

IEEE GRSS Gujarat (India) Chapter: Status and Activities 2019

The Gujarat Chapter of the IEEE Geoscience and Remote Sensing Society (GRSS) was established in 2013 through the combined efforts of the late Prof. W.M. Boerner, a distinguished senior professor emeritus of the University of Illinois at Chicago, along with Indian leaders. The GRSS Gujarat Chapter has been subsequently guided by Dr. Paul Rosen, global director of the GRSS. The Gujarat Chapter is one of the most vibrant Chapters in terms of its activities and outreach program. These efforts have resulted in the establishment of new Chapters and membership growth in India. This article focuses on the activities of the Chapter during 2019.

The following leaders provide services to the Chapter's activities:

- ▶ Dr. Shiv Mohan, chair
- ▶ Dr. A. Narain, vice chair
- ▶ Prof. Parul Patel, secretary
- ▶ Dr. Anup Das, treasurer
- ▶ Dr. Bindi Dave, Young Professionals representative.

Presently, our Chapter has a total of 45 members. The Chapter's activities during 2019 included technical lectures, the National Symposium, the training program, the Chapnet program operated jointly with Japan and Indonesia, establishing a booth during the Union Radio-Scientifique Internationale (URSI) conference, and various administrative meetings. The following sections provide the details.

TECHNICAL LECTURES

The Chapter organized technical lectures on advanced technologies under the IEEE Distinguished Lecturer, Distinguished Industry Lecture, and Special Lecture programs during 2019.

DISTINGUISHED LECTURER PROGRAM BY PROF. GUSTAU CAMPS-VALLS

A lecture on machine learning for remote sensing data analysis was organized in collaboration with the Indian Society of Remote Sensing on 22 June 2019 at CEPT University, Ahmedabad. In this talk, Dr. Gustau Camps-Valls presented an in-depth and detailed explanation of machine learning technology in general, followed by its application to and working case studies in the Earth observation domain (Figure 1). The session focused on the remote sensing image-processing chain and different strategies for feature extraction, classification, unmixing, retrieval, and pattern analysis for remote sensing data analysis. Powerful methodologies for supervised remote sensing data classification were discussed: extracting knowledge from data, including interactive approaches via active learning; classifiers that encode prior knowledge and invariances; semisupervised learning that exploits the information of unlabeled data; and domain adaptation to compensate for shifts in the ever-changing data distributions. The latest advances in the field of unmixing were reviewed, covering sparse approaches, spatial-spectral methods, and methods



FIGURE 1. Dr. Gustau Camps-Valls delivering a lecture.

constrained by physical models. Furthermore, recent advances in biogeophysical parameter estimation were also discussed. Beyond theory, the results of recent studies illustrating all of the covered issues were presented. Tutorial-based exercises were briefly discussed and shared with the participants for future reference.

Along with senior scientists from the Space Applications Center of the Indian Space Research Organization (ISRO) Physical Research Laboratory (PRL), Ahmedabad, a large number of students, researchers, faculty members, and industry representatives attended the enlightening lecture, followed by interaction with each other. The total number of participants was about 100, representing the Gandhinagar Institute of Technology, the Government Science College, the Shri Labhubhai Trivedi Institute of Engineering and Technology, Rajkot, the Indo-German Training Center, Charotar University of Science and Technology, S&P Global, Nirma University, Gujarat University, Amnax Technologies, CEPT University, the Institute for Plasma Research, Nascent Info Technologies, Pandit Deendayal Petroleum (PDP) University, and St. Xavier's College.

DISTINGUISHED INDUSTRY LECTURE PROGRAM BY DR. KEELY ROTH

An expert talk, "Vegetation Characterization With Multi-source Remote Sensing Data," was given at Nirma University by Dr. Keely Roth, a senior remote sensing scientist with The Climate Corporation, on 13 November 2019 (Figures 2 and 3). Dr. Roth covered the basic concepts of remote sensing, sensors, data collection methods, platforms, and data utilization. She also shared field data experience and discussed issues related to ground truth collections. The lecture also explored the benefits of combining sensor data across temporal, spatial, and spectral scales. The major focus of the lecture was on selecting the appropriate sensors and tradeoffs to consider, common methods for vegetation characterization, and how to use sensors and data fusion to leverage the strengths of multiple systems across various scales. The new sensor technology for ground truth collection was also discussed. Dr. Roth briefly explained the significance of data fusion and machine learning in remote sensing applications. The lecture was attended by participants from various institutes including the ISRO, CEPT University, PDP University, Gujarat University, and Nirma University.

EXPERT LECTURE BY DR. ANIL BHARDWAJ

On the occasion of the 50th anniversary of the Apollo moon landing, a popular lecture, "Exploring the Moon: 50th Year of the Moon Landing," was delivered at the M.G. Science Institute by Dr. Anil Bhardwaj, the director of PRL, on 20 July 2019 (Figure 4). This lecture covered various developments in lunar science since the moon landing, including developments at the ISRO. The lecture was attended by about 150 participants, mostly students, representing research and academic institutes including the ISRO PRL,

the M.G. Science Institute, Gujarat University, and Nirma University. At the end of the lecture, enthusiastic researchers interacted with the speaker on various issues related to lunar exploration.

TRAINING PROGRAM ON SYNTHETIC APERTURE RADAR POLARIMETRY

A training workshop was organized at the Arya Grand Hotel, Ahmedabad, from 2 to 5 December 2019, on synthetic aperture radar (SAR) polarimetry, basics, and applications. Faculty members were Dr. Kostas Papathanassiou of the



FIGURE 2. Dr. Keely Roth delivering the lecture "Vegetation Characterization With Multisource Remote Sensing Data."



FIGURE 3. Participants during the lecture by Dr. Keely Roth.



FIGURE 4. Dr. Anil Bhardwaj delivering the expert lecture "Exploring the Moon: 50th Year of the Moon Landing."



FIGURE 5. Dr. Carlos Lopez-Martinez delivering a lecture on SAR polarimetry.



FIGURE 7. Participants in the workshop on SAR polarimetry.



FIGURE 6. Dr. Kostas Papathanassiou delivering a lecture on SAR polarimetric interferometry.



FIGURE 8. Participants listening to various presentations.

German Aerospace Center and Prof. N. Carlos Lopez-Martinez of the Universitat Politècnica de Catalunya, Barcelona, Spain. About 70 participants from different organizations attended the course.

Day 1 of the tutorial covered topics on the basics of radar and polarimetry, data types, speckle filters, and decomposition theory, presented by Dr. Lopez-Martinez (Figure 5). Lectures on day 2 continued with Dr. Lopez-Martinez covering topics related to polarimetric decomposition, classification, and applications. On day 3, Dr. Papathanassiou delivered lectures on interferometry, polarimetric interferometry, and tomography (Figures 6 and 7). About 70 participants from various organizations in the country attended the tutorials (Figure 8).

NATIONAL SYMPOSIUM ON INDUSTRY-ACADEMIA COLLABORATION

Industry and academia are two pillars in shaping the nation's economy. However, a gap exists between what academics emphasize and what industry demands. The IEEE GRSS in collaboration with CEPT University is attempting to bring both stakeholders together to work out a joint program. To further this aim, the National Symposium of Industry-Academia Collaboration 2019 was organized on 10–11 December 2019. There were about 50 participants representing academia, industry, and government (Figure 9). The symposium presented topics of interest by various teams for joint work in the future.



FIGURE 9. A group photo of participants the National Symposium of Industry-Academia Collaboration 2019.



FIGURE 10. Dr. Paul Rosen and Dr. A. Narain at the URSI booth.

IEEE GRSS BOOTH AT URSI CONFERENCE, NEW DELHI, 11–14 MARCH 2019

The idea of a booth activity during the URSI conference was to create awareness and promote the membership of GRSS among institutions in India. For the first day, Dr. Shiv Mohan, Munir Mohammed, Dr. Paul Rosen, and Dr. A. Narain explained to visitors about GRSS Chapters in the country (Figure 10). In all, there were 50 visitors to the booth. Some were IEEE professional and Student Members representing various institutions and Chapters in the country and abroad. The visitors were briefed on the six technical committees of the GRSS dealing with specific areas of research and about the advantages of becoming a member of the GRSS.

CHAPNET PROGRAM

The CHAPNET program of the GRSS (Gujarat, India, Japan, and Indonesia) was proposed as a joint program for a presentation at the International Polarimetric SAR Workshop in Tokyo 2019, which was co-organized by the National Institute of Information and Communications Technology, Japan (Figure 11). Chairs from three Chapters presented their contributions to the global community. The following presentations were given during the session:



FIGURE 12. Dr. Maneesha Gupta: ready for the Chapter chairs' presentation.

- ▶ “Equatorial Satellite Constellation Communication for Disaster Mitigation” by Wahyudi Hasbi, National Institute of Aeronautics and Space, Indonesia
- ▶ “Study of HAPS Inclusion for Future Integrated Satellite Network,” by Dr. Arifin Nugroho, Indonesia
- ▶ “Towards Multiparameter SAR Applications: Indian Context,” by Dr. Shiv Mohan, India.

CHAPTER CHAIRS MEETING, YOKAHAMA, JAPAN

As is the tradition for exchanging information and discussing problems and solutions, a meeting of Chapter chairs was organized in Yokohama, Japan, on 30 July 2019. Chapter activity was presented by Dr. Maneesha Gupta from the ISRO (Figure 12). Her presentation was highly appreciated by the participants.

THE CHAPTER'S EFFORTS HAVE RESULTED IN THE ESTABLISHMENT OF NEW CHAPTERS AND MEMBERSHIP GROWTH IN INDIA.

INDIAN CHAIRS MEETING

Extending support for GRSS activities in India, our Chapter contributed to the Chapter chairs meeting on 10 March 2019 at the India Habitat Center, New Delhi. One item on



FIGURE 11. Global experts meet at the International SAR Polarimetry Workshop, Tokyo, Japan, 3–4 August 2019.



FIGURE 13. India Chapter chairs meeting with GRSS Global Director Dr. Paul Rosen (second from left).



FIGURE 14. Members of the Gujarat Chapter meeting on 22 June 2019.



FIGURE 15. Members of the Gujarat Chapter and guests meeting on 5 December 2019.

the agenda related to future directions for activities that could be done jointly and a proposal for an international conference. Subsequently, this group met on 13 July 2019 and 5 November 2019 to plan the InGARSS 2020 Symposium (Figure 13).

During the year, two new Chapters, namely Kerala and Madras, were established. Thus, a total of eight Chapters have been established during the last six years, with membership reaching to 380 in India.

IEEE GRSS GUJARAT: MEETING OF MEMBERS

The GRSS Gujarat Chapter professional and student members met on 22 June and 6 December 2019 (Figures 14 and 15). The major focus of discussion was planning activities and encouraging students to initiate a Student Branch

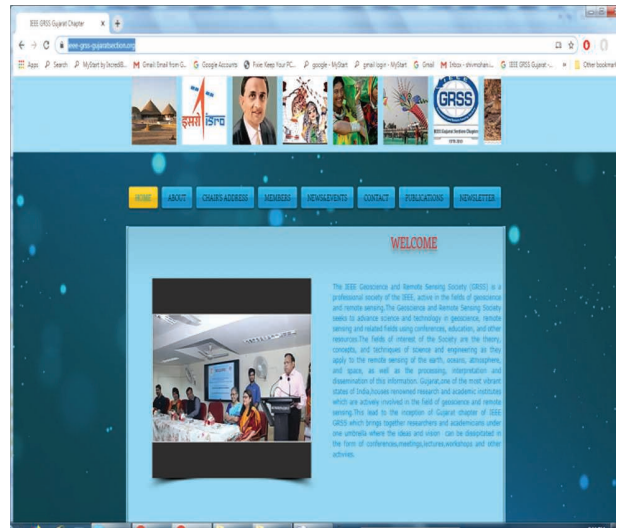


FIGURE 16. The homepage of the Gujarat Chapter website.



FIGURE 17. The cover page of the 2018 issue of the newsletter.

at CEPT University. It was decided to allow entry of members free of cost during the year's activities.

CHAPTER'S WEBSITE AND NEWSLETTER

The Gujarat Chapter established its website in 2013, and all activities are listed during the current year (<https://www.ieee-grss-gujaratsection.org/>). After the end of the year, activities are compiled in the form of a newsletter. The homepage of the website is shown in Figure 16, and an example of the newsletter is provided in Figure 17.

AUTHOR INFORMATION

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