

# Newsletter

## Department of Physics & Astronomy

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sPHENIX (left) and JWST (right) will deliver exciting new data to GSU faculty.

### Mystery of massive stars unveiled by Prof. Gies' team



Astronomers from Georgia State University have found an explanation for the strange occurrence of massive stars located far from their birthplace in the disk of our Milky Way Galaxy. A team of Georgia State astronomers, led by Prof. Doug Gies in our Department explains this strange difference between the star's lifetime and travel time by suggesting that HD93521 left the disk as two lower-mass and longer-lived stars, rather than the single massive star we see today. See more details on page 2. ■

### Letter from the Chair



Science never sleeps and the faculty, research staff, and graduate students in the Department of Physics and Astronomy have been continuing their cutting-edge research throughout the current COVID-19 pandemic, with no loss of enthusiasm. In 2021 our Department has held a total of \$3,215,551 in external research grants, primarily from NASA, the National Science Foundation (NSF), and the Department of Energy (DOE). Here are a few highlights.

Our nuclear physics group has continued to be an essential player in the development and construction of the new sPHENIX experiment, at the Brookhaven National Lab on Long Island, NY (see page 3). Our astronomy faculty and students, who

have long been using data from the Hubble Space Telescope, are now getting ready for its successor, the James Webb Space Telescope (page 4). Major updates are in the works for the CHARA array, our world-class optical interferometer located on Mount Wilson, CA, and a new telescope is being installed at our local observatory in Hard Labor Creek, GA (page 8). For more scientific accomplishments, see the list of dissertations that have been successfully defended by our newly minted PhDs (page 9).

We also have many new faces in the Department. Aside from our usual cohort of new graduate students (8 admissions in 2021), we have welcomed seven new faculty (4 long-term, 3 visiting) in our Department in the past 18 months (pages 4, 5). We are so happy with the new expertise and fresh dynamism they are bringing! All the while, we were also much saddened by the departure of long-time Department members and friends (pages 6, 7).

We are now looking forward to the challenges of the post-pandemic world. Fundamental research to understand the Universe from the smallest to the largest scales is what's driving us, and we are excited with sharing the wonders of the physical world with our students and the public.

Dr. Sébastien Lepine, Chair of P&A ■

## In the news



### Prof. Gies' team unveils the mysteries of massive stars

Astronomers from Georgia State University have found an explanation for the strange occurrence of massive stars located far from their birthplace in the disk of our Milky Way Galaxy. Stars more massive than the Sun have very hot cores that drive nuclear energy generation at very high rates. They are among the brightest objects in our galaxy. But because they burn through their hydrogen fuel so quickly, their lifetimes are relatively short, perhaps 10 million years compared to 10 billion years for the Sun. Their short lifetime means that there is little time for them to stray too far from their birthplace. Most massive stars are found in the flat disk part of our galaxy, where gas clouds are dense enough to promote star birth and where astronomers find young clusters of massive stars. So, when a massive star is found far away from the galaxy's disk, how did it get there?

This is the problem presented by the massive star known as HD93521 that lies about 3,600 light years above the galaxy's disk. A new study by Prof. Douglas Gies and his team at Georgia State reveals a profound discrepancy: the flight time to reach this location far exceeds the predicted age of this massive star. The Georgia State astronomers explain this strange difference between the star's lifetime and travel time by suggesting that HD93521 left the disk as two lower-mass and longer-lived stars, rather than the single massive star we see today. Their findings have been published in *The Astronomical Journal*. More information can be found by following [this link](#). ■

## Featured Faculty: Stuart Jefferies



Between 1987 and his arrival at GSU as a Professor in Physics and Astronomy in 2016, Stuart worked at the University of Delaware, the National Solar Observatory, New Jersey Institute of Technology, the University of New Mexico, and the University of Hawai'i. His research interests branched out during this journey to include image restoration, instrumentation, methods for high-resolution imaging through atmospheric turbulence, and the seismic probing of the interiors of the Giant planets. He is one of the pioneers of local helioseismology and one of the originators of the multi-frame blind deconvolution technique that is now used in a broad range of disciplines.

Dr. Stuart Jefferies received his B.Sc. in physics from Liverpool University in 1979. He started his research career in 1980 studying neutron metrology and gamma-ray spectroscopy at the National Physical Laboratory, the national measurement standards laboratory of the UK, and Imperial College of Science and Technology's nuclear reactor. Based on this work, Stuart received his Ph.D. in mechanical engineering from the University of London in 1983. He then joined the University of Birmingham's solar physics group as a postdoctoral fellow, where he traveled the world setting up solar observatories for the next four years. This experience provided the groundwork for a move to the USA in 1987 to conduct solar research from the South Pole, Antarctica, something he has been doing ever since.

Dr. Jefferies has received over \$18M in external funding as PI or Co-PI. His research has been transitioned into operational assets for the United States Air Force on two occasions.

He is currently working closely with groups at the University of Rome, Tor Vergata, and the University of Hawai'i to develop pipelines for student exchange. He is also leading efforts to capitalize on GSU's extensive expertise in imaging (via an "Imaging Hub") and position GSU to host a National Center of Gravity for Space Domain Awareness. Finally, Dr. Jefferies is looking to establish an observational site for astronomy research in the Arctic. If successful, this would give GSU a footprint in both polar regions, providing a unique opportunity for our students. ■

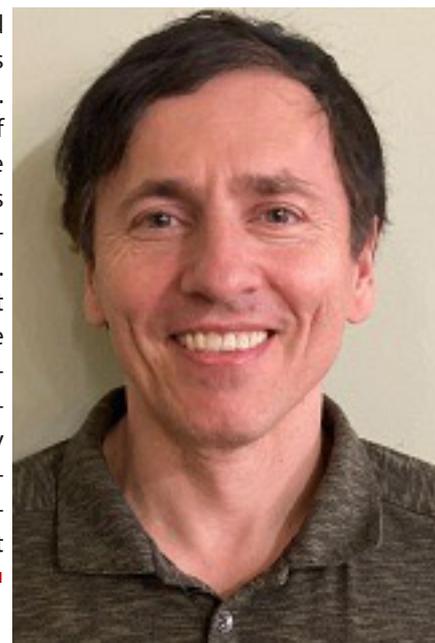


## Featured Faculty: Vadym Apalkov

**D**r. Vadym Apalkov received his Master Degree in physics from the Moscow Institute of Physics and Technology in 1991 and his Ph.D. from the University of Utah in 1995. His research at the graduate school was related to the theory of the fractional quantum Hall effect. Namely, he worked on the magnetoexciton dynamics in the regime of fractional quantum Hall effect. After his graduation, he held research position at the Kharkov Institute of Physics and Technology, Ukraine, where he worked on the theory of radiation-induced defects in solids. During this time he also held visiting research positions at the Institute of Mathematical Science, Chennai (India), at the University

of Exeter, Exeter (United Kingdom), and at the Max Planck Institute for the Physics of Complex Systems, Dresden (Germany). In 2000 he joined the University of Utah as a postdoctoral fellow, where he worked on different theoretical topics related to transport and optical properties of low dimensional electron systems.

**V**adym arrived at GSU as an Assistant Professor in 2004. Since then he worked on optical properties of graphene-like materials, ultrafast optically-induced electron dynamics in solids, highly nonlinear optical properties of topologically nontrivial materials, and nanoplasmonics. He received his financial support from NSF and the Department of Energy. ■



## The sPHENIX Hadronic Calorimeter



**I**mmediately after the big bang, the universe was in a phase known as the quark gluon plasma (QGP), a phase of nuclear matter the universe expanded and cooled trapping the quarks and gluons in hadrons such as protons and neutrons. The nuclear physics group at GSU has a long history of working on experiments at the Relativistic Heavy Ion Collider (RHIC) which collides particles at high energies to reproduce the QGP. RHIC is located at Brookhaven National Lab (BNL) on Long Island, New York. A new experiment, sPHENIX is scheduled to start taking data in 2023 and GSU has been leader in the development of the hadronic calorimeter for sPHENIX. The hadronic calorimeter (HCal) measures

the energy of hadrons, such as protons and neutrons, and is composed of scintillator tiles sandwiched between metal plates. As the hadrons traverse the metal they lose energy that is deposited in the tiles. The tiles then produce scintillation light that is directed by a fiber to a silicon photomultiplier (SiPM). The measurements from the SiPM can be used to determine the energy of original hadron. The sPHENIX HCal has two segments, the outer HCal and inner HCal, which are located outside and inside of the solenoid magnet respectively. Each segment is comprised of 32 sectors. Prior to installation the performance of each scintillator tile is quantified by studying the energy deposited by cosmic rays. GSU designed a test stand and testing procedures that could be used to measure the performance of over 15,000 tiles. Under the direction of Drs Connors, He and Sarsour, a team of 3 graduate students and over a dozen undergraduates have contributed to the tile testing effort at GSU. For each tile, students measured its dimensions to ensure the tiles would fit between the plates, quantified and recorded the response to cosmic rays and carefully packaged it for shipping to BNL. Once at BNL, collaborators installed the tiles in the metal plate assemblies and connected the electronics. After another round of testing, engineers constructed

lower half of the Outer HCal, installed the solenoid magnet and then installed the upper half of the HCal sectors. The final Outer HCal sector was installed on and is shown in Fig. Each sector, with an interior radius of 182 cm and outer radius of 270 cm, weighs 12,47 kg (27,000 lbs). This is a major milestone in the construction of sPHENIX. Despite having to close the lab in 2020 and other challenges due to the pandemic, the GSU team kept the sPHENIX project on schedule. The GSU team are now working on the simulations and code needed to properly calibrate the detector and look forward to analyzing the data that will start being collected next year! ■



## In the news



### NASA's James Webb Space Telescope launch

NASA's newest flagship observatory, the James Webb Space Telescope, launched on December 25, 2021. Since then it has traveled a million miles to its final location at L2 while deploying its sun shield, unfolding its mirrors, and finally seeing the first photons of starlight as it focuses its vision and readies its instruments for science. ■



Georgia State astronomer Prof. Misty Bentz is among the first group of scientists to perform research using NASA's James Webb Space Telescope. Focusing on the galaxy NGC4151, her team will use the NIRSpec instrument to study the stars closest to its central black hole and use their motions to constrain the black hole's mass. [Listen here](#) as she discusses her research and the capabilities of NASA's new eye in the stars. ■

## Lisa Krishnamurthy

Lisa is a translational magnetic resonance (MR) physicist and has considerable experience with MR imaging (MRI) and MR spectroscopy (MRS) sequence design and analysis to create novel biomarkers for the clinic and rehabilitation sciences. She joined the department as a research assistant professor in March of 2021. She holds a joint appointment with Atlanta VA medical center. She was a postdoctoral research associate at GSU for a few years before she took this position in 2021. ■



## Jun Kang

Jun Kang is a part-time lecturer at GSU. He received a master's degree in nuclear physics at South Korea and a Ph.D. in molecular physics at GSU. He has taught physics to a diverse group of students in colleges and college-level math and physics courses in a high school, where he was recognized for his teaching by getting the teacher of the year award. ■

## Idan Ginsburg

Idan Ginsburg moved to GSU from New England where he completed his PhD and postdoctoral work. Idan has been teaching the introductory astronomy courses, and is excited to teach his new course on black holes and relativity next year. Idan also has a number of undergraduate students doing research with him, as well as Braven Lyall, a graduate student in the Department. Research interests include black holes, high-velocity stars, exoplanets, and astrobiology. He is also completing a book on astrobiology which will be published next year by Cambridge University Press. ■



## Mehmet Fatih Taşar



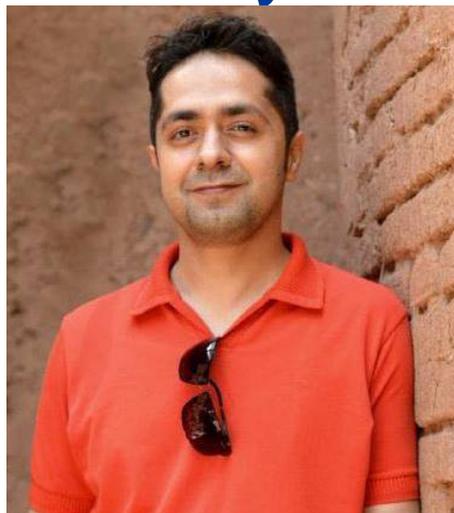
Mehmet Fatih Taşar earned his Ph.D. in Curriculum & Instruction with emphasis on Science Education from The Pennsylvania State University in 2001. Before joining GSU he was a full professor at Gazi University. Dr. Taşar's research focuses on the cognitive aspects of learning (mechanics) and the history and philosophy of science in science teaching. He is redirecting his research efforts on PCK and TPACK coupled with teacher professional development. He serves as a co-editor-in-chief for 3 journals: International Journal of Physics and Chemistry Education, Action Research and Innovation in Science Education, Hellenic Journal of STEM Education. Notably, he is the chief editor of The International Handbook of Physics Education Research to be published by American Institute of Physics Publishing. ■

## Leyla Rohani

Leyla earned her Bachelor of Applied Physics from Tehran Polytechnic University in Iran. After several gap years due to two times immigration and taking care of premature twin babies, she earned her Master of Computational Physics from Clark Atlanta University and a Ph.D. in Biophysics from Georgia State University. During her research, she enjoys all moments and especially the challenges involved in designing computational models to aid in the assignment of experimental data. Currently, she is a visiting lecturer in the Department of Physics and Astronomy, introducing physics courses as a different but attractive subject to undergrad students. These days, she has two college students at home, adding to the fun and hot discussion regarding students' points of view of Georgia Tech, the University of Georgia, and Georgia State University students. ■



## Amin Bayaat Barooni



Amin Bayaat Barooni is a Ph.D. in Physics Education Research (PER) and Visiting Lecturer at Georgia State University. He came from Tehran, Iran. After receiving his Master's degree, he taught Physics at the high school level. Many teachers in Iran use traditional methods for teaching, and it causes students to be unwilling and unmotivated to learn physics subjects. He worked hard to change this atmosphere, so he tried to combine different research-based methods of teaching physics to enhance his students' learnings. After a while, he understood that these methods do not entirely compatible with his country's education system. So he decided to pursue his education in PER to learn how to design a new method of teaching physics using research-based activities. Nowadays, he is teaching algebra-based and calculus-based physics courses in the studio and lectures. ■

## Viacheslav (Slava) Sadykov

Viacheslav (Slava) Sadykov joined the Physics & Astronomy Department of GSU as an Assistant Professor in January 2021. He was born in the Republic of Bashkortostan - a bright multinational and multicultural region of Russia with a very rich history and traditions. Before joining the department, Slava received his Ph.D. in Applied Physics from the New Jersey Institute of Technology in 2019 and worked as a research scientist at BAERI / NASA Ames Research Center in California. He has wide research interests in the areas of Solar Physics and Space Weather. He is especially fascinated about applying machine learning for the prediction of solar energetic events, making solar data more discoverable, and analyzing and modeling the solar spectra. During his free time, Slava enjoys spending time with his family, cross-country running, and remembering nice days of playing soccer before the pandemic. ■



## Yang-Ting Chien

Dr. Yang-Ting Chien joined our department in August 2021 as an assistant professor in theoretical high energy nuclear physics. After receiving his Ph.D. at Harvard University and prior to the position at GSU, he has conducted post-doctoral research at Los Alamos National Laboratory, Massachusetts Institute of Technology and most recently C.N. Yang Institute for Theoretical Physics. Yang-Ting's research focuses on the physics and the rich phenomenology of the strong interaction at high energy colliders. He is passionate about fundamental physics in general and eager to learn and share great ideas. He is an amateur tea connoisseur and appreciates great coffee and chocolate. ■

## Theo ten Brumelaar



Theo joined the department as a postdoc in early 1993 working under Hal McAlister in the CHARA group but then spent his entire professional career working at GSU. The CHARA Array was, at that time, in the early stages of conceptual design and as he had spent his graduate student days working on a similar device in Australia called SUSI I was a good fit to the position. At the time he had no intention, nor any expectation, of still being in the group some 29 years later but that's how it worked out. It was a question of being the right place at the right time. After about five years it was clear that it was time to move out to the Los Angeles area, closer to where the work was being performed. He has lived here ever since. For his retirement he plans to move back to Australia, live near the beach, and spend much more time playing his guitar. The entire CHARA team wants to thank Theo for being such a driving force behind CHARA all those years, relentlessly fixing bugs and issues, days and nights, and for ultimately making it what it is now, the leading interferometer in the world. Happy retirement Theo! ■

## Dwayne Alan Torres

Dwayne Alan Torres retired as an instrument maker in the instrumentation shop. He had joined the Physics and Astronomy department in 1999. Dwayne has been in charge of CNC, programming and machining parts with various materials for the several of the Departments at the university. Lately he was primarily involved in machining parts and assemblies for the CHARA array program at Mount Wilson, California. We wish him the best and thank him again for all his years of service! ■



## Dr. Matthew Alexander Willson (1990-2022)



We are saddened to report the sudden death of Dr. Matthew Willson at age 31. Matthew was visiting his long-time girlfriend Katherine Shepard (one of our PhD students) when he was struck by a stray gunshot that entered the apartment where he was staying. This premature end to the life of such a promising young scientist has devastated his colleagues and friends both at GSU and abroad.

Matthew Willson was an expert in the realm of high angular resolution imaging from ground-based telescopes. He explored planet formation in the accretion discs of young stellar objects, and he helped develop software tools for wavefront sensing with the European

Extremely Large Telescope.

Matthew was a postdoc in the department 2017-2019. He was a member of the Remote Sensing Group for Space Sciences led by Professor Stuart Jefferies. Here he pursued his interests in achieving diffraction limited imaging from ground-based optical telescopes. He was a postdoc at the STAR Institute at University of Liège at the time of his death. Matthew will be deeply missed by his family, friends, colleagues, and the students he inspired. He will be remembered as a pioneer and explorer in the realm of imaging young planets. A scientific obituary is available on-line at: <https://baas.aas.org/pub/2022i019/rel-lease/2>. ■

## Professor Mark Stockman (1947 - 2020)

It is with profound sadness we report the loss of one of our longtime colleagues, Dr. Mark Stockman, who passed away on November 11, 2020 after a brief battle with esophageal cancer.

Mark was born in Kharkov, Ukraine. He received BSc and MSc degrees from the Novosibirsk state university, and PhD and DSc degrees from institutes of the Russian Academy of Sciences. Mark joined the faculty at GSU in 1996. He was promoted to Professor in 2001, Distinguished University Professor in 2013 and Regents Professor in 2018.

Mark's research interests and expertise were in nanoplasmonics and nano-optics, and he is considered by many to be the father of these fields. His contributions in nanoplasmonics and nano-optics were, simply put, legendary. Mark is perhaps most famous for co-inventing the Spaser, a type of nano-scale laser device that can now be fabricated

and is finding wide application from materials science to medicine. To leverage and promote nanoscience Mark founded the Center for nano-optics (CENO) at GSU in 2012 and directed the center until his death. Touching tributes to Mark's life and legacy, with commentary by many of his colleagues and friends, have been published recently in the ACS Photonics, (2021,8,683-698) and the Nanophotonics journals (2021,10,14,3569-3585).

Mark was a truly devoted husband and father and is survived by his wife Bronislava ("Slava") and his son Dmitri. Mark was passionate about skiing, food and wine, in that order. Movies and pictures of his prowess as a skier can be viewed on his website (<http://physics.gsu.edu/stockman/>).

Mark's untimely death is a devastating loss to his colleagues, our department, the university, and the science community as a whole. He will be greatly missed. ■



## Student org news



**A**stroPAL: AstroPAL is a peer mentoring group for astronomy grad students in the department, providing one-on-one meetings between junior and senior grad students. We continued to host an orientation and meet-and-greet for new students, professional development focus groups, and mock oral qualifying exams despite restrictions caused by the pandemic. This year, AstroPAL had 10 mentees and 11 mentors participate in the program. Additionally, this year saw the founding of PhysicsPAL, an analogous program for the physics graduate students. PhysicsPAL is hoping to have its first batch of mentors and mentees at the start of the next school year. ■

**P**GSA: Last year, PGSA has hosted a variety of social events including virtual movie nights and a picnic at the beginning of the school year. Their primary focus continues to be on community building, professional development, and acting as a unified voice on behalf of graduate students. ■

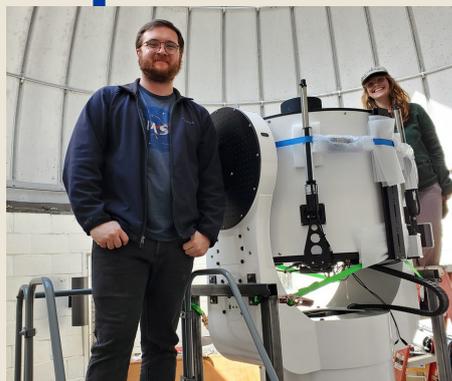
**W**omen in Physics (WiP): throughout every stage of the pandemic, WiP continued to be a support for minorities in physics. They have planned and facilitated coffee hours with female speakers after colloquium, online meetings, and virtual trivia nights. They have worked in conjunction with SPS and PGSA to make sure the physics community at GSU remains supported and connected. During the past 2 years, WiP has had multiple members of its undergrad accepted into graduate school. ■



PGSA outreach activities at Maynard and Trip last Fall.

**G**eorgia Outreach Team for Space (GOT Space) has remained extremely active in its outreach endeavors throughout the past 2 years. Transitioning to virtual visits in the Spring of 2020, GOT Space has visited hundreds of students virtually, and has recently begun to return to in-person visits. This past year, GOT Space has helped twice with the Atlanta Science Festival, participated in GA Tech's Space Day Atlanta, carried a 6-week long partnership with the Tuskegee Airman Global Academy to help them become STEM certified, and much more. With the original graduate student founders of GOT Space, Justin Robinson (GSU) and Casey Wilson (GA Tech) nearing the end of their graduate careers, GOT Space welcomed 3 new graduate leads the summer of 2020. The new leadership team looks forward to the future of GOT Space returning to in-person outreach visits while still using virtual visit options to expand the GOT Space Community. ■

## New 0.7m telescope installed at HLCO



**A** team led by Prof. Baron, Prof. Jefferies, and optics lab manager Dmitriy Shcherbik, successfully installed a \$250,000 Planewave CDK 700 telescope at Hard Labor Creek Observatory on March 24th 2022. This telescope will soon be equipped with adaptive optics and a performant speckle camera, and will be used for research in remote sensing and high angular resolution imaging, serving as a testbed for novel approaches to image through the turbulent atmospheric medium. It will also be used for outreach activities during Hard Labor Creek Observatory public nights. The HLCO facilities had been closed to the public during the Covid-19 pandemic but should reopen during Summer 2022. ■

# PhD successfully defended in 2020 & 2021

2020



**Kathryn V. Lester**, 4/10/2020 "Visual Orbits of Spectroscopic Binaries with the CHARA Array".  
Advisor: Doug Gies ■

2020

**Zaheer Ahmad**, "Migration Enhanced Plasma Assisted Metal Organic Chemical Vapor deposition of Indium Nitride".  
Advisor: Alexander Kozhanov ■

**Garnett Cross**, "Optoelectronic and Transport Properties of Indium Nitride".  
Advisor: Alexander Kozhanov ■

**Kiran Dhakal**, "Brain Functional and Structural Networks Underpinning Musical Creativity".  
Advisor: Mukesh Dhamala ■



**Zeynep Topdemir**, "Pedagogical Effects on Student Learning, Attitude, and Retention of Physics Majors".  
Advisors: Brian Thoms ■

**Cheuk-Ping Wong**, "Neutral Pion-hadron Correlations in 200 GeV Au + Au Collisions".  
Advisor: Megan Connor ■

2021 **Astronomy**

**Zachary Hartman**, 6/4/2021 "Examining the Higher-Order Multiplicity of Low-mass Wide Binary Systems".  
Advisor: Sebastien Lepine ■

**Arturo Martinez**, 6/17/2021 "Exploring Interferometric Realms: Modeling and Imaging of Stars, and Optical Test Bench Simulations".  
Advisor: Fabien Baron ■

**Physics**

2021

**Amin Bayat Barooni**, "Considering different research-based activities by using a k-means cluster analysis".  
Advisor: Brian Thoms ■

**Hemendra Mani Ghimire**, "Infrared Spectroscopy of Serum Samples for Disease Diagnostics".  
Advisor: Unil Perera ■

**Rupesh Ghimire**, "Theory of nanopasser: the role of topology and inter-level relaxation".  
Advisor: Vadym Apalkov ■

**Sushma Ghimire**, "A Quantitative Study of Infralow intracranial EEG and Resting State fMRI Network Activities in Human Epilepsy".  
Advisor: Mukesh Dhamala ■



**Bokyoung Kim**, 6/25/2021 "A Catalog of Stars in the Local Galactic Halo in Gaia EDR3 and Their Kinematics".  
Advisor: Sebastien Lepine ■

**Alexandra Yep**, 7/7/2021 "Young Stars amid External Radiation and Colliding Associations".  
Advisor: Russel White ■

**Neda Hejazi**, 12-1-2021 "Chemical Properties of the Local Galactic Disk and Halo Using Low-Resolution Spectroscopy of M dwarfs and M subdwarfs".  
Advisor: Sebastien Lepine ■

**Kalupahanaliyanage Don Binuka**

**Gunawardan**, "Bi-Chromatic Microwave Induced Resistance Oscillations on GaAs/AlGaAs Two Dimensional Electron Systems".  
Advisor: Vadym Apalkov ■

**Timothy Jordan**, "Effects of video game playing on sensorimotor decision-making abilities and brain network dynamics".  
Advisor: Mukesh Dhamala ■

**Ahmad Kafae Razavi**, "Photoionization and Structure of the Superheavy Atoms No, Cn and Og".  
Advisor: Steven Manson ■

**Chathuranga Rasadi Munasinghe**, "Relativistic and Interchannel Effects on Branching Ratios of Spin-Orbit Doublets".  
Advisor: Steven Manson ■

**Leyla Rohani**, "Calculated Vibrational Frequencies of Pigments in Protein Binding Site".  
Advisor: Gary Hastings ■

**Sajith Madushan Wijayarathna Withanage**, "Single-Crystalline Graphene by Low-Pressure CVD Method: Nucleation Limited Growth, Transfer, and Characterization".  
Advisor: Ramesh Mani ■

# Support Physics & Astronomy at GSU

There are many ways to support our department:

- Endow an [outstanding graduate student award](#) or set up an undergraduate scholarship.
- Support an [undergraduate summer research position](#) in physics, similar to the Raghavan fund for astronomy.
- Establish an [endowed chair or professorship](#) to support our [frontline collaborative research](#) in astronomy and physics.
- Contribute directly to the general fund of our Department to support faculty, staff, and student professional development, social and outreach activities, and recruitment (go to the [GSU Make a Gift](#) site, select "Find My Fund", and specify Fund ID 02041).

For more information, contact Nancy Duncan Porter, Assistant Vice President for Development at the College Development Office (404-413-5739, [nduncanporter@gsu.edu](mailto:nduncanporter@gsu.edu)), or contact our chair Dr. Sebastien Lepine (404-413-6020, [slepine@phy-astr.gsu.edu](mailto:slepine@phy-astr.gsu.edu)). You can also visit our [Giving Webpage](#). ■



## PHYSICS AND ASTRONOMY

# Endowed Activities



## Summer REU Program

**O**ur department has been awarded a grant from the National Science Foundation to support an official "Research Experiences for Undergraduates" (REU) program for three years beginning in Summer 2022 (Mike Crenshaw, PI).

**T**he program will support 6 students from outside institutions to come to GSU and work with department faculty mentors and their groups during a 10-week summer program (this year we had 208 applications for this program!). The theme of the program is "From the Largest to Smallest Scales in the Universe".

**I**n addition to frontline research, REU students will participate in a weekly seminar focused on professional development and practice for the summer symposium. Weekly lunch meetings will feature brief faculty talks and discussions of student research projects and their connectivity.

**S**ocial activities will take advantage of the many cultural and recreational opportunities in Atlanta (for more details, see <https://physics-astro.gsu.edu/reu>). A unique aspect of the program is that REU students will travel to a GSU-affiliated field location during the summer, which

could be Apache Point Observatory (New Mexico), the CHARA Array (California), or Brookhaven National Laboratory (New York). All faculty and students involved in the REU are very excited and eager to kick off the program on June 6th 2022. Next year our newsletter will include a full report on the experience! ■

## More Summer Undergraduate Research

**T**he department also continues to support paid summer research positions for our diverse undergraduate students at GSU and other local participating universities. Positions include two Raghavan Astronomy Student Fellowships (endowed), two physics fellowships supported by the department (and we note here that we are looking for an endowment), and faculty grants.

**D**espite the challenges presented by COVID-19, twelve undergraduate researchers were hired in Summer 2021 to work with faculty members in physics and astronomy and present their results in the Department's Undergraduate Symposium at the end of the summer. Many of these students continued their paid positions into the academic year.

**I**n the upcoming Summer 2022, the department's summer research students will be integrated with the REU students for combined professional development, symposium, and social activities. ■