

Mathematician Receives Grant for Quantum Mechanics Research

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Ohio University faculty member Martin Mohlenkamp has received a five-year, \$400,000 Faculty Early Career Development Grant from the National Science Foundation to conduct mathematics research with students.

Mohlenkamp, an assistant professor of mathematics, will use the grant to develop methods to better solve quantum mechanics problems based on the Multiparticle Schrödinger Equation. This equation can be used to calculate the energy of the electrons in a molecule, which is a fundamental issue in chemistry and physics.

As the number of electrons increases, the number of variables in the equation rises, significantly increasing the amount of computer time needed. Without sophisticated mathematical techniques, even the fastest supercomputer imaginable would never be able to handle more than a few electrons, he explained.

Over the past six years, Mohlenkamp and his collaborators at the University of Colorado at Boulder have been developing ways to use computer calculations on equations with many variables. Combining these methods with existing techniques in computational chemistry and physics offers a promising new approach for solving this equation, he said.

To help with the project and to fulfill the educational requirement of the grant, Mohlenkamp will recruit graduate and undergraduate students to

form a research group, which is uncommon in mathematics, he said.

“One goal is to help students understand how the research process works and how to do it better,” he added.

The research group is designed to facilitate interactions between students and to teach them how to write and talk about mathematics in a clear and understandable manner. Students will be required to submit short reports each week and give presentations regularly. Graduate students will be directly responsible for supervising undergraduate work, which will help them prepare for future teaching posts, Mohlenkamp said.

Source: Ohio University

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