

Mathematics REU at James Madison University May 24 2021- July 16 2021

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Department of
Mathematics and
Statistics

Make Math With Us!

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Undergraduate students who are US citizens or permanent residents are welcome to apply for our NSF funded eight week **virtual** REU program. Students work in groups of 2-4 under the supervision of two faculty mentors.

Project 1: Bias Mitigation for Machine Learning Estimators As machine learning estimators gain more attention, so does the study of the accuracy of these estimators. We will assess the accuracy of some popular machine learning estimators, including random forests and boosting estimators. In many situations, the dominant risk component turns out to be squared bias, which leads to the necessity of bias correction. We will focus on comparing the degree of bias of these estimators and exploring the effectiveness of adaptive bagging and bias correction bootstrap techniques in reducing bias. Students will get familiar with popular machine learning estimators and learn how to assess statistical risks. Students will also gain experience with R programming. Mentors are Lihua Chen and Prabhathi Gamage.

Project 2: Power series and highly nonlinear ODEs Join us as we continue to develop, analyze, and exploit an exciting approach to generate numeric and symbolic series solutions of nearly all systems of ODEs, including those which are highly nonlinear. We will employ Parker-Sochacki Power Series Method (PSM) to explore adaptive methods, investigate generation and application of symbolic Taylor representations, experiment with Pade approximants, develop PSM solvents for Hamiltonian systems, and more! Mentors are Roger Thelwell and Jim Sochacki.

Application Deadline: Feb 15, 2021. More Information <https://www.jmu.edu/mathstat/reu/>