

MONTH IN REVIEW

JULY / AUGUST 2017



Change was in the air all around RIT this summer. We're wrapping up Phase Two of the air conditioning project in Gosnell Hall and continuing to update chemistry and life sciences laboratory spaces in our buildings. We've welcomed our new President, Dr. David Munson, to the university and we've had several leadership changes in the College of Science as well. We run five NSF-funded REU (Research Experience for Undergraduates) programs! It was great to have with us students from various other universities and our own students who got Summer Undergraduate Research Fellowships (SURFs) or were funded by several faculty sponsored research programs, working with.

It's an exciting time to be a Tiger!

SOPHIA MAGGELAKIS

Dean, RIT College of Science

COS graduate alumni receive recognition for outstanding research

Two College of Science graduate alumni will be recognized during the Brick City Homecoming weekend for outstanding research contributions. **Alexandra Atrusio-Glimpse**, Ph.D. graduate May 2016, Center for Imaging Science is this year's recipient of the RIT Graduate Education Dissertation Award. **Peter LoVerso**, MS graduate May 2015, GSoLS/Bioinformatics received the MS Thesis award Honorable Mention.

These awards were established in 2015 to be awarded to an RIT Alumnus at each stage of the graduate program level to recognize exceptional research and to encourage the recognition of the research at the national and international level. The awards ceremony will take place at 3:00 on Friday, October 13 in the Crossroads River Room.



R·I·T

College of
Science



Paul Craig announced as ASBMB award winner for exemplary contributions to education

Paul Craig, Professor and Head of SCMS, recently received notification that he is the recipient of the 2018 American Society for Biochemistry & Molecular Biology Award for Exemplary Contributions to Education. The [ASBMB Award for Exemplary Contributions to Education](#) is given annually to a scientist who encourages effective teaching and learning of biochemistry and molecular biology through his/her own teaching, leadership in education, writing, educational research, mentoring or public enlightenment. Paul will present an award lecture at the ASBMB annual meeting to be held April 21-25, 2018 in San Diego, CA.

Emmett Ientilucci gives keynote address

Emmett Ientilucci, Assistant Research Professor in the Chester F. Carlson Center for Imaging Science, was the invited keynote speaker in the Hyperspectral Target Detection session at the 2017 IEEE Geoscience and Remote Sensing Symposium in Ft. Worth, Texas, July 23-28. His talk was on "Spectral Target Detection Considerations from a Physical Modeling Perspective."





Andre Hudson receives NIH funding

The NIH has awarded **Andre Hudson**, Associate Professor and Head of GSoLS, supplemental funding totaling \$30,765 to support undergraduate researcher **Natalya Cox**. The support will cover lab supplies, stipend for two academic years and one summer in addition to covering expenses for one scientific meeting per year.

Jerry Takacs receives external funding

The McNair and LSAMP Scholars program awarded **Jerry Takacs**, Professor in SCMS, funding to support two full-time summer research students. Both **Omran Omar** and **Shin Lutondo** did research over the summer that resulted in oral presentations at RIT's 2017 Undergraduate Research Symposium on August 4, 2017.



Peckham family donation to Rochester Project SEED

The Rochester Project SEED program is part of the national American Chemical Society SEED program which provides chemistry research opportunities for

local economically disadvantaged high school students. Many COS faculty have been long-time supporters of the program, by financially supporting students and/or being mentors. This year, the program received a very generous donation from the Peckham family to further support the SEED program over the next two years. This will provide many more stipends for students so our faculty can mentor students without paying for them! On Friday, July 21st, program director, **Lea Michel** hosted a Project SEED celebration in the Gosnell Atrium to celebrate this year's students, the SEED mentors (including **Andre' Hudson** and **Christy Tyler**), and the generous sponsors.



Fuzzy Science mini-class

Visiting professor in POCs from Polytechnic University of Valencia, **Samuel Morillas Gomez**, shared his expertise on fuzzy logic in a course that ran for two weeks over the summer.



RIT College of Science establishes Integrated Sciences Academy

Multidisciplinary science education and research is the focus of a new academic unit in RIT's College of Science that brings together researchers with different expertise to invent new ways to approach challenges facing a global society. The Integrated Sciences Academy will focus on implementing specific inter- and multidisciplinary programs within the College of Science and differs from custom-tailored programs offered through RIT's School of Individualized Study.

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RIT College of Science makes leadership changes

RIT's College of Science is expanding its focus on interdisciplinary education and industry partnerships through new leadership roles and assignments designed to enrich current curricula. The new assignments will increase opportunities for faculty-student research, study abroad, internships and co-ops, and develop interdisciplinary programs.

Joining the College of Science leadership team are:

- **Nathan Cahill**, associate dean for industrial partnerships;
- **Roger Dube**, assistant dean for undergraduate research and interdisciplinary programs; and
- **Mark Fairchild**, head of the new Integrated Sciences Academy.

Additional appointments to existing positions round out Maggelakis' leadership team. They are:

- **Casey Miller**, former director of the materials science and engineering graduate program, has become the associate dean for research and faculty affairs;
- **Larry Buckley**, former head of the Thomas H. Gosnell School of Life Sciences, has been named associate dean for academic affairs; and
- **André Hudson**, associate professor of biotechnology, has been named head of the Gosnell School of Life Sciences.

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Larry Buckley and Nathan Cahill

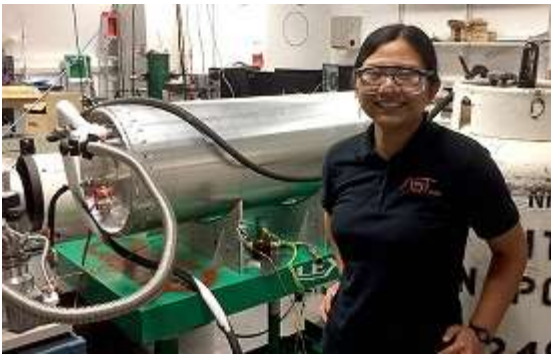


Roger Dube and Mark Fairchild



André Hudson and Casey Miller





Astrophysics Ph.D. student wins NASA Fellowship

RIT Astrophysics Ph.D. student, **Chi Nguyen**, wins competitive NASA fellowship to study how galaxies formed in the early universe. She is one of eight fellowship recipients selected from 141 applicants to the Astrophysics Science Research Program, a division of the NASA Earth and Space Science Fellowship Program. Nguyen works with Dr. Michael Zemcov, assistant professor in RIT's School of Physics and Astronomy, using an observational

technique known as intensity mapping to build a picture of astronomical objects in the early universe. Nguyen and Zemcov are members of RIT's Center for Detectors and the Future Photon Initiative.

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RIT physicist studies quantum sensing solutions

Research conducted by **Mishkat Bhattacharya**, a theoretical physicist, is advancing a new kind of sensing technology that captures data with better precision than currently possible and promises cheaper, smaller and lighter sensor designs.

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College of Science launches RIT's 8th Ph.D. program

This semester, RIT is launching a Ph.D. degree in mathematical modeling, elevating the emerging area of applied mathematics into its own program of study. The new program is the university's eighth doctoral degree and the fourth in the College of Science. **Dr. Elizabeth Cherry** is the program's director and an associate professor in the School of Mathematical Sciences.

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SMASH Camp another smashing success

Kara Maki, SMS, and Elizabeth DiCesare, GSoLS, led a team of scientists and mathematicians to inspire rising 8th grade girls in the [SMASH Experience for Girls](#) (Summer Math Applications in Science with Hands-on), a week-long exploration of STEM fields. One parent wrote, “Certainly, one week of camp won’t solve a systemic problem that my daughter is an example of; there is some magic though in what Dr. Maki and her team have created. [My daughter] came home excited, successful, energized. Not only was the format of the work



engaging, but also the setting—the diverse set of participants directly reinforced that any, and every, girl can do this. The interaction with the undergrads made this accessible and FUN!” Congratulations to the SMASH team for another outstanding week breaking down barriers and making STEM accessible to girls at a critical time in their education.

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Pre-vet program targets small, dedicated group

Alumni Liliya Beckett '11 (Photography, Communications) (*top*) and Kristen Swerzenski '17 (Biology) (*bottom*) benefitted from the network and guidance provided by the Pre-Veterinary Advisory Board, directed by Larry Buckley. Swerzenski is the former vice president of the Pre-Vet Club and cites her activity within the group for confirming her decision to pursue her interest in marine veterinarian care. She just completed an internship at the Karen Beasley Sea Turtle Rescue and Rehabilitation Center in North Carolina, and is continuing to strengthen her application to vet school with more animal care experience. Beckett, former Pre-Vet Club President, conducted research with Buckley on canine spleen cancer which inspired her to pursue a D.V.M. and a Ph.D. Cornell University College of Veterinary Medicine accepted her for this fall semester, and she was awarded a 10-week funded summer research fellowship with her graduate school mentor.



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NIH grants \$1 million to RIT Scientists-In-Training Program for Deaf and Hard-of-Hearing Undergrads

The National Institute of General Medical Sciences has awarded a grant to Rochester Institute of Technology that is expected to provide \$1.025 million in funding over five years to develop a Scientists-In-Training Program for Deaf and Hard-of-Hearing Undergraduates. The award is funded through the **Research Initiative for Scientific Enhancement (RISE)** program, which is designed to increase

the number of underrepresented students who enter Ph.D. programs in the biomedical and behavioral sciences. Dr. Scott Smith, a deaf medical doctor and health scientist, will lead this program assisted by Paul Craig, a hearing chemistry professor and the head of the School of Chemistry and Material Science, and Vincent Samar, a hearing cognitive science professor with many years of experience working with deaf and hard-of-hearing students.

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NEWSMAKERS

2017 Total Solar Eclipse

RIT Faculty Experts created a video about the solar eclipse.

[Watch video here >](#)



Brian Koberlein, SoPA, interviewed on Good Day Rochester, FOX Rochester (see video).

[Watch video here >](#)



Brian Koberlein, Senior Lecturer in SoPA, was quoted in an August 10 article in *Air & Space Magazine*, entitled ["No, Quantum Teleportation Won't Let Us Send Instant Messages to Alpha Centauri"](#). He was also featured in an article on August 20 from *The Effingham Daily News*, entitled ["Solar eclipse close to home for astrophysicist"](#).

Anthony Vodacek, Professor in CIS, was mentioned in an August 10 article from the *Daily Messenger* entitled ["Pooling resources against algae"](#).

Michael Savka, Professor, and **Andre Hudson**, Associate Professor and Head, both from GSoLS, were featured in the September 2017 issue of *INSIGHT into Diversity* in an article entitled ["Developing STEM Faculty Leaders"](#) (page 55).

Don Figer, Professor and Director of the Center for Detectors, was quoted in an August 2017 *New Scientist* article entitled ["Nobody knows how these baby stars got so close to our black hole"](#).

Richard O'Shaughnessy, Professor in SoPA, was quoted in an August 2017 *Science News* article entitled ["We share the Milky Way with 100 million black holes"](#).

SPONSORED RESEARCH

Manuela Campanelli, SMS, is the PI on a \$346,661 grant from the National Science Foundation to support the project titled "MRI: Acquisition of a Computing Cluster for Gravitational-Wave and Multimessenger Astrophysics in the Era of LIGO Detections." Campanelli and her Computational Relativity and Gravitation (CCRG) team propose to acquire, deploy, and maintain a new state-of-the-art computational cluster to support research at the frontiers of gravitational physics, relativistic astrophysics, advanced high-performance computation, and scientific visualization. The system will consist of a 1296-core, high-speed, large-memory computer cluster, with 768 TB of attached storage, and will be housed within the Black Hole Lab computer facility at the Center for Computational Relativity and Gravitation. Research with cluster will focus on some of the most extreme phenomena in the universe, where the strongest gravitational and magnetic fields interact with ultra-relativistic matter and high-energy radiation, that can only be studied through. Research training will involve students across several programs and colleges at RIT and an REU program. Visualizations will be used for enhancing the classroom experience of deaf and hard-of-hearing students at RIT's National Technical Institute for the Deaf, as well as out-of-class educational activities.

Kara Maki, SMS, is the PI on a \$15,409 grant from NYS.NYSTAR/University of Rochester – Center for Electronic Imaging Science (NYSTAR/UR-CEIS) for a project titled "Mathematical Model & a Computer Simulation of the Motion of a Toroidal lens Under the Influence of Shear Forces Produced by an Eyelid During a Blink." In recent work supported by Bausch & Lomb, Maki and her team have developed and applied two models of the coupled fluid mechanics and solid mechanics of a contact lens on an eye. Here they propose to develop a model of the stresses imposed on a contact lens by the eyelid during a blink, coupling this model with the centration model, so they can simulate the displacement of a lens during a blink and its re-centering under the influence of suction pressure gradients.

John Kerekes, CIS, is the PI on a \$199,921 grant from DOD. Dept of the Air Force, Materiel Command / Kitware, Inc. titled "Global Surveillance Augmentation Using Commercial Satellite Imaging Systems." This project will develop an end to end system to exploit current and future commercial satellite imaging systems by utilizing novel techniques and algorithms to fuse the different data packages together to detect changes and provide warning/cueing to other systems. RIT will provide expertise in the area of image processing algorithms, imaging system simulations, and systems engineering analysis.

Robert Kremens, CIS, is the PI on a \$16,827 grant from USDA Forest Service titled, "Pyrogenic controls on grass-shrub persistence in the Great Plains." Relative differences in the persistence of grasses and shrubs following fire are generally unknown, causing debate among rangeland managers on the appropriateness of prescribed fires conducted during drought and whether post-fire reseeding of grasses is necessary. Resolving this uncertainty is of high importance to multiple stakeholder groups and long-term fire research in the Great Plains has struggled to provide answers because fire treatments are not conducted in conditions capable of causing mortality of mature woody species. We have recently conducted studies in the Great Plains that show high intensity fires during drought can cause mortality and reduce densities of multiple resprouting shrub species. Yet, the ultimate challenge needed to respond to Great Plains stakeholder questions is to replace statistical models of fire effects prediction (as done in our previous study and in many fire effects models) with models more strongly linked to biophysical processes and plant traits. These updated models will also make more robust and generalizable across multiple species in a variety of ecosystems.

Sogol Jahanbekam, SMS, is the PI on a \$167,578 grant from the National Science Foundation titled, "Collaborative Research: Graph Coloring Techniques to Generate Design Concepts with Optimal Degree of Physical Integration: Implications for Assembly Design in Additive Manufacturing." The goal of the proposed project is to provide a fundamental understating of the impact of adopting 'independence of Functional Requirements principle and proper degree of 'physical integration' on increasing the productivity of Additive Manufacturing processes. Specific objectives of the work include generation, selection, and empirically evaluation of various design concepts compatible with 'design for assembly' as well as the 'independence of FRs' principles through computational efficient graph coloring methods. Several research tasks will be conducted: 1) We will use graph coloring techniques to generate design concepts based on the independences of functional requirements principle. 2) We will develop polynomial time algorithms with the aim of finding desired coloring of problems discussed in Task I. 3) We will create a set of novel clustering algorithms to determine the optimal level of physical integration in design concepts generated in Task I. 4) We will show the implications of the graph coloring techniques and physical integration algorithms generated in Tasks 1-3 in design for additive manufacturing. 5) We will cross-validate the productivity of the optimally designed structures through dedicated AM prototype, testbed and applications. The ultimate purpose of the scientific methods generated in this project is to illustrate the impact of the optimal degree of physical integration in 3D printed products on unlocking the unprecedented opportunities enabled by AM at an industrially relevant scale. The project spans several disciplines, and it is the joint effort between two universities with complementary expertise in graph theory, additive manufacturing, and design concepts characterization and modeling.

Zoran Ninkov, CIS, is the PI on a \$60,000 grant from Harris Corporation and a \$30,000 grant from NYS.NYSTAR / University of Rochester titled, "Developing the THz detector technology for inspection applications." The THz region provides a means of using non-ionizing radiation to perform a variety of non-invasive sensing tasks. Commercial cameras systems are available that utilize microbolometer or pyroelectric detectors (e.g. from Gentec & IMO) but these devices lack sensitivity, stability or readout speed. The proposed collaborative development by Harris/RIT/UR seeks to design, fabricate and test suitable CMOS based devices that, through iteration, will result in a commercial product marketed by Harris. The CMOS devices are fabricated in commercial foundries using standard chip manufacturing techniques to keep cost low. The ultimate goal of

this multi-year effort is to develop a room temperature, compact, inexpensive THz imaging system that our sponsor (Harris) can market to commercial (e.g. package inspection, crowd monitoring) and military (e.g. on aerial drones for short range imaging) customers.

Zoran Ninkov, CIS, is the PI on an \$18,000 grant from Thermo Fisher Scientific and a \$9,000 grant from NYS.NYSTAR / University of Rochester - Center for Electronic Imaging Science and titled, "Development of Quantum Dot Coated Detector Arrays." Improving the Sensitivity of silicon-based CMOS and CCD in the deep-UV is an area of interest. Lumogen has been previously used for this purpose but has limitations in its use in both vacuum and radiation harsh environments. Quantum Dots (QD) offer a robust alternative to Lumogen. The fluorescence wavelength of QDs is tunable and can match the peak sensor quantum efficiency. Aerosol jet printing (AJP) is being used at RIT for the deposition of QDs on substrates and commercial sensor arrays. Insights obtained and improvements in the equipment will permit commercially ready devices to be fabricated and tested this year.