RIT | College of Science

MONTH IN REVIEW

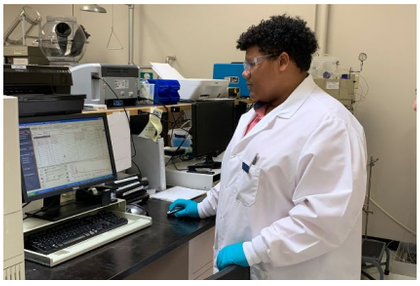
September 2019

Every new academic year in the College of Science is met with excitement for the return to campus, and this year was no exception. There is enormous energy that comes from students, faculty and staff reuniting with friends and colleagues, applying information in new ways, and planning for the future. We're happy to share some updates from the first six weeks of the semester in this edition of the newsletter.

RIT began the year with the announcement that we are now a Carnegie R2 research university. The outstanding work that our faculty are doing to push boundaries within their specialties is an enormous contribution to this new status. Each edition of this newsletter contains a list of new research projects and grants awarded since last publication. Past editions of the Dean's Bulletin can be found on the new College of Science website in the "About" tab. We hope that faculty will use this information to see the types of projects their peers are leading and potential collaborations between our faculty. We also hope that students can use the information to find out about the various interesting and challenging projects which faculty are pursuing that might have undergraduate research opportunities for them.

SOPHIA MAGGELAKIS
Dean, RIT College of Science

Student & Alumni News



Chemistry student receives Station1 Frontier Fellowship

Patrick Edwards, a second-year chemistry and public policy double major, was picked from more than 800 applicants to participate in the 2019 Station1 Frontiers Fellowship program. Edwards traveled to Massachusetts from June 9 to Aug. 17 to complete the program. As part of his fellowship, Edwards had the opportunity to intern at Aphios, a company that focuses on enabling technology platforms and enhanced therapeutic products.

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Imaging Science graduate students featured in livestream

Imaging Science Professor **Grover Swartzlander** and two Imaging Science students, **Lucy Chu** (Ph.D. student) and **Amber Dubill** (BS/MS ME student) were interviewed in the livestream of the NASA Innovative Advanced Concepts (NIAC) Symposium (at timestamp 1:14:22). The symposium featured highly innovative topics related to space propulsion, exploration, and settlement. The NIAC Program nurtures visionary ideas that could transform future NASA missions with the creation of breakthroughs – radically better or entirely new aerospace concepts – while engaging America's innovators and entrepreneurs as partners in the journey. Grover Swartzlander's talk on his Diffractive Light Sails research can be viewed at timestamp 27:51.

View Video >

Environmental Science students measure impact of bioretention areas

Environmental Capstone students **Alyssa Schoenfeldt**, **Alana Hughes** and **Emily Harris** were at Rochester Museum and Science Center installing native plants in a bioretention area that is part of the RMSC's Regional Green Infrastructure Showcase. RIT students are monitoring the performance of green infrastructure, like these bioretention areas, in reducing stormwater overflow and participate in outreach to encourage homeowners to create similar gardens at home.

Our Stories, News & Updates

Mary Lynn Reed appointed head of RIT's School of Mathematical Sciences

RIT's School of Mathematical Sciences has a new leader who is an accomplished mathematician and has been recognized with prestigious awards including the Presidential Rank Award of Meritorious Senior Professional and the National Security Agency Director's Distinguished Service Medal. **Mary Lynn Reed** joined RIT as the new head of the School of Mathematical Sciences on Aug 1.

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RIT research group joins the LSST Corporation

A group of RIT Astrophysics researchers, led by SoPA Assistant Professor **Jeyhan Kartaltepe**, were notified that their application for an Institutional Membership to join the Large Synoptic Survey Telescope Corporation (LSSTC) was approved in September. The Board of the LSSTC works with member institutions to sponsor workshops, internships, training, and other activities to help prepare students, post docs, and staff for working with big data and the data products that LSST will provide. Membership to the LSSTC is sponsored by the College of Science.

GSoLS faculty elected Fellow

Susan Smith-Pagano was recently nominated to become a Fellow of the American Ornithological Society (AOS). She was elected as one of twenty-seven new AOS fellows based on her exceptional and sustained contributions to ornithology and/or service to AOS.

COS hosts first Distinguished Speaker of AY2019-20

Dr. Eric Fullerton, director of the Center for Memory and Recording Research at the University of California, San Diego, was the guest of the School of Physics and Astronomy as the College of Science kicked off its Distinguished Speaker series on Sept. 11. Dr. Fullerton presented a talk on the new generation of data information storage and the challenges facing the industry titled Bits of the Future: Challenges for the continued growth of digital data. He is a Fellow of the American Physical Society and the IEEE as well as a member of the National Academy of Engineering.

Integrated Sciences Academy launches two new interdisciplinary minors

The College of Science has a variety of minors available to broaden student learning experiences while at RIT. This semester, GSoLS has updated their Environmental Science minor, and ISA has developed two new interdisciplinary minors: Art of Science/Science of Art and Applied Cognitive Neuroscience.

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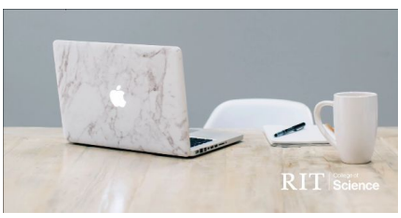
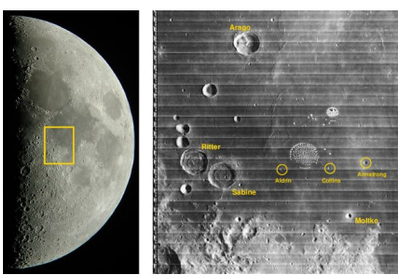
Two faculty win time with Hubble

SoPA Assistant Professor, **Jeyhan Kartaltepe** and CIS Professor **Joel Kastner** each were awarded observation time on the Hubble Space Telescope. Kartaltepe's project is titled, "Toward a Robust Method for Identifying Merger Signatures in Deep Hubble Images." Kastner's study is titled, "Young and Rapidly Evolving: a Panchromatic WFC3 Imaging Study of the Planetary Nebulae NGC 7027 and NGC 6302." The award of Hubble observing time is an exceptional accomplishment worthy of recognition and carries with it both the opportunity for scientific discovery as well as funding to ensure that awardees analyze and share their data with the scientific community, students, and the general public.



2nd annual Online Show 'N' Tell

Faculty gathered in the Bruce & Nora James Atrium in Gosnell Hall in early September to share knowledge about online teaching. Presenting faculty showcased what they do in their online courses and gave advice for utilizing online technology in the classroom with the goal to collectively enhance the online presence of COS classes. The event was organized by **Sandi Connelly**, Leader Faculty in Online Learning.



RIT Observatory hosts open house to commemorate Apollo 11's 50th anniversary

The Rochester Institute of Technology Observatory is celebrated the 50th anniversary of the first steps on the moon by holding an open house. On September 7, members of the Rochester community were invited to visit and explore the moon through the observatory's telescopes, using their eyes and cameras.

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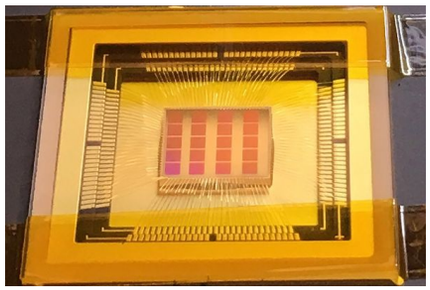

Scientists developing single photon detector to help search for habitable exoplanets

NASA announced it is awarding a team of researchers from Rochester Institute of Technology and Dartmouth College a grant to develop a detector capable of sensing and counting single photons that could be crucial to future NASA astrophysics missions. The extremely sensitive detector would allow scientists to see the faintest observable objects in space, such as Earth-like planets around other stars.

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RIT researchers help develop practical new method for measuring quantum entanglement

Assistant Professor **Gregory Howland,** and other researchers at RIT's Future Photon Initiative, helped develop a new technique for quantifying entanglement that has major implications for developing the next generation of technology in computing, simulation, secure communication and other fields. The researchers outlined their new method for measuring entanglement in a recent *Nature Communications* article.

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Researchers gain new insight about bacteria within grapevine-killing crown gall tumors

Researchers including several Rochester Institute of Technology faculty and alumni sequenced the microbiome found within tumors of grapevines afflicted with crown gall disease. The study spanned four continents and sheds light on the complex interaction between the grapevine and its microbial community, which could lead to better management of the crown gall disease in the future.

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'Global Women of Light' to gather for international symposium at 2019 Frontiers in Optics

Women from academia, industry and government met in Washington, D.C. in mid-September to collaboratively establish strategies to advance women's leadership across science, technology, engineering and entrepreneurship career rank at the fourth international "Global Women of Light" symposium.

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RIT receives multiple accolades for promoting diversity and inclusion

RIT received the 2019 **Higher Education Excellence in Diversity (HEED) Award** from *INSIGHT Into Diversity* magazine, the oldest and largest diversity-focused publication in higher education. Professor **André Hudson**, head of RIT's **Thomas H. Gosnell School of Life Sciences**, is among the individuals Minority Access celebrated at the National Role Models Conference this year. Fewer than 200 colleges and universities nationwide were recognized by the organization this year. Minority Access made a formal presentation in recognition of RIT's commitment at their National Role Models Conference, Sept. 26–29 in National Harbor, Md.

American Indian Science and Engineering Society gives RIT professor its highest honor

The American Indian Science and Engineering Society (AISES) announced that Rochester Institute of Technology Professor Emeritus **Roger Dube** is the winner of its annual Ely S. Parker Award. The award recognizes engineers, scientists and educators who have provided exemplary service to the American Indian/Alaska Native community. The highest AISES honor, the award is named for a distinguished 19th-century Seneca leader whose remarkable career included roles as an attorney, engineer, tribal diplomat, Sachem of the Six Nations Confederacy, wartime secretary to Ulysses S. Grant and commissioner of Indian Affairs.

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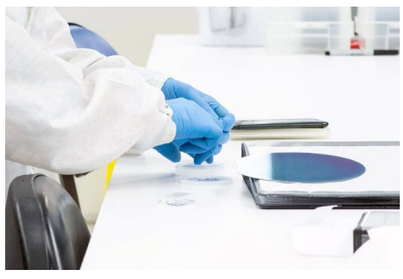

RIT Sponsored Research garners $74 million in funding

Rochester Institute of Technology had its second best year ever in sponsored research funding and a record year for research expenditures in fiscal year 2019.

RIT received 366 new awards totaling $74 million in funding, and expenditures grew to $61 million. RIT now has 353 principal investigators associated with active research awards.

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Newsmakers

Charles Bachmann, the Frederick and Anna B. Wiedman Chair and associate professor in the Chester F. Carlson Center for Imaging Science (CIS), was lead author of a cover article published in the January 2019 issue of the Journal of Imaging. The article is titled "A Low-Rate Video Approach to Hyperspectral Imaging of Dynamic Scenes." Contributors include **Rehman Eon**, imaging science Ph.D. student; **Christopher Lapszynski** '13 (imaging science), imaging science Ph.D. student; **Gregory Badura** '19 Ph.D. (imaging science); **Anthony Vodacek**, professor, CIS; **Matthew Hoffman**, associate professor, School of Mathematical Sciences; **Donald McKeown**, distinguished researcher, CIS; **Robert Kremens**, research faculty, CIS; **Michael Richardson**, former CIS researcher; **Timothy Bauch**, senior lab engineer, CIS; and **Mark Foote**, computer engineering technology student.

SoPA Assistant Professor **Pratik P. Dholabhai** published an article in Advanced Theory and Simulations titled Beyond Coherent Oxide Heterostructures: Atomic-Scale Structure of Misfit Dislocations.

Roger Dube, professor emeritus from the College of Science, has been appointed a visiting Indigenous scholar at the University of Manitoba and is serving a three-month residence in its Faculty of Science.

Ben Zwickl, associate professor in the School of Physics and Astronomy, organized the Rochester Optics Education and Workforce Development Meeting on Aug. 15. The meeting's goals included forming an internationally visible community that is renowned as a leader in optics education, forming new multi-institution collaborations that lead to external funding and prioritizing areas for new curricular development.

Sponsored Research

Christopher Collison, SCMS, is the PI on a $59,998 grant from the Hewlett-Packard Company to support the project titled "Light-Triggered Self-Healing High Transfer Efficiency, Flexible Belts and Films."

Don Figer, CfD, is the PI on a $945,228 grant from NASA to support the project titled "A Single Photon Sensing and Photon Number Resolving Detector for NASA Missions"

Aaron Gerace, CIS, is the PI on a $692,535 grant from NASA to support the project titled "Simulation and Modeling to Support Definition of Sustainable Land Imaging (SLI) System Requirements."

Emmett Ientilucci, CIS, is the PI on a $127,690 grant from the National Science Foundation to support the project titled "Quantitative Analysis of Nitrous Oxide after Blast Fumes by Drone Monitoring"

Christopher Kanan, CIS, is the PI on a $499,960 grant from the National Science Foundation to support the project titled "RI: Small: Lifelong Multimodal Machine Learning."

David Messinger, CIS, is the PI with key personnel **Michael Gartley** and **Donald McKeown,** CIS on a $978,138 grant from the DoD National Geospatial-Intelligence Agency to support the project titled "Radiometrically Accurate Spatial Resolution Enhancement of Spectral Imagery."

Matthew Montanaro, senior scientist in the Chester F. Carlson Center for Imaging Science, received a $1.3 million grant from NASA to provide Landsat thermal image systems engineering support over the next five years. The grant will allow RIT scientists to continue to support calibration activities for Landsat 9/TIRS-2 instrument through pre-flight instrument and observatory testing, launch and on-orbit commissioning, and transition to nominal operations.

Michael Zemcov, SoPA, is the PI with co-PI **Dorin Patru** of KGCOE on a $877,681 grant from NASA to support the project titled "Multi-Color Anisotropy Measurements of Cosmic Near-Infrared Extragalactic Background Light with CIBER-2."

Michael Zemcov, SoPA, is the PI on a $30,911 grant from NASA and the California Institute of Technology to support the project titled "SPHEREx: An All-Sky Spectral Survey, Phase B."

Michael Zemcov, SoPA, is the PI on a $192,389 grant from NASA and the California Institute of Technology to support the project titled "Measuring Reionization and the Growth of Molecular Gas with TIME."

Jan van Aardt, CIS, is the PI on a $21,407 grant from Love Beets to support the project titled "Enhanced 3D Sub-Canopy Mapping With Airborne and Spaceborne Full-Waveform LiDAR."

Jan van Aardt, CIS, is the PI on a $120,000 grant from DoI Geological Survey to support the project titled "Accretion assessment in mangrove forests: A comparison between terrestrial laser scanner data from two disparate mangrove forests."

COS in the Media

CBC News
Some tea bags may shed billions of micro plastics per cup
SMS Associate Professor **Matthew Hoffman** quoted.

Chicago Tribune
22 million pounds of plastics enter the Great Lakes each year. Most of the pollution pours into Lake Michigan
SMS Associate Professor **Matthew Hoffman** quoted.

Tech Explorist
A practical method to measure quantum entanglement
Research by Assistant Professor **Gregory Howland** of the Future Photon Initiative at RIT featured.

Chemistry World
How to protect your emotional wellbeing
Research by SCMS Professor **Paul Craig** about maintaining good emotional health while forging a career in science highlighted.

TruUnity
The Real Dr. Dre is a Biochemist
Career Profile – Professor Andre Hudson, GSoLS featured.

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