

## Dean's Message

I am pleased to share with you my biannual bulletin which aims to give you updates and to summarize our accomplishments. We have made good progress on many of our initiatives, and I am proud of what we have achieved. I am thankful to all of you for your dedication to our students and your contributions to the mission of our college.

Enjoy the rest of the summer. I am looking forward to seeing you in the Fall.

~ Sophia Maggelakis  
*Dean, RIT College of Science*

## Updates

### RIT astrophysics programs ranks 70<sup>th</sup> in US News and World Reports best graduate programs

The RIT astrophysics program was included in the 2016 edition of *US News and World Report's America's Best Graduate Schools*. The program tied for 70<sup>th</sup>.

[RIT News >](#)

### Galápagos courses resume after hiatus

Dr. Bob Rothman's biology course and tour of the Galápagos Islands resumed in May as eighteen students, faculty, and staff traveled to the Ecuadorian national park to observe the archipelago's unique wildlife.

This year marks Rothman's 23rd visit to the Galápagos.



## The Program of Color Science

**The Program of Color Science** and **Munsell Color Science Laboratory** accepted four new Ph.D. students, hired two faculty members, and created a new PoCS/MCSL Board of Counselors. The 2014 annual report features these items and highlights of the year's research.

## Research and Scholarship

Many of our faculty are conducting research and engaging a number of undergraduate and graduate students in solving challenging and complex problems. Below is an outline of our productivity:

### Undergraduate Research:

- We were awarded **4 NSF-funded REUs** (Research Experience for Undergraduates) programs! This is a huge success for our institute and college.
- Summer undergraduate research fellowships: Supported through fundraising 20 undergraduate research fellowships.
- Supported Weekly Undergraduate Research Seminar to promote interdisciplinary collaboration. Faculty and students participated to listen to presentations given by students from all math and science programs.
- Many of our students published papers as co-authors with their mentors and presented at national and international conferences and at the Summer Undergraduate Research Symposium.

**Publications:** There were 395 refereed publications (appearing) that were reported by the academic units.

**Sponsored Research:** Our sponsored research activity, February 1, 2014 to January 31, 2015, resulted to a total awards value of **\$12,179,163**, compared to \$9,204,827 last year.

- Chemistry = **\$759,659**
- Center for Detectors = **\$958,303**
- Imaging Science = **\$5,751,487**
- Life Sciences = **\$500,214**
- Mathematical Sciences = **\$1,381,132**
- Physics and Astronomy = **\$2,828,368**

## Staff Changes

**Ginny Gross**, formerly Administrative Assistant, has accepted the Senior Staff Specialist position in the School of Mathematical Sciences. This position opened due

to Anna Fiorucci's retirement. In the interim, **Dale Cenzi** will return as a temporary hire until the position is filled.

## Our Budget

**Balanced our Budget:** I am pleased to report that we have balanced our budget (for two years in a row).

## Women in Science

**Women in Science (WiSe):** The Women in Science (WiSe) program had another very successful year with many activities, invited speakers, panels featuring successful STEM professionals. We have also collaborated with the ADVANCE group and tried to help with their initiatives.

## Outreach

The Center for Applied and Computational Mathematics (CACM) raised \$20,000 from the Rochester City School District to give 70 high school math teachers feedback and guidance on math modeling lessons they created for their classrooms.

# Initiatives

## CSTEP Grant

**The Collegiate Science Technology Entry Program** has been funded by the New York State Department of Education for \$1.2 million over the next five years. CSTEP works to increase the number of historically underrepresented and/or economically disadvantaged undergraduate and graduate students (who are residents of New York State) pursuing a career in either science, mathematics, technology or a New York State licensed profession. **Dr. Roger Dube** is the PI of this grant in collaboration with the College of Liberal Arts.

## Academic Programs

The following programs, which are part of the COS strategic plan, were approved, revamped, or are developing proposals:

- **Ph.D. in Mathematical and Computational Modeling** – approved
- **Ph.D. in Color Science** was revamped – five students graduated this May.
- **BS/MS Physics/Public Policy** – approved
- **MS in Physics** - the concept paper was approved.

New double majors: We added the following double majors:

- **Biotechnology and Biochemistry**
- **Chemistry and Mathematics**
- **Applied Mathematics and Physics**
- **Environmental Science and Biology**
- **Environmental Science and Economics**

Joint Programs in progress:

- **MS in Computational Finance** (with SCB) – approved.
- **MS in Data Science and Analytics** (with GCCIS) – the proposal is almost completed and will be submitted to Graduate Council in the Fall.
- **Integrated Science and Business** – the concept paper was approved.

Transferred Programs from the Kate Gleason College of Engineering:

- **MS in Applied Statistics**
- **Advanced Certificate in Applied Statistics**

## Internal Grants

**Dean's Research Initiation Grants (D-RIG):** Put out the fifth call for the D-RIG proposals that were established to provide seed funding to help jump start research projects and cross-disciplinary research clusters in order to promote rich learning environments for our students and faculty. This has been a successful program that has given us a good return on our investment. Some of the accomplishments include 30 refereed journal papers submitted/published, 46 conference presentations submitted/completed, ~25 grant proposals submitted to 10 sponsors (12 proposals to NSF), ~\$8.5 million in proposals submitted (~\$4 Million to NSF), ~\$1 million of these grants funded (more in follow-up proposals), and 40 students funded on research projects.

## Recruiting

Developed a recruiting plan, in collaboration with the Admissions Office, which was implemented this year. We have already seen improvement in our enrolment numbers for next year.

## Experiential Learning

As part of the COS strategic plan, we approved to include an experiential learning component (capstone, co-op, undergraduate research) as requirement for graduation for all COS majors. This will be in effect in Fall of 2015.

## News Items

### Prostate cancer imaging project funded by NIH

A targeted molecular-imaging method, under development at COS, could help detect early stages of prostate cancer and improve image-directed biopsies.

**Dr. Hans Schmitthenner** is designing molecular imaging compounds that will selectively target prostate cancer cells and “light them up” with contrast dyes. A \$444,367 grant from the National Institutes of Health supports his research with a team of undergraduate student researchers. The project is in the preclinical phase.



Dr. Schmitthenner’s undergraduate researchers, **Taylor Barrett, Chelsea Weidman, Stephanie Beach, and Lauren Heese**, were also featured in a university news article prior to their graduation in May.

### Imaging Science Grad Lab wins first place at ImagineRIT

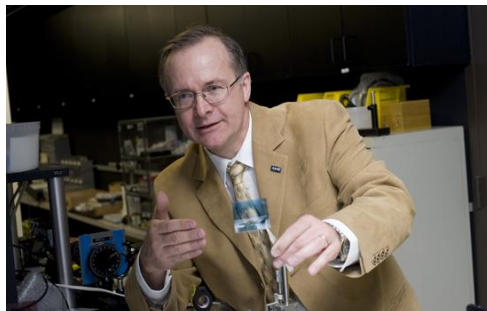
The **Imaging Science Grad Lab**, led by Dr. Roger Dube, won the first place Sponsor’s Prize at Imagine RIT in May. The project, “CRISIS: Crime Scene Imaging System,” consisted of a camera that would scan a crime scene for specific chemical content.

### Featured Scientist

The science website Red Orbit featured Dr. Manuela Campanelli, director of the Center for Computational Relativity and Gravitation, in an article marking Einstein’s Theory of Relativity centennial. [Red Orbit >](#)

### Could ‘glitter’ solve NASA’s giant telescope problem?

A proposal by **Dr. Grover Swartzlander** in the Chester F. Carlson Center for Imaging Science garnered international attention. Instead of launching costly hardware into space such as the upcoming \$8 billion James Webb Space Telescope, Swartzlander is working using lightweight reflective “glitter” in orbit and using computational photography to construct

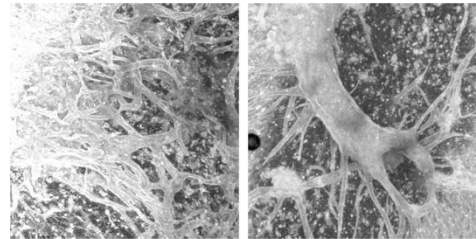


a usable composite image.

Dr. Swartzlander and his students have already tested the concept in their lab at RIT in a project they've named "Orbiting Rainbows."

### Imaging scientist investigates using ultrasound to advance artificial tissue development

**Dr. Maria Helguera**, of the Chester F. Carlson Center for Imaging Science, is working with researchers at the University of Rochester to develop complex vascular systems in artificial organs using ultrasound technology. Helguera provides the team an expertise in ultrasound imaging and image processing through high-frequency ultrasound techniques and quantitative analysis of microscopy images of the tissue samples.



Imaging science Ph.D. student **Mohammed Yousefhussien** developed an image-processing tool for evaluating the structures of the blood sprouts. Third-year imaging science student **Amy Becker** is modifying the tool to capture details that will help manipulate the sprouts' growth. Determining the preferred direction in which the vessels branch outward will lead to networks resembling the vascular system within an organ.

### Graduate student and advisor collect coffee grounds for biodiesel project

Environmental science graduate student **Rebecca Clontz**, and her thesis adviser, **Dr. Jeff Lodge**, associate professor in RIT's Thomas H. Gosnell School of Life Sciences, are exploring the potential of turning food waste into energy on a local level.



They started by asking coffee shops on the RIT campus to donate their grounds every day in August. Employees at Artesano Bakery & Café, Beanz, Java Wally's and Midnight Oil helped Clontz collect 150 gallons of used coffee grounds during one of the slowest months on campus.



## CCRG contributes to National Academy of Science art installation

The **Center for Computational Relativity and Gravitation** contributed to an art exhibition at the National Academy of Science in celebration of the centennial of Einstein's discovery of general relativity. Images produced by CCRG informed artist Rebecca Kamen's sculpture *Portal*, created in Mylar, fossils, and a soundtrack by Susan Alexander interpreted from motions in outer space including sonic frequencies that represent a binary pair of orbiting black holes.



## Dress color disagreement explained

**Drs. Mark Fairchild and Roy Berns** of the Program of Color Science were contacted by several media outlets to explain why a striped dress posted on social media created such controversy when people couldn't agree whether the dress was black and blue, or whether it was gold and white.

## Domino exhibit brings RIT tiger to life at Imagine RIT

The RIT tiger logo came to life in dominoes at Imagine RIT on May 2 at the "Tigers Earning Their Spots?" exhibit created by PiRIT, the RIT Association of Student Mathematicians and Statisticians. The eight-foot by eight-foot portrait was composed of 81 sets of dominoes, or 2,268 individual tiles using an integer linear programming model.



# Student Spotlight

## Four COS undergraduate researchers win prestigious Goldwater Fellowships

Three undergraduate researchers from the RIT College of Science and one from the Kate Gleason College of Engineering won \$7,500 awards from the **Barry M. Goldwater Scholarship and Excellence in Education Program**. All were mentored in their research projects by COS faculty members.

The 2015 Goldwater Scholars are:

- **Elizabeth Bondi**, a third-year imaging science student from Dansville, New York. She works with Roger Easton, professor in RIT's Center for Imaging Science, to recover erased and overwritten text in historical documents using image-processing techniques.
- **Selene Chew**, a third year computational mathematics student from Ithaca, New York. Chew and her mentor, Nathan Cahill, professor in the RIT School of Mathematical Sciences, explore techniques for improving algorithms that cluster similar points and classify regions of hyperspectral imagery.
- **Tyler Godat**, a third year double major in physics and applied mathematics from Greensboro, North Carolina. For nearly three years, Godat has explored theoretical research in the field of cavity optomechanics with his mentors, Mishkat Bhattacharya, assistant professor in RIT's School of Physics and Astronomy, and postdoctoral researcher Brandon Rodenberg.
- **Emily Holz**, a fourth year biomedical engineering major from Cottage Grove, Minnesota. She worked with Kara Maki, assistant professor in RIT's School of Mathematical Sciences, modeling the settling dynamics of a contact lens on the eye, a topic of interest to Bausch & Lomb.

### Imaging Science student wins Fulbright scholarship to Iceland

**Rose Rustowicz**, an imaging science undergraduate student from Amherst, New York, will travel to Iceland on a Fulbright Scholarship. She will work with a research team from the University of Iceland to conduct remote sensing at the Hekla volcano. The project aims to create a multidisciplinary assessment of the landscape which will allow them to map and monitor hazardous and vulnerable areas.





## RIT Imaging Science students win U.S. Geospatial Intelligence Hackathon

RIT students were on the winning team at the recent U.S. Geospatial Intelligence Foundation's GEOINT Hackathon held at in Herndon, Va. Briana Neuberger, from Herndon, Va., and Dan Simon, from Longmeadow, Mass., are fourth-year students in the Chester F. Carlson Center for Imaging Science.



## Other Items

- **Dan Kolbman**, a research advisee of Dr. Moumita Das, was runner up in the physical science category at a poster contest at the National Collegiate Research Conference at Harvard in January.
- **David Principe**, Ph.D. in astrophysical sciences and technology, was the winner of the annual RIT Dissertation Award.
- **Dmitry Vorobiev** was the winner of a NYSGC/AST Graduate Student Senior Fellowship.
- **Triana Almeyda** was the winner of a NYSCG/AST Graduate Student Junior Fellowship.

## Faculty Spotlight

- **Dr. Jan Van Aardt**, of the Chester F. Carlson Center for Imaging Science, won RIT's 2015 Trustee Scholarship Award. Dr. Van Aardt conducts research in the areas of the application of imaging spectroscopy and light detection and ranging for remote sensing of natural resources. This includes forestry inventory and assessment, species diversity, foliar biochemistry and scaling of remote sensing estimates.
- **Dr. Mishkat Bhattacharya**, of the School of Physics and Astronomy, won a five-year National Science Foundation CAREER award to examine the continuing demand for better optical sensing of mechanical rotation devices used in fields such as nanoscience, precision measurement, remote sensing and quantum computing.

- **Dr. Casey Miller**, of the School of Chemistry and Materials Science, won a five-year National Science Foundation CAREER award for “Magnetocaloric Effect in Metallic Nanostructures.”
- **Dr. Carlos Lousto and Darren Narayan**, both of the School of Mathematical Sciences, were named PI Millionaires by the RIT Office of Sponsored Research. The designation recognizes researchers who have achieved funding of \$1 million or more since 2000.
- The following COS Faculty won RIT’s 2015 Excellence in Faculty Mentoring Award:
  - **Dr. Scott Franklin**, professor and director of the Science and Mathematics Education Research Collaborative in the College of Science, joined RIT in 2000. His research interests include granular/soft matter, physics education research including the dynamics of student learning and how physicists associate meaning with mathematical expressions.
  - **Dr. Darren Narayan**, professor and director of undergraduate research in the College of Science, came to RIT in 2000. His research interests include graph theory, combinatorics, integer programming, and bio-mathematics.
- **Drs. Robert Teese, Dina Newman, and Kate Wright** were part of a team that won three awards in the National Science Foundation contest called “Teaching and Learning Video Showcase: Improving Science, Math, Engineering, and Computer Science Education.” Their Interactive Video Vignettes project, in collaboration with colleagues from Dickinson College, the University of Cincinnati, and Alfred University, presented short, web-based assignments for introductory science students.
- A set of British postal stamps commemorating the 25th anniversary of NASA’s Hubble Space Telescope includes a star detected by **Dr. Don Figer**, Director of the Center for Detectors, nearly 20 years ago.
- **Dr. Sandra Connelly**, of the Thomas H. Gosnell School of Life Sciences, won an Effective Practice Award from the Online Learning Consortium for her project, “Implementing Full Access Videos to Engage All Students in a Large General Education Biology Course.”
- **Dr. Lea Vacca Michel** was named one of the 2015 Inspiring Women in STEM, an award given by *Insight into Diversity* magazine. The national award honors 100 women in STEM professions who inspire and encourage young women to

consider careers in science, technology, engineering and mathematics through mentoring and teaching, research and programs.

- **Dr. Laura Muñoz**, of the School of Mathematical Sciences, was awarded a scholarship to attend the National Center for Faculty Development and Diversity Faculty Success Program, a “boot camp” designed to improve research productivity with coaching and peer support. Nine scholarships were supported by the RIT Wallace Center’s Faculty Career Development Services, AdvanceRIT, and the Provost’s Office.

## SABBATICALS

The following COS faculty members were awarded leaves of absence for professional development for 2015-16:

- **Dr. Jeremy Cody**, of the School of Chemistry and Materials Science, Associate Professor (Spring) for “A Study of the Acid-Promoted Vinyl Cation Formation via Prins Reaction and Subsequent Cascade Reactions”
- **Dr. Joshua Faber**, of the School of Mathematical Sciences, Associate Professor (Spring) for “Dynamical Studies of Compact Object Binaries”
- **Dr. Tony Harkin**, of the School of Mathematical Sciences, Associate Professor (Fall) for “Analyzing Brain Connectivity Networks and Concussive Head Injury in Athletes”
- **Dr. André Hudson**, of the Thomas H. Gosnell School of Life Sciences, Associate Professor (Fall) for “Genetics, Kinetics and Structural Analysis of L, L-diaminopimelate Aminotransferase (DapL): A novel and attractive target for antibiotic development”
- **Dr. Karl Korfmacher**, of the Thomas H. Gosnell School of Life Sciences, Associate Professor (Spring) for “Developing Spatial Modelling and Python Programming Skills in ArcGIS and Environmental Models”
- **Dr. David Lawlor**, of the Thomas H. Gosnell School of Life Sciences, Associate Professor (Full Year) for “Public Health in Developing Countries”
- **Dr. Carlos Lousto**, of the School of Mathematical Science, Professor (Fall) for “Extreme Binary Black Holes”
- **Dr. Zoran Ninkov**, of the Chester F. Carlson Center for Imaging Science, Professor (Spring) for “Advancement of MOS Imaging Spectrometers”
- **Dr. Jeff Pelz**, of the Chester F. Carlson Center for Imaging Science, Professor

(Full Year) for “Strengthening International Eye-Tracking Collaborations”

- **Dr. Michael Radin**, of the School of Mathematical Sciences, Associate Professor (Spring) for a semester at the University of Latvia
- **Dr. Jan van Aardt**, of the Chester F. Carlson Center for Imaging Science, Associate Professor (Fall) for “Extending Terrestrial Laser Biomass Mapping to Neo-Tropical Forests”
- **Dr. Tamas Wiandt**, of the School of Mathematical Sciences, Associate Professor (Spring) for “Computational Methods in the Study of the Lagrange Triangular Solutions for the ERTBP”
- **Dr. Yosef Zlochower**, of the School of Mathematical Sciences, Associate Professor (Fall), for “Exploring BH Interiors and Alternative Theories of Gravity”

## Events

- *Drug-resistant Bacteria*: **Dr. Jeffrey Lodge**, associate professor in the Thomas Gosnell School of Life Sciences, was a panelist at a March 12 public information event about drug-resistant bacteria. The discussion was followed by the screening of the documentary *RESISTANCE* by filmmaker Michael Graziano and UJI Films.
- *Next Generation Sequencing Workshop*: **The Thomas H. Gosnell School of Life Sciences** hosted 18 participants for its Next Generation Sequencing Workshop, which presented advancements and applications of new sequencing technologies.
- *Science Café*: **The Science Café** series was hosted by the Dean’s Office. The series was an gathering of faculty members that allowed for presentations and informal interactions.
- *CASTLE Symposium*: The second annual **CASTLE Symposium** was held May 20 featuring faculty and student presentations on STEM education and transformation efforts.
- *Celebrating Pi Day*: PiRIT, a club for math students, celebrated Pi Day on March 14 with pie and presentations.
- *Computational Relativity and Gravitation Workshops*: **The Center for Computational Relativity and Gravitation** hosted three workshops in May and June: the 18<sup>th</sup> **Eastern Gravity Meeting, Beyond the First Century of**

[General Relativity](#), and the [Astrophysical Black Hole Mergers Workshop V](#).

- *Nanodays*: Materials science students presented its annual **Nanodays** exhibit in Gosnell Hall and in the Rochester Museum and Science Center March 21-22.
- *Mathematical Competition*: The School of Mathematical Sciences hosted its annual **Applied Mathematics and Statistics Competition** during Imagine RIT. The event attracted 65 high school students and 31 college students for the applied math competition. Six students competed in the new applied statistics competition.
- *Observatory Open House*: The RIT Observatory held an open house April 24.
- *COS Research Scholars Ceremony*: The College of Science hosted its annual **Research Scholars Ceremony** prior to graduation on May 23.

## Speakers

### Distinguished Speaker Series

- Nobel Laureate physicist and 2014 RIT commencement speaker **Dr. William Phillips** presented “Time, Einstein and the Coolest Stuff in the Universe” on March 2 as the 2015 John Wiley Jones Distinguished Lecture.
- Ornithology expert **Dr. Jed Burtt** did a presentation on the founder of American ornithology, Alexander Wilson, as part of the Distinguished Speaker Series on April. He did a second presentation during his visit about how birds evolve their colorful plumage.

### Other Speakers

- NASA astronaut and International Space Station photographer **Don Pettit** spoke at RIT April 13 in an event co-sponsored by the College of Science. His presentation, “An Astronaut’s Guide to Photography,” highlighted his 370 days in space.
- **Dr. Charles Fisher**, of the Penn State Department of Biology, presented “Lessons from the Deepwater Horizon Oil Spill” on March 16. That evening, he also presented his insights into the science of the James Cameron film “The Abyss” as part of the Little Theatre’s “Science on Science” series.



- **Dr. Chet Van Duzer**, a cartography historian, gave a presentation on the Henricus Martellus World Map March 18 in a lecture co-sponsored by COS and COLA. The 15<sup>th</sup> century map resides at Yale University's Beinecke Library and is the subject of document restoration research for Dr. Roger Easton, of the Chester F. Carlson Center for Imaging Science.

## Alumni

**Dr. Karen Oates**, Dean of Arts and Sciences at Worcester Polytechnic Institute, was the 2015 College of Science Distinguished Alumna. She attended an April 17 awards presentation and gave the 2015 COS commencement address.