Colloquium. Academic Year 23-24

April 12, 2024 (Friday), 3:00 pm

The Mathematics of Fairness- Location- SC 5211
Note: Date and Time

Wendy Cho- Vanderbilt University
Important insights into redistricting can be gained through an interdisciplinary approach that combines research from many fields, including statistics, operations research, computer science, high performance computing, math, law, and political science. Our work integrates insights from all of these disciplines to create a novel approach for analyzing and reforming redistricting in a way that is tightly coupled with the framework that the Supreme Court has outlined over the past 5 decades.

April 18, 2024 (Thursday), 4:10 pm

On aqua planets – Location- SC 5211

Gieri Simonett- Vanderbilt
I will consider the motion of a viscous, incompressible fluid on a surface (or, more generally, on a Riemannian manifold). In this context, one might think of an aqua planet. The fluid motion is described by the surface Navier-Stokes equations. What are these equations, and how does the fluid evolve? Interestingly, there is an intriguing connection between the long-time behavior of solutions and the existence of Killing vector fields. Numerical simulations will also be shown to underscore theoretical predictions.

April 18, 2024 (Thursday), 4:10 pm

Do stars exist? – Location: SC 5211

Marcelo Disconzi – Vanderbilt University
Astronomy is arguably the oldest scientific discipline. Precise measurements of the motion of celestial bodies date back to the ancient Babylonians, Chinese, and indigenous peoples outside Eurasia. Yet, the basic objects of study in Astronomy, namely, stars, are not known to exist. By this, I mean that the standard model for describing the dynamics of a star, the Einstein-Euler system with a physical vacuum boundary, is not known to admit existence and uniqueness of solutions. As I'll explain, this is due to a fundamental difficulty in understanding the mathematics of the fluid-vacuum interface which separates the body of the star from vacuum. This interface displays a singular behavior which is not amenable to current analytic-geometric techniques. In this talk, I'll present recent progress in this problem which establishes, in the affirmative, existence and uniqueness of solutions to the system in some particular cases. The talk is based on joint works with Ifrim-Tataru and Speck.

May 16, 2024 (Thursday), 8:00 am

2024 Shanks International Conference on L-functions and Automorphic Form- May 13th – May 16th, 2024