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Thesis Title: *Adaptive Decision-Making in Dynamic Environments Using Sequential Bayesian Inference*

Thesis Title: *Gyroscopic Polynomials*

Thesis Title: *Adaptive Decision-Making in Dynamic Environments Using Sequential Bayesian Inference*

Thesis Title: *On the Three-Dimensional Quadratic Diffeomorphism: Anti-integrability, Attractors, and Chaos*

Thesis Title: *Source Localization on Infection Networks*

Thesis Title: *Methods for Change Points Detection and Model Selection in State-Space Models*

Thesis Title: *Contributions to Computational Techniques and Machine Learning for Applied Science*



Leo Crowder
Byanka Estudillo
Ahyo Falick
Seunghyun Kim
Dennis Krimer
Serena Lipari-DiLeonardo

Allison Liu
Benjamin Marquardt
John Montagunick
Aviral Prakash
Kyle James Weishaar

Meghan Buscher

Brian Cain

Rebecca Cohen

Megan Collins

Anders Harris

Michael Huffman

Ziyu Li

Brian Morales

Kevin Nguyen

Nathan Omdalen

Joshua Park

Zachary Sajevic

Sandra Tredinnick

Austin Wagenknecht

Jonathan Yang

Jongbae Yoon





The Department of Energy (DOE) recently provided \$15 million to a project pushing the development of nuclear energy as a reliable form of clean energy. To achieve this goal of sustainable nuclear energy, the required physics and computation of nuclear fusion needs to be better understood, which has created an opportunity

for interdisciplinary collaboration. The Center for Hierarchical and Robust Modeling of Non-Equilibrium Transport (CHaRMNET), led by Michigan State University and Los Alamos National Laboratory, is a collaborative effort with 9 institutions, including the University of Colorado at Boulder. Specifically, Applied Mathematics' Professor David Bortz and Associate Professor Stephen Becker are included in this effort. The provided \$15 million will go to create a Mathematical Multifaceted Integrated Capability Center (MMICC), which enables this

The Society for Industrial and Applied Mathematics

Attracting diverse, qualified candidates into the graduate program has been challenging over the years. Various graduate committees have attempted to tackle the problem of a monochrome student body from different angles, but complex financial, cultural, and systemic hurdles continue to thwart plans to bring in and maintain a diverse community. Applied Math's Graduate Student Coordinator explained the impetus behind APPM's push to become a GPG member: "Joining the Math Alliance is, in essence, calling in professional help to look at our current DEI strategies to assess and optimize their efficacy. We've laid bare our program stats for review, in order to be coached and mentored by experts on how to provide and promote a safe, inclusive working environment for all students."

APPM's strategic plan aims to address academic challenges, personal challenges, and social challenges. The application organizers outlined the details of how they will address each challenge:

"To address social challenges, we will hold a social activity between Math Alliance students (and any other student from a marginalized community) and Math Alliance mentors. The aim is to help build a community through social interactions. These events will provide an opportunity for Math Alliance students to develop a sense of cohort and to socialize with mentors in a low-key setting. We also plan to bring at least one underrepresented minority (URM) speaker for the Applied Mathematics Colloquium each semester, with whom students can meet and socialize before and after their talk.

We plan to help address academic challenges by giving students special office hours. Our Math Alliance faculty mentors will hold office hours every week. During these office hours, students will be able to get help with Analysis, Probability and Statistics, and Numerical Analysis, which are the core classes for our graduate program."

Joining the Math Alliance is a crucial step towards diversity in applied mathematics, and can further bolster the program's leading research in the field. Students wishing to read more about the Math Alliance can visit their website to find more information, including the history, currently accepted university programs, and goals of the alliance.

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- APPM GPG Application Organizers

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Department of Applied Mathematics