RIT | College of Science

DEAN'S BULLETIN

September 2021 in Review

The College of Science Dean Team welcomes back the students at the start of the Fall 2021 Semester. L to R: Georgeanne Hogan, Karin Harriman, Cassandra Nickels, Christie Lutzer, Melanie Green, Larry Buckley. Photo Credit: Mary Pryor

Message from the Dean

It has been a beautiful start to the fall semester. It's wonderful to see our RIT community back on campus after so many COVID precautions last year. With a vaccination rate greater than 94% among faculty, staff and students, the year feels more normal in the most important ways: students and faculty are back in the classrooms and walking down the quarter mile, sharing laughs and sharing knowledge!

Although many in the COS community celebrate the return to in-person learning, we are also working hard to improve online course offerings so that we can meet the needs of a wider population. Sandi Connelly, COS Leader Faculty for Online Learning, hosted the fourth annual **Online Show 'N' Tell**, an opportunity for faculty to share online teaching experiences among peers. This breakout room-style Zoom event allowed faculty to have in-depth, one-on-one conversations with faculty who have built robust online courses. Presenters showcased what they do in their online courses and gave advice for utilizing online technology in the classroom.

We're still not back to hosting guest speakers *on* campus, but that didn't stop us from hosting some wonderful guests virtually this month! In mid-September, we welcomed our first Distinguished Speaker of the year, **Dr. Stacey Lowery Bretz** from Miami University, who spoke about her expertise in the development of assessments to characterize students' understanding of multiple representations and learning in the chemistry laboratory through her talk titled,

"*How to Measure Learning in the Laboratory*." We were also excited to host two prospective faculty members who took part in the Future Faculty Career Exploration Program in late September:

- **Dr. Cristina Espinosa-Diez**, a postdoctoral associate at the University of Pittsburgh shared her work on radiotherapy and its impact on cancer patients, with a special interest on the increased risk of cardiovascular disease after radiotherapy. Dr. Espinosa-Diez was a guest of the Thomas H. Gosnell School of Life Sciences.
- **Dr. Alexander Leder,** a California Alliance Postdoctoral Fellow at the University of California, Berkeley, was a guest of the School of Physics and Astronomy. Dr. Leader is currently working on the HAYSTAC/DM Radio series of axion searches along with indirect axion searches utilizing the public data release of the Green Bank Radio Telescope under the Breakthrough Institute and shared a lecture titled *Searching for a needle in a HAYSTAC: Latest Results from Quantum Enhanced Axion Dark Matter Search with the HAYSTAC Experiment*.

I sincerely hope that everyone continues to find sources of strength and support as life gradually returns to normal. There are many lessons that we learned from the past 18 months of pandemic living, and we look forward to the day when we can welcome special guests back to campus and show off our wonderful Brick City! Be safe and continue to take precautions for your physical and mental health.

SOPHIA MAGGELAKIS

Dean, RIT College of Science

Student & Alumni News

College of Science student leaders

Left to Right: Nidhi Baindur, Quaid Guarino, Natalie Siwek, Maggie Muldoon, Zoë LaLena, Zach Thierman, Gauri Subramaniam, Mason Wahlers

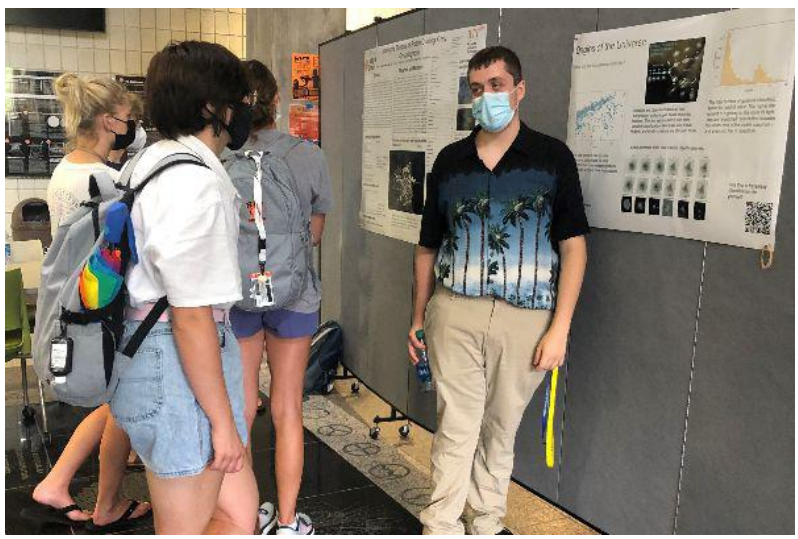
Our **College of Science Student Advisory Board** (COSSAB), the college's oldest student-led group, is an active voice for all science and math students. The COSSAB e-board, led this year by 3rd year imaging science student, **Zoë LaLena** as president, 3rd year biotechnology and molecular bioscience student, **Zach Thierman** as vice president, 2nd year environmental science student, **Natalie Siwek** as secretary, and 4th year biology student, **Ryan Krieger** as treasurer, continues to serve as a liaison between students and the dean. In addition, COSSAB members are hard at work planning social events and working on projects that will improve the college.

TAKE PART IN YOUR COMMUNITY

The **College of Science Ambassadors** (COSA) serve as leaders during open houses and other student recruitment efforts. The program is heading in an exciting new direction this year with a fresh executive board led by 3rd year biology student, **Quaid Guarino** as president, 2nd year computational math student, **Nidhi Baindur** as vice president, and 3rd year biotechnology student **Kavya Phadke** as secretary. The group plans to create short spotlight videos about COS research and student life that can be shared on social media. Additionally, they plan to run fundraisers throughout the year with 100% of the proceeds going towards scientific and medical charities of the group's choosing.

Finally, we welcome 4th year Biotechnology and Molecular Bioscience student **Gauri Subramaniam** as the **College of Science Senator** for Student Government. As student senator, Gauri has plans to initiate *COS Diversity and Inclusion Coffee Chats*, an opportunity for students and faculty to gather and build a mentorship community within the college. She will also continue to bring student concerns to the university administration to help work towards productive resolution on issues that impact COS students. We are excited for the enthusiasm Gauri brings to this important position.

We sincerely appreciate the efforts of our student leaders and hope that more students will reach out to get involved in the efforts of these outstanding organizations!



COS Pre-College SURE! Poster Presentations

Participants in the COS Pre-College Summer Undergraduate Research Experience shared experiences and research from their four-week summer program where they worked on their own research projects with COS lab teams – undergraduates, graduates, and faculty mentors.

RIT Students Get The Edge They Need With Co-ops

Kylie Pleakis ‘19 chose RIT for the mathematics program, competitive cross-country racing, and the welcoming atmosphere. The co-op program was an added bonus that gave her the edge she needed to start her career.

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Unique Electives Paving the Path to Vanderbilt

Unique electives and supportive faculty helped **Grace Morales** ’18 find her path and earn her place in Vanderbilt University’s Ph.D. program.

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Math + Real-World Applications = Success

Selene Chew ‘16 knew she wanted a major that allowed her to take math courses, but she also wanted to solve real-world, tangible problems. She discovered the Computational Mathematics major was the perfect balance of fun math courses with a sprinkling of computer science.

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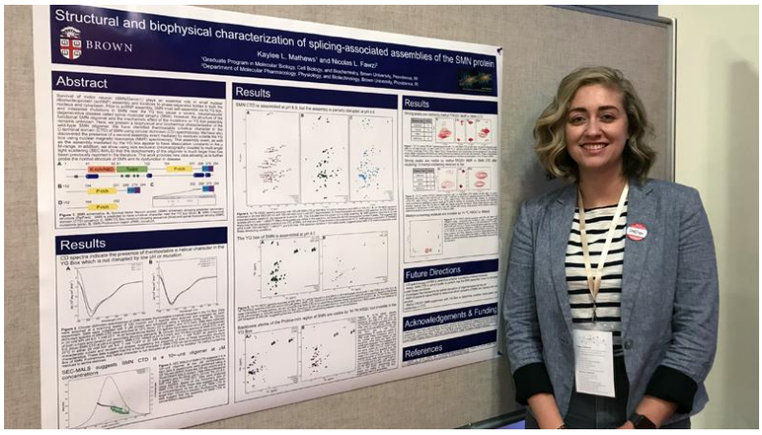

From Science Exploration to Brown University Researcher

Kaylee Mathews ’16 discovered the exciting world of research during her year in RIT’s Science Exploration program. Today she’s a Ph.D. candidate studying Molecular Biology, Cell Biology, and Biochemistry at Brown University.

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From Imaging Science to Computer Vision Engineer

Sara Leary ’18 (imaging science) entered RIT with a broad set of interests in science and technology and graduated with an even broader set of career options. Today she’s solving problems using computer vision and machine learning at MITRE.

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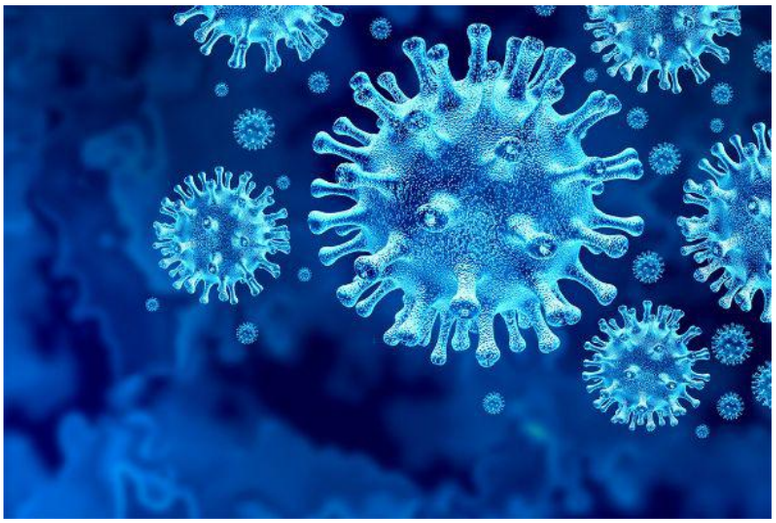
Kevin C. Cooke ’19 Ph.D. (astrophysical sciences and technology) was awarded a Science & Technology Policy Fellowship by the American Association for the Advancement of Science with a placement at the National Science Foundation. He will conduct a program assessment and help guide a strategic visioning process for the Established Program to Stimulate

Competitive Research, part of NSF's Office of Integrative Activities.

Our Stories



RIT scientists model how coronavirus attaches itself to human cells

Rochester Institute of Technology scientists have uncovered new information about the way coronavirus and several of its variants attach to human cells. A study recently published in the *Journal of Biomolecular Structure and Dynamics* reveals the findings.

The researchers used code developed by Gregory Babbitt, associate professor in the Thomas H. Gosnell School of Life Sciences, to examine how coronaviruses use their spike proteins to attach themselves to the host cells they are attacking.

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Christopher Kanan earns NSF CAREER Award to develop brain-inspired AI systems

The National Science Foundation is giving a Rochester Institute of Technology professor an esteemed award to help him expand the capabilities of artificial intelligence systems using new brain-inspired methods. Christopher Kanan, an associate professor in the Chester F. Carlson Center for Imaging Science, received an NSF Faculty Early Career Development (CAREER) award and grant for his five-year project.

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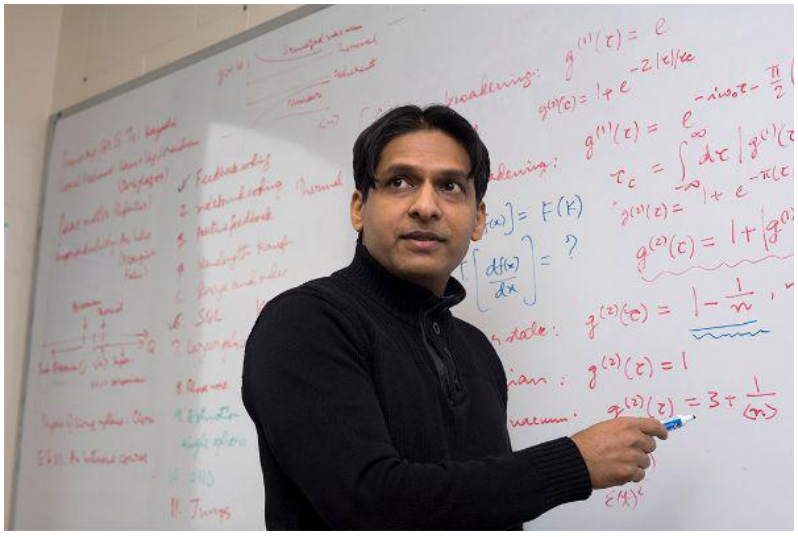

Researchers develop new method for detecting superfluid motion

Researchers at Rochester Institute of Technology are part of a new study that could help unlock the potential of superfluids—essentially frictionless special substances capable of unstopped motion once initiated. A team of scientists led by Mishkat Bhattacharya, an associate professor at RIT's School of Physics and Astronomy and Future Photon Initiative, proposed a new method for detecting superfluid motion in an article published in ***Physical Review Letters***.

Read More >

Researchers receive funding to research and address how plastic ends up in Great Lakes

Rochester Institute of Technology scientists will investigate plastic waste entering the Great Lakes and develop prevention and removal measures thanks in part to more than $420,000 in funding from the National Oceanic and Atmospheric Administration (NOAA). Professor Christy Tyler from the Thomas H. Gosnell School of Life Sciences and Associate Professor Matthew Hoffman from the School of Mathematical Sciences secured two NOAA Marine Debris Program awards to lead interdisciplinary projects with big environmental implications.

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NIH funds RIT project to search for novel antibiotics to fight multidrug-resistant bacteria

A team of Rochester Institute of Technology scientists is attempting to uncover novel antibiotics that could fight the growing threat of multidrug-resistant diseases. Professor André Hudson, head of the Thomas H. Gosnell School of Life Sciences, received a $443,583 grant from the National Institutes of Health's Department of Health and Human Services to isolate, identify, and characterize new antibiotics.

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RIT part of collaborative NSF project to program biological cells to design futuristic materials

Rochester Institute of Technology Associate Professor Moumita Das is part of a team of researchers that was recently awarded a $1.8 million grant from the National Science Foundation to design and create next-generation materials inspired and empowered by biological cells.

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RIT awarded nearly $2 million for NSF Research Traineeship Program, AWARE-AI

Associate Professors in the Chester F. Carlson Center for Imaging Science, Gabriel Diaz and Christopher Kanan are among the lead researchers on a nearly $2 million NSF grant awarded to Rochester Institute of Technology. The grant will create a new research traineeship program for graduate students, AWAREness for Sensing Humans Responsibly with AI (AWARE-AI). When reviewing applicants for NRT fellowships, priority will be given to women, AALANA, and deaf and hard-of-hearing students.

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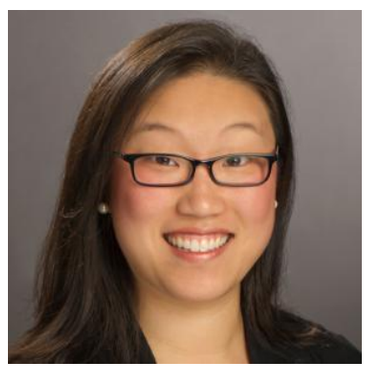
Honors, Awards & Recognitions

Lea Vacca Michel won the 2022 ASBMB Early-Career Leadership Award for her strong commitment to advancing women's careers in biochemistry and molecular biology, along with demonstrated excellence in research, discovery, and service. Dr. Michel is an associate professor in the School of Chemistry and Materials Science.



New Astrophysical Science & Technology Ph.D. graduate, **Dr. Jake Lange** has been selected as a co-recipient of the **2021 RIT Graduate School Ph.D. Dissertation Award**, for his dissertation "RIFT'ing the Waves: Developing and applying an algorithm to infer properties of gravitational wave sources" Jake's Advisor was Dr. Richard O'Shaughnessy, associate professor in the School of Mathematical Sciences and the Center for Computational Relativity and Gravitation.

This is the second year in succession that the dissertation prize has been awarded to an AST student!

The award was established in 2015 to recognize exceptional dissertation research and Jake joins our three previous AST recipients:

- Dr. Kevin Cooke (2020)

- Dr. Triana Almeyda (2018)
- Dr. Dave Principe (2015)

Emmett Ientilucci, assistant professor in the Chester F. Carlson Center for Imaging Science, has been named Senior Member of SPIE, the international society for optics and photonics. SPIE Senior Members are honored for their scientific excellence across the broad spectrum of optics and photonics research and applications, their active involvement with the optics community and SPIE, and the significant performance that distinguishes them from their peers.

College Updates

The College of Science welcomes Rebecca O'Connor as a part-time academic advisor for the Applied Mathematics and Computational Mathematics majors. Rebecca joins us with nine years of experience advising in the Golisano College of Computing and Information Sciences at RIT as she takes over the role vacated by **Lindsay D'Alleva**. Rebecca has a B.A. in Sociology from Mercyhurst College and a M.Ed. in School Counseling from Cambridge College. Rebecca's previous professional roles include K-12 counselor (School of the Arts and Wellesley High School) and 9 years at RIT as an academic advisor. She was also the GCCIS Staff Excellence Award nominee (in 2015, 2017, 2019) and team nominee for the RIT Presidential Award for Outstanding Staff (2015 2019). She began her position with us on September 27.

Jeyhan Kartaltepe is stepping into the role of Graduate Program Coordinator for the Astrophysical Science and Technology program. Andy Robinson, AST Program Director is glad for the support and partnership that Jeyhan will bring to the program planning and administration.

Meet Dr. Joshua Dentley! He is the embedded therapist who is working alongside Dr. Jaime Castillo for the College of Science. Students can contact Dr. Dentley by phone, email, or secure messaging through the Student Health Center in the Wellness Portal.

Peer Reviewed Publications

A team of RIT researchers published an analysis of whether graduate admissions metrics were predictive of graduate GPA and how graduate GPA affected Ph.D. completion. The research team included **Mike Verostek**, a graduate student in the Department of Physics and Astronomy at the University of Rochester, COS Associate Dean for Research and Faculty Affairs, Casey Miller, and Associate Professor in the School of Physics and Astronomy, Ben Zwickl. Their work was published in *Physical Review Physics Education Research* and a synopsis was featured in *Physics* magazine.

Understanding the color characteristics of a gemstone can provide a scientific basis to guide its cutting. **Che Shen**, a color science Ph.D. student, and Professor of Color Science, Mark Fairchild published "How to Calculate Color From Spectra of Uniaxial Gemstones" in the Gems & Gemology, a journal of the Gemological Institute of America. This study uses visible spectroscopy to determine the unpolarized spectra of a uniaxial material from the polarized spectra (o-ray and e-ray) to predict the color of a uniaxial gem material when viewed in any direction.

Two studies authored by Tony Wong, assistant professor in the School of Mathematical Sciences, are cited in the 2021 report released Aug. 9 by the Intergovernmental Panel on Climate Change in "Chapter 9: Ocean, cryosphere and sea level change." The studies are on the subject of future sea level rise and uncertainty surrounding the role of the Antarctic ice sheet.

James Marengo, professor, and **David Farnsworth**, emeritus professor, both from the School of Mathematical Sciences, published the paper, "A Geometric Approach to Conditioning and the Search for Minimum Variance Unbiased Estimators" in the *Open Journal of Statistics*.

Presentations & Workshops

Distinguished Speaker Series

The College of Science welcomed our first distinguished speaker of the year on September 15. **Dr. Stacey Lowery Bretz**, University Distinguished Professor in the Department of Chemistry and Biochemistry and Special Assistant to the Provost for Academic Initiative at Miami University in Oxford, OH joined us to share her expertise in the development of assessments to characterize students' understanding of multiple representations and learning in the chemistry laboratory through her talk titled, "*How to Measure Learning in the Laboratory*."

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Did you know that Aerial Drones can have Sensing Systems for Environmental Monitoring? Anthony Vodacek, professor in the Chester F. Carlson Center for Imaging Science, and the IEEE GRSS held an Aerial Drone Sensor Deployment Workshop in JKUAT SAJOREC. This workshop focused on Integrating Sensing Systems for Environmental Monitoring.

Ph.D. student **Olivia Kuzio**, Professor Mark Fairchild, and Assistant Professor Susan Farnand, all of the Program of Color Science in the Integrated Sciences Academy, presented their work at the 14th International Congress of the International Color Association (AIC), held virtually August 30 – September 3, 2021. Kuzio presented "LED-based versus Filter-based Multispectral Imaging Methods for Museum Studio Photography." Farnand presented work by Ph.D. student **Katie Carpenter** on "Determination of the Representative Color of a Smartphone Image." Fairchild educated and entertained the audience with his talk on "System for Visual Assessment of Wine Color."

Additionally, Susan Farnand presented lectures on Color Basics and Color Imaging as part of the Material Color / Pigment Summer Workshop, August 8 – 13, 2021. This event, organized by Sarah Rich and Elizabeth Mansfield at Penn State University, was sponsored by the Kress Foundation.

RIT student, **Ying-Ju Lucy Chu**, '21 (imaging science) presented, "First measurements and verification of radiation pressure and beam-riding on an axicon light sail" at the SPIE Optics and Photonics conference, held August 1-5 in San Diego, CA. Co-presenter(s) included Prateek R Srivastava, Monjurul Meem, Rajesh Menon, Nelson Tabiryan, Professor of Imaging Science Grover A Swartzlander Jr.

Emmett Ientilucci, assistant professor in the Chester F. Carlson Center for Imaging Science, gave an invited talk at the 2021 IEEE International Workshop on Spatial Geoinformatics using Machine Learning Approaches (SGiML), organized by the GeoScience and Remote Sensing Society of Kolkata, India. The workshop was held Sept. 23-25, 2021.

Sponsored Research

Manuela Campanelli, SMS-CCRG, is the PI with co-PI **Yosef Zlochower** (SMS-CCRG) on a $449,999.00 grant from NSF-National Science Foundation

to support a project titled “Collaborative Research: deploying Curvilinear Coordiante and Multipatch Methods on Neurtron Star Mergers.”

Moumita Das, SoPA, is the PI on a $360,019.00 grant from NSF-National Science Foundation to support a project titled “Collaborative Research: DMREF: Living biotic-abiotic materials with temporally programmable actuation.”

Ernest Fokoue, SMS, is the PI on a $33,000.00 grant from DOJ-Department of Justice / Rochester Police Department to support a project titled “Applied Statistical Document Analysis for Knowledge Discovery from Police Reports.”

André Hudson, GSoLS, is the PI on a $443,583.00 grant from DHHS.National Institutes of Health to support a project titled “Isolation, identification and characterization of novel compounds endowed with antibiotic activity from rhizospheric bacteria.”

Christopher Kanan, CIS, is the PI on a $549,988.00 grant from NSF-National Science Foundation to support a project titled “CAREER: Brain-Inspired Methods for Continual Learning of Large-scale Vision and Language Tasks.”

Robert Kremens, CIS, is the PI on a $11,460.00 cooperative agreement from USFS Southern Research Station to support a project titled “Fire Instrumentation Metrology and Development.”

Michael Lam, SoPA, is the PI on a $676,664.00 grant from NSF-National Science Foundation / Oregon State University to support a project titled “NANOGrav Physics Frontiers Center.”

Zoran Ninkov, CIS, is the PI on a $18,000.00 grant from Thermo Fisher Scientific to support a project titled “Development of High Dynamic Range (HDR) Capabilities of CID Sensors.”

Zoran Ninkov, CIS, is the PI on a $230,981.00 grant from NASA-National Aeronautics and Space Administration to support a project titled “Hadamard Transform Spectral Imaging with a Digital Micromirror Device based Multi-object Spectrometer.”

Shima Parsa Moghaddam, SoPA, is the PI on a $110,000.00 grant from American Chemical Society to support a project titled “Transport of Emulsions in Porous Media.”

Jie Qiao, CIS, is the PI on a $49,898.00 grant from Fuzehub to support a project titled “Prototype Development for a Femtosecond Laser-based Welding System.”

Gary Skuse, GSoLS, is the PI on a $58,110.00 contract from NSF-National Science Foundation / Tarleton State University to support a project titled “From Discovery to Market: Integrating Interdisciplinary Skills through a Collaborative Research-Based Laboratory Curriculum.”

Christy Tyler, GSoLS, is the PI with co-PI **Nathan Eddingsaas** (SCMS) on a $35,402.00 grant from University of Toronto to support a project titled “Non-alcoholic fatty liver disease: relationship between hepatic gene expression, intestinal microbiome and disease severity.”

Professor Carol Marchetti (SMS) is the PI on a $1,314,681.00 collaborative grant from the National Science Foundation entitled, “*ADVANCE Partnership: Building Community Understanding of the Institutional Compensation System*.” Co-PIs on this project include Drs. Margaret Bailey (KGCOE) and Iris Rivero (KGCOE) and partners from APLU, AAUW and NSF INCLUDES. Partner universities on the project include Drexel, Gallaudet, and Villanova.

Michael Murdoch, associate professor in the Program of Color Science, was awarded an unrestricted gift of $35,000 from Facebook Reality Labs to pursue research related to human visual perception of color, light, and materials in real and virtual spaces.

Shima Parsa Moghaddam, assistant professor in the School of Physics and Astronomy, has been awarded the Doctoral New Investigator grant from the American Chemical Society Petroleum Research Fund to study the transport of emulsions in soil. The Complex Fluids and Soft Materials lab received $110,000 to conduct fundamental research on microscale dynamics of emulsions with oil recovery and soil remediation applications over the next two years.

Lea Michel, associate professor in the School of Chemistry and Materials Science, was awarded a two-year R21 grant ($417,032) from NIH NIAID for the project "Using nano pocket membranes to capture bacterial outer membrane vesicles from biofluids." Michel is PI of the grant, along with Tom Gaborski, associate professor in the Department of Biomedical Engineering, and Co-PI Anthony Pietropaoli from the University of Rochester. The team will create a novel purification technology to capture bacterial vesicles for the purpose of diagnosing sepsis in the early stages.

Michael Kotlarchyk, Head of the School of Physics and Astronomy, was awarded $250,000 by the National Science Foundation for a two-year research project titled "Combining Nuclear Magnetic Resonance and Neutron Scattering for Determining Macromolecular and Liquid Structure: Towards Development of the Novel NMR-PNS Technique." This work is being done in collaboration with co-PI's George Thurston and Pratik Dholabhai, also in the School of Physics and Astronomy.

COS in the Media

Philadelphia – Aug 4
A Bunch of Philly Teens Are Touring the Country With Jon Anderson, Founder of the Rock Band Yes
Philadelphia magazine features **Gabby Gonzalez**, a first-year chemistry student who went on tour with Jon Anderson of the band Yes.

WROC-TV – Aug 16
RIT professor compares 'quadrillion dollar asteroid' to mining ocean for gold
WROC-TV talks to **Michael Richmond**, professor in the School of Physics and Astronomy and director of the RIT Observatory, about the asteroid Psyche.

The Conversation – Aug 27
Do I need a booster shot if I got the Johnson & Johnson vaccine? A virologist answers 5 questions
The Conversation asks **Maureen Ferran**, associate professor in the Thomas H. Gosnell School of Life Sciences, about the Johnson & Johnson COVID-19 vaccine. This article was republished by PBS Newshour and the *Houston Chronicle*, among others.

WROC-TV – Sept 14
New RIT visual modeling of coronavirus leads to discovery of behavior of second cellular 'touchpoint'
WROC-TV features research by **Gregory Babbitt**, associate professor in the Thomas H. Gosnell School of Life Sciences; **Patrick Rynkiewicz** '20 (bioinformatics and computational biology), '21 MS (bioinformatics); Professor **André Hudson**, and Associate Professor **Feng Cui**.

WROC-TV – Sept 17
RIT professor on $15M effort to resurrect the woolly mammoth by Harvard scientists
WROC-TV talks to retired College of Science Professor **Robert Rothman** about the cost, science, and ethics behind a project to bring back the woolly mammoth.

The Conversation – Sept 25
New Johnson & Johnson data shows second shot boosts antibodies and

protection against COVID-19 – but one dose is still strong against delta variant

Essay by **Maureen Ferran**, associate professor in the Thomas H. Gosnell School of Life Sciences, published by *The Conversation*.

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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