

BYU Mechanical Engineering

POSTDOCTORAL ASSOCIATE: MACHINE LEARNING, ATOMISTIC SIMULATIONS, AND STRUCTURE-PROPERTY RELATIONSHIPS OF GRAIN BOUNDARIES

JOB DESCRIPTION

There is an immediate opening for a postdoctoral associate in machine learning and atomistic simulations of grain boundaries. The successful candidate will join two different, but related, collaborative projects focused on structure-property relationships of grain boundaries.

The first project involves the application of machine learning methods to better understand how the complex variations of atomic structure in grain boundaries impacts their properties. The candidate will construct grain boundaries, characterize their structure using a variety of existing and emerging methods, apply machine learning algorithms to determine relationships, and ultimately analyze machine learning results to better understand the underlying physics governing the measured properties. This work will be performed in collaboration with Gus Hart, a physics professor at BYU, and other graduate and undergraduate students.

The second project involves a combination of atomistic simulations of grain boundary motion as well as the application of existing and emerging theories to better understand how a variety of migration behaviors can be exploited for tailored microstructure evolution. The candidate will simulate grain boundary motion using standard methods, analyze the atomic mechanisms of the motion as well as their associated energetics, and interpret the observations using both classical and recently emerging theories of grain boundary migration. This work will be performed in collaboration with Greg Thompson, a metallurgy professor at the University of Alabama, who is guiding the experimental component of the project, and with other graduate and undergraduate students.

The candidate will advise/mentor students, author or coauthor technical presentations, reports and manuscripts for peer-reviewed journals and conferences.

REQUIRED CRITERIA:

Candidates must have a Ph.D. in materials science, mechanical engineering, computer science, or a related field with a solid background in general materials science. While experience in particular computational techniques or materials systems is not necessary, a strong background in computational materials science and/or computer programming is required. Excellent written and oral communication skills are essential.

DESIRED CRITERIA:

Experience with machine learning methods and the LAMMPS molecular dynamics software is desired. Fluency in Python and MATLAB programming is a plus.

ABOUT BYU

Founded in 1875, Brigham Young University (BYU) is a private university located in Provo, Utah. It is the largest private university in the United States with over 30,000 undergraduate and graduate students. It is owned and guided by The Church of Jesus Christ of Latter-Day Saints. Interdisciplinary materials science research is carried out in a number of colleges and departments.

TO APPLY

To apply for this position, send a cover letter and complete CV to Prof. E. R. Homer, eric.homer@byu.edu.