulations, including the pending European Union AI Act. IEEE was recognized as a valuable contributor in this process, ensuring that AI is developed and used in a responsible and ethical manner.



IEEE-USA HELPS SHAPE PUBLIC POLICY

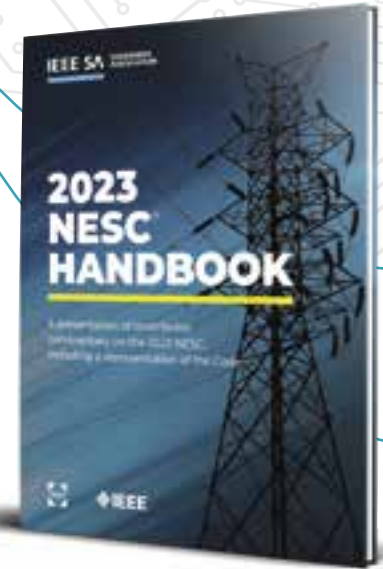
This year, significant legislation related to technology investment was proposed in the United States, with input from IEEE, which referenced the work of its members. These included:

- Passing of the Inflation Reduction Act and the Creating Helpful Incentives for Producing Semiconductors for America and Foundries Act (CHIPS). IEEE will continue to promote public policy issues that shape and protect technological growth and jobs to better serve the interests of our members, the profession and the public.
- The White House Office of Science and Technology Policy introduced a proposed “Blueprint” for an AI Bill of Rights that aims to ensure that automated systems work for the benefit of the American people. The proposed AI Bill of Rights outlines five key principles and corresponding practices that are intended to guide the design, use and deployment of automated systems in a way that protects the rights of the American public. IEEE participated in several sessions related to the development of the AI Bill of Rights and the draft included references to IEEE’s work in the field.



IEEE PUBLISHES UPDATED NATIONAL ELECTRICAL SAFETY CODE® (NESC®) TO HELP DELIVER A MORE SUSTAINABLE POWER SUPPLY

The NESC, which specifies best practices for the safety of electric supply and communication utility systems, is typically updated every five years to stay current with changes in industry and technology. The NESC sets the ground rules and guidelines for practical safeguarding of workers and the public during the installation, operation, or maintenance of power, telephone, cable TV and railroad signal systems. The latest updates address emerging technologies such as solar and wind energy, distributed energy/microgrids, batteries and energy storage and wireless small cell networks. Seven e-learning courses were also launched to help communicate the latest changes.



PATENT POLICY UPDATES ENHANCE CLARITY FOR STAKEHOLDERS

IEEE took steps this year to update its Patent Policy with the aim of enhancing the clarity of its standards processes regarding patented technologies and providing more options for stakeholders. The updated Patent Policy was approved on September 30, 2022, and went into effect January 1, 2023.

IEEE STANDARDS ASSOCIATION ACHIEVES MEMBERSHIP MILESTONE

The IEEE Standards Association reached a significant membership milestone this year, driven by IEEE's open global standardization approach, which excels in including new participants and communities to address rapidly changing technology and market dynamics. In 2022, this approach was evident in the increase in participation, including new working groups in China and new standards projects in areas such as cybersecurity, sustainability, mobility and smart transportation.





TOP: IEEE Day participants

ABOVE LEFT: TryEngineering Summer Institute student working on a circuit board

OPPOSITE FAR RIGHT: TryEngineering Summer Institute student operating a drone



COMMITTED TO EVOLVING OUR MEMBER AND VOLUNTEER EXPERIENCES

IEEE is dedicated to evolving the experiences of its members and volunteers, and in 2022 we continued to do so by fostering a global culture that is diverse, inclusive and respectful. With members from various demographics and locations around the world, IEEE's mission to drive IEEE forward, advance technological innovation and inspire change was further strengthened by their contributions.





REIMAGINING THE FUTURE OF IEEE

In an effort to evaluate the current state of IEEE and determine the path forward, 10 ad hoc committees were formed and appointed by the IEEE President. Through collaborative efforts, these committees worked toward a better future for IEEE as a whole, including one which focused on the IEEE in 2050.

IEEE APPROVES REGION REALIGNMENT

In order to better prepare IEEE for the future in all regions of the world and better serve members globally, the IEEE Board of Directors approved an IEEE Region realignment to go into effect in 2028, which will:

- Reduce the number of IEEE US Regions by merging current Regions 1 & 2, formally becoming Region 2
- Split the current Region 10 into two Regions, formally becoming Region 10 & Region 11

IEEE DIVERSITY AND INCLUSION COMMITTEE ACHIEVES SUCCESS IN FIRST YEAR

The IEEE Diversity and Inclusion Committee's inaugural year focused on building a framework to support the IEEE Diversity Statement and fortifying ongoing and new initiatives toward greater diversity, equity and inclusion. IEEE expanded its diversity and inclusion web presence, which provided resources and information to over 33,000 individuals and established outreach and communication channels to support IEEE organizational units. Additionally, the IEEE Diversity Report was published to increase awareness of the Committee's activities and generate ideas for future efforts.



IEEE FOUNDATION RECEIVES GENEROUS DONATIONS TO FUND SCHOLARSHIPS AND INITIATIVES

The IEEE Foundation, the philanthropic partner of IEEE, is a leader in transforming lives through the power of technology and education. The Foundation received several noteworthy donations this year, including a US \$1 million donor pledge to the IEEE Power & Energy Society Scholarship Plus Initiative, helping to fund 83 new scholarships. Additionally, the IEEE Foundation received a bequest to invest in IEEE initiatives that support engineers in developing countries and fund breakthroughs in aids for the disabled. To date, the Foundation has awarded funding to eight initiatives, including IEEE Smart Village.





TOP: 2022 IEEE medal recipients and IEEE Life Fellows from left Ingo Wolff and P.R. Kumar.

MIDDLE: 2022 VICS speaker Harry Kloor

BOTTOM: 2022 IEEE medal recipients: back row from left: Ned Mohan, James Fujimoto, Moeness Amin, Thomas Jahns, Anantha Chandrakasan, Tim Canham, Umesh Mishra; middle row from left: Susan Wijffels, Megan Scanderbeg, Deborah Estrin, Ingo Wolff, P.R. Kumar; bottom row from left: 2022 IEEE President-elect Saifur Rahman, Joseph Lillie, Jason Cong, Asad Madni, 2022 IEEE President K. J. Ray Liu, Ian Bovik.
Not pictured: David Donoho



NOTABLE ACHIEVEMENTS

Since 1884, IEEE has played an instrumental role in shaping the future of technology and the world. Through its tireless efforts in advancing innovation and technological excellence, the organization has been at the forefront of shaping the way we live today. In 2022, IEEE recognized the contributions of its leaders and members whose achievements have sparked radical transformation and have made our planet a more sustainable and prosperous place for everyone.



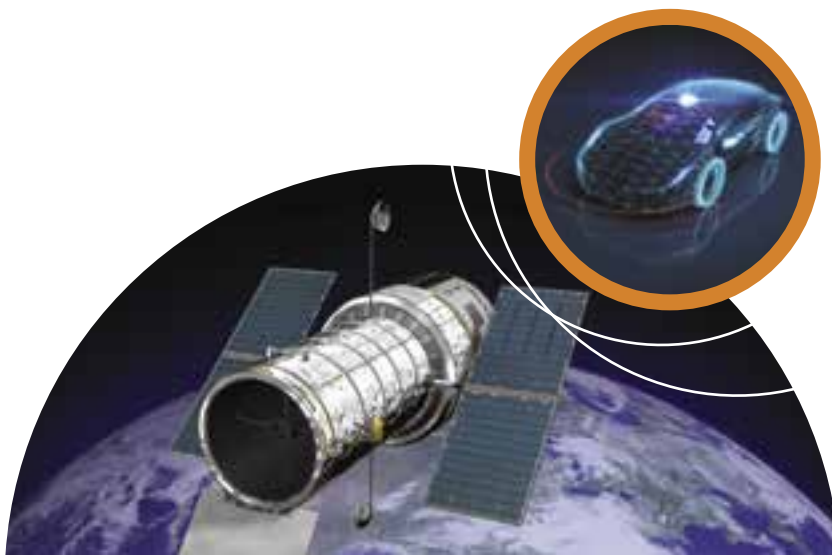
TOP: 2022 VICS Master of Ceremonies Marguerite Gong Hancock

MIDDLE: A steel telecommunications tower in Montreal, recognized as an IEEE Milestone



IEEE LIFE FELLOW ASAD MADNI RECEIVES IEEE MEDAL OF HONOR

Sponsored by the IEEE Foundation, the Medal of Honor is IEEE's pinnacle of recognition. In 2022, it was awarded to UCLA professor Asad M. Madni "for pioneering contributions to the development and commercialization of innovative sensing and systems technologies and for distinguished research leadership." Madni led the development of intelligent microsensors and systems for various industries, including aerospace and transportation. One of his notable achievements is the GyroChip technology, which revolutionized navigation and stability in aerospace and automotive systems, making automobiles safer, and less likely to roll over. He also led the development of an extremely slow motion servo control system for NASA's Hubble Space Telescope, which is still in use today and provides unprecedented pointing accuracy and stability, enabling higher quality images than ever before. The award was presented at the 2022 IEEE Honors Ceremony.



TOP (from left): 2022 IEEE President K. J. Ray Liu, 2022 IEEE Medal of Honor recipient Asad Madni

MIDDLE: 2022 IEEE Medal of Honor recipient Asad Madni

TECH LUMINARIES GATHER IN-PERSON FOR VIC SUMMIT

The IEEE Vision, Innovation and Challenges Summit (VICS) and Honors Ceremony, which had gone virtual due to the COVID-19 pandemic, was held in person for the first time in two years. This year's Summit, which took place in San Diego, CA, featured lively talks on future-forward technologies such as cloud computing, robotics, the Internet of Things and smart cities. In the evening, the IEEE Honors Ceremony Gala—also known as the “Technology Oscars”—celebrated the accomplishments of pioneers and visionaries whose work makes tomorrow's technology possible.

FRANCES E. ALLEN MEDAL PRESENTED FOR THE FIRST TIME

The inaugural presentation of the Frances E. Allen Medal was awarded to IEEE Senior Member Eugene Wimberly Myers Jr. and Webb Miller. These co-recipients' long-lasting contributions to the computational analysis of DNA and protein sequences have had a major impact on the course of modern biological research. Myers is a director of the Max Planck Institute of Molecular Cell Biology and Genetics, and Miller is a professor at Pennsylvania State University. Frances E. Allen was an IEEE Fellow and a computing pioneer who led a team of researchers that designed one of the first supercomputers.



Eugene Wimberly Myers Jr.



Webb Miller

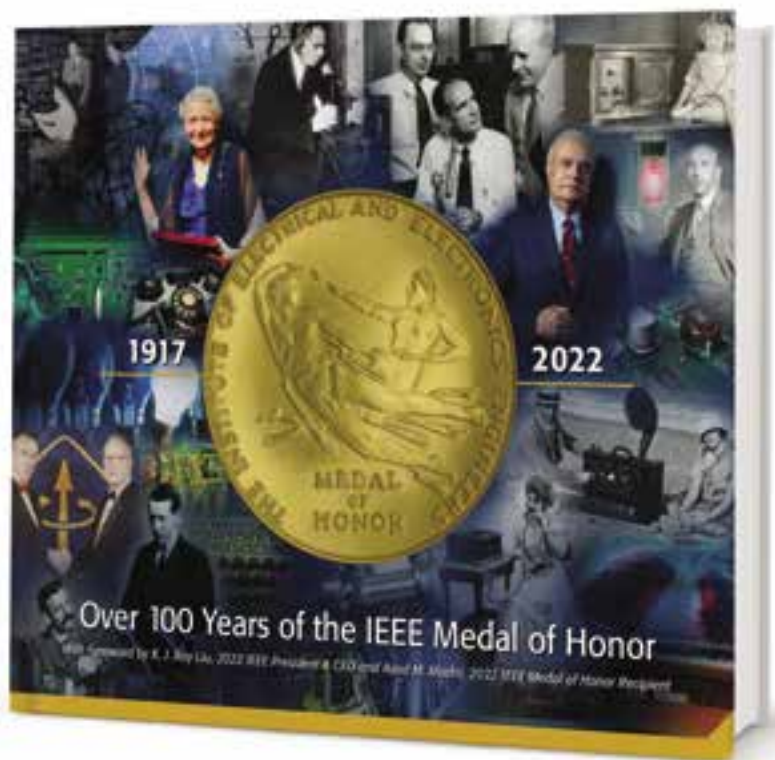


TOP: 2022 VICS speaker David Krum
MIDDLE: 2022 VICS student attendees
BOTTOM: Front display of the
Frances E. Allen Medal

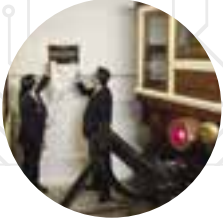


NEW E-BOOK CELEBRATES 100 YEARS OF VISIONARY MEMBERS AND TECHNOLOGIES

IEEE President K. J. Ray Liu commissioned the *Over 100 Years of the IEEE Medal of Honor* limited edition book and publicly available eBook version in celebration of visionary members and colleagues and the world-changing inventions and technologies they launched into existence. The IEEE Medal of Honor recipients featured, including 2022 recipient Asad Madni whose input made the book possible, represent a group of individuals who have made enormous contributions to science, technology and the engineering profession. Through their efforts, they have helped IEEE foster the creation of new technologies for the benefit of humanity.



• 1896 •



• 1901 •



• 1957 •



• 1975 •



• 1994 •



RECOGNIZING HISTORIC TECHNOLOGY MILESTONES

Each year, the IEEE Milestones in Electrical Engineering and Computing program honors exceptional technical achievements that occurred at least 25 years ago. In 2022, 10 Milestones were dedicated, including:

1896

Budapest Metroline No. 1

Budapest, Hungary

Budapest Metro Line No. 1 was the first underground railway designed specifically to use electric power. This line's design influenced later subway construction in Boston, Paris, Berlin and other metropolitan areas worldwide.

1901–1905

String Galvanometer

Leiden, The Netherlands

Willem Einthoven's pioneering work resulted in a string galvanometer specifically designed to measure and record the heart's electrical activity. This invention marked the beginning of electrocardiography as a major clinical diagnostic tool.

1957–1962

Atlas Computer and the Invention of Virtual Memory

Manchester, UK

The most significant new feature of Atlas was the invention of virtual memory, allowing memories of different speeds and capacities to act as a single large fast memory separately available to multiple users. Virtual memory has since become a standard feature of general-purpose computers.

1975

Handheld Digital Camera

Rochester, NY

The first self-contained portable digital camera, invented at Eastman Kodak Company, used movie camera optics, a charge-coupled device as an electronic light sensor, a temporary buffer of random-access memory and image storage on a digital cassette. Subsequent commercial digital cameras using flash memory storage revolutionized how images are captured, processed and shared.

1994

QR (Quick Response) Code

Kariya, Aichu, Japan

DENSO developed two-dimensional QR Code technology, inexpensive machine-readable optical labels that improved on barcoding by conveying larger amounts of data more quickly. Camera-equipped mobile phones brought QR Codes into advertising, design, and widespread applications such as electronic payments, giving consumers efficient new ways to access digital information.



IEEE BOARD OF DIRECTORS

1ST ROW FROM LEFT:

Stephen Welby, Mary Ellen Randall, Susan K. (Kathy) Land, K. J. Ray Liu, Saifur Rahman, and John W. Walz

2ND ROW FROM LEFT:

Enrique A. Tejera, Bob G. Becnel, Bruno Meyer, Dalma Novak, Christina M. Schober, Khaled Ben Letaief, Paul M. Cunningham, and Deepak Mathur

3RD ROW FROM LEFT:

Ruth A. Dyer, Timothy T. Lee, Theresa A. Brunasso, Robert L. Anderson, Cecilia Metra, Ali H. Sayed, Johnson A. Asumadu, James E. Matthews, and David A. Koehler

4TH ROW FROM LEFT:

Deborah M. Cooper, Stephen M. Phillips, Franco Maloberti, Manfred J. Schindler, Antonio Luque, Claudio Cañizares, Lawrence O. Hall, and Greg T. Gdowski

Not Pictured: Barry C. Tilton, Theodore W. Hissey



IEEE MANAGEMENT COUNCIL

1ST ROW FROM LEFT:

Konstantinos Karachalios, Russell Harrison, Mary Ward-Callan, Stephen Welby, Thomas R. Siegert, Sophia A. Muirhead, and Steven Heffner

2ND ROW FROM LEFT:

Cecelia Jankowski, Cherif Amirat, Karen L. Hawkins, Jamie Moesch, Donna Hourican, and Chris Brantley

MESSAGE FROM THE TREASURER

With a mission of advancing technology for the benefit of humanity, IEEE maintained its commitment to its members and volunteers. IEEE remained agile and responsive, implementing creative solutions and activities that further strengthened connections to our worldwide communities.

I am pleased to present the audited financial reports of IEEE. These reports indicate that the overall financial health of the organization remains strong.

The IEEE Statement of Activities reflects total operating revenues for 2022 of \$542.2 million, an increase of \$77.9 million, or 16.8%, from 2021. Total operating expenses for 2022 of \$470.1 million, an increase of \$89.0 million, or 23.4%, from 2021 as further discussed below:

- **Periodicals and Media:** Overall customer demand for IEEE products remained strong. IEEE continued its focus on improving publication efficiency and cost reduction. Revenues increased by \$10.2 million, or 4.4%, while expenses increased by \$1.8 million, or 1.1%.
- **Conferences:** In 2022, IEEE saw an increase in the number of conferences, which returned to pre-pandemic levels. Revenues increased by \$62.1 million, or 48.5%, and expenses increased by \$63.4 million, or 75.6%.
- **Membership:** Revenues declined by \$0.4 million, or 0.6%, while expenses increased by \$11.5 million, or 13.9%.
- **Standards Association:** Revenues increased by \$5.4 million, or 13%, while expenses increased by \$6.8 million, or 18%.

Non-operating activities generated \$96.9 million in net loss, primarily due to \$102.7 million in net loss from investments (inclusive of interest and dividends), \$1.9 million in conference related insurance claims, \$4.8 million in pension related gains, and \$0.9 million in unrelated business income tax expense.

Total IEEE net assets decreased by \$24.8 to \$826.6 million, or 3% as of December 31, 2022.

Crowe LLP, the independent auditors for IEEE, met with the IEEE Audit Committee to discuss the scope and results of the financial statement audit, to review the adequacy of IEEE's internal accounting controls and to examine the quality of IEEE's financial reporting prior to issuing its opinion on the financial statements. IEEE received an unmodified opinion from Crowe LLP in the Report of Independent Certified Public Accountants.

IEEE is tax exempt under Section 501(c)(3) of the Internal Revenue Code. The IEEE Foundation is a separately incorporated related organization of IEEE; accordingly, its audited financial statements are not included in the accompanying documents.

I submit these financial statements with confidence that IEEE continues to be a financially sound organization.



Mary Ellen Randall

Mary Ellen Randall
2022 IEEE Treasurer

INDEPENDENT AUDITOR'S REPORT

To the Board of Directors of: **The Institute of Electrical and Electronics Engineers, Incorporated**

Opinion

We have audited the consolidated financial statements of The Institute of Electrical and Electronics Engineers, Incorporated and subsidiaries (collectively, the "Institute"), which comprise the consolidated statement of financial position as of December 31, 2022, and the related consolidated statements of activities and cash flows for the year then ended, and the related notes to the consolidated financial statements.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the financial position of the Institute as of December 31, 2022, and the changes in their net assets and their cash flows for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for opinion

We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of the Institute and to meet our other ethical responsibilities in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Emphasis of Matter

As discussed in Note 2 to the financial statements, the Institute has adopted Accounting Standards Update (ASU) 2020-07—Not-for-Profit Entities (Topic 958)—Presentation and Disclosures by Not-for-Profit Entities for Contributed Nonfinancial Assets and ASU 2016-02, Leases (Topic 842) for the year ended December 31, 2022. Our opinion is not modified with respect to this matter.

Other Matter

The financial statements of The Institute of Electrical and Electronics Engineers, Incorporated and subsidiaries for the year ended December 31, 2021, were audited by other auditors, who expressed an unmodified opinion on those statements on May 17, 2022.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the Institute's ability to continue as a going concern for one year from the date the financial statements are available to be issued.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the consolidated financial statements.

In performing an audit in accordance with US GAAS, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Institute's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the consolidated financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about the Institute's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.



Crowe LLP
New York, New York
May 25, 2023

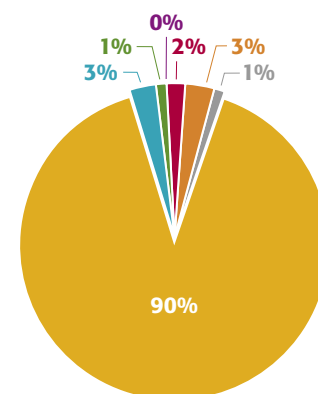
CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

December 31, 2022 and 2021

	2022	2021
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	\$ 19,359,500	\$ 17,410,800
Accounts receivable, less allowance for doubtful accounts of \$1,376,500, in 2022 and \$1,876,000 in 2021	37,219,000	34,843,600
Prepaid expenses and other assets	15,129,900	12,079,300
Investments, at fair value	981,250,000	1,009,811,000
Investments - other	3,751,800	3,107,800
Total current assets	1,056,710,200	1,077,252,500
NONCURRENT ASSETS		
Land, buildings and equipment, net	28,053,700	34,970,700
Right of use of assets	7,282,500	-
Deferred tax assets	36,100	914,500
Total assets	\$ 1,092,082,500	\$ 1,113,137,700
LIABILITIES AND NET ASSETS		
CURRENT LIABILITIES		
Accounts payable and accrued expenses	\$ 58,939,900	\$ 55,335,800
Current lease obligations	2,061,100	18,500
Accrued pension and other employee benefits	634,100	626,100
Amounts held on behalf of IEEE Foundation, Incorporated	54,106,400	63,019,700
Deferred revenue	128,816,700	122,757,200
Total current liabilities	244,558,200	241,757,300
NONCURRENT LIABILITIES		
Lease obligations	6,313,800	8,800
Accrued pension and other employee benefits	14,629,400	19,998,700
Total liabilities	265,501,400	261,764,800
Commitments and contingencies		
NET ASSETS		
Without donor restrictions		
Undesignated	815,690,500	838,231,600
Board-designated fund	8,538,300	11,044,100
Total without donor restrictions	824,228,800	849,275,700
With donor restrictions	2,352,300	2,097,200
Total net assets	826,581,100	851,372,900
Total liabilities and net assets	\$ 1,092,082,500	\$ 1,113,137,700

2022 ASSETS

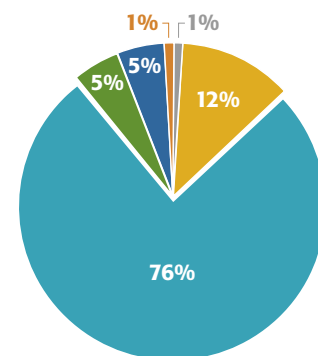
IEEE total assets as of December 31, 2022, was \$1,092.1 million. Investments comprised 90% or \$985 million of the total assets. IEEE total assets decreased by \$21 million from 2021, primarily due to change in investments value.



- Cash and cash equivalents
- Accounts receivable, less allowance for doubtful accounts
- Prepaid expenses and other assets
- Investments (current and long-term)
- Land, buildings and equipment, net
- Right of use of assets
- Deferred tax assets

2022 LIABILITIES

IEEE total liabilities and net assets was \$1,092.1 million. Net assets comprised 76% of the total IEEE total liabilities and net assets. IEEE net assets decreased by \$24.8 million, or 3%, to \$826.6 million, as of December 31, 2022, from \$851.4 million as of December 31, 2021. This decrease in net assets is primarily due to loss on non-operational activities.



- Accounts payable and accrued expenses
- Lease obligations (current and long-term)
- Accrued pension (current and long-term)
- Deferred revenue
- Net assets
- Amounts held on behalf of IEEE Foundation, Incorporated

See accompanying notes to consolidated financial statements.

CONSOLIDATED STATEMENT OF ACTIVITIES

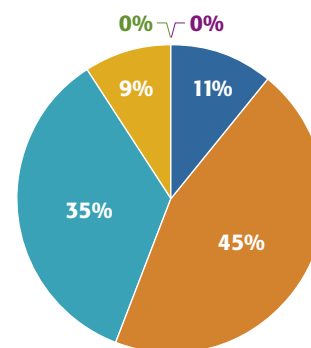
Year ended December 31, 2022 (with comparative total for 2021)

	Without Donor Restrictions	With Donor Restrictions	Total 2022	Total 2021
REVENUES				
Memberships	\$ 57,939,200	\$ —	\$ 57,939,200	\$ 58,317,100
Periodicals	244,125,400	—	244,125,400	233,922,400
Conferences	190,069,700	—	190,069,700	127,989,100
Standards	46,918,400	—	46,918,400	41,504,400
Public imperatives	2,722,400	347,700	3,070,100	2,403,000
Other income	39,700	—	39,700	187,500
Net assets released from restrictions	20,200	(20,200)	—	—
Total revenues	541,835,000	327,500	542,162,500	464,323,500
EXPENSES				
Program services:				
Memberships	94,101,400	—	94,101,400	82,590,000
Periodicals	160,165,600	—	160,165,600	158,382,600
Conferences	147,124,000	—	147,124,000	83,767,400
Standards	44,747,000	—	44,747,000	37,927,100
Public imperatives	11,642,500	—	11,642,500	9,115,900
Total program services	457,780,500	—	457,780,500	371,783,000
Supporting services:				
In-Kind contribution	1,483,700	—	1,483,700	1,366,800
General and administrative	10,817,300	—	10,817,300	7,887,600
Total expenses	470,081,500	—	470,081,500	381,037,400
Changes in net assets before non-operating activities	71,753,500	327,500	72,081,000	83,286,100
NON-OPERATING ACTIVITIES				
Investment (loss) gain, net	(102,590,000)	(72,400)	(102,662,400)	86,353,700
Pension and related benefits activity other than net periodic benefit cost	4,760,900	—	4,760,900	6,529,800
Gain on insurance recoveries	1,879,900	—	1,879,900	9,582,000
Changes in net assets before income tax	(24,195,700)	255,100	(23,940,600)	185,751,600
(Expense) benefit for income taxes	(851,200)	—	(851,200)	327,800
Changes in net assets	(25,046,900)	255,100	(24,791,800)	186,079,400
Net assets, beginning of year	849,275,700	2,097,200	851,372,900	665,293,500
Net assets, end of year	\$ 824,228,800	\$ 2,352,300	\$ 826,581,100	\$ 851,372,900

See accompanying notes to consolidated financial statements.

2022 REVENUES

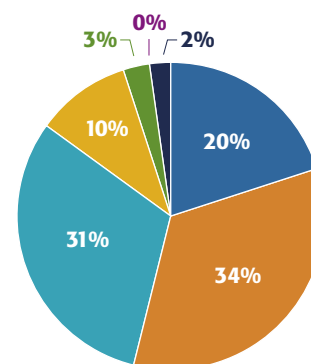
Total operating revenues for 2022 was \$542.2 million, an increase of \$77.8 million, or 16.8%, from 2021. Increase in the number of in-person conferences was a contributing factor.



- Memberships
- Periodicals
- Conferences
- Standards
- Public imperatives
- Other income

2022 EXPENSES

Total operating expenses for 2022 of \$470.1 million, an increase of \$89.0 million, or 23.4%, from 2021 due to in-person conferences returning to pre-pandemic levels.



- Memberships
- Periodicals
- Conferences
- Standards
- Public imperatives
- In-Kind contribution
- General and administrative

CONSOLIDATED STATEMENT OF ACTIVITIES

Year ended December 31, 2021

	Without Donor Restrictions	With Donor Restrictions	Total
REVENUES			
Memberships	\$ 58,317,100	\$ —	\$ 58,317,100
Periodicals	233,922,400	—	233,922,400
Conferences	127,989,100	—	127,989,100
Standards	41,504,400	—	41,504,400
Public imperatives	2,351,000	52,000	2,403,000
Other income	187,500	—	187,500
Net assets released from restrictions	83,300	(83,300)	—
Total revenues	464,354,800	(31,300)	464,323,500
EXPENSES			
Program services:			
Memberships	82,590,000	—	82,590,000
Periodicals	158,382,600	—	158,382,600
Conferences	83,767,400	—	83,767,400
Standards	37,927,100	—	37,927,100
Public imperatives	9,115,900	—	9,115,900
Total program services	371,783,000	—	371,783,000
Supporting services:			
In-Kind contribution	1,366,800	—	1,366,800
General and administrative	7,887,600	—	7,887,600
Total expenses	381,037,400	—	381,037,400
Changes in net assets before non-operating activities	83,317,400	(31,300)	83,286,100
NON-OPERATING ACTIVITIES			
Investment gain, net	86,274,000	79,700	86,353,700
Pension and related benefits activity other than net periodic benefit cost	6,529,800	—	6,529,800
Gain on insurance recoveries	9,582,000	—	9,582,000
Changes in net assets before income tax	185,703,200	48,400	185,751,600
Benefit for income taxes	327,800	—	327,800
Changes in net assets	186,031,000	48,400	186,079,400
Net assets, beginning of year	663,244,700	2,048,800	665,293,500
Net assets, end of year	\$ 849,275,700	\$ 2,097,200	\$ 851,372,900

See accompanying notes to consolidated financial statements.

CONSOLIDATED STATEMENTS OF CASH FLOW

Years ended December 31, 2022 and 2021

	2022	2021
CASH FLOWS FROM OPERATING ACTIVITIES		
Changes in net assets	\$ (24,791,800)	\$ 186,079,400
Adjustments to reconcile changes in net assets to net cash provided by operating activities:		
Depreciation and amortization	10,940,300	11,045,200
Unrealized losses (gains) on investments	120,802,100	(35,938,600)
Gains on sale of investments	–	(38,401,900)
Bad debt (recovery) expense	(57,600)	151,400
<i>Changes in assets and liabilities:</i>		
Accounts receivable	(2,317,800)	(7,543,800)
Deferred tax assets	878,400	–
Prepaid expenses and other assets	(3,050,600)	5,471,200
Accounts payable and accrued expenses	3,829,600	1,417,400
Accrued pension and other employee benefits	(5,361,300)	(4,421,600)
Amounts held on behalf of IEEE Foundation, Incorporated	(8,913,300)	8,907,100
Operating lease assets and liabilities, net	1,086,400	–
Deferred revenue	6,059,500	4,940,700
Income tax payable and deferred tax liability	–	(277,800)
Net cash provided by operating activities	99,103,900	131,428,700
CASH FLOWS FROM INVESTING ACTIVITIES		
Proceeds from sales of investments	746,160,300	486,637,000
Purchases of investments	(839,045,400)	(608,646,900)
Purchase of land, buildings and equipment	(4,023,300)	(10,255,100)
Net cash used in investing activities	(96,908,400)	(132,265,000)
CASH FLOWS FROM FINANCING ACTIVITIES		
Change in cash overdraft	(225,500)	(1,764,200)
Payment of finance lease obligations	(21,300)	(115,000)
Net cash used in financing activities	(246,800)	(1,879,200)
Net increase (decrease) in cash and cash equivalents	1,948,700	(2,715,500)
Cash and cash equivalents, beginning of year	17,410,800	20,126,300
Cash and cash equivalents, end of year	\$ 19,359,500	\$ 17,410,800
SUPPLEMENTAL DATA		
Purchases of fixed assets included in accounts payable and accrued expenses	\$ –	\$ 351,200

See accompanying notes to consolidated financial statements.

CONSOLIDATED NOTES TO FINANCIAL STATEMENTS

December 31, 2022 and 2021

NOTE 1: THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INCORPORATED

The objectives of The Institute of Electrical and Electronics Engineers, Incorporated (the "Institute," or "IEEE") are (a) scientific and educational, directed toward the advancement of the theory and practice of electrical engineering, electronics engineering, computer engineering, computer sciences, and the allied branches of engineering and related arts and sciences and (b) professional, directed toward the benefit of the engineering community and the general public.

Implementation of the Institute's objectives is performed by members and volunteer communities organized as regions, sections, chapters, societies, and councils, none of which are separately incorporated, and their financial results are incorporated in the Institute's accompanying consolidated financial statements. These units are aligned to serve the technical interests of members and to coordinate local activities of the sections and the broader activities of the Institute. The societies and councils promote the technical interests of their members through symposia, conferences, various publications, and the development of standards.

The consolidated financial statements include the accounts of IEEE, Inc., Global IEEE Institute for Engineers, Inc., IEEE Global LLC, IEEE International LLC, IEEE Europe GmbH, IEEE Latin America SA, IEEE Broadcast Technology Convention LLC, IEEE Worldwide Limited, IEEE Asia-Pacific Limited, and IEEE Technology Center GmbH.

NOTE 2: SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation

The Institute's consolidated financial statements are presented in conformity with accounting principles generally accepted in the United States of America ("GAAP") and have been prepared on the accrual basis of accounting. All intercompany accounts and transactions have been eliminated in the accompanying consolidated financial statements.

Cash and Cash Equivalents

Cash and cash equivalents are defined as cash balances held in bank accounts and highly liquid short-term investments held by the Institute for operating use with original maturities of three months or less from the date of purchase.

Investments

Investments in publicly traded debt and equity securities are recorded at fair value determined on the basis of quoted market prices as of the reporting date. Investments in alternative investments (e.g., commingled funds) that are not readily marketable are reported at fair value as determined by the respective investment manager as of the reporting date. The Institute follows guidance on measuring the fair value of alternative investments, which offers investors a practical expedient for measuring the fair value of investments in certain entities that calculate net asset value ("NAV"). Under this practical expedient, entities are permitted to use NAV without adjustment for certain investments which: (a) do not have a readily determinable fair value and (b) prepare their financial statements consistent with the measurement principles of an investment company or have the attributes of an investment company. Additionally, the Institute follows guidance that removes the requirement to categorize, within the fair value hierarchy, all investments for which the fair value is measured using NAV.

Such valuations involve assumptions and methods that are reviewed by the Institute and have been concluded to be reasonable and appropriate. Because such investments are not readily marketable, their estimated fair value is subject to uncertainty and, therefore, may differ from the value that would have been used had a ready market for such investments existed. Such difference could be material. However, the risk to the Institute is limited to the amount of the Institute's investment in each of the respective funds with respect to its ownership interests.

Purchases and sales of securities are reflected on a trade-date basis. Gains and losses on sales of securities are determined on an average cost basis and are recorded on the consolidated statements of activities in the period in which the securities are sold. Dividends and interest are recognized as earned.

Investments – Other

Investments – other consist of certificates of deposit held to maturity with original maturities greater than three months that are not debt securities and are carried at amortized cost.

Fair Value Measurements

The Institute follows guidance that defines fair value, establishes a framework for measuring fair value, and expands disclosures about fair value measurements. This guidance provides a consistent definition of fair value, which focuses on an exit price between market participants in an orderly transaction. The guidance also prioritizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that observable inputs be used when available to determine the fair value of an instrument as of the reporting date.

Observable inputs are inputs that market participants would use in pricing the asset or liability based on market data obtained from independent sources. Unobservable inputs reflect assumptions that market participants would use in pricing the asset or liability based on the best information available in the circumstances. The hierarchy is broken down into three levels based on the transparency of inputs as follows:

- Level 1:** Quoted prices are available in active markets for identical assets or liabilities as of the measurement date. A quoted price for an identical asset or liability in an active market provides the most reliable fair value measurement because it is directly observable to the market.
- Level 2:** Pricing inputs are other than quoted prices in active markets, which are either directly or indirectly observable as of the measurement date. The nature of these securities includes investments for which quoted prices are available but traded less frequently and investments that are fair valued using other securities, the parameters of which can be directly observed.
- Level 3:** Securities that have little to no pricing observability as of the measurement date. These securities are measured using management's best estimate of fair value, where the inputs into the determination of fair value are not observable and require significant management judgment or estimation.

Inputs are used in applying the various valuation techniques and broadly refer to the assumptions that market participants use to make valuation decisions, including assumptions about risk. Inputs may include price information, volatility statistics, specific and broad credit data, liquidity statistics, and other factors. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. However, the determination of what constitutes "observable" requires significant judgment by an entity. The Institute considers observable data to be that market data that is readily available, regularly distributed or updated, reliable and verifiable, not proprietary, and provided by independent sources that are actively involved in the relevant market. The categorization of a financial instrument within the hierarchy is based upon the pricing transparency of the instrument and does not necessarily correspond to the Institute's perceived risk of that instrument.

Concentration of Market and Credit Risks

Cash, cash equivalents and investments are exposed to interest rate, market, and credit risks. The Institute maintains its cash and cash equivalents in various bank deposit accounts that may exceed federally insured limits at times. To minimize risk, the Institute's excess cash accounts are placed with high-credit quality financial institutions, and the Institute's investment portfolio is diversified with several investment managers in a variety of asset classes. The Institute regularly evaluates its depository arrangements and investments, including the performance thereof.

Accounts Receivable and Allowance for Doubtful Accounts

Accounts receivable are stated at the amount the Institute expects to collect on outstanding balance. In general, the Institute reviews a customer's credit history before extending credit. The Institute maintains allowances for doubtful accounts against certain billed receivables based upon the latest information available regarding whether the receivables are ultimately collectible. Assessing the collectability of customer receivables requires management's judgment. The Institute determines its allowance for doubtful accounts by specifically analyzing individual accounts receivable, historical bad debts, customer creditworthiness, current economic conditions, and accounts receivable aging trends. Valuation reserves are periodically re-evaluated and adjusted as more information about the ultimate collectability of accounts receivable becomes available. Upon determination that a receivable is uncollectible, the respective receivable balance and any associated reserve are written off. Any payments subsequently received on such receivables are recorded as income in the period received. The Institute believes that all accounts receivable balance at December 31, 2022 and 2021 are collectible within one year.

Land, Buildings, and Equipment

Land, buildings, and equipment are stated at cost, including interest expense capitalized during the period of construction, or period of development, until the time that it is ready for its intended use. Additions and improvements costing more than \$5,000 and with useful lives greater than three years are capitalized. Maintenance and repairs are expensed as incurred.

Assets acquired under capital lease agreements are depreciated over the term of the respective lease agreement to which they pertain. Leasehold improvements are amortized over their useful lives or lease period, whichever is shorter.

During fiscal year 2020, the Institute began the process of updating its financial system and moving to an integrated, cloud-based platform for financial recording and reporting (including contracts, banking, and expense reporting). This implementation was completed in 2021. The Institute capitalized implementation costs relating to such financial system upgrade in accordance with FASB Accounting Standards Update ("ASU") 2018-15, *Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement that is a Service Contract*, and such costs are reflected in the "Software" and "Information systems upgrade in process" lines of Note 5 for 2022 and 2021, respectively.

Depreciation and amortization are provided on a straight-line basis over the following estimated useful lives:

	Years
Buildings	20–40
Building improvements	10–15
Furniture, equipment and vehicles	5–10
Software and information systems	3–5
Computers	3

Leases, Right of Use Assets and Lease Liabilities

At the inception of an arrangement, the Institute determines if an arrangement is a lease based on all relevant facts and circumstances. Leases are classified as operating or finance leases at the lease commencement date. Operating leases are included in operating right-of-use ("ROU") assets and operating lease liabilities in the consolidated statement of financial position. Lease expense for operating leases is recognized on a straight-line basis over the lease term. Leases with a term of 12 months or less (short-term leases) are not recorded on the consolidated statement of financial position.

Right of use ("ROU") assets represent the Institute's right to use the underlying assets for the lease term and lease liabilities represent the net present value of the Institute's obligation to make payments arising from these leases. The lease liabilities are based on the present value of fixed lease payments over the lease term using the implicit lease interest rate or, when unknown, the Institute's incremental borrowing rate on the lease commencement date or January 1, 2022 for leases that commenced prior to that date. If the lease includes one or more options to extend the term of the lease, the renewal option is considered in the lease term if it is reasonably certain the Institute will exercise the options. Operating lease expense is recognized on a straight-line basis over the term of the lease. As permitted by ASC 842, leases with an initial term of twelve months or less ("short-term leases") are not recorded on the accompanying balance sheet.

The Institute has lease agreements with lease and non-lease components, which are accounted for as a single lease component under the practical expedient provisions of the standard. The Institute has lease agreements with terms less than one year. For the qualifying short-term leases, the Institute elected the short-term lease recognition exemption in which the Institute will not recognize ROU assets or lease liabilities, including the ROU assets or lease liabilities for existing short-term leases of those assets in upon adoption.

Variable lease payments consist primarily of common area maintenance, utilities, and taxes, which are not included in the recognition of ROU assets and related lease liabilities. Variable lease payments and short-term lease expenses were immaterial to the Institute's consolidated financial statements for the year ended December 31, 2022. The Institute's lease agreements do not contain material restrictive covenants.

Accounts Payable and Accrued Expenses

Cash overdrafts are included in accounts payable and accrued expenses. At December 31, 2022 and 2021, cash overdrafts amounted to \$0 and \$225,500, respectively.

Net Asset Classifications

The Institute's net assets, revenues, expenses, gains, and losses are classified based on the existence or absence of donor-imposed restrictions. Accordingly, the net assets of the Institute and changes therein are classified and reported as follows:

Without donor restrictions — net assets that are not subject to donor-imposed stipulations. Net assets without donor restrictions may be designated for specific purposes by actions of the Board of Directors. Net assets without donor restrictions can be utilized to carry out any of the purposes of the Institute.

Included within net assets without donor restrictions are balances of \$8,538,300 and \$11,044,100 as of December 31, 2022 and 2021, respectively, relating to funds that were designated by the Board of Directors for the purpose of upgrading the Institute's financial systems and processes.

With donor restrictions — as of December 31, 2022 and 2021 net assets with donor restrictions totaled \$2,352,300 and \$2,097,200 respectively. These balances represent amounts restricted by donors for specific activities of the Institute or to be used at some future date. The Institute records contributions as net assets with donor restrictions if they are received with donor stipulations that limit their use either through purpose or time restrictions. When a donor restriction expires, that is, when a time restriction ends or a purpose restriction is fulfilled, net assets with donor restrictions are reclassified to net assets without donor restrictions and reported on the consolidated statements of activities as net assets released from restrictions. However, when restrictions on donor-restricted contributions and investment returns are met in the same accounting period, such amounts are reported as part of net assets without donor restrictions.

Another portion of net assets with donor restrictions include funds wherein donors have stipulated that the principal contributed be invested and maintained in perpetuity. Income earned from these investments is available for expenditure according to restrictions imposed by donors and consideration of the appropriation for expenditure criteria by the Institute pursuant to the New York Prudent Management of Institutional Funds Act ("NYPMIFA").

Operating Measure

The Institute classifies its consolidated statements of activities into operating and non-operating activities. Operating activities include all income and expenses related to carrying out the Institute's mission. Non-operating activities include interest and dividends, realized and unrealized gains (losses) on investments, pension and other employee benefit related activity other than net periodic benefit cost, and other items considered to be unusual or of a non-recurring nature.

Revenue

In accordance with Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") Topic 606, Revenue from Contracts with Customers ("ASC 606"), the Institute recognizes revenue when control of the promised goods or services are transferred to the Institute's customers in an amount that reflects the consideration the Institute expects to be entitled to in exchange for those goods or services, as outlined in note 3. The standard outlines a five-step model whereby revenue is recognized as performance obligations within which a contract is satisfied.

Public Imperatives

Public imperative revenues primarily consist of grants and contributions, including unconditional promises to give. Grants and unconditional promises to give are reported as revenues in the period received. Conditional contributions are recorded as revenue when the conditions on which they depend are substantially met.

Public imperatives are social good activities that are directed at the public and not an individual or small group of individuals. They are generally related to the promotion of the public's understanding and appreciation of the Institute's fields of interest and/or positioning the Institute's technical expertise in ways to benefit humanity. Typically, these activities are not expected to create a financial surplus but rather are funded by the surplus of other activities.

Public imperative revenues primarily consist of IEEE-USA Assessments, History Center, and Foundation related activities.

Public imperative expenses consist of History Center, grants, certain IEEE-USA activities, and educational activities, initiatives, honors ceremonies, presentations and some society activities.

Contributed Services

Contributed services are recognized as expenses for services that create or enhance nonfinancial assets of IEEE Foundation, Incorporated (the "IEEE Foundation"), require specialized skills, are provided by individuals possessing those skills and typically would need to be purchased if not otherwise provided by donation. Contributed services are recorded at the fair value of the services provided and are recorded on the statement of activities as expenses in the period incurred. See also Note 12.

IEEE Foundation is a related organization, which performs activities in support of the scientific and educational functions and programs of the Institute.

Income Taxes and Tax Status

a. Uncertain Tax Positions

The Institute is qualified under Section 501(c)(3) of the Internal Revenue Code ("Code") as an organization exempt from federal income tax and applicable state income tax and is classified as a publicly supported charitable organization under Section 509(a)(2) of the Code. Nevertheless, the Institute is subject to tax on income unrelated to its exempt purpose, unless that income is otherwise excluded by the Code.

The Institute follows guidance that clarifies the accounting for uncertainty in tax positions taken or expected to be taken in a tax return, including issues relating to financial statement recognition and measurement. This section provides that the tax effects from an uncertain tax position can be recognized in the financial statements only if the position is "more-likely-than-not" to be sustained if the position were to be challenged by a taxing authority. The assessment of the tax position is based solely on the technical merits of the position, without regard to the likelihood that the tax position may be challenged. As of December 31, 2022 and 2021, management has determined that there are no significant uncertain tax positions that would require recognition or disclosure in the accompanying consolidated financial statements.

b. The Institute's Income Tax Provision

The Institute generates revenue from unrelated business income activities and files federal Form 990-T and associated equivalent state unrelated business income tax returns. The Institute has historical losses and tracks federal Net Operating Losses ("NOLs") in two separate categories: NOLs generated prior to January 1, 2018 ("pre-TCJA"), which can be carried forward up to 20 years, and NOLs generated after December 31, 2017 ("post-TCJA"), which can be carried forward indefinitely.

For the year ending December 31, 2022, the Institute generated current year losses of approximately \$75,000, resulting in cumulative federal NOLs of \$5,373,000, which is comprised of \$4,156,000 pre-TCJA and \$1,217,000 post-TCJA. The Institute also has cumulative state NOLs of \$426,000 with carryforward periods ranging from 12 years to indefinitely.

Deferred income taxes are recognized for the temporary differences between the tax basis of assets and liabilities and financial-reporting amounts at each year-end, taking into consideration enacted tax laws and statutory tax rates applicable to the periods in which the differences are expected to affect taxable income. Valuation allowances are recognized if, based on the weight of available evidence, it is more likely than not that all or some portion of any deferred tax asset will not be realized. The benefit or provision for income tax represents the income tax benefit or payable for the year and the change in deferred tax assets and liabilities during the period.

As of December 31, 2022, the Institute's deferred tax asset with respect to its NOL from unrelated business activities had total balances of \$36,100, reflecting a full valuation allowance booked against its federal deferred tax asset. As of December 31, 2021, the Institute's deferred tax asset with respect to its NOL from unrelated business activities had total balances of \$914,500, reflecting a \$11,000 partial valuation allowance against its deferred tax asset. The Institute booked the respective valuation allowances against the deferred tax assets since there is no expectation the Institute will utilize these benefits in the foreseeable future.

The Institute's deferred tax assets are netted with deferred tax liabilities on the accompanying 2022 and 2021 consolidated statements of financial position.

c. Income Tax Provisions of For-Profit Subsidiaries

IEEE, Inc., a subsidiary of the Institute, is considered a for-profit entity under the Code. Management is maintaining a full valuation allowance against the net deferred tax assets for IEEE, Inc.

d. Consolidated Income Tax Provision

For the years ended December 31, 2022 and 2021, the expenses (benefit) for income taxes consisted of the following:

	2022	2021
Current:		
Federal	\$ —	\$ —
State	(27,200)	(50,000)
	(27,200)	(50,000)
Deferred:		
Federal	881,700	(255,200)
State	(3,300)	(22,600)
	878,400	(277,800)
Expense (benefit) for income taxes	\$ 851,200	\$ (327,800)

For the year ended December 31, 2022, the Institute's consolidated income tax expense is \$851,200, which is comprised of \$881,700 in tax expense related to the Institute's unrelated business income activities and associated off-setting valuation allowance, and \$30,500 in income tax benefits from associated state activities. For the year ended December 31, 2021, the Institute's consolidated benefit for income tax was \$327,800, which was comprised of \$331,300 in tax benefit from the Institute's unrelated business income activities and \$3,500 in provision expense adjustment for prior periods from IEEF, Inc.'s for-profit business income activities.

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Reclassifications

Certain reclassifications have been made to present last year's financial statements on a basis comparable to the current year's financial statements. These reclassifications had no effect on the change in net assets or total net assets.

Adoption of Recent Accounting Pronouncements

In September, 2020, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2020-07, Not-for-Profit Entities (Topic 958): Presentation and Disclosures by Not-for-Profit Entities for Contributed Nonfinancial Assets. The update increases transparency about contributed nonfinancial assets, including how they are used and how they are valued, through enhancements to presentation and disclosure. The Institute implemented this ASU for the year ended December 31, 2022 and has adjusted the presentation of these financial statements accordingly including retrospective adjustment to December 31, 2021.

In February 2016, the FASB issued ASU No 2016-02, Leases (Topic 842). This ASU and all subsequently issued clarifying ASU's require lessees to, among other things, recognize lease assets and lease liabilities on the statement of financial position for all leases (unless an accounting policy election is made by class of underlying asset to exclude short-term leases) and also disclose key information about leasing arrangements. The Institute adopted the new standard effective January 1, 2022 using a permitted method of applying the guidance retrospectively at the beginning of the period of adoption through a cumulative-effect adjustment, with no adjustment to comparative periods. The Institute elected a package of practical expedients upon adoption that permits the Institute to: (1) not reassess whether expired or existing contracts are or contain leases, (2) not reassess lease classification for existing or expired leases and (3) not consider whether previously capitalized initial direct costs, if any, would be appropriate under the new standard. In addition, the Institute elected the practical expedient upon adoption to use hindsight to determine the lease term.

The Institute further made accounting policy elections to not recognize lease assets and liabilities for leases with a term of twelve months or less (short-term leases) and to not separate lease components from non-lease components for all classes of underlying assets. The rate implicit in the lease is not readily available in any of the Institute's leases, therefore the Institute has also made the accounting policy election available to private entities to use a risk-free rate to discount the lease liability for all classes of underlying assets.

The adoption of the new standard resulted in the recording of right-of-use assets and lease liabilities of approximately \$7,881,800 and \$9,832,800, respectively, as of January 1, 2022. The adoption of the new standard did not have an impact on the Institute's operating results or cash flows.

Subsequent Events

The Institute evaluated its December 31, 2022 consolidated financial statements for subsequent events through May 25, 2023, the date the consolidated financial statements were available to be issued. The Institute is not aware of any other material subsequent events which would require recognition or disclosure in the accompanying consolidated financial statements.

NOTE 3: REVENUE RECOGNITION

Membership Dues

The Institute offers membership for term of one year. The Institute satisfies its performance obligation and recognizes revenue evenly over the membership term as its members simultaneously receive and consume the benefits over that timeframe. Generally, membership does not commence until after the Institute receives payment.

Payments received for membership dues in advance of the Institute satisfying its performance obligation are recorded within deferred revenue in the accompanying consolidated statements of financial position. The changes in deferred revenue relating to membership dues were caused by normal timing differences between the satisfaction of performance obligations and customer payments.

Periodicals

Periodicals revenues primarily include subscriptions and online products and content. Such revenues are recognized upon delivery of the online product or content or over the related subscription period.

Payments received for periodicals and media agreements in advance of the Institute satisfying its performance obligations are recorded within deferred revenue in the accompanying consolidated statements of financial position and recognized as revenue in future periods as performance obligations are satisfied. The changes in deferred revenue were caused by normal timing differences between the satisfaction of performance obligations and customer payments.

For the years ended December 31, 2022 and 2021, the Institute recognized 100% of the periodicals revenues over time, respectively.

Conferences

Conference revenues primarily include registration and sponsorships, and also includes the conference proceedings and published articles related to respective conferences. Revenues from conference registration and sponsorships are recognized when the conferences take place. Revenues from conference proceedings and articles are recognized in the period in which they are sold.

Payments received for conferences in advance of the Institute satisfying its performance obligation are recorded within deferred revenue in the accompanying consolidated statements of financial position and recognized as revenue in future periods as performance obligations are satisfied. The changes in deferred revenue were caused by normal timing differences between the satisfaction of performance obligations and customer payments.

Standards

Standards revenues primarily include subscriptions, publications and online products and content relating to technology standards. Such revenues are recognized upon delivery of the online products or content or over the related subscription period.

Payments received for standards agreements in advance of the Institute satisfying its performance obligation are recorded within deferred revenue in the accompanying consolidated statements of financial position and recognized as revenue in future periods as performance obligations are satisfied. The changes in deferred revenue were caused by normal timing differences between the satisfaction of performance obligations and customer payments.

For the years ended December 31, 2022 and 2021, approximately 38% and 62% of standards revenue were recognized “over time” and at “point-in-time,” respectively.

Accounts Receivable

Accounts receivable relating to the above revenues consist of the following:

	2022	2021
Periodicals and standards	\$ 27,935,600	\$ 26,839,400
Conferences	8,336,700	8,768,000
Other	2,323,200	1,112,200
Total accounts receivable	38,595,500	36,719,600
Less: allowance for doubtful accounts	(1,376,500)	(1,876,000)
Accounts receivable, net of allowance for doubtful accounts	\$ 37,219,000	\$ 34,843,600

Deferred Revenue

Deferred revenue from contracts with customers represents payments received in advance for which services have not been performed as of December 31, 2022 and 2021. The following tables present contract balances along with activities for deferred revenue as of and for the years ending December 31, 2022 and 2021:

	Balance at January 1 2022	Revenue Recognized 2022	Cash Received In Advance of Performance	Balance at December 31 2022
Membership Dues	\$ 27,025,800	\$ (27,025,800)	\$ 32,219,100	\$ 32,219,100
Periodicals	85,191,900	(85,191,900)	89,595,200	89,595,200
Conferences	8,511,700	(8,511,700)	4,812,900	4,812,900
Standards	2,027,800	(2,027,800)	2,189,500	2,189,500
	\$ 122,757,200	\$ (122,757,200)	\$ 128,816,700	\$ 128,816,700

	Balance at January 1 2021	Revenue Recognized 2021	Cash Received In Advance of Performance	Balance at December 31 2021
Membership Dues	\$ 32,858,300	\$ (32,858,300)	\$ 27,025,800	\$ 27,025,800
Periodicals	80,480,100	(80,480,100)	85,191,900	85,191,900
Conferences	3,635,000	(3,635,000)	8,511,700	8,511,700
Standards	833,100	(833,100)	2,027,800	2,027,800
	\$ 117,806,500	\$ (117,806,500)	\$ 122,757,200	\$ 122,757,200

NOTE 4: INVESTMENTS

The Institute's investments, at fair value, by level within the fair value hierarchy, consist of the following as of December 31:

	December 31, 2022		
	Level 1	Net Asset Value	Total
<i>Common stock:</i>			
Consumer	\$ 35,542,100	\$ —	\$ 35,542,100
Technology	86,252,000	—	86,252,000
Financial services	45,249,100	—	45,249,100
Healthcare	51,969,800	—	51,969,800
Industrials	30,398,400	—	30,398,400
Energy	17,102,300	—	17,102,300
Other	16,636,900	—	16,636,900
Total common stock	283,150,600	—	283,150,600
<i>Mutual funds:</i>			
Growth funds	67,585,200	—	67,585,200
Fixed income funds	238,052,200	—	238,052,200
Money market funds	114,888,400	—	114,888,400
Other funds	73,748,800	—	73,748,800
Total mutual funds	494,274,600	—	494,274,600
U.S. government securities	41,736,600	—	41,736,600
Commingled funds	—	130,762,400	130,762,400
	\$ 819,161,800	\$ 130,762,400	949,924,200
Cash held for investment			31,278,500
Add: receivables for securities sold and accrued interest			569,900
Less: liabilities for securities purchased and accrued fees			(522,600)
Total investments, at fair value		\$	981,250,000

December 31, 2021

	Level 1	Net Asset Value	Total
<i>Common stock:</i>			
Consumer	\$ 32,566,900	\$ —	\$ 32,566,900
Technology	108,242,400	—	108,242,400
Financial services	49,099,200	—	49,099,200
Healthcare	48,609,600	—	48,609,600
Industrials	27,857,700	—	27,857,700
Energy	8,387,300	—	8,387,300
Other	16,510,900	—	16,510,900
Total common stock	291,274,000	—	291,274,000
<i>Mutual funds:</i>			
Growth funds	60,429,000	—	60,429,000
Fixed income funds	216,040,300	—	216,040,300
Money market funds	199,539,600	—	199,539,600
Other funds	65,076,500	—	65,076,500
Total mutual funds	541,085,400	—	541,085,400
U.S. government securities	39,626,600	—	39,626,600
Commingled funds	—	126,456,900	126,456,900
	\$ 871,986,000	\$ 126,456,900	998,442,900
Cash held for investment			11,893,300
Add: receivables for securities sold and accrued interest			288,500
Less: liabilities for securities purchase and accrued fees			(813,700)
Total investments, at fair value		\$	1,009,811,000

The Institute's policy is to recognize transfers in and transfers out of levels at the end of the reporting period.

Investments valued at NAV by major category as of December 31, 2022 and 2021 consisted of the following:

December 31, 2022

Type	Strategy	NAV in Funds	# of Funds	Remaining Life	\$ Amount of Unfunded Commitments	Redemption Terms	Redemption Restrictions
Commingled funds	One fund seeks to outperform the Russell 2000 Index over a 1 to 3 year period; and one fund seeks to maximize portfolio returns while minimizing risk through an asset allocation based on measurements of the investible universe of institutional real estate.	\$130,762,400	2	Subject to the determination of the respective fund manager.	N/A	One fund has daily redemption upon notice; and one fund has quarterly redemption with 60 days notice.	N/A

December 31, 2021

Type	Strategy	NAV in Funds	# of Funds	Remaining Life	\$ Amount of Unfunded Commitments	Redemption Terms	Redemption Restrictions
Commingled funds	One fund seeks to ouperform the Russell 2000 Index over a 1 to 3 year period; and one fund seeks to maximize portfolio returns while minimizing risk through an asset allocation based on measurements of the investible universe of institutional real estate.	\$126,456,900	2	Subject to the determination of the respective fund manager.	N/A	One fund has daily redemption upon notice; and one fund has quarterly redemption with 60 days notice.	N/A

The Institute also held investments, which included certificates of deposits and term deposits, totaling \$3,751,800 and \$3,107,800 as of December 31, 2022 and 2021, respectively, that were classified as investments—other on the accompanying consolidated statements of financial position. These investments do not qualify as securities, as defined by relevant guidance, and as such, fair value disclosures are not provided.

Investment (losses) income, net, for the years ended December 31, 2022 and 2021, are reflected in the accompanying consolidated statements of activities and consist of the following:

	2022	2021
IEEE		
Interest and dividends, net	\$ 18,139,700	\$ 12,013,200
Net realized and unrealized (losses) gains on investments	(120,802,100)	74,340,500
IEEE investment (loss) income, net	\$ (102,662,400)	\$ 86,353,700

Investment expenses, which are netted with interest and dividends, amounted to \$1,721,300 and \$1,595,500 in 2022 and 2021, respectively.

For the years ended December 31, 2022 and 2021, investment returns related to amounts held as on behalf of the IEEE Foundation, that have not been reflected in the accompanying consolidated statements of activities, consist of the following:

	2022	2021
IEEE Foundation, Incorporated		
Interest and dividends, net	\$ 991,400	\$ 829,200
Net realized and unrealized (losses) gains on investments	(7,495,000)	5,528,400
IEEE Foundation investment (loss) income, net	\$ (6,503,600)	\$ 6,357,600

NOTE 5: LAND, BUILDINGS, AND EQUIPMENT, NET

Land, buildings, and equipment, carried at cost, net of the related accumulated depreciation and amortization, at December 31, 2022 and 2021 consist of the following:

	2022		
	Cost	Accumulated Depreciation and Amortization	Net
Buildings	\$ 17,385,900	\$ 15,886,100	\$ 1,499,800
Furniture, equipment, vehicles and computers	17,644,000	15,935,300	1,708,700
Software	62,812,900	47,956,300	14,856,600
Building improvements	22,250,200	16,184,700	6,065,500
	120,093,000	95,962,400	24,130,600
Land	836,400	–	836,400
Information systems upgrade in process	3,086,700	–	3,086,700
Total	\$ 124,016,100	\$ 95,962,400	\$ 28,053,700

	2021		
	Cost	Accumulated Depreciation and Amortization	Net
Buildings	\$ 17,385,900	\$ 15,469,200	\$ 1,916,700
Furniture, equipment, vehicles and computers	22,310,700	19,769,900	2,540,800
Software	83,023,700	61,938,200	21,085,500
Building improvements	21,504,300	14,873,900	6,630,400
	144,224,600	112,051,200	32,173,400
Land	836,400	–	836,400
Information systems upgrade in process	1,960,900	–	1,960,900
Total	\$ 147,021,900	\$ 112,051,200	\$ 34,970,700

Depreciation and amortization expense amounted to \$10,940,300 and \$11,045,200 for the years ended December 31, 2022 and 2021, respectively.

NOTE 6: PENSION AND OTHER POST-RETIREMENT BENEFITS

The Institute sponsors two qualified pension plans and one nonqualified pension plan and other postretirement benefit plans for its employees. In November 2006, the Board of Directors approved the freezing of its qualified employee benefit plans as of June 30, 2007 and the implementation of a defined contribution plan effective July 1, 2007. Accordingly, as of June 30, 2007, no further benefits will accrue under the qualified employee benefit plans after that date.

The following tables provide a reconciliation of the changes in the plans' benefit obligations and fair value of assets over the two-year period ended December 31, 2022, and a statement of the funded status as of December 31, 2022 and 2021:

	Pension Benefits		Other Benefits	
	2022	2021	2022	2021
<i>Reconciliation of benefit obligation:</i>				
Obligation at January 1	\$ 90,534,800	\$ 98,661,200	\$ 8,754,300	\$ 8,895,300
Service cost	290,000	290,000	263,300	276,300
Interest cost	1,796,800	1,508,100	194,300	159,800
Actuarial gain	(24,421,100)	(5,128,200)	(2,691,400)	(437,900)
Benefit payments	(1,777,100)	(1,825,400)	(141,000)	(139,200)
Settlements	(4,031,700)	(2,970,900)	—	—
Obligation at December 31	\$ 62,391,700	\$ 90,534,800	\$ 6,379,500	\$ 8,754,300
<i>Reconciliation of fair value of plan assets:</i>				
Fair value of plan assets at January 1	\$ 87,357,600	\$ 89,868,600	\$ —	\$ —
Actual return on plan assets	(21,070,500)	2,284,100	—	—
Employer contributions	8,200	1,200	141,000	138,200
Benefit payments	(1,777,100)	(1,825,400)	(141,000)	(138,200)
Settlements	(4,031,700)	(2,970,900)	—	—
Fair value of plan assets at December 31	\$ 60,486,500	\$ 87,357,600	—	—
Funded status at December 31	(1,905,200)	(3,177,200)	(6,379,500)	(8,754,300)
Accumulated benefit obligation	\$ 62,391,700	\$ 90,534,800	\$ 6,379,500	\$ 8,754,300

At December 31, 2022 and 2021, the funded status of the plans is included in accrued pension and other employee benefits on the consolidated statements of financial position as follows:

	Pension Benefits		Other Benefits	
	2022	2021	2022	2021
Current liabilities	\$ (4,000)	\$ (7,600)	\$ (328,300)	\$ (322,000)
Noncurrent liabilities	(1,901,200)	(3,169,600)	(6,051,200)	(8,432,300)
Net amount recognized	\$ (1,905,200)	\$ (3,177,200)	\$ (6,379,500)	\$ (8,754,300)

Cumulative amounts recognized in changes in net assets without donor restrictions and not yet recognized in net periodic benefit cost as of December 31, 2022 and 2021 consist of:

	Pension Benefits		Other Benefits	
	2022	2021	2022	2021
Net loss (gain)	\$ 9,201,200	\$ 11,194,300	\$ (866,500)	\$ 1,901,300

The following table provides the components of net periodic benefit cost for the plans for 2022 and 2021:

	Pension Benefits		Other Benefits	
	2022	2021	2022	2021
Service cost	\$ 290,000	\$ 290,000	\$ 263,300	\$ 276,300
Interest cost	1,796,800	1,508,100	194,300	159,800
Expected return on plan assets	(2,105,100)	(2,607,800)	—	—
Amortization of net loss	153,500	789,900	76,500	130,400
Settlement loss	594,200	367,200	—	—
Net periodic benefit cost	\$ 729,400	\$ 347,400	\$ 534,100	\$ 566,500

Amounts recognized in changes in net assets without donor restrictions for the years ended December 31, 2022 and 2021 consist of:

	Pension Benefits		Other Benefits	
	2022	2021	2022	2021
Net gain	\$ (1,245,400)	\$ (4,804,500)	\$ (2,691,300)	\$ (437,900)
Amortization of net loss	(747,700)	(1,157,100)	(76,500)	(130,300)
Pension and related benefits activity other than net periodic benefit cost	\$ (1,993,100)	\$ (5,961,600)	\$ (2,767,800)	\$ (568,200)

The prior service costs are amortized on a straight-line basis over the average remaining service period of active participants. Gains and losses in excess of 10% of the greater of the benefit obligation and the fair value of plan assets are amortized over the average remaining service period of active participants.

The assumptions used in the measurement of the Institute's benefit obligation are shown in the following table:

	Pension Benefits		Other Benefits	
	2022	2021	2022	2021
Weighted-average assumptions as of December 31				
Discount rate	4.94%	2.59%	4.99%	2.71%
Rate of compensation increase	N/A	N/A	N/A	N/A

The assumptions used in the measurement of the net periodic benefit cost are shown in the following table:

	Pension Benefits		Other Benefits	
	2022	2021	2022	2021
Weighted-average assumptions as of December 31				
Discount rate	2.59%	2.19%	2.71%	2.35%
Expected return on plan assets	2.50%	3.00%	N/A	N/A
Rate of compensation increase	N/A	N/A	N/A	N/A

The health care plan benefits are a flat dollar reimbursement to the retirees toward health care premiums. An increase in the reimbursement amount is not assumed.

Contributions

There are no required contributions due to the qualified pension plans during 2022 under the Internal Revenue Service ("IRS") minimum funding regulations.

IEEE expects to contribute approximately \$4,000 to its nonqualified pension plan and approximately \$328,000 to its other post-retirement benefit plans during 2022.

Expected Benefit Payments

	Pension Benefits	Other Benefits
2023	\$ 5,092,500	\$ 328,400
2024	4,812,500	330,100
2025	4,425,200	339,400
2026	4,391,500	347,300
2027	4,466,700	363,700
2028 to 2032	21,664,400	1,942,900

Plan Assets

IEEE determines its assumptions for the expected rate of return on plan assets for its retirement plans based on ranges of anticipated rates of return for each asset class. A weighted range of nominal rates is then determined based on target allocations for each asset class. IEEE considers the expected rate of return to be a longer-term assessment of return expectations and does not anticipate changing this assumption annually unless economic conditions change significantly. The expected rate of return for each plan is based upon its expected asset allocation. Market performance over a period of earlier years is evaluated covering a wide range of economic conditions to determine whether there are reliable reasons for projecting forward any past trends.

IEEE's pension and post-retirement plan asset allocation at the end of 2022 and 2021, and the target asset allocation for 2022 and 2021 by asset category based on asset fair values are as follows:

Asset Category	Target Asset Allocation	Pension Assets at December 31		Post-Retirement Assets at December 31	
		2022	2021	2021	2020
Equity securities	10%	10%	11%	N/A	N/A
Debt securities	90%	89%	88%	N/A	N/A
Cash and cash equivalents	0%	1%	1%	N/A	N/A
Total	100%	100%	100%	N/A	N/A

Third-party investment professionals manage IEEE's pension plan assets, rebalancing assets as the Institute deems appropriate. IEEE's investment strategy with respect to its pension plan assets is to maintain a diversified investment portfolio across several asset classes targeting an annual rate of return of 5% in 2021 and 2020. To develop the expected long-term rate of return on assets assumption, the Institute considered the historical returns and the future expectations for returns for each asset class, as well as the target asset allocation of the pension portfolio.

IEEE's pension and post-retirement funds' investment strategies are to invest in a prudent manner for the exclusive purpose of providing benefits to participants. The investment strategies are targeted to produce a total return that, when combined with IEEE's contributions to the funds, will maintain the funds' ability to meet all required benefit obligations. Risk is controlled through liability driven investing. The majority of the assets are matched against the pension liability.

The Institute's investment objectives for the pension plans are to minimize the volatility of the pension assets relative to pension liabilities and to offset the required contributions. The current target asset allocations are 10% equity securities and 90% debt securities. The investment guidelines further allow the managers to keep up to 5% in cash and cash equivalents.

Investment strategies and policies for the pension plans reflect a balance of risk-reducing and return seeking considerations. The objective of minimizing the volatility of assets relative to liabilities is addressed primarily through asset-liability matching.

All plan assets are externally managed. Investment managers are not permitted to invest outside of the asset classes or strategy for which they have been appointed. The Institute uses investment guidelines to ensure investment managers invest solely within the investment strategy for which they have been retained.

The following table prioritizes the inputs used to measure and report the fair value of the Institute's pension plan assets at December 31:

December 31, 2022				
	Level 1	Level 2	Net Asset Value	Total
<i>Common stock:</i>				
Consumer	\$ 676,400	\$ —	\$ —	\$ 676,400
Technology	897,700	—	—	897,700
Industrials	246,900	—	—	246,900
Healthcare	401,100	—	—	401,100
Financial services	277,000	—	—	277,000
Materials	120,400	—	—	120,400
Energy	140,300	—	—	140,300
Other	65,200	—	—	65,200
Total common stock	2,825,000	—	—	2,825,000
Equity mutual funds	3,021,300	—	—	3,021,300
Corporate bonds	—	37,482,400	—	37,482,400
U.S. government securities	13,425,000	—	—	13,425,000
Municipal bonds	—	1,792,300	—	1,792,300
Foreign bonds	—	524,500	—	524,500
Collective trust fund	—	—	745,500	745,500
	\$ 19,271,300	\$ 39,799,200	\$ 745,500	59,816,000
Cash held for investment				1,400
Add: receivables for securities sold and accrued interest				669,100
Total pension plan investments				\$ 60,486,500
December 31, 2021				
	Level 1	Level 2	Net Asset Value	Total
<i>Common stock:</i>				
Consumer	\$ 1,266,600	\$ —	\$ —	\$ 1,266,600
Technology	1,799,800	—	—	1,799,800
Industrials	361,800	—	—	361,800
Healthcare	622,800	—	—	622,800
Financial services	460,000	—	—	460,000
Materials	221,500	—	—	221,500
Other	97,600	—	—	97,600
Total common stock	4,830,100	—	—	4,830,100
Equity mutual funds	4,495,100	—	—	4,495,100
Corporate bonds	—	52,804,200	—	52,804,200
U.S. government securities	20,951,400	—	—	20,951,400
Municipal bonds	—	1,589,600	—	1,589,600
Foreign bonds	—	729,500	—	729,500
Collective trust fund	—	—	1,301,600	1,301,600
	\$ 30,276,600	\$ 55,123,300	\$ 1,301,600	86,701,500
Cash held for investment				3,400
Add: receivables for securities sold and accrued interest				652,700
Total pension plan investments				\$ 87,357,600

The Institute's policy is to recognize transfers in and transfers out of levels at the end of the respective reporting period.

The Institute uses, as a practical expedient for fair value, a NAV per share or its equivalent for purposes of valuing certain investments which: (a) do not have a readily determinable fair value and (b) prepare their financial statements consistent with the measurement principles of an investment company or have the attributes of an investment company. The following table lists such investments by major category as of December 31, 2022 and 2021:

December 31, 2022

Type	Strategy	NAV in Funds	# of Funds	Remaining Life	\$ Amount of Unfunded Commitments	Redemption Terms	Redemption Restrictions
Collective trust fund	Seeks the highest level of current income possible consistent with the preservation of capital and maintenance of liquidity.	\$745,500	1	Subject to the determination of the respective fund manager.	N/A	Daily redemption, upon notice.	N/A

December 31, 2021

Type	Strategy	NAV in Funds	# of Funds	Remaining Life	\$ Amount of Unfunded Commitments	Redemption Terms	Redemption Restrictions
Collective trust fund	Seeks the highest level of current income possible consistent with the preservation of capital and maintenance of liquidity.	\$1,301,600	1	Subject to the determination of the respective fund manager.	N/A	Daily redemption, upon notice.	N/A

The Institute also has a defined contribution 401(k) Savings and Investment Plan (the "Plan") for employees, who are eligible to participate after the start of the next pay period following 30 days of employment. Under the Plan, employees may generally contribute between 2% to 16% of their salary; however, not in excess of IRS limitations. The Institute provides a 100% matching contribution up to 4% of each employee's salary. The Institute contributed \$5,299,900 and \$5,062,300 on behalf of eligible employees to the Plan in 2022 and 2021, respectively. Amounts payable at December 31, 2022 and 2021 totaled \$87,100 and \$90,200, respectively, and are included in the current portion of accrued pension and other benefits in the accompanying consolidated statements of financial position.

Effective September 1, 2002, the Institute implemented a 457(b) plan for those highly compensated employees who have reached the IRS maximum 401(k) contribution for the year. These employees have the option of continuing their contributions up to the maximum dollar amount under section 457(e)(15) of the Internal Revenue Code of 1986, as amended. All other criteria for eligibility follow the same guidelines as the 401(k) plan. The amounts of \$6,677,000 and \$8,396,800 pertaining to obligations due under the 457(b) plan are accrued and included in accrued pension and other employee benefits at December 31, 2022 and 2021, respectively, and the related 457(b) plan assets are included in investments on the accompanying consolidated statements of financial position.

The Institute has established a Defined Contribution Retirement Plan under which it makes contributions to accounts established for each employee according to a predetermined schedule of contributions. The employee's retirement benefit is the value of the account. All contributions under the Defined Contribution Retirement Plan are made by the Institute and are not funded through salary deductions (employee contributions). Vesting occurs at the completion of each year of service at a rate of 25% per year until 100% after four years. The Institute contributed \$11,846,100 and \$10,768,300 to this plan in 2022 and 2021, respectively. Amounts payable at December 31, 2022 and 2021 totaled \$214,600 and \$206,300, respectively, and are included in the current portion of accrued pension and other benefits in the accompanying consolidated statements of financial position.

NOTE 7: FUNCTIONAL EXPENSES

The following table summarizes the Institute's functional expense classification presented below for the years ended December 31, 2022 and 2021:

	December 31, 2022								
	Program Services					Supporting Services			Total
	Memberships	Periodicals	Conferences	Standards	Public Imperatives	In-Kind Contribution	General and Administrative		
People costs and related expense	\$ 45,538,000	\$ 72,582,800	\$ 44,087,200	\$ 21,990,300	\$ 3,749,200	\$ 1,130,300	\$ 3,251,800	\$ 192,329,600	
Conference event related expense	234,400	51,400	44,833,000	891,000	13,400	—	21,700	46,044,900	
Travel, meetings and accommodation	9,485,600	5,153,500	16,191,600	1,855,800	624,400	46,700	526,900	33,884,500	
Commission, licensing and royalty	1,610,100	29,625,400	752,200	110,900	—	—	—	32,098,600	
Consultants and contractors	3,576,800	6,036,800	12,219,700	7,446,600	628,600	47,200	335,600	30,291,300	
Printing and publishing expense	4,393,700	15,406,100	2,409,900	250,800	73,500	9,200	31,500	22,574,700	
Computer software and related expense	2,480,500	5,137,000	3,081,000	1,678,900	49,800	46,600	51,700	12,525,500	
Marketing and promotions	2,860,200	4,407,400	2,774,100	977,300	73,400	30,500	70,100	11,193,000	
Depreciation and amortization	1,587,400	2,444,300	2,253,900	3,126,300	23,000	—	1,505,400	10,940,300	
Maintenance expense	1,597,000	3,934,700	2,813,700	710,200	—	—	654,300	9,709,900	
General office expense	3,018,600	4,389,400	1,202,500	549,600	218,300	54,600	251,900	9,684,900	
Grants, awards, scholarships and others	2,034,000	592,500	1,308,600	51,300	5,388,200	—	234,300	9,608,900	
Professional fees	1,041,300	3,118,100	3,162,200	236,500	—	—	97,900	7,656,000	
Operating leases and related expense	836,500	117,300	1,752,300	28,600	339,000	—	3,546,300	6,620,000	
Insurance	152,700	320,100	724,700	278,800	2,000	—	165,200	1,643,500	
Communication services	125,000	94,600	108,700	101,500	3,700	400	4,500	438,400	
Bad debt expense (recovery)	98,000	75,600	243,100	100	—	—	(474,400)	(57,600)	
Various other	13,431,600	6,678,600	7,205,600	4,462,500	456,000	118,200	542,600	32,895,100	
Total	\$ 94,101,400	\$ 160,165,600	\$ 147,124,000	\$ 44,747,000	\$ 11,642,500	\$ 1,483,700	\$ 10,817,300	\$ 470,081,500	

December 31, 2021

	Program Services					Supporting Services			Total
	Memberships	Periodicals	Conferences	Standards	Public Imperatives	In-Kind Contribution	General and Administrative		
People costs and related expense	\$ 44,440,500	\$ 78,014,900	\$ 30,711,400	\$ 20,312,100	\$ 3,674,800	\$ 1,064,900	\$ 1,541,400	\$ 179,760,000	
Commission, licensing and royalty	1,342,200	29,678,100	815,400	67,700	100	—	—	31,903,500	
Conference event-related expense	218,800	9,200	31,448,700	138,400	48,100	—	4,000	31,867,200	
Consultants and contractors	4,709,600	7,186,400	5,384,200	7,143,000	180,200	64,500	127,100	24,795,000	
Printing and publishing expense	4,917,000	13,716,900	2,081,400	191,500	274,100	22,900	4,700	21,208,500	
Depreciation and amortization	1,612,900	3,322,900	1,436,600	2,877,300	32,000	—	1,763,500	11,045,200	
Maintenance expense	1,941,500	5,964,700	1,692,300	913,400	500	—	294,400	10,806,800	
Computer software and related expense	2,044,000	4,244,600	1,643,600	1,292,200	34,400	7,700	18,200	9,284,700	
Marketing and promotions	2,357,800	3,706,100	1,054,500	398,600	54,100	71,800	25,600	7,668,500	
General office expenses	2,694,300	3,597,500	538,500	235,300	131,500	58,200	146,800	7,402,100	
Grants, awards, scholarships and others	1,137,600	291,300	674,900	48,400	4,209,700	—	128,600	6,490,500	
Professional fees	1,164,900	3,477,700	1,326,500	208,300	12,100	—	1,300	6,190,800	
Operating leases and related expense	846,600	183,600	132,200	30,100	199,500	—	3,608,400	5,000,400	
Travel, meetings and accommodation	1,534,200	455,000	1,100,600	370,800	3,300	1,700	18,900	3,484,500	
Insurance expense	144,700	286,300	584,400	213,700	1,700	—	85,700	1,316,500	
Communication-related services	101,600	460,100	40,600	101,700	3,200	100	10,700	718,000	
Bad debt expense	76,200	19,700	46,300	2,800	—	—	6,400	151,400	
Various other expense	11,305,600	3,767,600	3,055,300	3,381,800	256,600	75,000	101,900	21,943,800	
Total	\$ 82,590,000	\$ 158,382,600	\$ 83,767,400	\$ 37,927,100	\$ 9,115,900	\$ 1,366,800	\$ 7,887,600	\$ 381,037,400	

Management has reviewed all overhead costs and determined that it is appropriate to allocate the majority of these costs to the program services. There are a number of allocation methodologies that are used focusing on the location where the costs are incurred along with staffing levels and program service cost incurred prior to allocations. Included in these allocations are approximately \$61 million and \$45 million of society administrative, committee, and executive expenses and approximately \$57 million and \$58 million of indirect corporate overhead charges in 2022 and 2021, respectively.

NOTE 8: ADDITIONAL INFORMATION PRESENTED BY ACTIVITY

The following presents the Institute's consolidated financial results presented in a traditional surplus or loss format for the years ended December 31, 2022 and 2021. This format differs from the accompanying consolidated statements of activities, which present the financial results by the types of products and services sold. The surplus and loss presents the same data pertaining to the nature of activities.

	2022	2021
Net revenues	\$ 539,092,400	\$ 461,920,500
Less: cost of revenues	209,465,400	153,355,600
Direct contribution to surplus	329,627,000	308,564,900
Expenses:		
Selling	35,577,300	30,996,600
Marketing	28,768,200	24,772,000
Development and design	14,995,600	13,686,500
Supporting services	168,148,800	147,744,000
Contribution to surplus	82,137,100	91,365,800
Public imperatives, net	8,572,400	6,713,600
In-Kind contribution	1,483,700	1,366,100
Subtotal before non-operating activities	72,081,000	83,286,100
Non-operating activities:		
Investment (loss) gain, net	(102,662,400)	86,353,700
Gain on insurance recoveries	1,879,900	9,582,000
Pension benefit	4,760,900	6,529,800
(Deficit) surplus before tax	(23,940,600)	185,751,600
(Expense) benefit for income taxes	(851,200)	327,800
Net (loss) surplus after tax	\$ (24,791,800)	\$ 186,079,400

A description of each line item is discussed below:

Revenues

Net earnings from the sales of products and services.

Cost of Revenues

Direct costs incurred in producing or providing products and services that are sold and generate revenue.

Selling

Expenses incurred in the effort to sell products or services, includes commissions and other related expenses.

Marketing

Expenses incurred to generate additional sales of existing products or services, including brand awareness, promotions, displays, and media.

Development and Design

Expenses incurred in relation to developing new products and services to be sold in the future.

Supporting Services

This caption includes operational support and shared services. Operational support includes operational support and shared services. Operational support includes expenses that are indirectly related to the sale of products and services which generate revenue (e.g., costs associated with conference and event management, volunteer engagement and executive or governance functions). Shared services include general overhead such as Human Resources, Finance, Information Technology, Facilities and other related expenses. The presentation of supporting services, as reported on the accompanying consolidated statements of activities, reflects an allocation of such costs amongst the lines of operation specifically benefited.

Public Imperatives

Public imperatives are outreach and public awareness efforts to inform the public and members about technology and the engineering profession.

NOTE 9: LIQUIDITY RESOURCES

The Institute's primary source of operating funds is derived from the sale of products and services for its memberships, periodicals, conferences, and standards. These activities are intended to advance technology for humanity. The Institute has various sources of liquidity at its disposal, including cash and cash equivalents, and investments.

The following table reflects the Institute's financial assets as of December 31, 2022 and 2021 reduced by amounts that are not available to meet general expenditures within one year of the statement of financial position date because of contractual restrictions or donor restrictions.

	2022	2021
Cash and cash equivalents	\$ 19,359,500	\$ 17,410,800
Accounts receivable, less allowance for doubtful accounts	37,219,000	34,843,600
Investments, at fair value	981,250,000	1,009,811,000
Investments - other	3,751,800	3,107,800
Total financial assets available within one year	1,041,580,300	1,065,173,200
Less:		
IEEE Board-designated net assets	8,538,300	11,044,100
Amounts held on behalf of IEEE Foundation, Incorporated	54,106,400	63,019,700
Amounts subject to expenditure for specified donor purposes	1,752,100	1,421,200
Amounts relating to endowment funds with donor restrictions	600,200	676,000
Total amounts unavailable for general expenditures within one year	64,997,000	76,161,000
Total financial assets available within one year after Board designations	\$ 976,583,300	\$ 989,012,200

NOTE 10: NET ASSETS AND ENDOWMENT FUNDS

Net assets with donor restrictions are available for the following purposes at December 31, 2022 and 2021:

	2022	2021
Grant funds held for specific purposes	\$ 1,044,100	\$ 732,900
Fund held for awards, medals, and other specific purposes	708,000	688,300
Donor-restricted endowment funds, including accumulated unspent appreciation of \$408,800 and \$484,600	600,200	676,000
	\$ 2,352,300	\$ 2,097,200

Net assets were released from donor restrictions by incurring expenses satisfying the restricted purposes for the years ended December 31, 2022 and 2021 as follows:

	2022	2021
Grant funds held for specific purposes	\$ 11,500	\$ 56,800
Funds released for awards, medals, and other specific purposes	8,700	26,500
	\$ 20,200	\$ 83,300

Donor-imposed endowment net assets at December 31, 2022 and 2021 consist of assets that have been restricted by donors to be invested in perpetuity to provide a permanent source of income. The Institute's donor-restricted endowment consists of eleven (11) individual funds established principally for awards.

On September 17, 2010, the State of New York passed the NYPMIFA, its version of the Uniform Prudent Management of Institutional Funds Act. All not-for-profit organizations formed in New York must apply this law. The Institute classifies as net assets with donor restrictions, unless otherwise stipulated by the donor: (a) the original value of gifts donated to its donor-restricted endowment, (b) the original value of subsequent gifts to its donor-restricted endowment and (c) accumulations to its donor-restricted endowment made in accordance with the direction of the applicable donor gift instrument at the time the accumulation is added to the funds.

In accordance with NYPMIFA, the Institute considers the following factors in making a determination to appropriate or accumulate donor-restricted endowment funds: the purpose, duration, and preservation of the endowment fund; expected total return on endowment investments; general economic conditions; the possible effects of inflation and deflation; other resources of the Institute; and the investment policy of the Institute.

The Institute has adopted investment management and spending policies for its donor-restricted endowment assets which totaled \$600,200 and \$676,000 as of December 31, 2022 and 2021, respectively. This supports the objective of providing a sustainable and increasing level of donor-restricted endowment income distribution to support the Institute's activities while seeking to maintain the purchasing power of the endowment assets. The Institute's primary investment objective is to maximize total return within reasonable and prudent levels of risk while maintaining sufficient liquidity to meet disbursement needs and ensure preservation of capital.

To satisfy its long-term rate-of-return objectives, the Institute relies on a total return strategy, the objective of which is to achieve a return consisting of a combination of current income and capital appreciation, without regard to an emphasis on either, recognizing that changes in market conditions and interest rates will result in varying strategies in an attempt to optimize results. The endowment portfolio is diversified among various investment classes and strategies to help reduce risk.

The following table summarizes the Institute's total return on donor-restricted endowment investments and the changes in donor-restricted endowment net assets for the years ended December 31, 2022 and 2021:

	2022		
	Without Donor Restrictions	With Donor Restrictions	Total
Donor-restricted endowment funds	\$ —	\$ 600,200	\$ 600,200
Endowment assets, beginning of year	\$ —	\$ 676,000	\$ 676,000
Dividends and interest	—	12,500	12,500
Net realized and unrealized appreciation in fair value of endowment assets	—	(80,000)	(80,000)
Endowment return used for operations	—	(8,300)	(8,300)
Endowment assets, end of year	\$ —	\$ 600,200	\$ 600,200

	2021		
	Without Donor Restrictions	With Donor Restrictions	Total
Donor-restricted endowment funds	\$ —	\$ 676,000	\$ 676,000
Endowment assets, beginning of year	\$ —	\$ 633,100	\$ 633,100
Dividends and interest	—	10,400	10,400
Net realized and unrealized appreciation in fair value of endowment assets	—	58,500	58,500
Endowment return used for operations	—	(26,000)	(26,000)
Endowment assets, end of year	\$ —	\$ 676,000	\$ 676,000

NOTE 11: OPERATING LEASES

The Institute leases office space from third-party lessors under noncancellable operating leases. The following table summarizes the details for the Institute's operating leases recorded on the consolidated statement of financial position as of December 31, 2022.

Right-of-use lease assets	\$	7,282,500
Lease liabilities	\$	8,374,900
Weighted average remaining lease term		25 months
Weighted average discount rate		3.49%

The Institute's lease agreements do not provide an implicit rate, as such the Institute uses an estimated incremental borrowing rate, which is derived from third-party information available at the adoption date in determining the present value of lease payments. The rate used is the risk-free rate.

Fixed lease payments are recognized as operating lease cost on a straight-line basis over the lease term. ROU assets are periodically evaluated for impairment.

The following table summarizes maturities of the Institute's operating lease liabilities as of December 31, 2022, which reconciles to total lease liabilities included on the Institute's consolidated statement of financial position.

Year ending December 31	
2023	\$ 2,183,800
2024	2,048,500
2025	1,879,000
2026	1,363,200
2027	685,800
Thereafter	976,100
Total lease payments	9,136,400
Less: imputed interest	761,500
Total lease liabilities	8,374,900
Less: current lease liabilities	2,061,100
Long-term lease liabilities	\$ 6,313,800

NOTE 12: COMMITMENTS AND CONTINGENCIES

Letters of Credit

At December 31, 2022 and 2021, the Institute had irrevocable standby letters of credit with Wells Fargo Bank, N.A., in the amount of \$583,000, which serve as security deposits as required by the terms of its lease agreements with Three Park Avenue Building Company, LP and 2001 L Street, LLC, respectively.

At December 31, 2022 and 2021, the Institute had issued standby letters of credit in relation to certain dealers' agreements and VAT tax payments totaling \$903,100 and \$566,400, respectively, with HSBC Bank USA, N.A. The Institute is charged 2% of the face amount, upon issuance, of the standby letters of credit.

Litigation

The Institute, in the normal course of its operations, is a party to various legal proceedings and complaints, some of which are covered by insurance. While it is not feasible to predict the ultimate outcomes of such matters, management of the Institute is not aware of any claims or contingencies, which are not covered by insurance, that would have a material adverse effect on the Institute's consolidated financial position, changes in net assets or cash flows.

NOTE 13: RELATED – PARTY TRANSACTIONS

The Institute has transactions with IEEE Foundation. The Institute made cash contributions of \$454,000 and \$438,000 in 2022 and 2021, respectively, to the IEEE Foundation.

The IEEE Foundation has no staff and thus, receives certain accounting and administrative services from IEEE. The IEEE Foundation reimbursed IEEE for the cost of such services, which amounted to approximately \$996,500 and \$865,200 during 2022 and 2021, respectively. The Institute provided In-Kind fundraising administrative services (contributed services) during 2022 and 2021 that were not reimbursed by the IEEE Foundation, valued at approximately \$1,483,700 and \$1,366,700 during 2022 and 2021, respectively.

Contributed services are recognized as revenue by the IEEE Foundation if the services create or enhance nonfinancial assets or require specialized skills, are provided by individuals possessing those skills and typically would need to be purchased if not otherwise provided by donation. Contributed services are recorded at the fair value of the services provided and are recorded on the statement of activities as expenses in the period contributed.

The Institute held on deposit approximately \$54,106,400 and \$63,019,700 from the IEEE Foundation at December 31, 2022 and 2021, respectively, and is separately reported on the accompanying consolidated statements of financial position. The Institute invests these amounts on behalf of the IEEE Foundation. Receivables due from the IEEE Foundation include grants receivable of \$1,505,000 and \$604,600 at December 31, 2022 and 2021, respectively, and other receivables of approximately \$76,900 and \$111,100 at December 31, 2022 and 2021, respectively, and are included in accounts receivable on the accompanying consolidated statements of financial position. Amounts due to the IEEE Foundation of approximately \$224,700 and \$264,600 at December 31, 2022 and 2021, respectively, are included in accounts payable and accrued expenses on the accompanying consolidated statements of financial position.

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