UNIVERSITY OF MINNESOTA

Driven to Discover℠

Ph.D. Positions on Intelligent Computing, Mechanics, Materials Modeling at the University of Minnesota, Twin Cities

Fully funded PhD positions are available in Dr. Qizhi He's *Intelligent Computational Mechanics Group* in the Department of Civil, Environmental, and Geo- Engineering (CEGE) at the University of Minnesota, Twin Cities. The expected start date is Fall 2023. The successful candidate will work with Dr. He on the research areas, including *Physics-Informed Machine Learning*, *Multiscale Materials Modeling & Design*, *Meshfree-based Simulation*, *Data-Driven Computing*, and *Structural Optimization*. Primary research topics include but are not limited to:

1. Physics-informed machine learning in computational mechanics and engineering
2. Finite element / meshfree methods for multiscale modeling, optimization, and design of advanced materials
3. Forward, inverse, and reduced-order modeling of large-scale energy and environmental systems

Qualifications

Students who are talented and enthusiastic about learning are encouraged to submit your application. The desired candidate should have:

- B.S. or M.S. in civil/mechanical/aerospace engineering, material science, applied mathematics, physics, or a related discipline, with a strong GPA: >3.5 for undergraduate and >3.6 for graduate study (Master degree is not required).
- Strong background on at least one of the following areas: computational mechanics, solid mechanics, fluid mechanics, finite element modeling and simulation, and numerical methods.
- Programming experience (Fortran, C++, Python, MATLAB, etc.) is highly desired.
- Demonstrated research experience with the finite element analysis of nonlinear solid materials, meshfree method, topology optimization, reduced order modeling, and scientific machine learning would be a strong plus.
- Excellent communication and writing skills

Full financial support will be provided for successful candidates. Excellent applicants will be recommended for College and Departmental Fellowship.

How to apply

Interested candidates are invited to email Dr. He (imechanics.group@gmail.com) with 1) a cover letter (no more than 1 page) briefly describing your research experience and interests, 2) a latest CV (with

mentioning your GPA), 3) transcripts and 4) English standard test scores (for foreign applicants). This and any other specific inquiries should be addressed with "PhD Application 2023 – [Last Name, First Name] – [Affiliated Institution]" in the subject line.

Deadline: Open until filled. Please note that the deadline for graduate student application for the Fall 2023 semester is December 3, 2022.

General information about admissions and applications can be found at:

- How to Apply to CEGE Graduate Programs:
  https://cse.umn.edu/cege/how-apply-cege-graduate-programs
- Financial Support Info: https://cse.umn.edu/cege/financial-support

About PI

Dr. Qizhi He joined the Department of Civil, Environmental, and Geo- Engineering at the University of Minnesota as an Assistant Professor in January 2022, leading the Intelligent Computational Mechanics Group. He obtained his Ph.D. in Structural Engineering with Specialization in Computational Science (2018) and M.A. in Applied Mathematics (2016) from UC San Diego. Before joining UMN, he worked as a Postdoctoral Scholar in the Computational Mathematics Group at Pacific Northwest National Laboratory (PNNL), participating in several DOE centers and projects including PhILMs. His research mainly focused on developing next-generation computational tools by combining high-fidelity scientific computing and artificial intelligence to enable effective modeling, simulation and design capabilities of complex physical systems involving multiple phases, scale lengths, and physical processes. His research interests also include meshfree materials modeling, fracture mechanics, topology optimization, reduced-order modeling, and deep learning for inverse problems that involve porous, composite, and energetic materials. He serves as an external reviewer of several research journals and funding agencies, and an editorial board member for *Computers and Geotechnics*. Please visit his website for more information: https://qzhe.umn.edu/

About University of Minnesota [Video]

University of Minnesota (UMN) established in 1851 is the flagship institution of the University of Minnesota System, located in the Twin Cities of Minneapolis and Saint Paul, Minnesota. UMN is one of only 66 U.S. research universities in the prestigious Association of American Universities (AAU) and is ranked 17th in research activity, with $954 million in research and development expenditures in the fiscal year 2018. The University of Minnesota faculty, alumni, and researchers have won 29 Nobel Prizes and three Pulitzer Prizes. In 2021, UMN was ranked as 40th best university in the world (24th nationwide) by the Academic Ranking of World Universities (ARWU), and the 47th best global university by the U.S. News and World Report. Civil engineering at UMN consistently ranks among the top 20 programs nationwide.

About the Twin Cities

The Twin Cities, i.e., Minneapolis–Saint Paul, is the 16th largest metropolitan area in U.S. with a population of about 3.6 million according to 2020 census estimate. The cosmopolitan area is a balanced commercial, industrial, educational, and cultural center, and functions much as one city. With numerous

lakes and extensive park systems for outdoor recreation, the Twin Cities is shaded by luxuriant trees and have lovely scenery of the four seasons. The Twin Cities is also the home of fine art museums, renowned restaurants, the world-class Guthrie Theater, Mall of America, and more than 10 Fortune Global 500 companies. According to the U.S. News & World Report and Niche's rankings, Minneapolis is one of the top 25 best cities to live in America.

University of Minnesota, Minneapolis, MN