



Earth Science Informatics Technical Committee

Chairs:

Peng Yue, Wuhan University

Rahul Ramachandran, NASA/MSFC

Peter Baumann, Jacobs University Bremen

Standards Group:

Siri Jodha S. Khalsa, University of Colorado

Meixia Deng, George Mason University

GRSS AdCom Meeting

IGARSS 2017

Fort Worth, Texas, USA, July, 2017



Content

- | **Presentation of the TC**
- | **Review of what has been done in 2016 with a highlight**
- | **IGARSS sessions (shortly) and the main thematic focus**
- | **Ongoing and new initiatives for 2016/2017**
- | **Publications**
- | **Others**



ESI TC Mission Statement



Earth Science Informatics Technical Committee

- | **The mission of the Earth Science Informatics Technical Committee (ESI TC) is to advance the application of informatics to the geosciences and remote sensing, to provide a venue for ESI professionals to exchange information and knowledge, and to give technology advice to major national and international ESI initiatives.**



Research Areas

- | **Data and information policies**
- | **Data stewardship (preservation, provenance, quality, etc.)**
- | **Knowledge representation and information models**
- | **Interoperability and standards**
- | **Data discovery and access**
- | **Web-based services and analysis**
- | **Semantic representation of entities in the Geosciences (e.g., spatial and process ontologies, vocabularies, semantic web)**
- | **Sensor web and applications**
- | **Cloud computing**
- | **Information and knowledge extraction; decision support systems**
- | **Earth system modeling**
- | **Software tools to visualize and analyze geoscience data**
- | **Emerging information technologies and their applications in the geosciences**
- | **...**



ESI TC membership status

- | **Currently ESI TC has more than 100 members**
- | **Countries/Areas represented:**

- **Australia** – **Germany**
- **Belgium** – **India**
- **Brazil** – **Italy**
- **Canada** – **Japan**
- **China** – **New Zealand**
- **France** – **South Africa**
- **Switzerland**
- **Taiwan**
- **Turkey**
- **UK**
- **USA**

Agro-Geoinformatics 2017

ESI TC has been supporting the international conference series on Agro-Geoinformatics

- The Sixth International Conference on Agro-Geoinformatics
- Dates: August 7-10 2017
- Location: Fairfax, VA, USA
- ESI TC is technically co-organizing the conference: ESI TC chair Peng Yue is the scientific committee co-chair



The screenshot shows the website for the Sixth International Conference on Agro-Geoinformatics 2017. The main banner features a globe and the text: "The Sixth International Conference on Agro-Geoinformatics", "Agro-Geoinformatics 2017", "7-10 August 2017 | Fairfax VA, USA", and "Fairfax VA USA 2017". Below the banner is a navigation menu with links: HOME, ABOUT, REGISTRATION, FOR AUTHORS, PROGRAM, TRAVEL AND VENUES, STUDENTS AND YOUNG PROFESSIONALS, CONTACT US. The main content area includes the date "August 7-10 2017", the conference title, and location. A section titled "UPCOMING IMPORTANT DATES" lists: "June 25, 2017 Author Registration Deadline", "June 30, 2017 Full paper submission deadline", and "August 07-10, 2017 Agro-Geoinformatics 2017". A paragraph describes the conference's focus on agricultural sustainability, food security, and environmental research. The footer contains the IEEE logo.



ESI Invited Session: IGARSS 2017

| **MO4.L10: Intelligence for Big Geospatial Data**

- Time: Monday, July 24, 16:20 - 18:00 Location: Room 202 B
- Session Chairs: Peng Yue, Wuhan University, Peter Baumann, Jacobs University Bremen

| **Presentations**

- **MO4.L10.1: CUMULUS: NASA'S CLOUD BASED DISTRIBUTED ACTIVE ARCHIVE CENTER PROTOTYPE**
- **MO4.L10.2: A STREAM COMPUTING BASED APPROACH FOR UPDATING WATERLOGGING INFORMATION ON REMOTE SENSING IMAGES**
- **MO4.L10.3: DEEP WEB CRAWLING FOR INSIGHTS FROM POLAR DATA**
- **MO4.L10.4: ADVANCES IN FUSION OF BIG GEOSPATIAL DATA**
- **MO4.L10.5: LATENCY ANALYSIS OF LARGE VOLUME SATELLITE DATA TRANSMISSIONS**



GRSS-OGC Joint Invited Session: IGARSS 2017

- | **FR2.L7: Remote Sensing Big Data and the Internet of Things**
 - Time: Friday, July 28, 10:40 - 12:20 Location: Room 203 A
 - Session Chairs: Trevor Taylor, Open Geospatial Consortium (OGC), Peng Yue, Wuhan University

- | **Presentations**
 - **FR2.L7.1: BIG DATA MEETS INTERNET OF THINGS: A STANDARDS-BASED PERSPECTIVE**
 - **FR2.L7.3: AN OPEN STANDARDS BASED METHOD FOR INTEGRATED ENVIRONMENTAL MODELLING**
 - **FR2.L7.4: CONNECTING THE INTERNET OF THINGS TO THE EO COMMUNITY AND THE GEOSPATIALLY ENABLED WEB USING OGC STANDARDS**
 - **FR2.L7.5: APPLYING DISCRETE GLOBAL GRID SYSTEMS TO SENSOR NETWORKS AND THE INTERNET OF THINGS**



ESI TC 2018 New Initiative Proposal – Submitted

- | **2018 International Workshop on Big Geospatial Data and Data Science**
 - Organized by ESI TC and Wuhan University
 - Sept. 22 - 23, 2018 , Wuhan, China
- | **Lead:**
 - Peng Yue, Wuhan University
- | **Funding**
 - 3% Initiative 2018 \$10K approved to reimburse travel expense for invited experts or additional travel costs and facilities.
- | **Return on Investment**
 - Promoting activities of Globalization Committee and ESI TC
 - Enhancing the reputation of IEEE GRSS in the geospatial field
 - Fostering collaboration with sister societies including ISPRS and OGC
 - Potential new members of IEEE GRSS
 - Advancing theories and practices on big geospatial data

ESI TC Article for GRSM 2016 December Issue

predictive
mathematics
 learning
models techniques
 machine
statistics
 descriptive

Analytics

information
 distributed volunteered
 paradigm longterm centers
 shift **provenance**
data preservation
 environment curation
 processing **management**
lifecycle

Data lifecycle

Earth Data
 Science



processing geospatial
 applications **interoperability**
 adopted **RDA** number
ISO OGC
 enhanced research
W3C
 resources standards
integration

Standards

Recent Activities in Earth Data Science [Technical Committees]

6 Author(s) | 1 Paper Citation | 167 Full Text Views

Abstract: Recent trends on big Earth-observing (EO) data lead to some questions that the Earth science community needs to address. Are we experiencing a paradigm shift in Earth science research now? How can we better utilize the explosion of technology maturation to create new forms of EO data processing? Can we summarize the existing methodologies and technologies scaling to big EO data as a new field named earth data science? Big data technologies are being widely practiced in Earth sciences and remote sensing communities to support EO data access, processing, and knowledge discovery. The data-intensive scientific discovery, named the fourth paradigm, leads to data science in the big data era [1]. According to the definition by the U.S. National Institute of Standards and Technology, the data science paradigm is the "extraction of actionable knowledge directly from data through a process of discovery, hypothesis, and hypothesis testing" [2]. Earth data science is the art and science of applying the data science paradigm to EO data.

Published in: IEEE Geoscience and Remote Sensing Magazine (Volume: 4, Issue: 4, Dec. 2016)

Page(s): 84 - 89 | DOI: 10.1109/MGRS.2016.2600528



Member Contributions: Miscellaneous

- | **ESI TC member Hampapuram K. Ramapriyan**
 - **Distinguished Lecturer Series : three in Shanghai, Wuhan, and Beijing GRSS Chapters in May, 2017, and will do one in September 2017 in Melbourne, FL and the other in November 2017 in Hyderabad, India**
 - **New Work Item Proposal (NWIP) for ISO 19165-2 standard: “Geographic information -- Preservation of digital data and metadata -- Part 2: Content specifications for earth observation data and derived digital products”**



GRSS and Standards Development

| Peter Baumann, ESI chair:

- ISO 19123 ⁴ ISO 19123-1 (contributing expert)
 - » Revision of 19123; NWIP accepted
- ISO 19123-2 (project leader)
 - » Adopting OGC Coverage Implementation Schema (CIS); entering DIS ballot
- ISO 19163-2 (contributing expert)
 - » Optical remote sensing imagery, based on OGC CIS / ISO 19123-2
- ISO 9075 SQL Part 15: Multi-Dimensional Arrays (MDA) (initiator, co-editor)
 - » n-D arrays in SQL, domain-neutral
- INSPIRE WCS Download Service
 - » Adoption of OGC WCS & WCPS
- Indirect contribution to standards: *The Datacube Manifesto*
 - » <http://earthserver.eu/tech/datacube-manifesto>