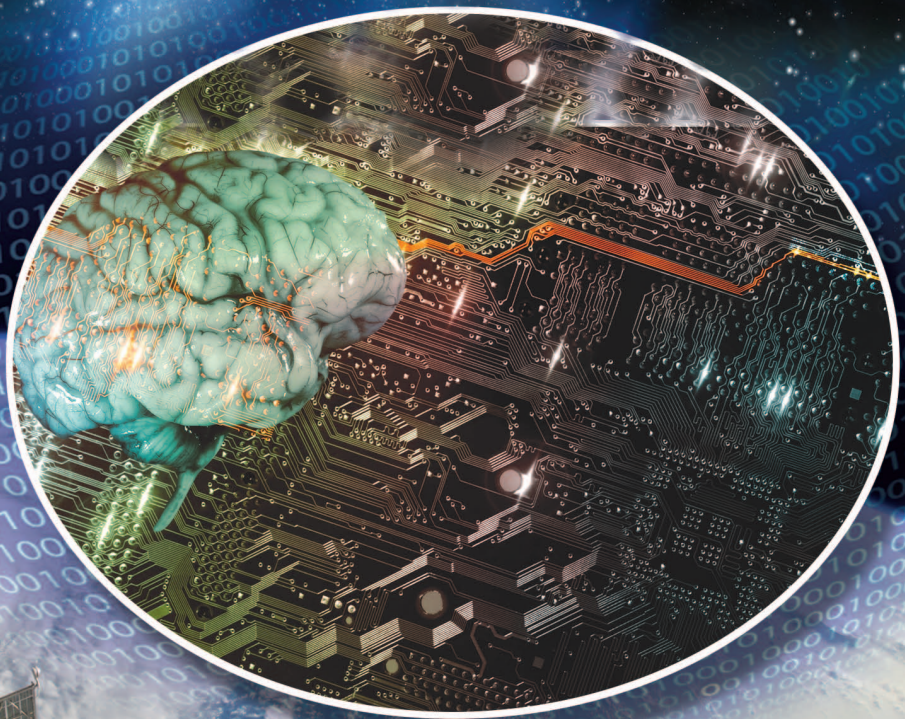


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Deep Learning Comes to Remote Sensing

Can Data Science Help Solve Major Challenges?



EMMETT IENTILUCCI

GRSS Western New York Chapter Status and Activities 2016–2017

The Western New York (WNY) Chapter of the IEEE Geoscience and Remote Sensing Society (GRSS) has hosted a number of important activities since 2016. Following are a brief history of our Chapter and descriptions of some of our more recent functions.

GRSS WNY CHAPTER HISTORY

The GRSS WNY Chapter was officially inaugurated on 27 May 2007 by Dr. John Kerekes of the Rochester Institute of Technology (RIT), New York. The Chapter spans the five Sections of IEEE Region 1, Area D, including Binghamton, Buffalo, Ithaca, Rochester, and Syracuse, with Rochester serving as the parent Section.

Formed in response to the area's growing remote-sensing activity in both industry and academia, the Chapter's goals include providing opportunities for networking and information sharing through technical presentations at Chapter meetings, as well as raising the visibility of the GRSS within our local community. In the ten years since the Chapter's inception, we have held numerous technical meetings, including our latest annual endeavor—a workshop on unmanned aerial systems (UASs), which is discussed later in this column.

2016–2017 OFFICERS

The WNY Chapter officers for 2016–2017 are as follows:

- ▶ Chapter chair: Emmett Ientilucci, RIT
- ▶ Chapter vice chair: Sildomar Monteiro, RIT
- ▶ Chapter secretary: John Kerekes, RIT
- ▶ Buffalo Section coordinator: Bea Csatho, University of Buffalo
- ▶ Ithaca Section coordinator: Bill Philpot, Cornell University
- ▶ Syracuse Section coordinator: Jay Kyoon Lee, Syracuse University
- ▶ Binghamton Section coordinator: open.

The Chapter chair is elected by the membership, while Section coordinator positions are appointed by the chair. Due to the large geographic distance covered by the Chapter, we have found the Section coordinator positions to be helpful in staying in touch with local members and arranging meeting logistics.

2016–2017 MEMBERSHIP AND MEETING PROMOTION

During 2016–2017, the Chapter had 22 members: four students, ten regular members, six IEEE Senior Members, one IEEE Life Member, and one IEEE Life Fellow. We regularly promote activities through the *IEEE Rochester Section Newsletter*, the *Rochester Engineer* (published by the Rochester Engineering Society), and the GRSS WNY website.

2016–2017 TECHNICAL MEETINGS

Eight formal GRSS WNY Chapter meetings were held during 2016–2017. The Chapter hosted the speakers for dinner afterward; funds for these expenses were provided by the IEEE Rochester Section. Following are details of each meeting.

- ▶ 5 April 2017: "Multimodal Unmanned Aerial System Development and Applied Research at RIT," by Dr. Jan van Aardt, professor, RIT. The meeting was held on the RIT campus as part of the IEEE Joint Chapters Meeting (JCM) and was attended by 18 IEEE Members and two guests.
- ▶ 1 March 2017: "Sunnier Than a Sunny Day: Recent Advances in Hyperspectral Image Simulation for Partly Cloudy Scenes," by Dr. Rob Sundberg, president of Spectral Sciences, Inc., Burlington, Massachusetts. The meeting was held on the RIT campus, in conjunction with the Center for Imaging Science Weekly Seminar Series, and was attended by 12 IEEE Members and 48 guests.
- ▶ 31 October 2016: "Imaging Spectroscopy Technologies and Applications," by Dr. Zakos Mouroulis, senior



FIGURE 1. Prof. Emmett Ientilucci (general chair) providing introductory remarks during the first STRATUS Workshop at RIT in October.



FIGURE 2. Brian Pitre of SkyOp, Canandaigua, New York, giving a presentation at the STRATUS 2016 Workshop on the topic of small UASs and their impact on business.

research scientist, Jet Propulsion Lab, Pasadena, California. The meeting was held on the RIT campus, hosted jointly with the Optical Society of America, and was attended by four IEEE Members and 38 guests.

- ▶ 28 October 2016: “The 2016 Systems and Technologies for Remote Sensing Applications Through UASs (STRATUS 2016) Workshop,” by Dr. Emmett Ientilucci, general chair (Figure 1). This workshop, as discussed later in this column, addressed many emerging topics in the field of remote sensing and UASs and was attended by ten IEEE Members and 72 guests.
- ▶ 21 September 2016: “RIT’s 35+ Years of Support for the NASA/United States Geological Survey Landsat Program of Earth Observation: How It Began, Stalled, Got Back on Track, and Is Flourishing Today,” by Dr. John Schott, professor, RIT. The meeting was held on the RIT campus,

scheduled in conjunction with the Center for Imaging Science Weekly Seminar Series, and was attended by 12 IEEE Members and 52 guests.

- ▶ 19 April 2016: “Landsat 8 Thermal Infrared Sensor Stray Light Correction Algorithm Development and Assessment,” by Dr. Aaron Gerace, associate scientist, RIT. This meeting was held as part of the JCM and was attended by two IEEE Members and four guests.
- ▶ 16 March 2016: “An Overview of Nonlinear Mixing Models for Hyperspectral Imagery,” by Dr. Joshua Broadwater, principal scientist, Johns Hopkins Applied Physics Laboratory Columbia, Maryland. The meeting was held on the RIT campus, scheduled in conjunction with the Center for Imaging Science Weekly Seminar Series, and was attended by ten IEEE Members and 32 guests.
- ▶ 24 February 2016: “Geoenvironmentalism: Advocating Environmental Sustainability Through Satellite-Derived Geoinformatics,” by Dr. Giorgos Mountrakis, associate professor, State University of New York College of Environmental Science and Forestry, Syracuse. The meeting was held on the RIT campus, scheduled in conjunction with the Center for Imaging Science Weekly Seminar Series, and was attended by ten IEEE Members and 42 guests.

CHAPTER WEBSITE

The Chapter continues to take advantage of the IEEE’s web hosting service

and tools and maintains a WNY GRSS Chapter website at <http://ewh.ieee.org/r1/rochester/grss>. The site is primarily used to announce upcoming meetings by providing information about each technical seminar as well as its location information and directions. Links to area remote-sensing organizations and other events are also provided along with links to the local IEEE Sections and the IEEE and GRSS home pages.

ADDITIONAL 2016 ACTIVITIES

In addition to the seven technical presentations previously mentioned, the WNY GRS Society hosted its first annual workshop related to remote sensing and UASs on 28 October 2016. The STRATUS 2016 workshop was made possible, in part, by a US\$3,400 GRSS grant awarded to Dr. Ientilucci, the workshop’s general chair (Figure 1). The grant allowed

the Chapter to charge low registration fees for nonstudents and waive registration fees for students. The workshop also received technical cosponsorship from the GRSS, which enabled hosting of the event on the IEEE GRSS website, advertising in *IEEE Geoscience and Remote Sensing Magazine (GRSM)*, and the ability to publish accepted full papers on *IEEE Xplore*.

The aim of the workshop was to facilitate interaction among academic and industry researchers along with students working in the field of remote sensing utilizing UASs. Because this is an emerging field, the goal was not to define technical requirements, standards, or legal policy, but rather to illustrate the specific connection between remote sensing and unmanned aerial platforms at both the commercial and academic levels. Talks were given by representatives from industry (Figure 2) and academia (Figure 3), and tours were provided of the Digital Imaging and Remote Sensing Lab located in the Center for Imaging Science at RIT (Figure 4).

There were 82 people (29 of whom were students) from both industry and academia registered for the workshop. Companies including SkyOp, Positive Science, Headwall Photonics, RIT Research Enterprise, Benewake, Choice Research Group, Microdrones, Harris Corporation, Eagle Hawk, EnableUAV, Oak Ridge National Labs, and the Monroe County Water Authority were represented. Individuals from universities such as the University of Guelph (Canada), the Beijing Institute of Technology (China), Hobart and William Smith Colleges (Geneva, New York), Cornell University (Ithaca, New York), St. John Fisher College (Pittsford, New York), the University of Rochester (New York), Cayuga Community College (Auburn, New York), RIT, and Monroe Community College (Rochester, New York) were also in attendance.

This first workshop had a two-track submission process. Individuals could either submit an abstract (plus presentation) or a four-page, full peer-reviewed paper (plus presentation); these papers appear on *IEEE Xplore*. We solicited work



FIGURE 3. Prof. Josephine Wolff, RIT, giving a presentation at the STRATUS 2016 Workshop.



FIGURE 4. Graduate student Paul Sponagle (left) giving a tour of the UAS Lab in RIT's Center for Imaging Science Digital Imaging and Remote Sensing Lab.



FIGURE 5. A poster session at the STRATUS 2016 Workshop.

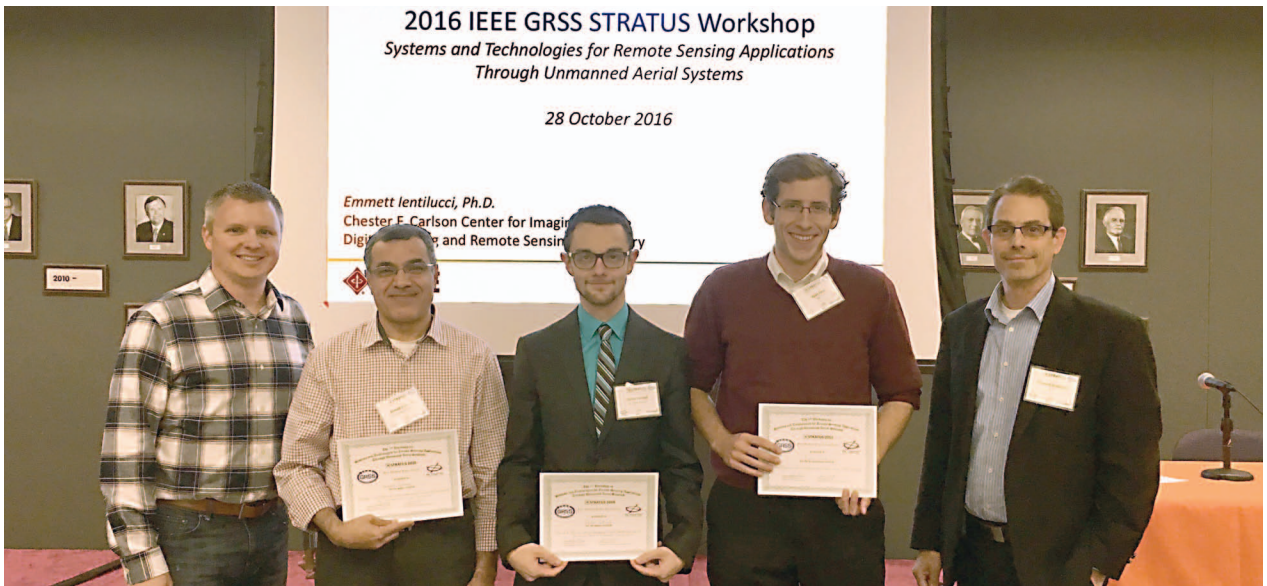


FIGURE 6. The student awards for best paper, poster, and presentation: (from left) Thom Salter (EagleView Pictometry), Ahmed Elshamli (best paper), Dylan Cornell (best poster), Ryan Ford (best presentation), and Prof. Ientilucci (general chair).



FIGURE 7. Prof. John Kerekes leading a panel discussion with (seated, from left) David Messinger (director, Center for Imaging Science), Peter Clemens (director of Engineering and Development, Headwall Photonics, Massachusetts), Brian Pitre (managing member, SkyOp), and Josephine Wolff (assistant professor of public policy, RIT).

on such diverse topics as three-dimensional and multiview imaging, analysis techniques and applications, imaging systems, platforms, sensors, and general UAS technologies.

There were 11 oral and six poster presentations (Figure 5) along with two keynote speakers, one from industry (Headwall Photonics in Boston, Massachusetts) and one from academia (RIT). The coil-bound proceedings were handed out on the morning of the workshop. Student awards (US\$200 each) were given out for the best paper (Ahmed Elshamli), best poster (Dylan Cornell), and best oral presentation (Ryan Ford); these awards were made possible by the generous financial contributions of EagleView Pictometry (Figure 6). The workshop concluded with a panel discussion by individuals from industry and academia (Figure 7).

Based on anonymous feedback forms passed out at its conclusion, this GRSS-sponsored workshop was a huge

success. The workshop was advertised by way of a local radio station interview, an article in *GRSM*, an article in the *Rochester Engineer*, and an article in the local university news. Additionally, postworkshop articles were printed in both the *Rochester Engineer* (December 2016 issue) and *RIT University News* (November 2016). The intention is that this will be the first of an annual series of RIT workshops on UASs.

2017 ACTIVITIES AND FUTURE PLANS

Technical presentations on topics such as cloud simulations and UAS applications were held in early 2017. We have also been looking into securing a speaker through the IEEE Distinguished Lecturer Series. A second STRATUS workshop was held on 19–20 October 2017. This latest GRSS-cosponsored workshop included two tutorial sessions on radiometric calibration (presented by Labsphere, Inc.) and on UAS-focused photogrammetry and mapping (presented by Pix4D, Inc.). Information on the workshop can be found at <http://ewh.ieee.org/r1/rochester/grss/STRATUS2017> and will be described in more detail in a 2018 issue of *GRSM*.

AUTHOR INFORMATION

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