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InGARSS 2023 in Bangalore: Striking a Balance

The regional conference of the IEEE Geoscience and Remote Sensing Society (GRSS), India Geoscience and Remote Sensing Symposium (InGARSS), brings the experience of the flagship GRSS conference, the International Geoscience and Remote Sensing Symposium (IGARSS), to the GRSS community on the Indian subcontinent by design. The benefits of having such an experience closer to home go a long way in strategically building and strengthening the professional community on the home turf. India boasts eight Chapters covering representation of the GRSS throughout the country, and it has the highest density of

Chapters, with respect to area coverage, compared to other countries. The first edition of InGARSS was slated to open the series grandly under the able leadership of the GRSS Gujarat Section in 2020. However, the COVID-19 pandemic changed the course of the conference organization worldwide. Thus, InGARSS was organized for consecutive editions in 2020 and 2021 exclusively in online mode. Since IGARSS 2022 was organized in IEEE Region 10 (Asia–Pacific) in Malaysia [1], InGARSS skipped a year. InGARSS 2023, officially referred to as the *2023 IEEE India Geoscience and Remote Sensing Symposium*, was organized by the GRSS Bangalore Section (Figure 1).

For a relatively young and small Chapter, organizing a regional conference was a herculean task for the GRSS

FIGURE 1. (a) Organizing GRSS Chapter YouTube channel playlists of daywise video proceedings of InGARSS 2023 (https://www.youtube.com/@ieee-grss-blrsection-talks5088/playlists). (b) The banner of InGARSS 2023, featuring the skyline of Bangalore and the conference logo, i.e., the stylized sun. (Design credit for all creatives: Amruth Kiran.)

Bangalore Section. The Chapter was inaugurated in December 2013, and, at the time of the IEEE conference application submission in January 2023, the Chapter had only 75 members. However, with a vibrant slate and Executive Committee, the Chapter undertook the task, intending to build new experiences in the InGARSS conference series. Borrowing themes and goals from the IGARSS series, InGARSS 2023 aimed to strike a balance on various fronts, namely, diversity in the key events, such as keynote talks and tutorials; diversity in the Organizing Committee (OC); equal participation from academia, industry, and other sectors; and international cooperation. The OC actively worked with the GRSS Administrative Committee (AdCom) to achieve these goals.

CONFERENCE HIGHLIGHTS

THEME
The theme (Figure 1) of InGARSS 2023 focused on advancements in geoscience and remote sensing technologies, particularly in the context of Earth observations and disaster monitoring, relevant to the Indian subcontinent and others. The conference theme color palette was blue, yellow, and white, where the logo of the stylized yellow sun indicates climate change, and the banner is an abstract rendering of the skyline of Bangalore using its iconic architectural structures. The conference website, https://ingarss.org, incorporates the theme and its associated creatives.

TIME AND VENUE
The conference was hosted at the International Institute of Information Technology, Bangalore (IIIT-B), an academic institution, during 10–13 December 2023. The Institute also served as a venue for a GRSS Distinguished Lecture by Dr. Carlos López-Martínez on 9 December 2023. A preconference GRSS chairs meeting and dinner for the OC and invited delegates were organized as events on the 9 December.

CONFERENCE LOGISTICS OVERVIEW
There were 309 submissions for the conference, of which 268 were in the research track. The research track included two special invited sessions. The Technical Program Committee, comprising 83 members, worked on the research track, whose outcome was a 48% acceptance rate for the conference. There were 466 conference registrations in hybrid mode, of which there was 63% in-person attendance and 37.5% student participation (Figure 2).

The conference had support from four gold sponsors, one silver sponsor, one double bronze sponsor, and three bronze sponsors. There were sponsor sessions comprising talks and discussion panels. There were community events covering Women in Engineering (WiE); Young Professionals (YP); and the Inspire, Develop, Empower, Advance (IDEA) programs. The Doctoral Colloquium featured 11 student presentations and three expert talks. The conference had a colocated event, namely, a workshop by the European Space Agency (ESA), which featured five talks by its scientists. The plenary talks at InGARSS 2023 included three keynote talks and four short sponsor talks. Finally, an outcome of the conference is a special issue of *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* with extended accepted papers from the conference.

TECHNICAL ACTIVITIES

RESEARCH TRACK
The general themes for the research track were "Sensing Methods," "Data Science Methods," and "Applications." Of the 268 submissions, 41 were desk-rejected, and 129 papers were accepted, of which 53 were for oral and 76 for poster presentations. Given the hybrid mode of the conference, oral presentations were 15-min live ones, whereas poster presentations were 10-min prerecorded video presentations. For both presentation modalities, the speakers were available for live question-and-answer sessions, either in person or online. Of the accepted papers, 12 were presented remotely, and 10 papers were withdrawn. Thus, 119 papers were submitted to IEEE *Xplore* for publication.

The research track included special invited sessions on the following:

◗ radio-frequency interference in radio astronomy, remote sensing, and navigation
◗ Interferometric synthetic aperture radar (InSAR)/global navigation satellite system (GNSS) for assessment of landslide and land subsidence.

The proceedings are now available at https://ieeexplore.ieee.org/xpl/conhome/10490313/proceeding?isnumber=10490314.

INAUGURAL SESSION
The conference commenced on 10 December 2023 (Figure 3), with the opening remarks by the general chair followed by an invocation song, as per Indian tradition. This was followed by the conference report by the general chair and short addresses by the delegates on the dais. Dr. Mariko Burgin, GRSS president, and Dr. Shiv Mohan, GRSS India liaison, gave brief inputs on the GRSS and the InGARSS conference series, respectively. Dr. Shubha Pandey, a scientist in the National Geospatial Program, Department of Science and Technology, Government of India, talked about the National Geospatial Policy and the timeliness of conferences like InGARSS. The chief guest, Dr. Sanghamitra Bandopadhyay, who is a renowned researcher in machine learning, delivered the inaugural address, which connected the dots between the data science and geospatial domains. This was followed by a befitting inaugural keynote talk by Dr. Harini Nagendra, who is a renowned ecologist and author, on social–ecological resilience building in times of climate change.
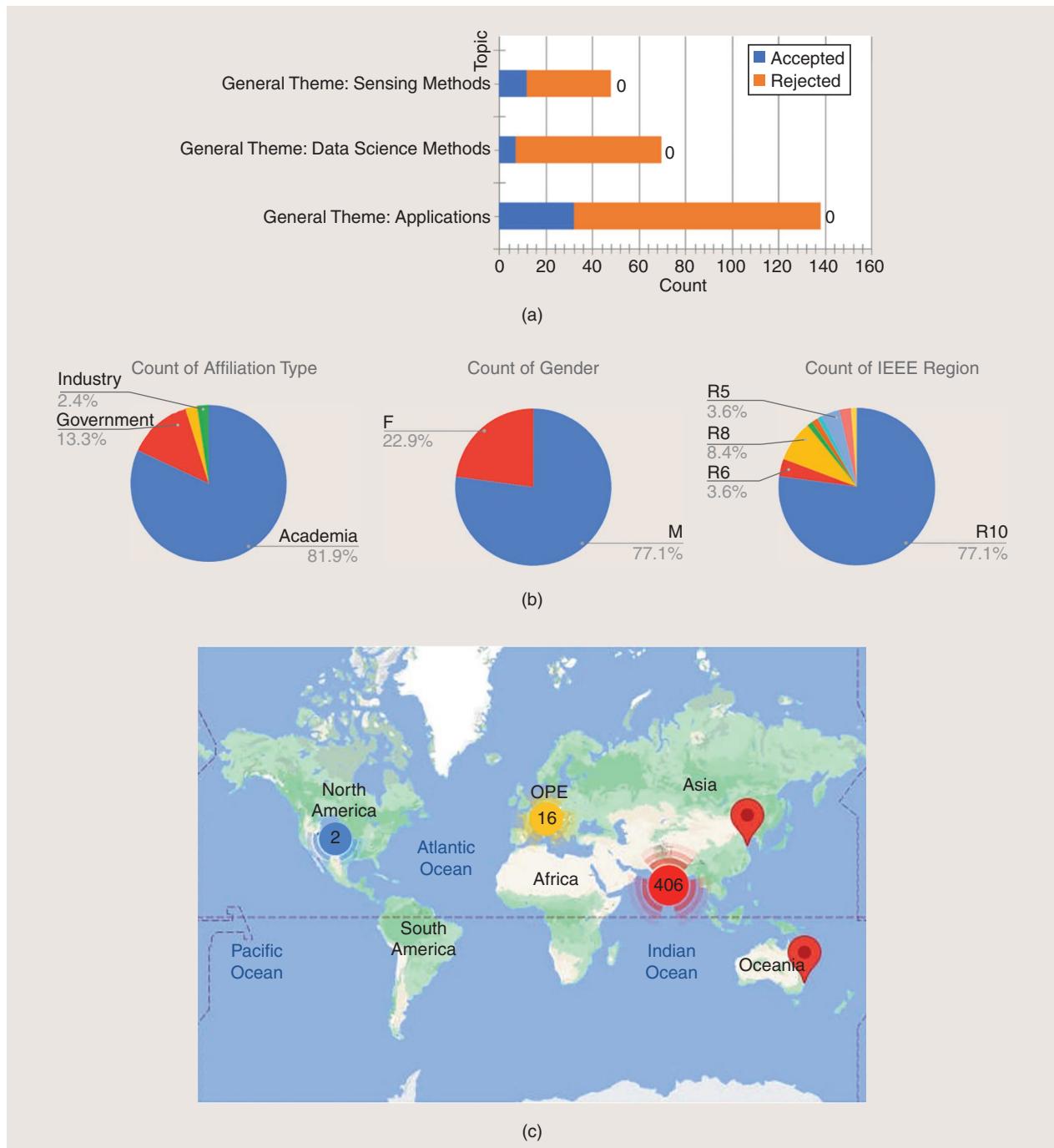
PLENARY SESSIONS
The conference saw a special plenary session, "Space Missions Overview," where Dr. Prakash Chauhan, Dr. Alberto Moreira, and Dr. Klaus Scipal spoke of mission overviews

in the Indian Space Research Organization (ISRO), German Aerospace Center, and the ESA. In addition to the inaugural plenary keynote talk, there were plenary keynote talks by Dr. Armando Marino and Rashmit Singh Sukhmani on polarimetric synthetic aperture radar (PolSAR) and AI/machine learning in Earth observations, respectively. To include more plenary talks from academia and industry, there were shorter talks on topics covering the Karnataka Data Lake for policy support, geospatial research initiatives at IIIT-B, ecology mapping and impact assessment, and generative AI for multisensory satellite data fusion (Figure 4).

TUTORIALS

From the responses to the call for tutorials, four proposals were selected. The much-appreciated tutorials covered a set of diverse topics, namely, monitoring land use/land


FIGURE 2. Conference highlights. (a) The topicwise distribution of submissions and acceptances of papers, giving a 48% acceptance rate. (b) The demographics of the Technical Program Committee in terms of affiliation, gender, and IEEE Region. (c) The Regionwise distribution of conference registrations in hybrid mode, with 63% in-person attendance and 37.5% student participation. F: female; M: male; R: Region.

cover using Google Earth Engine, deep learning in Earth observations, SAR polarimetry, and standards for geospatial analysis-ready data products (Figure 5).

COLOCATED ESA WORKSHOP

The colocated workshop by six speakers from the ESA featured the theory and practice of PolSAR and SAR tomography [Figure 3(f)].

DOCTORAL COLLOQUIUM

This event featured 11 doctoral colloquium presentations and three expert talks on career progression after a Ph.D. degree, the interdisciplinary aspect of Google Maps as a playground for computer scientists, and geospatial capacity building in India. The student speakers covered a diverse set of topics in 20-min presentations (Figure 5).

FIGURE 3. The inaugural ceremony proceedings. (a) Delegates on the dais. (b) The conference report by the general chair. (c) Opening remarks by the general chair. (d) The chief guest introduction by the general chair. (e) The welcome gift to the GRSS president, Dr. Mariko Burgin. (f) Participants of the colocated ESA workshop on polarimetric synthetic aperture radar.

INDUSTRY TRACK

For the first time in the InGARSS series, there was an exclusive track inviting presentations from industry. The track included six shortlisted talks and one expert talk on AI for geospatial technology.

CLOSING SESSION

The conference ended with the award ceremony and an address by the guest of honor, Prof. Bharat Lohani, a renowned lidar data researcher. The awards were presented for best paper, best poster, and YP challenges. Conference feedback was sought during the session and, also, there was a postconference survey.
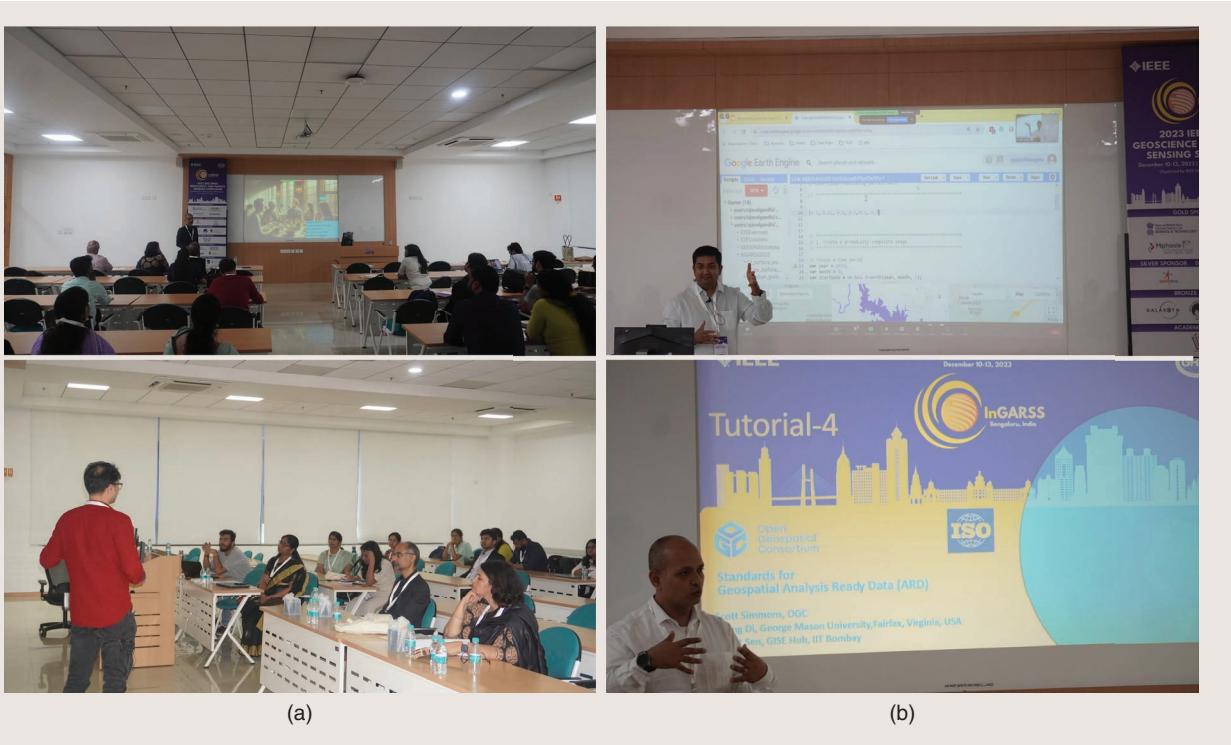
COMMUNITY EVENTS

The community events (Figure 6) featured four different groups, namely, WiE; YP; Diversity, Equity, and Inclusivity; and GRSS IDEA. The engaging events included a mix of
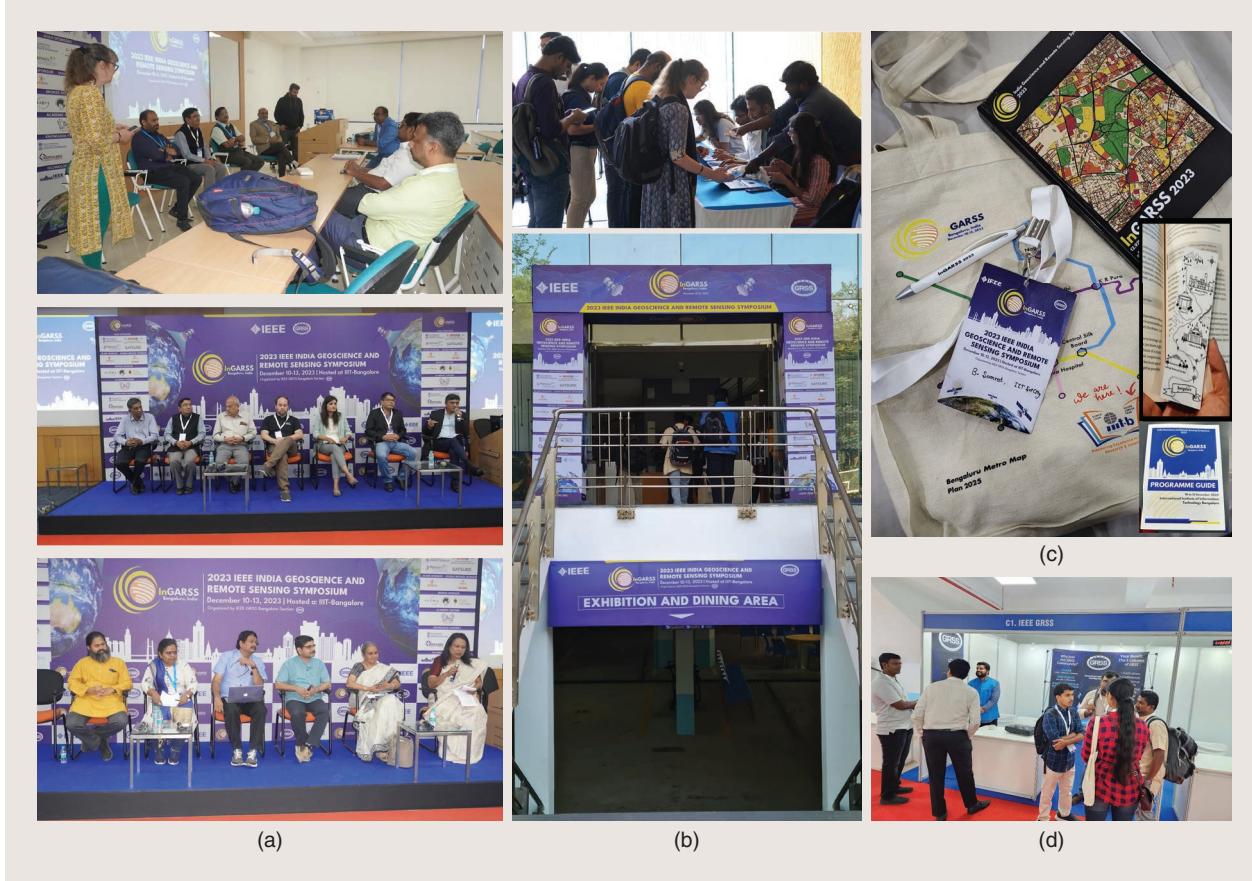
FIGURE 4. Invited speakers in the plenary session. (a) Demographics of the invited delegates for plenary sessions for (from top) affiliation, gender, and IEEE Region. (b) Similar demographics for other Regions. (c) The space mission overview speakers. (d)–(f) The plenary speakers for (d) keynote talks, (e) short talks from academia, and (f) short talks from industry.

FIGURE 5. Glimpses of (a) the doctoral colloquium expert talk and student presentation and (b) tutorials.

FIGURE 6. Glimpses of the (a) WiE panel discussion; (b) Diversity, Equity and Inclusivity creativity event; and (c) GRSS IDEA event.

FIGURE 7. Glimpses of (a) panel discussions in sponsor events; (b) local arrangements for registration, dining, and exhibition; (c) the registration kit; and (d) the GRSS booth.

panel discussions, talks, creative activity, storytelling contests, a data fusion contest, and mentoring and networking sessions. The data fusion contest prizes were generously supported by the GRSS YP team.

SPONSORSHIPS

The conference had four sponsorship categories in Indian rupees (INR) value, namely, gold (INR 500,000), silver (INR 100,000), double bronze (INR 50,000), and bronze (INR 25,000). The four gold sponsors were the Department of Science and Technology, Government of India (DST, GOI), Machine Intelligence and Robotics Center, Satsure, and Mphasis F1 Foundation. ISRO was the silver sponsor, and the National Remote Sensing Center was the double bronze sponsor. The bronze sponsors included Galaxeye, HALG, and Indian Institute of Technology Navavishkar i-Hub Foundation (IITTNiF).

The sponsors set up exhibit stalls and drove several technical events, such as panel discussions and talks (Figure 7). The exhibit stalls provided networking opportunities. The panel discussions covered interesting topics, such as advancing geospatial technologies for inclusive development; Indian Regional Navigation Satellite System (NavIC); and spatial thinking pedagogy for science, technology, engineering, arts, and mathematics learning.

CONFERENCE LOGISTICS

The conference was organized by a 40-member-strong OC along with enthusiastic volunteers from the host institute (Figure 8). The GENERAL CHAIRS, Dr. Jaya Sreevalsan-Nair, Dr. Avik Bhattacharya, and Dr. B. S. Daya Sagar, ably led the conference organization with the full support of the organizing Chapter slate and Executive Committee. Keeping up with the IGARSS tradition, the GRSS Chapter chairs meeting and the IEEE GRSS president's interaction session were organized on the preconference day. This could not have been possible without the support of the GRSS AdCom, who provided guidance to the OC at every step of the conference organization, including financial support, publicity, generous student travel support, and sponsorship of YP and IDEA events.

InGARSS 2023 was heavily publicized on social media, e.g., LinkedIn and X; in the GRSS e-newsletter and website; via a conference e-notice; and at IGARSS 2023 in Pasadena.

Last but not least, the conference organization focused on social responsibility, where all conference gifting was sourced from a social entrepreneurial company, Diya Innovations, that supports the livelihood of the differently abled. The registration kit was designed by a postgraduate environmental science student, Prakriti Goswami, thus enabling her fledgling company,

FIGURE 8. The people of InGARSS 2023. (a) The host institute volunteer team. (b) Conference participants. (c) The GRSS Chapter chairs meeting. (d) The organizing Chapter slate. (e) and (f) The OC.

Palettes and Patterns. The conference also consciously reduced plastic usage in its registration kit.

SUMMARY

In short, InGARSS 2023 was well balanced on all fronts and gave a memorable experience of a conference series successfully transitioning from online to hybrid mode. The next edition of InGARSS is slated to be held in Goa in December 2024.

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