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Dean Fernando Miralles-Wilhelm

Message from the Dean

As we embark on a new year, the world has had a front row seat to science.

Two weeks ago, the world raptly and virtually followed the progress of NASA's fifth **Mars rover named Perseverance** as it landed on the red planet to look for signs of ancient life and collect rock samples for further analysis here on Earth.

In the U.S., we now have three COVID-19 vaccines approved for distribution, more people are being vaccinated daily, and infection rates are declining. (Good news noted, please stay vigilent!)

As a scientist for more than 30 years, and now as Dean of this extraordinary College of Science, of course, I appreciate the collaborative nature of science—the value of visionary and foundational research that has

contributed to these advances.

Never has this spirit of collaboration and “building on past discoveries” been more obvious than recent scientific advancements. Scientists from around the world, in academia and industry, working tirelessly, with a sense of urgency and extreme collaboration —to build on the accretionary discoveries of the scientists who came before them, developing vaccines and treatments, and landing spaceships on Mars.

Now, as an administrator, I often have opportunities to share the many successes of our Mason Science community. Whether we are developing COVID-19 vaccines, discovering exoplanets, or skillfully and successfully educating the next generation of the STEM workforce during a global pandemic, there is much to share. Over the past year, in addition to our impactful discoveries, I’ve been extremely impressed with the steady stream of our published work by both faculty and students, the many global colloquiums and conferences our faculty have coordinated, and the invaluable mentoring programs we’ve fostered. In such a thriving scientific community, I can’t help but be inspired to not slow down my work as a researcher and continue the work in my field of interest: water.

As some of you may know, my research focuses on the nexus of climate, land, water, and biodiversity. In collaboration with The Nature Conservancy and the Food and Agriculture Organization of the United Nations, I’ve just recently published a synthesis of science literature on this topic, as well as a review of case studies of applications of nature-based solutions in agriculture: **Sustainable management and conservation of land, water and biodiversity** and **The case and pathway for adoption.**

As Mason’s scientific research efforts strive to impact a healthy environment, healthy economy, healthy people, and healthy society, we will continually update you on our progress, successes, and collaborations. Thank you for your ongoing support of science.

Highlighting the Work of Professor Kelly Knight

In this issue we are proud to highlight the work of **Associate Professor Kelly Knight.** Kelly Knight is an associate professor with the George Mason University **Forensic Science Program** and a **STEM Accelerator**. She teaches undergraduate and graduate courses in forensic DNA and forensic chemistry and is also the principal investigator of the forensic DNA laboratory. As a STEM Accelerator, she guides and mentors undergraduate students in the Forensic Science Program and coordinates K-12 STEM outreach including the Females of Color and those Underrepresented in STEM summer programs for middle and high school girls.

Having qualified as an expert in both forensic serology and forensic DNA analysis, Prof. Knight has testified in several circuit court trials involving crimes such as homicides and sexual assaults. At some point between testifying in court and leading tours as the laboratory tour coordinator, Prof. Knight discovered her love for teaching. She realized how passionate she was about sharing the science she loved with others. This passion inspired her to begin her career as an adjunct professor while still working for the Maryland State Police.

In addition to her experience with forensic casework, she has over 10 years of experience in research which has included areas such as laser microdissection and low copy number DNA methods. She has done several platform and poster presentations regarding her research at both the American Academy of Forensic Sciences (AAFS) and the Mid-Atlantic Association of Forensic Scientists (MAAFS) annual meetings.

In addition, she has attended various biology workshops around the country and has also co-authored several publications.

- Probabilistic genotyping
- Evaluation of the p30 antigen in breastmilk and it's effect on confirmatory kits for semen identification
- Comparative studies of presumptive kits for saliva detection
- Rape kit backlog
- Touch DNA collection methods

Prof. Knight enjoys staying involved in the forensic science community and has remained active in professional organizations since beginning her education in forensic science.

Learn About the STEM Accelerator

MASON SCIENCE SERIES

Invitation from
Dean Fernando Miralles-Wilhelm

GEORGE MASON UNIVERSITY
College of Science

Spring 2021 Mason Science Series Research Discussion Presenters Announced

Last week we kicked off our Spring 2021 Mason Science Series with Dr. Aarthi Narayanan. In her presentation, **"Rising to the National and International COVID-19 Challenge"** Dr. Naryanan discussed her work at **Mason's National Center for Biodefense and Infectious Diseases.** Her laboratory is involved in a multitude of efforts geared towards development of therapeutics and vaccines against SARS-CoV-2. Her team collaborates with several national and international academic and corporate entities. If you were not able to join us for the live event, a recording will be made available on **our website.**

Our Spring 2021 lineup has been announced! For more information about our speakers, and to register to attend go to **science.gmu.edu/MasonScienceSeries**.

Jennifer L. Salerno, PhD
Environmental Science and Policy

Microbes and the Stories they Tell: Microorganisms as Sentinels of Organism Health and Ecosystem Function

Tuesday, March 30, 2021 4-5pm

Shobita Satyapal, PhD
Physics and Astronomy

Seeking the Invisible: Detecting Supermassive Black Holes in Space

Tuesday, April 27, 2021 4-5pm

Mason Science in the News

Mason's Expanded COVID-19 Testing and Tracking Gaining Attention

Mason announced that it is introducing a rapid-result, saliva based COVID-19 test that will greatly expand testing capabilities on its campuses this spring. Both **Science Codex** and **News Medical** highlighted the effor, led in part by **Center for Applied Proteomics and Molecular Medicine** professors **Lance Liotta** and **Virginia Espina**, as well as Senior Associate Dean **Ali Andalibi**.

Lance and Virginia spoke about this effort to create a safer return to campus on the Access to Excellence Podcast. Click below to access the episode!

Mason Develops Computational Tools to Optimize Ship Design and Train Naval Architects

Dr. Chi Yang

Chi Yang, a professor of computational fluid dynamics in the Department of Physics and Astronomy, leads a U.S. Navy funded research group that was hase developed a computational tool, SimDShip, to accomplish innovative, simulation-based design of ship hull forms.

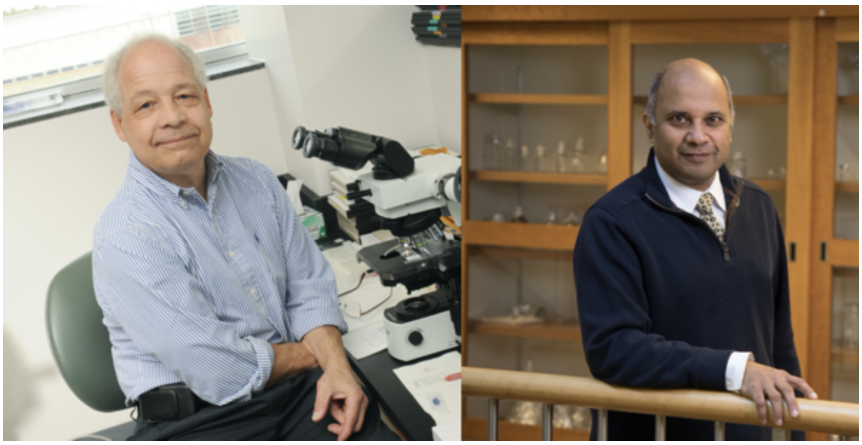
Learn More

School of Systems Biology Professors Publish Study on the MMR Vaccine and its Effects on COVID-19

The *Journal of Microbiology & Biology Education* by the American Society for Microbiology released a paper by Professor Ancha Baranova and affiliated faculty member Ekaterina Marakasova exploring how and why the MMR Vaccine may aid in reducing the severity of COVID-19 symptoms.

Full Article

Mason Scientists and Rutgers Cancer Institute of New Jersey Collaboration Receives U.S. Army's Breakthrough Award



Dr. Lance Liotta & Shridar Ganesan, MD, PhD

The College of Science announced an exciting $1.33 million collaboration with Rutgers Cancer Institute of New Jersey and Mason's Center for Applied Proteomics and Molecular Medicine (CAPMM) which taps cancer research diagnostics and treatment strengths within the medical facilities and CAP/CLIA laboratory respectively of the two regional powerhouses.

Learn More

Student Highlights

Climate Dynamics PhD grad joins NASA GMAO

Dr. Abdullah al Fahad earned his PhD in Climate Dynamics from the Department of Atmospheric, Oceanic, and Earth Sciences in fall 2020. Fahad hails from Sylhet, Bangladesh, and has always had a passion for understanding the inner workings of weather and climate phenomena. His Ph.D. research, advised by AOES Associate Professor Natalie Burls, focused on large-scale atmospheric circulation and the processes that govern its variability and change. His strong publication record, paired with his skills passion and drive have lead him to accepting a postdoctoral position in NASA's Global Modeling and Assimilation Office (GMAO).

Learn More

Mason Students Published in the Astronomical Journal

This month we'd like to highlight the work of many students here at George Mason who collected and analyzed data in support of the confirmation of several TESS mission candidates, in a publication just accepted to the Astronomical Journal. The title of the paper is "**TESS Delivers Five New Hot Giant Planets Orbiting Bright Stars from the Full Frame Images**". Specifically, Mason students observed two "ingresses" (starts) of the transit of the hot Jupiter exoplanet passing in front of its host star TOI 1601 every 5.32 days, as shown in a figure from the paper below. The data quality of the data collected with our campus telescope exceeds the quality of the data collected from other professional observatories (with the exception of the TESS mission data taken in space). You can tell the quality of the data from the scatter of the data points compared to the red curve, which is the modeled brightness of the star as a function of time as the planet passed in front of the star; the smaller the scatter, and the more the data matches the red curve, the better. The "light curves" are shifted down arbitrarily to space them out in the figure so all the data points from different telescopes don't overlap.

The Mason students that contributed to this exoplanet discovery include graduate students Justin Wittrock, Kevin Collins, and Patrick Newman, undergraduate students Michael Bowen, Kevin Eastrdige, Mary Jimenez, Natasha Latouf, and Caitlin

Stibbards, and Mason high school research interns Sudhish C and Kingsley K. Congratulations to all the Mason students!

Full Article

Events & Announcements

Mathematics and Artificial Intelligence Friday Series

The Center for Mathematics and Artificial Intelligence (CMAI) virtually meets on Fridays to discuss a variety of academic issues. The Center focuses on artificial intelligence, big data, control, optimization, anomalous (nonlocal) diffusion, nonlinear partial differential equations, with a broad range of applications.

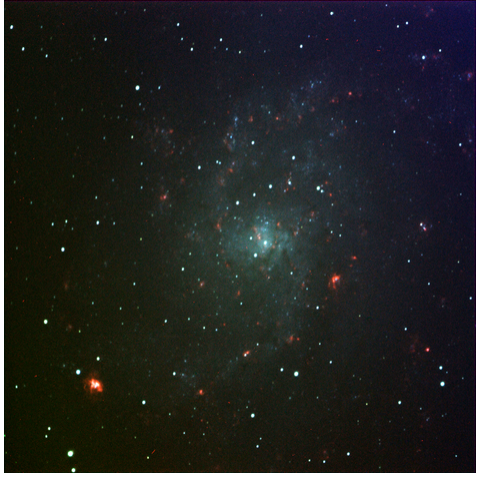
Future Topics

Smithsonian Associates and the GMU Observatory: The Future of Humanity in Space

Michael Summers, professor of physics and astronomy at George Mason University, discusses how the use of space resources could propel human colonization throughout the solar system in the coming decades and beyond.

Following the talk, Peter Plavchan brings the skies into your living room with remote control of the GMU Observatory. Weather permitting, enjoy a remote tour of the observatory after the program.

Evenings Under the Stars



The GMU Observatory is proud to host free public tours on alternating Monday evenings during the academic year, each beginning shortly after sunset.

Unless otherwise noted, expect the scientific talks to last 30 minutes and their content to be appropriate for ages 5+. An approximate hour-long guided telescope tour* of that night's sky will follow the scientific talk. To learn more about how to join Observatory Events please visit the **GMU Observatory website.**

To stay up-to-date on our events, you can follow our **calendar here**.

E-mail us for more information.

If you have a question you'd like us to answer in a future newsletter, please write to us!

Follow us on social media:

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