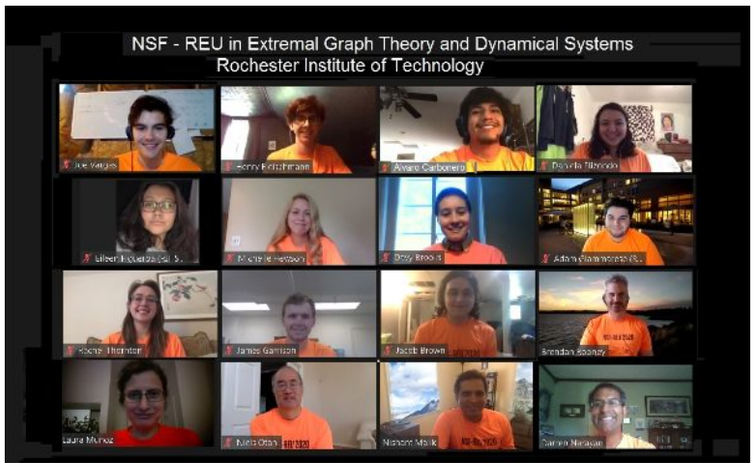
RIT | College of Science

DEAN'S SUMMER BULLETIN

June & July 2020



Message from the Dean

In less than 2 weeks, the RIT campus will reopen after one of the most extensive and swift upgrades in history. Campus remained closed throughout the summer due to the COVID-19 outbreak, but the facilities crews were hard at work preparing our buildings for a safe return. Below are just a few of the cleaning, safety, and infrastructure upgrades made to prepare for the fall:

- Bipolar ionization systems were installed in 15 academic and residential buildings this month to help neutralize airborne contaminants. **Dr. André Hudson**, Head of the Thomas H. Gosnell School of Life Sciences, tested these systems to make sure they worked as indicated. Additional buildings are being considered for the future.
- 600+ door pulls on campus were upgraded with 3D-printed copper plating, copper polish, or copper electroplating to help reduce the spread of viruses on these frequently touched surfaces.
- 1,000 hand- or foot-operated hand sanitizer stations were placed around campus.
- Bathrooms were updated with hands-free paper towel dispensers, foot pedals, touchless soap dispensers, and, in some cases, automatic door openers.

Learn more about the many ways in which we are RIT Ready and check back often for updates.

As the situation in the region surrounding RIT improved and health restrictions eased, faculty gradually returned to research labs and began preparing courses for the fall. The RIT administration announced that classes would resume a week earlier than originally scheduled, August 19th, allowing students to return home at Thanksgiving and stay home through the holidays. Every precaution is being put into place to keep our tiger family safe and we are all looking forward to being together again.

We were saddened to learn that we lost two members of our College of Science community over the summer. **Jerome "Jerry" Wagner** was a Professor of physics at RIT from 1976-2012. His grandkids took pride in the fact that their grandfather lent credibility to the physics department through his resemblance to Albert Einstein. He was a great colleague and a good friend to many in the college. He will be remembered fondly. It was especially difficult when we heard the news that environmental sciences student **Cory Jacobson** passed away suddenly in mid-July. We join the larger RIT community in expressing our most sincere condolences to Cory's family and friends. At times like these we are reminded of the importance of self-care and taking the time to care for one another. RIT Counseling and Psychological Services, NTID Counseling and Academic Advising Services, and Spirituality & Religious Life have continued to support the community throughout this difficult time.

Our incoming students were able to connect with each other early and get college class experience (and credit!) through the First Class Academy. The first-time program was a resounding success with more than 1700 first-year students signing up for classes such as "Kitchen Science: Gourmet Cooking in Your Dorm Room," "Street Fighting Mathematics" or "Hominids: Back to the Future" that took place during the second 6-week summer term. Additionally, incoming COS students were invited to participate in weekly COS Tiger Talks. The Zoom events connected incoming students with current COS students to chat about topics like getting involved in COS clubs, where to eat on campus, and how to succeed in college classes.

While we are preparing for the new academic year with anticipation and excitement, we realize that many things will be different this year. This year, more than ever, we are reminded of the critical importance of science and math in our daily lives, and the significance of educating our scientists and mathematicians of tomorrow.

SOPHIA MAGGELAKIS
Dean, RIT College of Science

Student & Alumni News

Astrophysical Science & Technology graduate recognized for exceptional dissertation research

New Astrophysical Science & Technology Ph.D. graduate **Kevin Cooke** was selected to receive the **2020 RIT Graduate Education Ph.D. Dissertation Award** for his dissertation "Magnificent Constructions: The Role of Environment on the Stellar Mass Growth of Massive Galaxies" (2019). Kevin's advisor was **Jeyhan Kartaltepe,** assistant professor in the School of Physics and Astronomy.

The award was established in 2015 to recognize exceptional dissertation research and Kevin joins two previous AST recipients:
Dr. Dave Principe '15 and **Dr. Triana Almeyda** '18.

Biotechnology alumnus helping Bolivia respond to COVID-19 pandemic

An RIT alumnus is helping to lead Bolivia's response to the COVID-19 pandemic**. Mohammed Mostajo-Radji** '11 (biotechnology) was appointed as Bolivia's first ambassador for science, technology and innovation in February. He is typically based out of Silicon Valley, helping to encourage technology investment in Bolivia and facilitating exchanges between universities, technology companies, startups, and more. But on March 19 he flew back home at the request of Bolivia's interim president, Jeanine Áñez, to help coordinate his country's efforts to combat COVID-19's spread.

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Imaging Science Ph.D. candidate paper wins prize

Biswa Ranjan Swain, a student in the Imaging Science Ph.D. program won the Optical Society (OSA) **Imaging and Applied Optics Congress Student Paper Prize** for the paper entitled "High-Dynamic Range, High-Resolution Freeform Metrology with Optical Differentiation Wavefront Sensing." Biswa is mentored by **Jie Qiao**, associate professor in the Chester F. Carlson Center for Imaging Science.

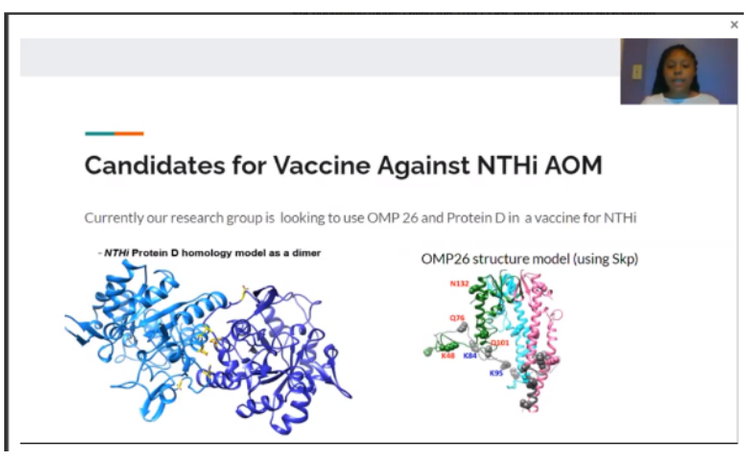


Image from Undergraduate Research Symposium presentation

by Niaya Jackson, 4th year Biochemistry major

Protein structure models by Seth Jones, 3rd year Biochemistry major

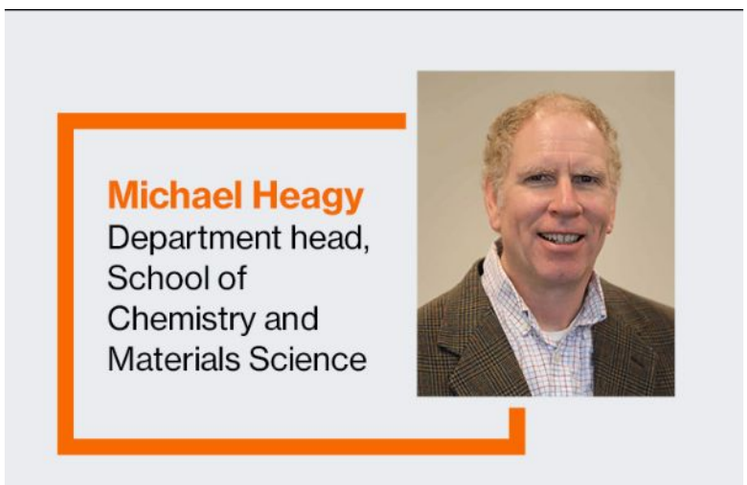
Student research continues through summer shutdowns

The College of Science continued to engage undergraduate students in research this summer, though on a much more limited basis than in past years due to the pandemic. Many of the COS summer researchers presented a summary of their research in the online Undergraduate Research Symposium. Presentations are viewable online from July 30-August 6.

- Twelve College of Science students received funding through the **Emerson Summer Undergraduate Fellowship**, and two incoming first-year students participated in the **Fast Forward Summer Research Program** to conduct remote research with COS faculty in the School of Chemistry & Materials Science, School of Mathematical Sciences, School of Physics & Astronomy, and the Thomas H. Gosnell School of Life Sciences.
- **Research Experiences for Undergraduates** (REUs) were offered through the Center for Advancing STEM Teaching, Learning and Evaluation (CASTLE) and the School of Mathematical Sciences to 19 non-RIT students from across the country and 10 RIT students.
    - Students in the CASTLE program were working on projects related to Discipline Based Education Research.
    - The SMS REU students were divided into two groups: One group used **dynamical systems** to analyze the effect of the Amazon rain forest on global climate systems, and the **mathematical biology** group researched methods for stabilizing heart arrhythmias, which are often precursors of a heart attack. They plan to present the results of their research at the 2021 Joint Mathematics Meeting.
- Thanks to a grant from **Jeff Harris** '75 (photographic science and instrumentation) and **Joyce Pratt**, The Chester F. Carlson Center for Imaging Science engaged three RIT students in an Extension of their Freshman Imaging Project to examine cultural heritage documents throughout the summer.

Additionally, the Imaging Science Summer Internship Program is in its 21st year with 17 local high school students working virtually with faculty, staff and graduate students in the Imaging Science program, participating in projects to correct imagery from the International Space Station, examine cultural heritage documents, and process LANDSAT data of a lake in Africa. They will present their final projects August 13-14 via Zoom.

Our Stories, News & Updates



School of Chemistry & Materials Science welcomes new head

Michael Heagy, Ph.D. has been appointed the new head of Rochester Institute of Technology's School of Chemistry and Materials Science. Dr. Heagy comes to RIT from the New Mexico Institute of Mining & Technology, where he began his academic career as an assistant professor in 1996 and has served as the chair of the Department of Chemistry since 2016. Heagy joined RIT July 1 and succeeds **Professor Paul Craig**, who served as head of the School of Chemistry and Materials Science for two terms. Craig will return to teaching in the fall.

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New director of Materials Science & Engineering program

Dr. Scott Williams has been appointed as the new director of the M.S. Materials Science & Engineering (MSE) degree program. Dr. Williams is a professor in the School of Chemistry & Materials Science who came to RIT in 1994, joining the Department of Chemistry in 2011. His research group synthesizes and formulates new materials for functional printed electronics and optics applications in collaboration with the RIT AMPrint Center. He is a highly regarded teacher, having won both the Provost's Excellence in Teaching Award (1997) and the Eisenhart Excellence in Teaching Award (2008) at RIT. In 2011, he also received the Raymond C. Bowman Award for Excellence in Teaching from the Society for Imaging and Scientific Technology.

As MSE program director, Scott will oversee the admissions process and academic and career counseling for all of our MS and BS/MS students. He will work closely with other program and affiliated program faculty members in the College of Science and the Kate Gleason College of Engineering on matters relating to curriculum development and research opportunities for our students. He will also work closely with the head of the School of Chemistry and Materials Science on course scheduling and teaching assignments.

New Inclusive Excellence Program Coordinator appointed

The College of Science is pleased to announce the appointment of **Rita Margarida de Almeida Dias Quiñones de Magalhães** to program coordinator of the Inclusive Excellence Initiative. Magalhães will work with program team members **Scott Franklin, Dina Newman, Lea Michel, Elizabeth Hane, Jennifer Connelly** and **Tina Chapman DaCosta** on programmatic activities and strategic issues for sustainability plans.

RIT strategically upgrades campus to prevent the spread of coronavirus

RIT's Infrastructure and Health Technologies task force, led by RIT Finance and Administration, is putting changes in place to make RIT's campus as safe and clean as possible so that students, faculty, and staff can study and work confidently and comfortably in the fall. They are implementing a variety of changes to RIT's academic settings, housing, and dining. And they have been utilizing in-house expertise from RIT's health engineering professionals and scientists like **Dr. André Hudson**, head of the Thomas H. Gosnell School of Life Sciences to inform their decisions.

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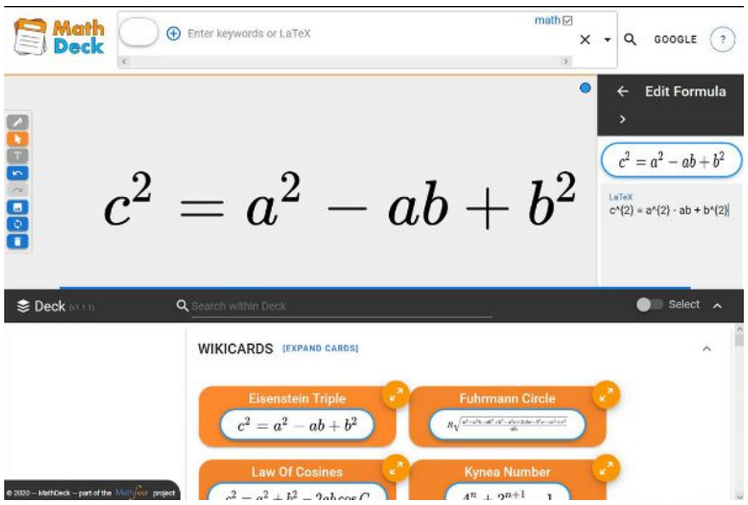

RIT researchers create easy-to-use math-aware search interface

Anurag Agarwal, associate professor in the School of Mathematical Sciences, is among a group of researchers at Rochester Institute of Technology who developed MathDeck, an online search interface that allows anyone to easily create, edit and look up sophisticated math formulas on the computer.

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Photonics for Quantum workshop goes virtual

The **Future Photon Initiative** hosted its Photonics for Quantum workshop in a new format this year. International academic and industry experts, and students in quantum photonic information science and technology convened virtually in a speaker series each weekday at 1:00 EDT from June 23-August 7.

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Imaging Systems help libraries and museums uncover lost texts

Scientists from Rochester Institute of Technology's Chester F. Carlson Center for Imaging Science are developing affordable imaging systems to help libraries and museums preserve and expand access to their historical collections. The project, funded by a grant from **the National Endowment for the Humanities**, aims to create a low-cost spectral imaging system and software that can be used to recover obscured and illegible text on historical documents.

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Virtual reality helps stroke patients regain lost vision

Scientists from Rochester Institute of Technology and the University of Rochester aim to use virtual reality to help restore vision for people with stroke-induced blindness. The team of researchers led by **Gabriel Diaz**, assistant professor at RIT's Chester F. Carlson Center for Imaging Science, received a grant from the **National Institutes of Health** to develop a method they believe could revolutionize rehabilitation for patients with cortically induced blindness. The condition afflicts about 1% of the population over age 50.

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Digital Imaging and Remote Sensing Laboratory now offering services to the public

A Rochester Institute Technology laboratory with deep expertise in drones, imaging and remote sensing technology is now offering its services to the public. Through the Digital Imaging and Remote Sensing (DIRS) **Enterprise Center**, customers can now hire faculty and staff from RIT's Chester F. Carlson Center for Imaging Science to provide training, consulting, data collection, equipment calibration and more.

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Groundbreaking study of binary star evolution is focus of new NSF grant

A new grant, led by **Jason Nordhaus**, RIT/NTID assistant professor of physics, will help researchers at Rochester Institute of Technology's National Technical Institute for the Deaf learn more about "one of the most challenging phases in stellar astrophysics," according to the National Science Foundation.

The nearly $300,000 project, which incorporates research opportunities for deaf and hard-of-hearing undergraduate students, will revolutionize how scientists understand a crucial phase of binary star evolution that rapidly shrinks the orbit of two stars to 0.1 percent of the distance from the Earth to the sun in only one year. This is the main method for forming tight binaries in the universe, such as binary black holes, neutron stars, white dwarfs, and many other classes of objects. But scientists have never seen it happen.

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RIT | Division of Diversity and Inclusion

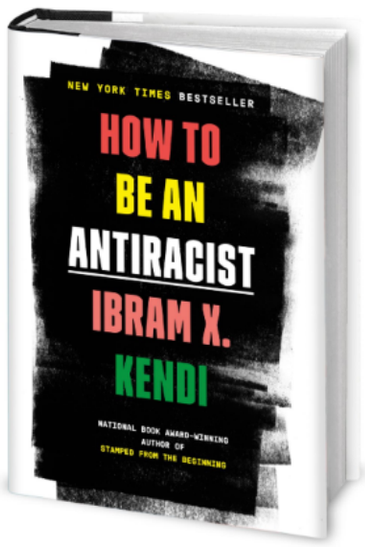
RIT DIVERSITY THEATER PRESENTS:

Community Understanding and Healing: Stories of Discrimination and Progress

RIT | Division of Diversity and Inclusion Diversity Theater | College of Science Inclusive Excellence

Playback Theater workshop addresses impacts of discrimination

The COS Inclusive Excellence Initiative hosted two campus-wide **Playback Theater** workshops to feature the stories of RIT community members most impacted by discrimination, racism, biases and oppression. Virtual Playback Theater (PBT) is based on an international form of improvisational theater where participants share personal stories around a common theme that are enacted by PBT actors and musicians in a virtual space.



Inclusive Excellence group book club

In response to the civil unrest throughout the country this summer, the College of Science Inclusive Excellence Initiative is leading a book club to discuss Ibram X. Kendi's book *How to be an Antiracist*. Small groups of COS employees meet weekly to discuss chapters of the book, the impacts of systemic racism both on us individually and on the community as a whole, and the implications of changing our actions from "not racist" to "anti-racist."

COS Staff gather for virtual retreat

The College of Science Staff Advisory Council hosted their annual summer retreat virtually this year. In addition to staff taking some time to connect socially, guest speaker **Ben Woelk** of RIT's Information Technology Services joined to talk about Cybersecurity and share some tips about protecting digital devices. Dean **Sophia Maggelakis** also joined and answered questions that were on the minds of staff members.

Sponsored Research

Scott Brown, CIS, is the PI on a $50,000 grant from DOD-Department of the Air Force, Materiel Command/Intelligent Automation, Inc to support a project titled "Adaptable Interfaces for M&S Tools."

Manuela Campanelli, CCRG-SMS, is the PI on a $466,853 grant from NSF-National Science Foundation to support a project titled "Collaborative Research: Supermassive Binary Black Hole Mergers: Accretion Dynamics and Electromagnetic Output."

Seth Hubbard, SoPA, is the PI with co-PI **Stephen Polly** (GIS-NPRL) on a $199,981 grant from DOE-Department of Energy/Arizona State University to support a project titled "Sonic Wafering of III-V substrates for High Efficiency Cells: A path to <$0.50/W."

Jeyhan Kartaltepe, SoPA, is the PI on a $444,119 grant from NASA-National Aeronautics and Space Administration to support a project titled "Toward a Uniform and Complete Keck Spectroscopic Archive for the COSMOS Legacy Field."

Michael Murdoch, PoCS-ISA, is the PI on a $174,724 grant from NSF-National Science Foundation to support a project titled "CAREER: Computational Model of Perceived Color and Appearance in Augmented Reality."

Jason Nordhaus, NTID-CCRG, is the PI with co-PI **Philip Muirhead** of Boston University on a $296,190 grant from NSF-National Science Foundation to support a project titled "Brief But Spectacular: New Windows into the Physics of Common Envelope Evolution."

Andrew Robinson, SoPA, is the PI on a $371,287 grant from NSF-National Science Foundation to support a project titled "Modeling light echoes from hot dust and the broad line region in Active Galactic Nuclei."

Andrew Robinson, SoPA, is the PI with co-PI **Michael Zemcov** (SoPA) on a $60,000 grant from NASA-National Aeronautics and Space Administration/Cornell University to support a project titled "Graduate and Undergraduate Research Fellowships in Astrophysical Sciences and Technology."

Jan Van Aardt, CIS, is the PI on a $17,257 grant from USDA-Forest Service to support a project titled "A new tool to monitor the resilience of mangroves to sea level rise."

COS in the Media

Lucia Carichino, assistant professor in the School of Mathematical Sciences, was awarded the Best Paper Prize for her article in the Institute of Mathematics journal, **Mathematical Medicine and Biology**, entitled "Emergent three-dimensional sperm motility: coupling calcium dynamics and preferred curvature in a Kirchhoff rod model."

A paper on the effects of eye-contact in remote communication derived from a master's thesis introduction is being cited in guides for workplace meetings and online teaching. The paper authors are **Leanne Bohannon** '07 (psychology), '10 (experimental psychology); **Andrew Herbert**, a professor in the Department of Psychology; **Jeff Pelz**, the Endowed Professorship in RIT's Center for Imaging Science; and **Esa Rantanen**, associate professor in the Department of

Psychology.

Tony Wong, an assistant professor in the School of Mathematical Sciences, is the guest editor for a special issue of the journal *Water*. The issue is titled "Climate Model Projections: Sea-Level Rise and Impacts on Coastal Defense Decision-Making."

WROC-TV
RIT professors' study helps predict infection rate of Covid-19
WROC-TV talks to **Nathaniel Barlow**, associate professor in RIT's School of Mathematical Sciences, and **Steven Weinstein**, head of RIT's Department of Chemical Engineering, about their work to help epidemiologists map the spread of COVID-19.

NASA.gov
X-rays From a Newborn Star Hint at Our Sun's Earliest Days
NASA mentions **Joel Kastner**, professor in the Chester F. Carlson Center for Imaging Science and School of Physics and Astronomy, and alumnus **David Principe** '10 Ph.D. (astrophysical science and technology) for being part of a team that observed an X-ray flare from a very young star using NASA's Chandra X-ray Observatory.

NASA.gov
Hubble Provides Holistic View of Stars Gone Haywire
NASA features **Joel Kastner**, a professor in RIT's Chester F. Carlson Center for Imaging Science and School of Physics and Astronomy, and astrophysical science and technology Ph.D. students **Jesse Bublitz** and **Paula Moraga** on their latest Hubble telescope observations.

How Stuff Works
Hubble Hubble: Telescope Provides Stunning New Images of Two Planetary Nebulas
How Stuff Works features work by **Joel Kastner**, professor in RIT's Chester F. Carlson Center for Imaging Science and School of Physics and Astronomy, and astrophysical science and technology Ph.D. students **Jesse Bublitz** and **Paula Moraga**.

NASA.gov
Astronomy Picture of the Day
NASA features an image of planetary nebula NGC 7027, captured by RIT professor **Joel Kastner** and his team, as its Astronomy Picture of the Day.

WHAM-TV
Researchers at RIT to study pollution of microplastics on Lake Ontario
WHAM-TV reports on an RIT study how microplastics are affecting Lake Ontario.

CTV News
How one environmentalist set out to detect microplastics in his own body
CTV News talks to **Nathan Eddingsaas**, associate professor in the School of Chemistry and Materials Science, about the presence of microplastics in the human body.

The Globe and Mail
Searching for microplastics within the human body
The Globe and Mail features work by **Christy Tyler**, associate professor in the Thomas H. Gosnell School of Life Sciences, and **Nathan Eddingsaas**, associate professor in the School of Chemistry and Materials Science.

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