CONFERENCE REPORTS

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IGARSS 2023 in Pasadena, California

Impressions of the First Days

After four years of online and hybrid conferences, the 43rd IEEE International Geoscience and Remote Sensing Symposium (IGARSS) was held in person again on 16–21 July 2023. The symposium was located at the Pasadena Convention Center, Pasadena, in sunny California, USA, only 11 miles from Los Angeles (Figure 1). At the base of the San Gabriel Mountains in the San Gabriel Valley, filled with historic architecture and national landmarks, Pasadena is known as the "crown of the valley."

To organize such a big conference with thousands of attendees from around the world may have posed a challenge, but it was met most professionally by the local IGARSS 2023 organizing team, Conference Management Services, and the IEEE Geoscience and Remote Sensing Society (GRSS), and it exceeded expectations. The symposium aimed at providing a platform for sharing knowledge and experience on recent developments and advancements in geoscience and remote sensing technologies, particularly in the context of Earth observation, disaster monitoring, and risk assessment. A variety of programs was offered, such as keynote talks, technical sessions, tutorials, exhibitions, a Young Professionals' (YP's) mixer, presentation and writing workshops, a career panel, a Technology, Industry, and Education (TIE) forum, a technical tour, an awards banquet, and also a 3-min thesis competition, a student paper contest, and a summer school prior to the symposium.

Following are some highlights from the IGARSS 2023 opening and plenary session, held on Monday, 17 July 2023.

WELCOME ADDRESSES AT THE PLENARY SESSION
The plenary ceremony of IGARSS 2023 started on Monday with an introduction of the conference by IGARSS 2023 general cochairs Shannon Brown and Sidharth

Misra (see Figure 2). They gave the welcome address, described the logistics for the week as well as the social program, and highlighted the most important events of the week.

The IGARSS 2023 technical program was presented by Dr. Rashmi Shah and Dr. David Kunkee, technical committee cochairs (see Figure 3). First, Dr. Kunkee presented some astonishing statistics from the conference. The success of such a big conference is unthinkable without the help of many volunteers: 328 session organizers

FIGURE 1. City of Pasadena, CA, USA, the venue of IGARSS 2023. [Courtesy of Visit Pasadena (visitpasadena.com)]

FIGURE 2. Opening remarks of IGARSS 2023 general cochairs Shannon Brown (right) and Sidharth Misra (left).

TABLE 1. PRESENTATIONS AND ATTENDANCE.

TOTAL PAPERS SUBMITTED	TOTAL PAPERS ACCEPTED	ORAL PAPERS	POSTER PAPERS	ORAL SESSIONS	POSTER SESSIONS	TOTAL REGISTERED	STUDENTS
3,688	2,868	1,534	1,334	319	154	2,768	961

and 1,294 reviewers were involved in the preparations. With about 3,700 attendees, there was a record number of submissions, which finally resulted in 2,868 oral or poster presentations assisted by 475 session cochairs and 120 session managers (see Table 1).

Several changes were made this year to improve the IGARSS technical program: Shorter abstracts were used to streamline the abstracts submission and, instead of invited sessions "community contributed sessions" were introduced to get more of the community involved. Also, the structure of the oral session was changed to include more discussion among the community members: presentations were planned to be 12 min long, and within a session there was only at the end of all presentations a 15-min slot in which to ask questions.

Dr. Rashmi recommended the TIE events and YP events. She also spoke about the 13 tutorials with more than 300 participants that were held in the run-up to the conference and were a great success.

After Dr. Rashmi spoke, 2023 IEEE President-Elect Dr. Tom Coughlin's introduction followed (see Figure 4). He sees IEEE as a resource for technology decisions. As technology of all sorts drives the world's economy, this is something that is very important to be aware of. IEEE is the largest technical professional organization in the world, its members are involved in all aspects of technology creation and use, its research powers patents, and it creates the world's technical standards. IEEE also fosters efforts in future directions, technical road maps, and tracking megatrends as well as informing public policy and serving as a resource for technical discussions.

IEEE has more than 420,000 members in more than 190 countries and sponsors more than 2,000 conferences in 96 countries annually. In addition to its 46 Societies and technical councils, it provides a lot of volunteer opportunities that help Members to build networks and learn new concepts. IEEE is the most-cited publisher in new patents from top-patenting organizations, and IEEE research is increasingly valuable to innovators.

As part of his IEEE presidency, Dr. Coughlin would like to increase IEEE's outreach to younger members and the broader public, increase engagement with industry, and make investments in new products and services.
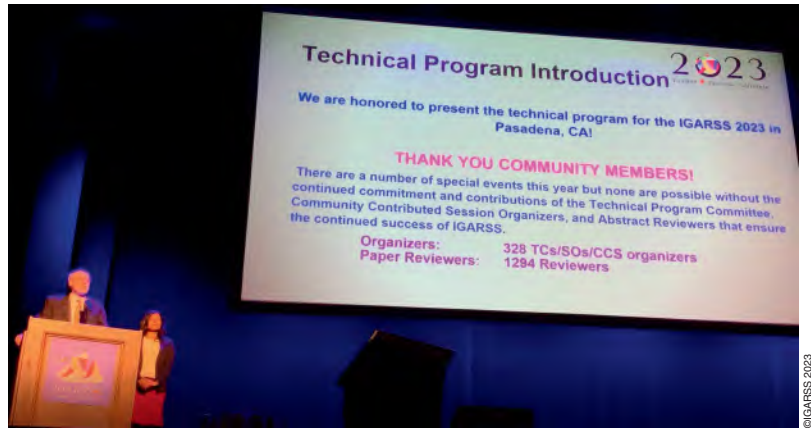

FIGURE 3. Technical committee cochairs Dr. Rashmi Shah (right) and Dr. David Kunkee (left) presenting the technical program.

After Dr. Coughlin's presentation, GRSS President Dr. Mariko S. Burgin gave a warm welcoming address to all attendees and reported on the activities of the GRSS (see Figure 5). The GRSS is one of 39 IEEE Societies, and it is a truly global community. It has nearly 5,000 members in 144 countries and is organized into 128 Chapters with 12 ambassadors all over the world. The GRSS is governed by the GRSS AdCom.
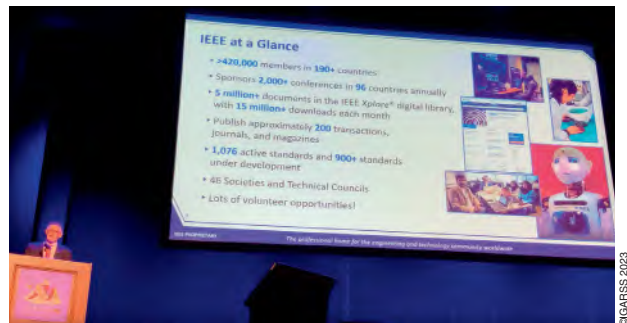
FIGURE 4. 2023 IEEE President-Elect Dr. Tom Coughlin's introduction.
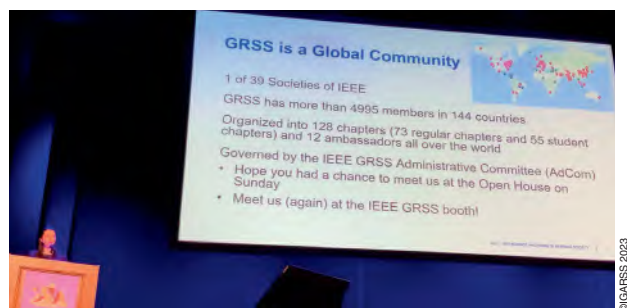
FIGURE 5. Opening remarks of Dr. Mariko Burgin, 2023 president of the GRSS, during the plenary session.

The GRSS fosters engagement of its members for the benefit of society through science, engineering, applications, and education as related to the development of the field of geoscience and remote sensing. The GRSS is also a group of scientists, researchers, and practitioners with common interests and a common framework for building a community.

Dr. Burgin also highlighted five important GRSS areas. The GRSS disseminates premium science by sponsoring four refereed publications [*IEEE Geoscience and Remote Sensing Magazine* (*GRSM*), *IEEE Transactions on Geoscience and Remote Sensing* (*TGRS*), *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* (*J-STARS*), and *IEEE Geoscience and Remote Sensing Letters*], cosponsoring *IEEE Journal on Miniaturization for Air and Space Systems* and curating an eNewsletter. Eight GRSS technical committees organize a wide variety of technical activities. The GRSS provides connections and networking opportunities, such as the IGARSS, regional symposia, smaller conferences, and cosponsored conferences and workshops. The GRSS also organizes professional activities with distinguished lecturers, YP events, professional development microgrants, the Women Mentoring Women program, and much more. Finally, the GRSS provides learning and other opportunities, like GRSS schools, webinar series, high school and undergraduate student outreach, student grand challenges, travel grants, and more.

All of this speaks in favor of choosing the GRSS as a "professional home"—a place for technical excellence, where you are welcome and where you belong. It is a place that you can make your own because the GRSS can help interact with like-minded researchers, engineers, and developers to make a difference in the world through remote sensing.

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MAJOR AWARDS CEREMONY

Following the opening remarks for IGARSS 2023, Prof. Alberto Moreira, chair of the GRSS Major Awards Committee, opened the 2023 awards ceremony. As in the past, the opening and plenary session of IGARSS 2023 was chosen for the recognition of IEEE GRSS members elevated to IEEE Fellow grade and the four major awards of the GRSS. For each award, 2023 GRSS President Dr. Mariko Burgin and IEEE President Dr. Tom Coughlin presented the recognitions and congratulated the awardees.

IEEE FELLOW AWARDS

The grade of IEEE Fellow recognizes unusual distinction in the profession, and it is conferred only by invitation of the IEEE Board of Directors upon a person of outstanding and extraordinary qualifications and experience in IEEE-designated fields. The IEEE bylaws limit the number of Members who can be advanced to Fellow grade in any one year to one per mil of the Institute membership, exclusive of students and affiliates. To qualify, the candidate must be a Senior Member and must be nominated by an individual familiar with the candidate's achievements. Endorsements are required from at least five IEEE Fellows and an IEEE Society best qualified to judge. The GRSS IEEE Fellow Committee completes the first evaluation of the nominees. After this, the IEEE Fellow Committee, comprising approximately 50 IEEE Fellows, carefully evaluates all nominations, considering the Society rankings and presents a list of recommended candidates to the IEEE Board of Directors for the final election.

On average, the GRSS performs above the average with respect to the number of elected Fellows every year. This year we have four GRSS members who were promoted to IEEE Fellow.

The first Fellow recognition went to Prof. James Garrison with the following citation (see Figure 6): "For contributions to Earth remote sensing using signals of opportunity."

James Garrison is a professor in the School of Aeronautics and Astronautics at Purdue University with a courtesy appointment in the School of Electrical and Computer Engineering and the Ecological Sciences and Engineering Interdisciplinary Graduate program. His research interests include Earth remote sensing using GNSSs and signals of opportunity. He is the principal investigator for SNOOPI, a NASA mission to demonstrate remote sensing with P-band signals of opportunity. Prior to his academic position, Prof. Garrison was with NASA. He earned a Ph.D. degree from

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FIGURE 6. IEEE Fellow Award recipient Prof. James Garrison.

FIGURE 7. IEEE Fellow Award recipient Prof. Jonathan Li (middle) with Dr. Mariko Burgin (right) and IEEE President-Elect Dr. Tom Coughlin (left).

FIGURE 8. IEEE Fellow Award recipient Prof. Gabriele Moser.

the University of Colorado Boulder in 1997 and also holds a B.S. degree from the Rensselaer Polytechnic Institute and an M.S. degree from Stanford University. He is a fellow of the Institute of Navigation. From 2018 to 2022 he was editor-in-chief of *GRSM*.

The second Fellow recognition went to Prof. Jonathan Li with the citation (see Figure 7) "For contribution to point cloud analytics in lidar remote sensing."

Prof. Jonathan Li received his Ph.D. degree in geomatics engineering from the University of Cape Town, South Africa, in 2000. Prof. Jonathan Li is currently a professor of geomatics and systems design engineering with the University of Waterloo, Canada. His main research interests include artificial intelligence (AI)-based 3D geospatial information extraction from Earth observation images and lidar point clouds, photogrammetry and pointgrammetry for high-definition map generation, 3D vision, and GeoAI for digital twin cities. He has coauthored more than 530 publications, more than 330 of which were published in refereed journals. He has also published papers in flagship conferences in computer vision and AI. His publications have received more than 15,000 Google citations with an h-index of 65. He has supervised more than 120 master's and Ph.D. students as well as postdoctoral fellows to completion. He is a fellow of both the Canadian Academy of

FIGURE 9. IEEE Fellow Award recipient Prof. Ping Yang.

Engineering and the Engineering Institute of Canada and is the recipient of more than 20 prestigious awards.

The third Fellow recognition was received by Prof. Gabriele Moser with the following citation (see Figure 8): "For contributions to pattern recognition in remote sensing."

Prof. Gabriele Moser is a full professor of telecommunications at the University of Genoa. His research activity is focused on pattern recognition and image processing methodologies for remote sensing and energy applications. He served as chair of the GRSS Image Analysis and Data Fusion Technical Committee (IADF TC) from 2013 to 2015 and as IADF TC cochair from 2015 to 2017. He was publication cochair of IGARSS 2015, technical program cochair of the GRSS EarthVision workshop at the 2015 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), and coorganizer of the second edition of EarthVision at CVPR 2017. Since 2019, he has been the head of the M.Sc. program in Engineering for Natural Risk Management at the University of Genoa. Since 2021, he has been a member of the national evaluation committee for national scientific qualification (Abilitazione Scientifica Nazionale) as a full professor in the telecommunications field in Italy.

The fourth Fellow recognition was presented to Prof. Ping Yang with the citation (see Figure 9) "For seminal contributions to

radiative transfer and remote sensing of ice clouds and dust aerosols."

Prof. Ping Yang is a University Distinguished Professor at Texas A&M University (TAMU), where he currently serves as senior associate dean for research and graduate studies in the College of Arts and Sciences. He has joint professorship appointments with the Department of Physics & Astronomy and the Department of Oceanography, and he holds the David Bullock Harris Chair in geosciences. Prof. Yang has supervised the completion of 29 doctoral dissertations and 20 master's degree theses. He has published 359 peer-reviewed journal papers and four monographs. His publications have been cited 23,483 times (Google Scholar) with an h-index of 78 (Google Scholar). His research focuses on light scattering, radiative transfer, and satellite-based remote sensing. Prof. Yang is a recipient of the NASA Exceptional Scientific Achievement Medal (2017), the American Geophysical Union Atmospheric Sciences Ascent Award (2013), the David and Lucille Atlas Remote Sensing Prize from the American Meteorological Society (2020), and the Van de Hulst Light-Scattering Award from Elsevier (2022). Prof. Yang was named the 2022 Distinguished Texas Scientist by the Texas Academy of Science. Within TAMU, he received a university-level faculty research award bestowed by the Association of Former Students in 2017 and several college-level awards.

The IEEE Fellow recognition part of the awards ceremony was concluded with a group photo with the four IEEE Fellows nominated by the GRSS together with GRSS President Dr. Mariko Burgin and IEEE President-Elect Dr. Tom Coughlin (Figure 10).

GRSS MAJOR AWARDS AT THE AWARDS CEREMONY
The call for nominations for the GRSS Education Award, the GRSS Outstanding Service Award, the GRSS Industry Leader Award, and the GRSS Fawwaz Ulaby Distinguished Achievement Award was posted in 2022 on the GRSS website and announced in the eNewsletter of the GRSS. The nomination forms are available at http://www.grss-ieee.org/about/awards/. Any member, with the exception of GRSS AdCom members, can make nominations to recognize deserving individuals. Typically, the lists of nominated candidates comprise three to five names each year. An independent Major Awards Evaluation Committee makes the selection, which is approved by the GRSS president and AdCom. The following major awards were presented:
◗ Outstanding Service Award
◗ Education Award
◗ Industry Leader Award
◗ Fawwaz Ulaby Distinguished Achievement Award.

IEEE GRSS OUTSTANDING SERVICE AWARD
The Outstanding Service Award was established to recognize an individual who has given outstanding service for the benefit and advancement of the GRSS. The award is considered annually but will not be presented unless a suitable candidate is identified. The following factors are suggested for consideration: leadership innovation, activity, service, duration, breadth of participation, and cooperation. GRSS membership is required. The awardee receives a certificate and a plaque.

The 2023 GRSS Outstanding Service Award was presented to Dr. Simon Yueh with the following citation (see Figure 11): "In recognition of his outstanding service for the benefit and advancement of the Geoscience and Remote Sensing Society."

Simon Yueh received his Ph.D. degree in electrical engineering in January 1991 from the Massachusetts Institute

FIGURE 10. IEEE Fellow Award recipients Prof. Gabriele Moser (second from left), Prof. Jonathan Li, Prof. James Garrison, and Prof. Ping Yang (second from right) with GRSS President Dr. Mariko Burgin (right) and IEEE President-Elect Dr. Tom Coughlin (left).

of Technology. In September 1991, he joined the Radar Science and Engineering Section at the Jet Propulsion Laboratory (JPL). He was the supervisor of the Radar System Engineering and Algorithm Development Group during 2002–2007, the deputy manager of the Climate, Oceans and Solid Earth Section from July 2007 to March 2009, and the section manager from April 2009 to 2013 January. He served as the project scientist of the NASA Aquarius mission from January 2012 to September 2013, the deputy project scientist of the NASA Soil Moisture Active Passive mission from 2013 January to September 2013, and the Soil Moisture

FIGURE 11. 2023 IEEE GRSS Outstanding Service Award recipient Dr. Simon Yueh.

Active Passive Project scientist since October 2013. He has been the principal/coinvestigator of numerous NASA and U.S. Department of Defense research projects on remote sensing of ocean salinity, ocean wind, terrestrial snow, and soil moisture. He has authored four book chapters and published more than 300 publications and presentations. He received the 2021 J-STARS Prize Paper Award, the 2014, 2010, and 2002 GRSS Transactions Prize Paper awards, the 2000 Best Paper Award at IGARSS 2000, and the 1995 GRSS Transactions Prize Paper award for a paper on polarimetric radiometry. He received the JPL Lew Allen Award for Excellence in 1998, the Ed Stone Award in 2003, the NASA Exceptional Technology Achievement Medal in 2014, and the NASA Outstanding Public Leadership Medal in 2017. He was an associate editor of *Radio Science* from 2002 to 2006 and editor-in-chief of *TGRS* from 2018 to 2022.

IEEE GRSS EDUCATION AWARD

The Education Award was established to recognize an individual who has made significant educational contributions to the field of GRSS. In selecting the individual, the factors considered are significance of the educational contribution in terms of innovation and the extent of its overall impact. The contribution can be at any level, including K-12, undergraduate, and graduate teaching, professional development, and public outreach. It can also be in any form (e.g., textbooks, curriculum development, and educational program initiatives). GRSS membership or

FIGURE 12. 2023 IEEE GRSS Education Award recipient Prof. Shutao Li.

affiliation is required. The awardee receives a certificate and a plaque.

The 2023 GRSS Education Award was presented to Prof. Shutao Li with the citation (see Figure 12) "In recognition of his significant educational contributions to geoscience and remote sensing."

Shutao Li received his B.S., M.S., and Ph.D. degrees from Hunan University, Changsha, China, in 1995, 1997, and 2001, respectively. Prof. Shutao Li has been a full professor with the College of Electrical and Information Engineering, Hunan University, since 2004 and is currently the vice rector of Hunan University. Prof. Li's current research interests include remote sensing image processing, pattern recognition, AI, and applications in environmental observation, resource investigation, and precise agriculture. He has authored or coauthored more than 300 refereed journal and international conference papers. He has received more than 28,000 citations in Google Scholar (h-index: 79) and was selected as a Clarivate Analytics' Global Highly Cited Researcher in 2018–2022. For his scientific research contributions, he received two Second-Grade State Scientific and Technological Progress Awards of China (in 2004 and 2006), a Second Prize of the National Natural Science Award by the State Council of China (in 2019), and two First Prize Hunan Provincial Natural Science Awards (in 2017 and 2022). Prof. Li is the founder and head of the Hunan Provincial Key Laboratory of Visual Perception and

Artificial Intelligence. He also founded the GRSS Changsha Chapter and cofounded the International Joint Research Center for Hyperspectral Imaging and Processing. He is now an associate editor of *TGRS* and *IEEE Transactions on Instrumentation and Measurement* and a member of the editorial board of *Information Fusion*.

IEEE GRSS INDUSTRY LEADER AWARD

The GRSS established the Industry Leader Award to recognize an individual who has made significant contributions over a sustained period of time in an industrial and/or a commercial remote sensing discipline. The evaluation awards committee may give preference to an individual who 1) is a GRSS member, 2) has made significant contributions to remote sensing system engineering, science, and/or technology, 3) has made significant contributions to dissemination and commercialization of remote sensing products, and 4) has demonstrated leadership to promote remote sensing science and technology. Criteria for selection are significance, quality, and impact of activities and contributions and achievements. The award is considered annually and presented if a distinguished candidate is identified.

The 2023 GRSS Industry Leader Award was presented to Robbie Schingler with the following citation (see Figure 13): "For co-founding Planet and for outstanding contributions for the commercialization and dissemination of optical remote sensing data."

Robbie Schingler is a director, cofounder, and chief strategy officer (CSO) at Planet. As CSO, Robbie leads the company's long-term strategic trajectory and oversees Planet's Space Systems, Corporate Development, and Special Projects functions. He spearheaded Planet's acquisition of BlackBridge in 2015, Boundless in 2019, and VanderSat in 2021. Prior to Planet, Robbie spent nine years at NASA, where he helped build the Small Spacecraft Office at NASA Ames and served as chief of staff for the Office of the Chief Technologist at NASA headquarters. He received an MBA from Georgetown University, an M.S. degree in space studies from the International Space University, and a B.S. degree in engineering physics from Santa Clara University.

IEEE GRSS FAWWAZ ULABY DISTINGUISHED ACHIEVEMENT AWARD

The Fawwaz Ulaby Distinguished Achievement Award was established to recognize an individual who has made significant technical contributions, within the scope of GRSS, usually over a sustained period. In selecting the individual, the factors considered are quality, significance, and impact of the contributions; quantity of the contributions; duration of significant activity; papers published in archival journals; papers presented at conferences and symposia; patents granted; and advancement of the profession. IEEE membership is preferable, but not required. The award is considered annually and presented only if a suitable candidate is identified. The awardee receives a plaque and a certificate.

The 2023 IEEE GRSS Fawwaz Ulaby Distinguished Achievement Award was presented to Prof. Howard

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FIGURE 13. 2023 GRSS Industry Leader Award recipient Robbie Schingler.

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FIGURE 14. IEEE GRSS Fawwaz Ulaby Distinguished Achievement Award recipient Prof. Howard Zebker.

FIGURE 15. Group photo at the end of the major awards ceremony (from left to right): IEEE President-Elect Dr. Tom Coughlin, Prof. Gabriele Moser, Prof. James Garrison, Prof. Ping Yang, Prof. Howard Zebker, Dr. Simon Yueh, GRSS President Dr. Mariko Burgin, and Major Awards Chair Prof. Alberto Moreira.

Zebker with the citation (see Figure 14) "For sustained outstanding contributions and leadership in the field of radar interferometry."

Howard Zebker was born in Ventura, CA, USA, received his B.S. degree from Caltech in 1976, his M.S. degree from UCLA in 1979, and his Ph.D. degree from Stanford in 1984. Dr. Howard Zebker is currently a professor of geophysics and electrical engineering at Stanford University, where his research group specializes in interferometric radar remote sensing. Originally a microwave engineer, he built support equipment for the *Seasat* satellite synthetic aperture radar (SAR) and designed airborne radar systems. He later developed imaging radar polarimetry, a technique for measurement of the radar scattering matrix of a surface. He is best known for the development of radar interferometry, leading to spaceborne and airborne sensors capable of measuring topography to meter scale accuracy and surface deformation to millimeter scale. More recently he has participated in the NASA Cassini mission to Saturn and currently is concentrating on the upcoming NASA/Indian Space Research Organisation (ISRO) mission.

The major awards ceremony concluded with a group photo with all awardees together with GRSS President Dr. Mariko Burgin, IEEE President-Elect Dr. Tom Coughlin, and GRSS Major Awards Chair Prof. Alberto Moreira (see Figure 15). The deadline for nominations for the 2024 major awards and special awards of the GRSS is 15 December 2023. A detailed description of the awards is available at https://www.grss-ieee.org/resources/awards/.

KEYNOTE SPEECHES AT THE PLENARY SESSION

After the awards ceremony, the plenary session started with presentations by three distinguished plenary speakers:

◗ "Dare Mighty Things Together," by Dr. Laurie Leshin, director of NASA's JPL

◗ "Talking Pigs—Math Stories From the Visual Effects Industry," by Joe Mancewicz, senior software engineer in Nvidia's Omniverse Group

◗ Keynote speech by Elia Saikaly, award-winning adventure filmmaker based in Ottawa, Canada.

The first keynote speaker, Dr. Laurie Leshin, director of NASA's JPL, gave insights into the work of JPL, the current status of activities in Earth science, and future challenges (see Figure 16). As the conference's participants also had

FIGURE 16. Dr. Laurie Leshin, Director of NASA's JPL, provided a speech on "Dare Mighty Things Together" in the IGARSS plenary session.

the possibility during the week to join a tour of JPL, this presentation was especially interesting and exciting.

Dr. Leshin related JPL's history—how everything started as early as back in the 1930s, even before NASA was founded. JPL has 6,500 employees and is a unique organization. Nationwide and also international teamwork and collaboration are important parts of JPL's life.

JPL has four big topics in its portfolio: Earth science, planetary science, and astrophysics, and it operates for NASA the Deep Space Network with satellite antennas on three different locations all around the globe. These antennas are constantly in contact with JPL's deep space missions. In a further presentation, Dr. Leshin presented these topics in more detail.

The work of JPL in Earth science focuses on the areas of biodiversity, greenhouse gases, water availability, air quality, sea level, and natural hazards. JPL is interested not only in the big missions, but also in the applications that can improve people's lives. Dr. Leshin showed a couple of examples, like the mission EMIT, which is a multispectral science mission originally designed to look at the composition of mineral dust, but that also has the ability to detect methane plumes and sees very clearly from space where methane emission is happening. As methane is a very powerful greenhouse gas, which has a much shorter residence time in the atmosphere than CO_2, providing this information offers an excellent possibility to get ahead of global warming in an effective way.

The mission Surface Water and Ocean Topography (SWOT) was launched in 2022 in collaboration between the French Space Agency CNES and NASA. The SWOT mission uses radar interferometry, achieving much higher resolution ocean topography and higher spatial resolution and getting closer to the shore than usual. SWOT is going to represent a spectacular revolution in our understanding of the oceans. The mission helps us to understand what is happening to Earth's surface water and will measure the height of millions of lakes and rivers around the world to about a few centimeters, which will provide revolutionary insights into the distribution of fresh water.

JPL's next big science launch is planned for 2024 in southern India and is called the NASA ISRO SAR (NISAR). The dual-frequency SAR satellite with a 12-m reflector is entering the final testing phase and will be able to look at all kinds of land surface changes, for example, changes in biomass, ice, earthquakes, or volcanoes, and as such will be a real game changer in understanding land surface change.

In the field of astrophysics, Dr. Leshin described the Nancy Grace Roman Space Telescope, which will be launched in 2027. The mission is managed by NASA Goddard, but JPL is building the coronagraph instrument, which is one of its key instruments. The mission is aiming to image planets in other solar systems. More than 5,000 exoplanets have already been detected, but we cannot see them because of the brightness of their stars. To be able to see one of those planets, one has to block out its star very effectively, and this is what the coronagraph instrument is designed to do.

In the field of planetary science, Dr. Leshin talked about the mission Europa Clipper, which is to be launched in October 2024. Europa is a moon of Jupiter and is covered by a water–ice shell. Beneath that icy shell, a global ocean is suspected, which could harbor life. Europa Clipper will go into orbit around Jupiter and have multiple very close flybys—some of them go down only tens of kilometers above the surface—with many instruments to study and understand the environment on Europa. Another important question to be answered is where future missions could more easily access the planet.

Another mission called Psyche is going to be launched in October 2023. The mission goes to the asteroid called Psyche.

The Mars mission with the rover Perseverance and the helicopter Ingenuity was launched in 2021. They are exploring and sampling the inside of a crater that once held a lake. By studying the stored small rocks, they want to answer the question of whether life could have started in the Mars environment at the same time life was starting on Earth. Finally, Dr. Leshin showed an animation about the Mars Sample Return mission, where all of the rock samples are planned to be transported to Earth. She concluded her speech by referring to Voyager missions 1 and 2 from 1977 (the spacecraft are still sending signals every day), and she expressed her pleasure to be able to do this kind of work for the benefit of the science community.

The second speaker of the plenary session was Joe Mancewicz, senior software engineer in Nvidia's Omniverse Group (see Figure 17). After showing an astonishing video and explaining technical terms, Mr. Mancewicz talked about problems that arise when creating an animation of a moving figure. The character's behavior, and even its mood and the texture of its clothing, must look realistic. To make the scene imagined by the authors work on the screen, it takes a lot of sophisticated work and a bunch of good ideas. It is a long way from using nature photos to several models until you finally

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FIGURE 17. The plenary session speech on "Talking Pigs—Math Stories From the Visual Effects Industry" was given by Joe Mancewicz, senior software engineer in Nvidia's Omniverse Group.

arrive at a well-done computer animation. Even the representation of the lighting alone needs many iterations. Joe demonstrated these challenges on a scene from the movie "Night at the Museum: Battle of the Smithsonian," where Amy Adams and Ben Stiller are looking at a giant octopus and Ben Stiller throws water onto the animal.

A further example was from the movie "Life of Pi": after a disastrous shipwreck, Pi Patel, son of an Indian zoo director, is floating in a lifeboat in the middle of the ocean—together with a Bengal tiger. Joe Mancewicz talked about the layers of technical animation: the depiction of the boat scene required many carefully coordinated steps, from shooting in a swimming pool to simulating the tiger's muscles, skin, fur, and movements to placing the scene in an ocean environment.

Another issue that was explained was the refraction problem. Joe demonstrated on a virtual model of an eye the challenge of computing the effects of breaking light, which is also relevant in the field of Earth observation, if the working and movements of satellites are modeled and simulated.

At the end of his truly amazing speech, Joe showed that animations can also support the planning and optimization of satellites. As CubeSat picosatellites have only a very limited area on their walls for solar cells assembling, the available area has to be effectively shared with other parts. With an animation you can choose the most suitable places for solar panels where the sun's rays will be the strongest; other parts can be placed in other locations.

The third keynote speaker of the plenary session, Elia Saikaly (https://eliasaikaly.com/), an award-winning adventure filmmaker based in Ottawa, Canada, started his presentation with a short video with breathtaking images of the top of the world (see Figure 18). Elia Saikaly has participated in more than 25 world-class expeditions, including 10 to Mount Everest—always with a camera in hand. Elia Saikaly illustrated through his own story the power of storytelling, which is also important for researchers when they try to explain their findings.

From a state of "had been written off," Elia Saikaly was able to become a successful documentary filmmaker. In his early 20s he discovered for himself the video camera and fell in love with storytelling. Dr. Sean Egan was one of the key people who had a great influence on him, and Saikaly fulfilled Dr. Egan's dream of climbing Mount Everest, which he unfortunately could not achieve because he died of heart failure. Dr. Egan's mission was not about standing on top of the world but about using the platform of Mount Everest to spread the message of hope. He wanted people to get fit, get active, and live healthier, happier, more meaningful lives. After Dr. Egan's death, Elia Saikaly wanted to ensure that his message could be spread and his legacy would live on. In 2007 he started a project to create a real-time experience for pupils from a remote environment and to connect it back to their curriculum. FindingLife (https://findinglife.ca/) creates immersive educational experiences by connecting students in the classroom to world-class expeditions. Expeditions and campaigns have enabled students to raise money for a well in Kathmandu, classrooms in Kenya, an orphanage in India, and, most recently, a new school in the village of Banakhu, Nepal, after the 2015 earthquake, which tragically claimed more than 8,000 lives. FindingLife's mission is to inspire positive change in youth by bringing the world right into their classrooms, and its motto is: Educate. Inspire. Empower.

It was in the framework of this project that Elia Saikaly successfully climbed Mount Everest. In his speech he talked about the challenges and choices of such a man-trying enterprise, and he also emphasized that, without the help of the Sherpas, you would not stand a chance. He showed photos of himself and his tent at the base of Mount Everest, where he connected live on Skype to the schools three times a week. He let us experience the excitement of the climb.

After this first successful expedition, Elia Saikaly planned the next adventure, which was climbing K2, the world's second highest peak, in the winter season, which was unprecedented until then.

On 16 January 2021, a team of 10 alpinists from Nepal, led by Nirmal Purja and Mingma Gyalje Sherpa, succeeded in making the winter ascent of K2. Other alpinists started too, including John Snorri Sigurjónsson from Iceland, Juan Pablo Mohr Prieto from Chile, and Ali Sadpara from Pakistan, but unfortunately, they went missing during the attempt. Elia Saikaly was part of the international team that was searching for the mountaineers. The search was coordinated together with the Icelandic, Pakistani, and Chilean governments and also involved the Icelandic Space Agency. The agency was mapping the mountain and providing satellite imagery, but it could not find the missing mountaineers. Six months later, in

FIGURE 18. Plenary session speech by Elia Saikaly, award-winning adventure filmmaker based in Ottawa, Canada.

(a)   (b)

FIGURE 19. AdCom participants at the GRSS AdCom meeting prior to IGARSS 2023: (a) AdCom at large. (b) Executive AdCom members.

the summer season, Elia Saikaly put the original team back together because the misfortune of their friends was a shock for all of them, and this time they were able to find the bodies of the three rope companions from Pakistan, Chile, and Iceland.

Elia Saikaly was on Mount Everest again this year. He shared with us reflective thoughts about the reasons why people are dying on Mount Everest. The media oversimplify the reasons and blame traffic as only this season 478 foreign climbers received government permission to climb Everest—this is more tourists than usual. Elia Saikaly interviewed mountaineers and families who had lost some-

FIGURE 20. Core members of the IGARSS 2023 organizing and supporting team (from left to right): Mehmet Ogut, Nathan Longbotham, Sidharth Misra, Fairouz Stambouli, David Kunkee, Shannon Brown, Joan Francesc Munoz-Martin, Rashmi Shah, Javier Bosch-Lluis, Sharmilla Padmanabhan, Mariko Burgin, Maryam Salim, Nereida Rodriguez-Alvarez, and Tianlin Wang.

one in the attempt of climbing Mount Everest. The other side of the problem is not only the foreigner's ambitions, but also the ambitions of the locals, for whom being in business around Mount Everest is a way out of poverty. Now local people are trying to fight for insurance and retirement plans.

Another issue with Mount Everest is the environmental disaster caused by the climbers. They leave their trash behind, which is very often the result of poor planning because no manpower is accounted for to leave no trace behind. A further issue is the overcommercialization of Mount Everest with clients who are interested only in speed records and multiple peaks. As people are hovered by helicopters across the valley, more inexperience and negligence can be observed. People on the inside of the country have to change this, but as storytellers, bystanders and supporters can also help get the word out to finally find positive solutions.

At the end of his speech, Elia Saikaly addressed the effects of climate change. The ice and snow layer is also getting thinner on Mount Everest. He compared a photograph taken by Sir George Mallory in 1921 from a glacier in Tibet and another from 2009 taken from the same position. According to calculations, the glacier is 300 feet less dense.

Finally, Elia Saikaly reminded us of the responsibility of the storyteller. Everyone can communicate their message and share their work with the world, and the possibilities are unlimited.

FUTURE IGARSS CONFERENCES

The GRSS AdCom met on 14–15 July 2023, just before IGARSS. In this meeting all of the Society's operational and technical issues were discussed and main decisions were taken. The 2023 members of the GRSS AdCom are shown in Figure 19. The road map for future IGARSS conferences was confirmed, and a decision was made for IGARSS 2027:

- ◗ IGARSS 2024, Athens, Greece, 7–12 July 2024
- ◗ IGARSS 2025, Brisbane, Australia, 3–8 August 2025

- IGARSS 2026, Washington, D.C., USA, 19–24 July 2026
- IGARSS 2027, Iceland, 5–9 July 2027.

You are cordially invited to participate in future IGARSS conferences, and we look forward to meeting all of you at IGARSS 2024 in Athens, Greece, on 7–12 July 2024.

IGARSS 2023 in Pasadena was a great success and surpassed all expectations. The networking achieved in the IGARSS week was highly appreciated by the participants. Such an outstanding event cannot happen without the hard work of a large team of volunteers. Figure 20 shows some of the key organizing team members. Not shown in the picture are Chris Ruf, Ronny Hänsch, Musafa Ustuner, Eric Loria, Alex Akins, Omkar Pradhan, Mary Morris, Kazem Bakian Dogaheh, Alireza Tabatabaeenejad, and also the following committee members at-large: Fabio Pacifici, Paul Rosen, Saibun Tjuatja, Karen St. Germain, Steve Reising, and Upendra Singh. In total, more than 30 members worked in the core organizing team of IGARSS.

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