

ABOUT THE AUTHORS



JULIAN BOWNE is a senior at Rutgers University studying aerospace engineering. He is a member of the Rutgers Rocket Propulsion Laboratory, and he has been doing research relating to space exploration. Julian's research involves control systems, robotics, and aerospace engineering. His current project has been an extension of a three-year long research project involving a traction control system for a Martian rover. First, the project was a simple ABS control scheme using Pacejka's Magic Tire Formula. Then, through NASA's Space Grant Consortium, the project developed into using a more complex terrain model, called the deformable-soil-rigid-tire model. Next, under the Aresty program, the project focused more on designing a controller using the sliding mode control method. Currently, the project's main focus is data-driven control, which is an advanced control system that uses data instead of a model. This project continues to evolve, revealing better solutions using more advanced techniques.

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ROBERT BUCKELEW is a senior at Rutgers University studying aerospace engineering. His academic and research interests focus on the modeling, simulation, and control of dynamical systems. His most recent collaborative project gained inspiration from a DARPA initiative entitled "Robotic Servicing of Geosynchronous Satellites" and sought to produce a useful simulation tool for a complex satellite-mounted robotic arm system. Robert hopes to apply the critical thinking skills developed throughout his time in the Rutgers undergraduate research environment to solve problems of importance in the chemical processing industry following graduation.

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ETHAN CATALANELLO is an undergraduate senior in Mechanical Engineering. His research is primarily in the field of nonlinear controller design and robotics. He is particularly focused on employing numerical models and computational analysis to create simulations of coupled dynamical systems, such as a free-floating satellite with mounted robotic manipulators. These simulations greatly reduce the cost and risk associated with refining spacecraft design since they do not require a physical launch. Recently, he worked to design a controller that could potentially be utilized in the DARPA RSGS project. Ethan hopes that his research contributes to the proliferation of human presence in space by helping to encourage private organizations to allocate more resources to developing the next era of spacecraft.

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YUEXING HAO is a Rutgers undergraduate student majoring in computer science. Through her undergraduate time, she spent time doing research in Intelligent Visual Interface (IVI) lab and publishing papers in different leading journals such as Bioinformatics, IET Image Processing. Yuexing is interested in computer vision and machine learning. She is currently a part-time lecturer of Rutgers SAS signature course Data 101. In the future, Yuexing is going to pursue her dream as a Ph.D. student.

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SHANE LE COMPTE is currently a senior at Rutgers University studying mechanical engineering and mathematics. He loves creating things, solving problems in new ways, and is always open to a challenge. Aside from academics, Shane enjoys classical music and playing games with friends. The broader context of this research fits within the JJ Slade program at Rutgers where this project is currently being continued. The end goal is to form a baseline from which real applications to space exploration can be realized within the near future.

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ADRIANA SCANTEIANU is a fourth-year student in the Honors College and a member of the Douglass Residential College studying Mathematics with a minor in Urban Studies. She is a Rutgers Presidential Scholar, a Lloyd C. Gardner Fellow, and a recipient of the Katherine Hazard Prize in Mathematics. Adriana has also been recently accepted into the 3+1+1 program at the Bloustein School, which culminates in a Master of Public Policy. Adriana's research experience began in high school when she conducted and published computational biology research at the Icahn School of Medicine at Mount Sinai. As a Rutgers student, she traveled to Rwanda under the Western Washington University NSF REU program to study Rwanda's family planning system from both quantitative and qualitative perspectives. Last summer, Adriana began conducting research in quantum mechanics through the Rutgers DIMACS NSF REU program under Prof. Shadi Tahvildar-Zadeh, alongside Rutgers student Xiangyue Wang. This research continued throughout the academic year and was accepted for presentation at a Contributed Paper Session at the American Mathematical Society Spring Eastern Sectional Meeting. Adriana and Xiangyue have continued to work on their research remotely and will be working with a new Rutgers DIMACS REU cohort this summer.

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HANNAH VARKEY: For a phenomenon that affects nearly two-thirds of the world's population, we have still yet to learn about the monsoonal system, particularly as its predictability wavers in the midst of the climate crisis. Living in India for a significant part of my life, I've come face-to-face with the effects of the Indian monsoon, impacting aspects that range from agriculture and economy to water supply and travel. My project started the summer after my first year, with my PI Dr. Richard Mortlock, through the Aresty Summer Science Program 2018 Internship. To me, my motivations for this project are driven by personal experience—from being able to discern whether the weather is really getting quite worse or unbearable (as my grandparents often tell me) to being able to provide solutions that can change lives for the better. At Rutgers, I'm learning cognitive science and the geological sciences, exploring both worlds of the visceral and innate to the external and ever-changing. This perspective allows me to look at issues of climate change from being a neurological and public health concern to being able to appreciate to it in through a more in-depth and paleo-climatological perspective into the monsoon trends of southern Asia.

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XIANGYUE WANG is a senior in the Honors Program studying Physics, Mathematics, and Philosophy. He strives to find innovative and equitable solutions to climate change. He is a Rutgers Scarlet Scholar, an Anthony D. Kurtz Scholar, and a recipient of the NJ Chinese Chamber of Commerce Special Recognition Award. Furthermore, he represents more than 30,000 undergraduate students in the Rutgers Senate. Xiangyue's effort to combat climate change began in high school when he was selected by the AT&T Young Science Achievers' Program to research the impact of ocean acidification on phytoplankton. Later, he searched for sustainable and reusable concrete in the NJIT Material Dynamics Lab. At Rutgers, Xiangyue uses physics-based machine learning models to improve wind energy efficiency under Prof. Ahmed Aziz Ezzat. Xiangyue began conducting research in quantum mechanics through the Rutgers DIMACS NSF REU program under Prof. Shadi Tahvildar-Zadeh, alongside Rutgers student Adriana Scanteianu. This research continued throughout the academic year and was accepted for presentation at a Contributed Paper Session at the American Mathematical Society Spring Eastern Sectional Meeting. Xiangyue and Adriana have continued to work on their research remotely and will be working with a new Rutgers DIMACS REU cohort this summer.

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