

# R·I·T Science+Math

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## MONTH IN REVIEW

### Message from the Dean

I hope your semester is going well.

I am pleased to share with you last month's highlights and accomplishments of our students, faculty, and staff.

Congratulations to all and keep up the good work!

SOPHIA MAGGELAKIS  
Dean, College of Science



**Sophia Maggelakis, Dean**  
RIT College of Science

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## February 2017

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### Michael Zemcov and COS students to publish paper in *Nature Communications*

Michael Zemcov, SoPA assistant professor of physics has had a paper accepted by *Nature Communications*. The paper, titled "Measurement of the Cosmic Optical Background using the Long Range Reconnaissance Imager on New Horizons," was also co-authored by Chi Nguyen, a Ph.D. candidate in the RIT Astrophysical Sciences and Technology graduate program, and Poppy Immel, a BS/MS student. NASA's New Horizons spacecraft recently performed the first detailed reconnaissance of the Pluto-Charon system. In addition to the fly-by mission, New Horizons acquired a great deal of data during the mission's 10-year cruise phase, some of which can be used to measure the cosmic optical background, which is the summed emission from all sources outside of our Milky Way galaxy



emitted at wavelengths roughly corresponding to those visible with the human eye. The authors showed that a direct observation of the background brightness from the outer solar system can be obtained by New Horizons.

### **Nine COS students nominated for the RIT Outstanding Undergraduate Award**

Nine students from the College of Science have been nominated for the 2016-17 RIT Outstanding Undergraduate Student Award.

- **Christian Cammarota**, Physics
- **Shayna Gray**, Chemistry
- **Arthur Kalb**, Computational Mathematics
- **Brody Kutt**, Computational Mathematics
- **Stefano Marin**, Physics
- **Cassandra Martin**, Biochemistry
- **Alex Mcmanus**, Applied Mathematics
- **Renee Meinhold**, Applied Mathematics
- **Shivana Phadke**, Biochemistry

### **Scott Franklin earns APS advocacy award**

Scott Franklin, SoPA professor and CASTLE director, was one of two inaugural recipients of the American Physics Society's Five Sigma award for physics advocacy. Dr. Franklin was recognized for developing a working relationship with U.S. Representative Louise Slaughter's office and visiting the offices of U.S. Senator Kirsten Gillibrand and Rep. Slaughter during a pilot APS in-state effort.



### **RIT undergraduates reproduce conditions of oceans, atmosphere on Earth-like planets**

First-year students in Rochester Institute of Technology's Science Exploration Program are reproducing a slice of life in their lab that might exist on the seven Earth-like planets recently discovered in another solar system. RIT undergraduates are simulating the right atmospheric conditions within the habitable zone suitable for supporting life beyond our solar system. The students' experiments have created 10 amino acids—the fundamental building blocks of life—in different solutions.



[University News >](#)

### **Chip Bachmann awarded Department of Defense grant for hyperspectral video imaging assessment**

CIS associate professor Charles "Chip" Bachmann was awarded \$178,849 by the U.S. Department of Defense National Geospatial Intelligence Agency for a proposal titled "Hyperspectral Video Imaging Assessment and Mapping of Littoral Conditions." Dr.



Bachman will develop and demonstrate the ability to acquire and directly map in a field setting key geotechnical parameters of the beach that directly influence trafficability using the new DURIP hyperspectral video system.

### **Scott Brown awarded US Intelligence grant for improved maritime image simulation**

CIS associate scientist Scott Brown was awarded \$74,981 for a proposal titled "DIRISG Upgrades for Improved Maritime Image Simulation" by U.S. Government Intelligence / Arete Associates. Digital Imaging and Remote Sensing Image Generation (DIRSIG) is a physically based first principles tool widely used by government programs to generate simulated imagery from electro-optic sensors. Over the past 20 years significant development has occurred expanding the applicability of the model. However, the tool has yet to be optimized in the maritime regime where imaging the dynamic air-sea surface and transparent water bulk pose different challenges than imaging land. In this effort DIRSIG developers will work with Arete Associates to extend the model to the maritime regime.



### **Aaron Gerace awarded US Geological Survey grant for Landsat thermal instrument calibration**

CIS associate scientist Aaron Gerace was awarded \$100,000 for a proposal titled "Support to USGS to Enhance Calibration for Current and Future Landsat Thermal Instruments" by the U.S. Geological Survey. Since first light, the Thermal Infrared Sensor (TIRS) on-board Landsat 8 has suffered from a significant stray-light issue that has limited the utility of this dual-band instrument. The proposed effort seeks to provide calibration support for TIRS-1, to assess its potential to be used for deriving land-surface temperature using the split-window technique, and to investigate non-traditional methodologies to provide an enhanced absolute calibration for TIRS and future Landsat thermal instruments.



### **Manuela Campanelli presents TEDx talk**

Manuela Campanelli, director of the Center for Computational Relativity and Gravitation, gave a presentation during a TEDx talk at RIT February 4 on Einstein's predictions about gravitational waves and binary black holes. She was joined on stage during the multidisciplinary event by experts in education, engineering, and the performing arts.



## **COS faculty and students participate in Girls Soaring into STEM**



Lea Michel and Kara Maki, of Women in Science, were joined by Triana Almeyda, Chi Nguyen, Brittany Vanderhoof, and Meaghann Stoelting in organizing seven hands-on experiment tables at RIT's February 4 event "Girls Soaring Into STEM." The event was attended by more than 150 Girl Scouts and other participants.

[WXXI >](#)  
[YouTube >](#)

**COS participates in Immersions, Minors, and Majors Fair**

College of Science advisors and school administrators participated in the annual Immersions, Minors, and Majors Fair February 23 hosted by the College of Liberal Arts. The event gives current RIT students a chance to meet with representatives of programs they can use to supplement their study in majors across the university.

**COS faculty approved for sabbatical projects**

The following COS faculty members have been approved for sabbaticals during the 2017-18 academic year.

- **Don Figer, CfD**  
Expansion of the Center for Detectors
- **Akhtar Khan, SMS**  
Uncertainty Quantification in Elasticity Imaging Inverse Problem of Locating Cancerous Tumor



- **Nathan Cahill, SMS**  
Graph-Based Manifold Learning for Imaging Analysis and Neuroscience Applications
- **Suzanne O'Handley, SCMS**  
Discovery and Characterizations of Nudix Hydrolases and HAD Superfamily Members as Potential Novel Antibiotic Targets
- **Andrew Robinson, SoPA**  
Hidden Monsters: multiwavelength studies of supermassive black holes (and other energetic phenomena) in galactic nuclei
- **Susan Smith Pagano, GSoLS**  
The nutritional origins of *Rhamnus cathartica*: a biochemical comparison of native and introduced populations

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## Social Media

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### 'The Shape of Space'

Distinguished Lecturer Jeff Weeks, an independent geometric topologist, gave a presentation February 6 titled "The Shape of Space." Dr. Weeks used computer games to introduce the concept of a "multiconnected universe," then took the audience on a tour of several possible shapes for space using interactive 3D graphics. Finally, Dr. Weeks showed how satellite data provides tantalizing clues to the true shape of the universe.



### Why COS Wednesday

Rebecca Knauff, an MS student in Applied and Computational Mathematics, tells us she selected RIT because "I'm head over heels in love with the subject I study."

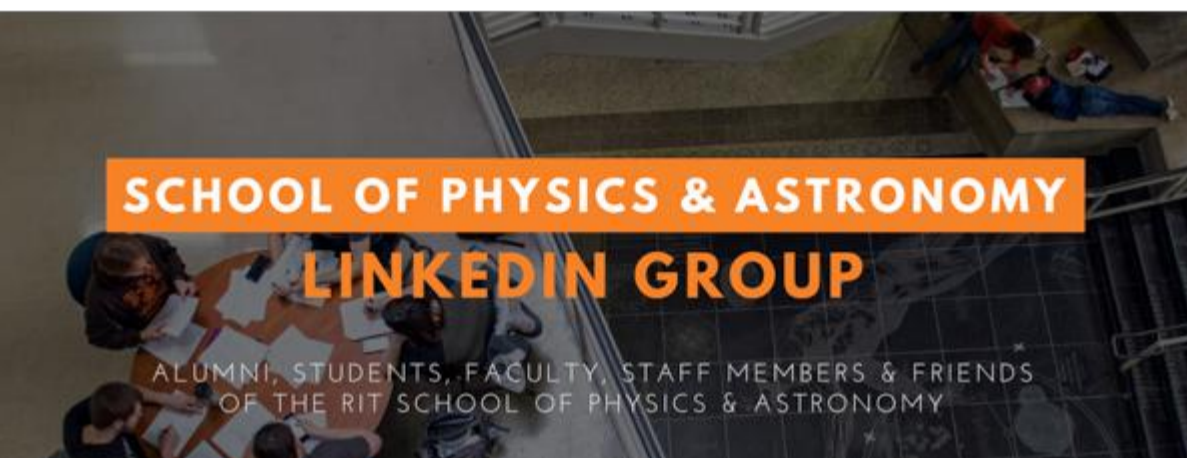
### Dean's List luncheon

Students who made the Fall Dean's List gathered February 24 in the Bruce and Nora James Atrium for a special luncheon with Dean Sophia Maggelakis, as well as COS faculty and staff.





## SoPA on LinkedIn



The RIT School of Physics and Astronomy has created an LinkedIn group to serve as an open space for engagement between alumni, students, family, friends, faculty, and staff members. [SoPA LinkedIn >](#)

## Liquid Nitrogen Ice Cream



The Beta Sigma chapter of Alpha Chi Sigma served up liquid nitrogen ice cream to RIT students in the Bruce and Nora James Atrium on February 8.


## National Wear Red Day



The College of Science Dean's Office staff observed National Wear Red Day February 3, an event promoted by the American Heart Association to support women's heart health.

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## Newsmakers

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**Nargess Hassani**, a Ph.D. candidate in color science from Tehran, Iran, presented “Color discrimination threshold for medical test devices” at the IS&T International Symposium on Electronic Imaging in Burlingame, Calif., Jan. 29-Feb. 2. RIT Women In Science (WISe) awarded her travel funding to attend the conference.

**Rachael Thormann**, a fourth-year computational math major from Williamstown, N.Y., won student travel grants from the Mathematical Association of America and RIT’s Women in Science, or WISe, program to attend the Joint Mathematics Meetings, Jan. 4-7 in Atlanta, Ga. She presented her research on the motion of a contact lens. Thormann works with David Ross, professor, and Kara Maki, assistant professor, in RIT’s School of Mathematical Sciences.

**Matthew Hoffman**, SMS assistant professor, continues to see his research in simulating solid waste pollution featured in the popular media. Great Lakes Echo published an article titled ["New model tracks plastic in the Great Lakes."](#) He was also interviewed for [WROC-TV](#) in Rochester.

**Brian Koberlein**, SoPA senior lecturer, explained how astronomers found seven earth-sized planets around dwarf star Trappist-1 for [Forbes.com](#).

**Kristina Punzi**, astrophysical sciences and technology Ph.D. candidate, was featured in *Astronomy*, Jan. 10, in an article titled ["This small star may be dimming because it ate a Jupiter-sized planet."](#)

**Scott Franklin**, SoPA professor and director of the Center for Advancing Science/Math Teaching, Learning & Evaluation was quoted in AAAS, Jan. 3 in an article titled ["Experts Seek to Boost Knowledge and Allies for Teaching STEM"](#)



The following [student newsmakers](#) were recently listed by University News for accomplishments in the fall semester:

**Ryan McMullan**, an environmental sustainability, health and safety major; **Tim Snyder**, a biotechnology and molecular bioscience major, and **Daniel Baah**, a graduate student in environmental science, presented a poster on the benefits of using microalgae to clean agricultural wastewater and make biofuels at the Rochester Academy of Sciences hosted by Roberts Wesleyan College on Nov. 12.

**Fatima Zara** and **Sam Alrobaie**, biotechnology and molecular bioscience majors, presented talks on converting spent coffee grounds to energy at the Rochester Academy of Sciences hosted by Roberts Wesleyan College on Nov. 12.

**Ryan Ford**, a Ph.D. student in the Chester F. Carlson Center for Imaging Science, won the Best Student Oral Presentation award at the Systems and Technologies for Remote Sensing Applications Through Unmanned Aerial Systems (STRATUS) Workshop at RIT on Oct. 28.

**Zachary Mulhollan**, a Ph.D. student in the Chester F. Carlson Center for Imaging Science from Derby, N.Y., presented “Optical Differentiation Wavefront Sensing for Freeform Optics Metrology” with Jie Qiao, associate professor in the Center for Imaging Science, at Frontiers in Optics: The 100th Optical Society of America Annual Meeting in Rochester on Oct. 19.

**Shagan Sah**, a Ph.D. student in the Chester F. Carlson Center for Imaging Science, participated in the International Conference on Pattern Recognition 2016 and presented “Key Frame Extraction for Salient Activity Recognition” and “Adaptive Hierarchical Classification Networks.” Shagan won a travel stipend by the International Association for Pattern Recognition to participate in the conference in Mexico.

**Alexander Rasskazov**, a Ph.D. student in the astrophysical sciences and technology program from Astrakhan, Russia, presented “Evolution of massive black hole binaries in rotating galactic nuclei: Implications for gravitational wave detection” at the Cornell Astronomy Colloquium at Cornell University on Sept. 29.

