RIT | College of Science

DEAN'S BULLETIN

November & December 2021 in Review

Message from the Dean

Sometimes in work, and in life, we recognize the value of keeping our heads down and focusing on the task at hand. Despite the uncertainty of our current world, I've found that when I lift my head up and look around, there is much to celebrate and be grateful for.

Here in the College of Science, we offer classes to nearly every student at RIT. When the incoming class swelled to more than 3,000 students, our faculty, staff, and teaching and learning assistants rose to the challenge to offer math and physics courses to our first-year students. I'm extremely grateful to those members of our team who have gone above and beyond to make that happen, and I'm thrilled to see so many students choosing RIT as their home for undergraduate studies.

We also continued to grow our research and faculty scholarship this past year. Many faculty are contributing their knowledge both to published journals and to public information channels including The Conversation. Dr. Andre Hudson and Dr. Crista Wadsworth recently discussed genomic sequencing - a tool that scientists have used for decades but is only now gaining broader recognition for its power and promise. Dr. Jeyhan Kartaltepe and Dr. Don Figer will soon celebrate the gift of the James Webb Space Telescope launching into orbit after nearly 30 years of development.

And our students continue to inspire us. Throughout the semester, I met with many of our students. Speaking with students in person makes me feel energized and excited about our mission. We heard laughter in the hallways again, welcomed visitors in the Dean's office, and even shared some pizza! These small things that we sometimes take for granted are worth celebrating. Similarly, the comfort of Zoom has allowed to connect us with our alumni in new ways, and I hope you take a few minutes to read the featured profiles of a few of our alumni.

This holiday I hope you have a moment to slow down and look around at all that we have accomplished and all that we can celebrate. Thank you for your continued support of the College of Science.

Happy Holidays and a very Happy New Year to you and your loved ones.

SOPHIA MAGGELAKIS

Dean, RIT College of Science

Student & Alumni News

Alumnus and COS External Advisory Board member Jeffrey Harris named chair of RIT Board of Trustees

Jeffrey Harris has been named the 21st chairperson of Rochester Institute of Technology's Board of Trustees. Harris, who resides in Annapolis, Md., and has served on the RIT board for nearly 15 years, graduated from RIT in 1975 with a Bachelor of Science degree in photographic sciences. He thrived in the experiential nature of RIT's imaging science program, which led him to a career advancing national security programs in both government and industry.

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RIT astrophysics graduate students conduct experiment at White Sands Missile Range

Serena Tramm, a Ph.D. student from Palos Verdes, Calif., and **Mike Ortiz**, a master's student from Flagstaff, Ariz., are pursuing their studies in astrophysics and have been working alongside Michael Zemcov, assistant professor in RIT's School of Physics and Astronomy. Together, the team conducted an experiment that resulted in a trip to New Mexico's White Sands Missile Range for the first CIBER-2 launch earlier this year.

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RIT welcomes its most recent Newman Civic Fellow

Growing up in a family of teachers, **Nidhi Baindur** has valued education from a very young age. Baindur, a second-year computational mathematics major from the island nation of Mauritius, is well on her way to helping others as just the second RIT recipient of the Newman Civic Fellowship, which recognizes and supports community-committed students who are change-makers and public problem-solvers.

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Using Artificial Intelligence for Conservation and Sustainability

Elizabeth Bondi '16 explored a range of technical and research skills during her years as an imaging science student at RIT. She used those skills to develop an algorithm that aided in preventing poaching in South Africa, and now she's pursuing a Ph.D. in computer science at Harvard University.

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RIT Alum Uses Math for NBA Analytics

Calvin Floyd '17 developed the strong technical skills needed to succeed in an NBA analytics department during his masters degree program in applied and computational mathematics at RIT.

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Finding Work/Life Balance as a Podiatrist

Breeann Wilson '02 always wanted to perform surgery, but she also wanted flexibility. She earned her BS in biochemistry and now runs her own podiatry practice in Buffalo, NY which gives her time to pursue personal interests.

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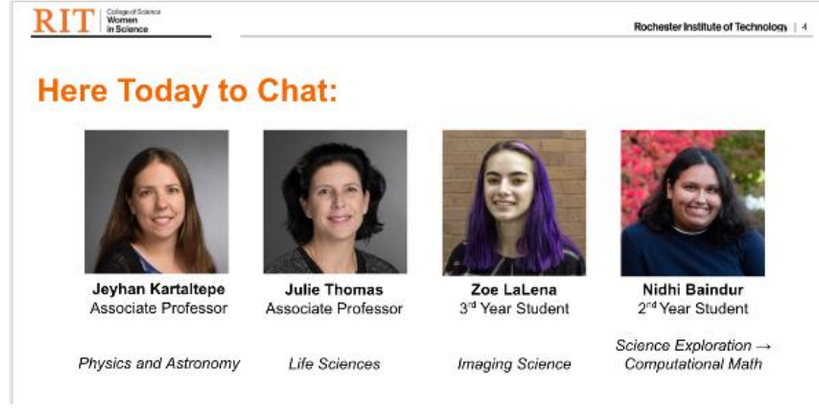


Women at RIT Event

Women's groups from Business, Computing, Engineering, Engineering Tech, and Science came together for the first **Women at RIT** recruiting event. More than 300 prospective students attended the interactive Zoom meeting to hear about the opportunities available at RIT before breaking out into small groups. Women In Science **(WISe)** chair **Jeyhan Kartaltepe** led the COS panel with vice chair **Julie Thomas**, and COS students **Zoë LaLena** (fourth-year, imaging science) and **Nidhi Baindur** (second-year, computational mathematics). Another session is being planned for the spring for women who are accepted into College of Science programs.

Gifts from Alumni & Benefactors

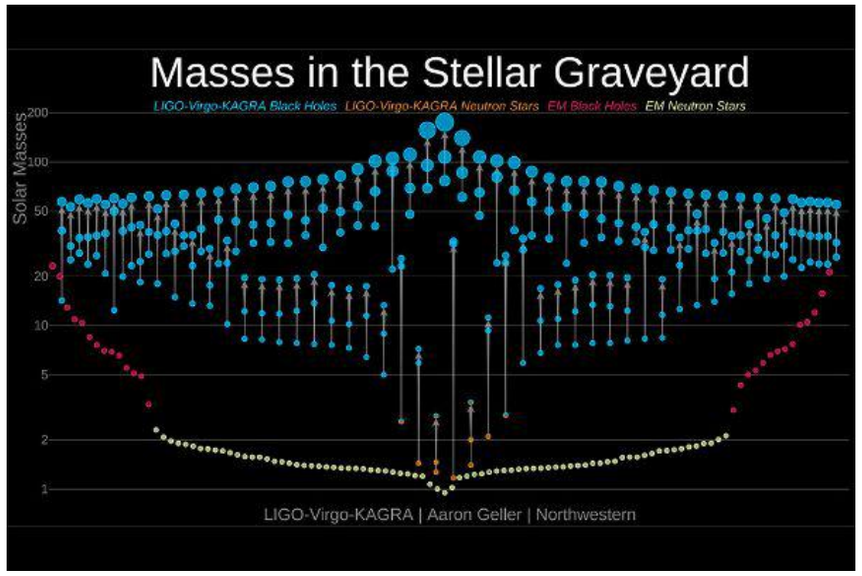
Annual Day of Thanks honors generosity and impact of RIT donors

RIT alumni **Brandy** '08 (biochemistry) and **Luiz** '07 (economics) Freitas are proud that they are able to give back to the university community that means so much to them. Not only did they meet one another nearly 20 years ago as Honors students, but they credit much of their professional successes to their time spent at RIT, both in the classroom and during their co-op experiences.

Pre-Vet Endowment Fund Established

Friend of the college, **Lt. Col. Mary Ann Latosi Jernigan** has generously established an endowment fund for RIT students interested in pursuing a career in veterinary medicine. Funding is intended to address costs associated with, books, application fees, required standardized examinations, travel and incidental needs for interviews and professional conferences, and undergraduate research with special consideration given to students related to veterans who served in the military.

Our Stories



LIGO-Virgo-KAGRA Collaboration announces 90 gravitational wave discoveries to date

The LIGO-Virgo-KAGRA Collaboration unveiled several studies that shed important new light on the nature of gravitational waves. They include a “census” of gravitational wave events to date and a new catalog of results from the second half of its third observing run.

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Faculty awarded NSF funding to improve computing system memory

Dorin Patru and Linlin Chen, faculty-researchers at Rochester Institute of Technology, received a grant from the National Science Foundation to upgrade functions of programmable memory. The research partners at RIT, along with colleagues from University of Rochester (UR), will develop new algorithms to improve the internal computing memory system to enable scalable and more robust performance.

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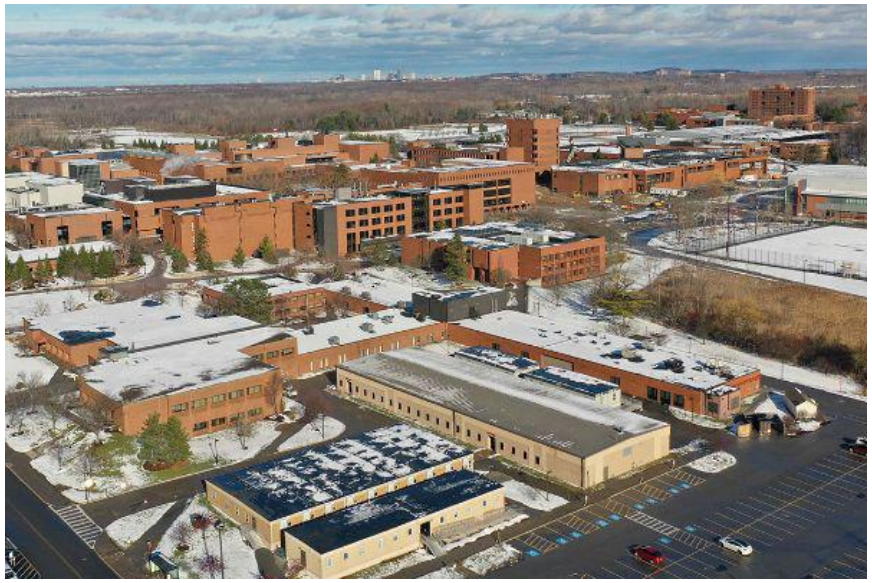

Brown Hall begins its evolution to research lab facilities

Brown Hall will get a face-lift as it becomes a new location for several science and engineering research laboratories. Work is expected to begin on the redesign of the building, on the west side of campus, which previously housed offices of RIT's Division of Marketing and Communications and several classrooms.

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Growing Faculty Diversity

RIT has modernized its approach to recruiting faculty members to improve representation. Assistant Professor Eli Borrego, pictured above, is an expert in the genetics and biochemistry of plant-microbe and plant-insect communication and ecology, and he was introduced to RIT through the Future Faculty Career Exploration Program.

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RIT poised to contribute to NASA's next great observatory following release of decadal survey

Researchers from RIT's Center for Detectors are poised to contribute to the top priority outlined in the decadal survey recently released by the National Academies of Sciences, Engineering, and Medicine. The report outlines the American astronomy community's scientific priorities, opportunities, and funding recommendations for the next 10 years.

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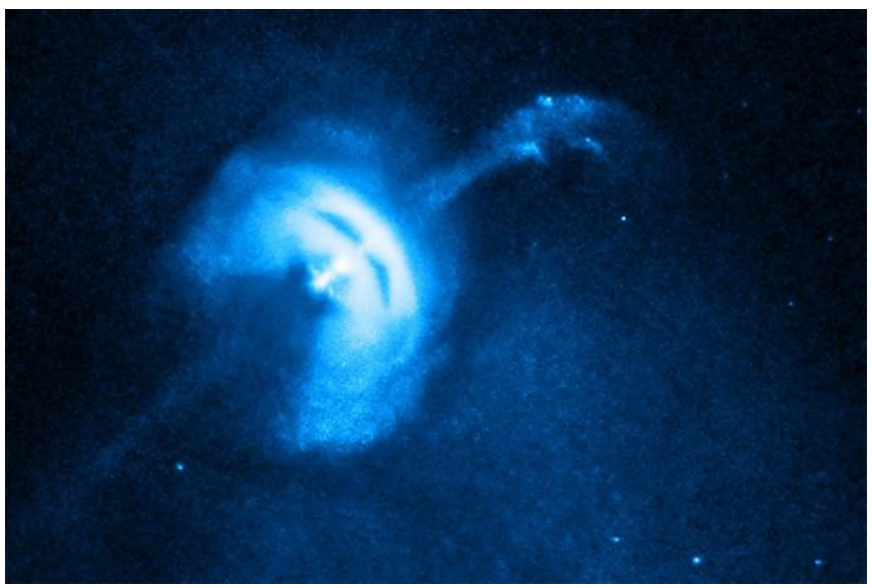

RIT scientists develop machine learning techniques to shed new light on pulsars

New machine learning techniques developed by scientists at Rochester Institute of Technology are revealing important information about how pulsars—rapidly rotating neutron stars—behave. In a new study published by *Monthly Notices of the Royal Astronomical Society*, the researchers outlined their new techniques and how they applied to study Vela, the brightest radio pulsar in the sky.

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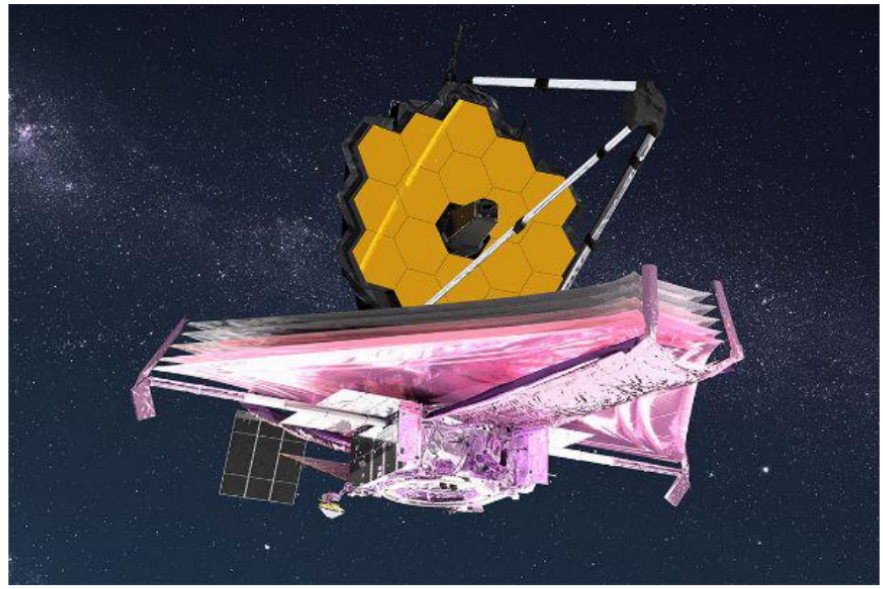

Multiple RIT scientists contribute to the newest space telescope

When the James Webb Space Telescope (JWST) launches, it will mark the culmination of nearly 30 years of development on the most powerful observational instrument ever made. Numerous members of Rochester Institute of Technology's College of Science have been involved in its creation or will work on projects once it becomes operational.

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Researching the Health of Our Freshwater Ecosystems

Sandi Connelly, a principal lecturer in the Thomas H. Gosnell School of Life Sciences, is helping her students and others understand freshwater ecosystems and their health, one conversation at a time.

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Providing Discoverability and Accessibility of Historical Documents to Museums and Libraries

Students in the Museum Studies degree program are working alongside research scientists from the College of Science Chester F. Carlson Center for Imaging Science to create, test, and iterate a low-cost spectral imaging system and software to recover obscured and illegible text on historical documents. Enhancing the work of library, archive, and museum professionals and generously funded by the National Endowment of the Humanities, this project is only one of the many experiential learning opportunities undertaken by RIT museum studies students.

View the Video >

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Honors and Awards

Manuela Campanelli, director of the Center for Computational Relativity and Gravitation, has agreed to serve as a member of the Editorial Board for the journal *Physical Review D* for a period of two years, beginning in January 2022.

Carly Metcalfe, Lecturer in Statistics in the School of Mathematical Sciences, was awarded a Lecturer's Professional Development Grant in the amount of $1,984 to attend the **International Teaching Learning Cooperative (ITLC) Lily Conference at Miami University** in November 2022. This grant is sponsored by Faculty Career Development in the Office of Faculty Affairs.

Allison Healy, coordinator of laboratory resources for the Thomas H. Gosnell School of Life Sciences, is the latest College of Science staff member to complete the requirements for the Cultural Humility Certificate program through the Division of Diversity and Inclusion.

Michael Izaguirre, Ph.D. candidate in Imaging Science and research assistant working with Shima Parsa Moghaddam, assistant professor in the School of Physics and Astronomy, received a travel grant in the amount of $1000 from the American Physical Society to present his research at the 74th annual Division of Fluid Dynamics meeting in Phoenix, AZ. Izaguirre will talk about his recent work on "Predicting Uniform Droplet Formation in Microchannels Using Time-Domain Analysis."

Society of Physics Students

RIT Wins SPS Distinguished Chapter Award

The Society of Physics Students has recognized the RIT chapter of the national organization for their hard work and devotion to improve professional relationships between physics students throughout the year by awarding the chapter the designation of **Distinguished Chapter**. Reviewers commented on the amazing community engagement that RIT students have on the national discord, attendance at zone meetings, and attendance at conferences such as Conferences for Undergraduate Women in Physics (CUWiP). The RIT chapter of SPS is led by faculty advisor Michael Pierce who was also recognized for his devotion to the success of the chapter.

College Updates

COS Diversity, Equity & Inclusion Plan

As I reflect on the past year in the College of Science, I'm especially grateful for the efforts of our COS community to continue to work towards increasing Diversity, Equity, and Inclusion in the college, serving as leaders to carry these efforts to the wider RIT community. The $1M Howard Hughes Medical Institute grant that established the Inclusive Excellence initiative in June of 2017 is nearing the end of its 5-year timeline, but I can see that the foundation that has been laid over these years is strong within the college. The college recently hired Desirée Forsythe as program manager for the Inclusive Excellence initiative so that the work that was started during the grant period can continue. This past year, in keeping with our mission of preparing our COS students to be leaders in their future careers, the college approved a plan to promote Diversity, Equity and Inclusion. Here are some of the ways in which we're putting the plan into action:

- Our faculty who serve on search committees for new faculty attend training about inclusive hiring practices and avoiding bias in the search process.
- Through the IE initiative, 68 faculty have participated in a year-long cohort-model workshop series, meeting 16 times to learn about various inclusion-related topics.
- Several of our staff have earned the Cultural Humility certificate that is offered through RIT's Division of Diversity and Inclusion. Certification is achieved by attending a series of 6 workshops that focus on multiple aspects of diversity, equity and inclusion.
- Faculty and staff participate regularly in book clubs and workshops led by Inclusive Excellence leaders, where discussions about DEI topics become more comfortable over time.
- The IE Summer Research Experience has funded 27 students in their first year at RIT to work on research projects over the summer guided by COS Faculty Mentors.
- Our student leaders are creating opportunities for AALANA students to meet with and be mentored by AALANA faculty.

Diversity, Equity and Inclusion goes far beyond simply *thinking* about race and gender, to taking action to make this college a place that values and supports all students, faculty and staff in bringing their "whole selves" to the workplace and learning environment. I'm incredibly proud of the inclusive environment that we nourish and grow in our college and look forward to seeing these efforts flourish in the years to come.

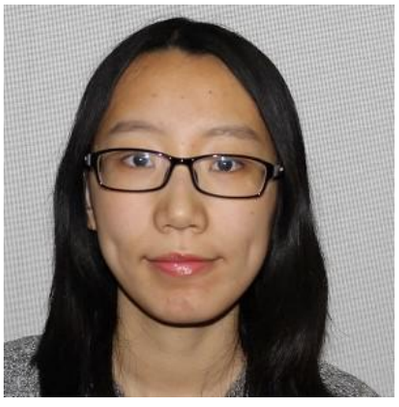
Karin Harriman will retire from RIT on December 20 to assume the post of Associate Registrar at St. John Fisher College in the new year. Karin has served as the Scheduling Officer for the College of Science for the past three years. Prior to joining COS, Karin served as Administrative Assistant to the Dean and Operations Coordinator in her roles in the Saunders College of Business and served as Curriculum Archivist/Sr. Staff Assistant earlier in her career at NTID. We wish Karin well in her new role and hope that we can lure her back to RIT someday!

Lori Hyde joins the Chester F. Carlson Center for Imaging Science as the Academic Coordinator, starting Dec. 20. Lori has a BA in psychology and a BS in sound recording technology from SUNY Fredonia, and an MS in Higher Education, Student Affairs concentration from the University of Rochester. She is currently pursuing a certificate in Organizational Change and Leadership from RIT.

Before coming to CIS, Lori worked for three years as a Senior Staff Assistant in the Gosnell School of Life Sciences. Previous to that, Lori worked for two years as the interim scheduling officer for the College of Science.

Bethanie Dell will be the new CIS Senior Staff Assistant supporting the director, starting Dec. 15. Bethanie has an AS in liberal arts from Monroe Community College and an AS and BS from Medaille College in veterinary technology. She has completed Army Basic Combat Training and Army Advanced Individual Training and is a Carpentry and Masonry specialist in the US Army Reserves. Bethany comes to us from Newtex Industries where she was a quality control technician. She has also worked for eight years as a veterinary technician.

Also arriving in the Center for Computational Relativity and Gravitation in November is Wenli Chen, Senior Staff Specialist. Wenli is a 2020 RIT graduate of the Saunders College of Business MBA program. She replaces **Qin Ye** who moved to Houston to continue her professional development in a warmer climate.



Peer Reviewed Publications

Lucia Carichino, assistant professor in the School of Mathematical Sciences, was the lead author on a publication with colleagues at Worcester Polytechnic Institute that appeared in the Frontiers of Physics titled "A Computational Study of Hydrodynamic Interactions Between Pairs of Sperm With Planar and Quasi-Planar Beat Forms." The article is a mathematical study to investigate interactions between two sperm cells swimming in free fluid or near a wall.

Alumni of the RIT Research Experiences for Undergraduates program on Extremal Graph Theory and Dynamical Systems, **Ryan Vogt** and **Anthony Guzman**, along with **Clar Charron**, '19 (B.S. computer science and computational mathematics) co-authored a paper with Laura Munoz, assistant professor in the School of Mathematical Sciences, published in the journal *Computers in Biology and Medicine* titled "Controllability and State Feedback Control of a Cardiac Ionic Cell Model." This study provides advice on best strategies and perturbation timings for suppressing abnormal wave patterns within a detailed model of a cardiac myocyte.

Emmett Ientilucci, assistant professor in the Chester F. Center for Imaging Science, recently collaborated with the Department of Earth and Space Sciences at the Indian Institute of Space Science and Technology, Thiruvananthapuram, Kerala, India, to publish the paper "Influence of atmospheric modeling on spectral target detection through forward modeling approach in multi-platform remote sensing data" in the *ISPRS Journal of Photogrammetry and Remote Sensing*.

Darren Narayan, professor in the School of Mathematical Sciences, was co-author on an article titled "All Graphs with a Failed Zero Forcing Number of Two," published in Symmetry - MDPI. The article presents a solution to a previously unsolved mathematical problem. Collaborators included Luis Gomez (University of Arkansas), Karla Rubi (CSU-Dominguez Hills), and Jordan Terrazas (Southern Methodist University).

Duc Le, a fourth-year electrical engineering major and physics minor, and **Akif Qadeer**, a fourth-year physics major, are co-authors of "Conservation of extremal ellipticity for coherent single-mode Gaussian beams propagating in rotationally invariant media" published in the journal *Optics Communications* along with Associate Professor Mishkat Bhattacharya**.** This work explains the constancy of extremal ellipticity for Gaussian beams in terms of the conservation of orbital angular momentum and is relevant to laser micromachining.

David Farnsworth, emeritus professor in the School of Mathematical Sciences, and Steven Kilner, professor of mathematics at Monroe Community College, published "Pairing Theorems about Parabolas through Duality" in the November issue of *The Mathematical Gazette*. This is the third and final paper in their trilogy of articles about parabolas that appeared in *The Gazette* in November 2019, July 2021, and November 2021.

Abu Taufique, an imaging science Ph.D. student, and **Andreas Savakis**, professor of computer engineering and director of the Center for Human-aware AI (CHAI), published "LABNet: Local graph aggregation network with class balanced loss for vehicle re-identification" in the journal *Neurocomputing*.

Speaker Series

Distinguished Speaker Series: Visible to Short Wavelength Infrared Imaging Spectroscopy

The College of Science Distinguished Speaker Series continued on November 3, with guest speaker Dr. Robert O. Green, senior research scientist at the Jet Propulsion Laboratory, California Institute of Technology, giving a lecture about using imaging spectroscopy to study Earth and other planets across the solar system.

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Inclusive Excellence Seminar: Continuing the Search for Equity

On November 1, guest speaker, **Dr. Michael J. Williams**, Applications Specialist at Boston Electronics and 2021 OPTICA Ambassador, shared insights about the 2020 awakening in the scientific community to the bias, indifference, and discrimination faced by black scientists. Dr. Williams shared his personal journey to earning his Ph.D. in optics from historically black colleges and discussed the importance of advocating for racial equality in the sciences.

Presentations & Workshops

Hao Zie, **Che Shen**, and **Tucker Downs**, color science Ph.D. candidates; **Anku** '21 Ph.D. (color science); **Fu Jiang** '18 MS (imaging science), '21 Ph.D. (color science); and Mark Fairchild, professor and graduate program director of the color science program, presented their work at the Society for Imaging Science and Technology's 29th International Color and Imaging Conference.

Xie and Fairchild's paper, "G0 revisited as equally bright reference boundary," was awarded the Best Paper of the Conference. Shen and Fairchild's paper, "The threshold of color inconstancy," was voted Runner-Up Best Student Paper. Jiang and Fairchild's paper, "Preliminary result on the direct assessment of perceptible simultaneous luminance dynamic range," was concurrently published in the *Journal of Imaging Science and Technology*. Anku presented on "Preferred White Balance for Skin Tones in Multi-illuminant Scenes"; Downs presented on "Color Layer Scissioning in See-through Augmented Reality"; and Fairchild presented on "Individual differences and the color science of images" and "A digital test chart for visual assessment of color appearance scales."

Jie Qiao, associate professor in the Chester F. Carlson Center for Imaging Science, presented at the 2021 Optical Fabrication and Testing Conference (by Optica, formally OSA). The presentation was based on her paper "Ultrafast Laser Enabled Optical Fabrication," which presents methods, computational models, physical processes, and demonstrations related to femtosecond laser enabled polishing and micro-joining of optical and optomechanical components.

Liam Megraw, an Environmental Science MS student, presented a poster and invited lightning talk at the New York State Invasive Species Summit. His poster

highlights collaborative work using Google Street View imagery to identify priority invasive plants along roadsides. Co-authors on the poster are **Manoj Archarya** an Imaging Science Ph.D. student, Arturo Flores a Ph.D. student at University of California San Diego, Chris Kanan, associate professor in the Chester F. Carlson Center for Imaging Science and Christy Tyler, professor in the Thomas H. Gosnell School of Life Sciences.

Sponsored Research

Matthew Hoffman, SMS, is the PI with co-PIs **Steven Day** (KGCOE), **Nathan Eddingsaas** (SCMS), **André Hudson** (GSoLS) & **Christy Tyler** (GSoLS) on a $332,282.00 cooperative agreement from DOC National Oceanic and Atmospheric Administration to support a project titled "Closing the gap on watershed sources and sinks of debris in the Great Lakes."

Seth Hubbard, SoPA, is the PI with co-PI **Stephen Polly** (GIS) on a $118,743.00 procurement from DOD Department of the Navy, Off of the Chief of Naval Research / Jacobs Engineering Group Inc. to support a project titled "MOCVD Growth of Multijunction Laser Power Converter."

Joseph Sirianni, CIS, is the PI with co-PI **David Messinger** and key personnel **Charles Bachmann, Emmett Ientilucci,** and **John Kerekes** (CIS) on a $483,008.00 contract from DOD National Reconnaissance Office to support a project titled "YR.5 AC LASS Research in Sensor and System Modeling."

Christy Tyler, GSoLS, is the PI with co-PI **Matthew Hoffman** (SMS) on a $105,340.00 grant from DOC National Oceanic and Atmospheric Administration / Council for the Great Lakes Region to support a project titled "Great Lakes Plastic Cleanup."

COS in the Media

The Conversation– Dec 20
Genomic sequencing: Here's how researchers identify omicron and other COVID-19 variants
Essay by Andre Hudson, professor and head, and Crista Wadsworth, assistant professor, Thomas H. Gosnell School of Life Sciences, published by *The Conversation*.

Universe Today – Dec 8
Seeing the Clearest View of the Universe with Michael Zemcov
Universe Today talks to Michael Zemcov, associate professor in the School of Physics and Astronomy, about astronomy from the outer solar system.

PolitiFact – Nov 24
DNA damage from COVID-19 spike proteins in lab study does not apply directly to COVID-19 vaccines
PolitiFact talks to **Andre Hudson**, head of the Thomas H. Gosnell School of Life Sciences, about a study on the spike protein that covers the surface of the COVID-19 virus.

The Conversation – Nov 1
A small telescope past Saturn could solve some mysteries of the universe better than giant telescopes near Earth
Essay by **Michael Zemcov**, assistant professor in the School of Physics and Astronomy and Center for Detectors, published by *The Conversation*.

Argonne Voices – Nov 1
Fundamental Excitement: The Search for the Higgs Boson
Argonne Voices, a podcast by the Argonne National Laboratory, features **Walter Hopkins** '07 (applied mathematics), '07 (physics), the head of Argonne's High-Energy Physics division.

Haverblog – Oct 25
Roger L. Easton Jr. '72 Presents Multispectral Imaging Technology at Haverford
Haverford College features **Roger Easton**, professor, and **Tania Kleynhans**, researcher/engineer II, both in the Chester F. Carlson Center for Imaging Science.

Do you have news you want amplified? Submit the details using the new COS Newsmakers Form, and we'll help you share it. "COS Newsmakers" is a quick and easy way to acknowledge the professional and academic accomplishments of COS faculty, students, and staff for acknowledgement in upcoming monthly newsletters, web and social media, or even RIT news! Examples of achievements may include:

- publishing an article in a scholarly peer-reviewed journal
- presenting research at a conference
- sponsored research awards
- earning a scholarship
- winning an award
- …and more!

COS Newsmaker Submission Form

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