

Senior Research Associate

Opportunity Available at CU DENVER NIST PREP Program

This position is part of the National Institute of Standards (NIST) Professional Research Experience (PREP) program. NIST recognizes that its research staff may wish to collaborate with researchers at academic institutions on specific projects of mutual interest, thus requiring that such institutions must be the recipient of a PREP award. The PREP program requires staff from a wide range of backgrounds to work on scientific research in many areas. Employees in this position will perform technical work that underpins the scientific research of the collaboration.

NIST Organization (Div/Group/Program): [Div. 647/ Thermodynamics Research Center](#)

NIST Grade Equivalent: [ZP-III](#)

Based on candidate's education and experience, the candidate is equivalent to a NIST grade level as indicated above.

Level of Appointment: [Senior Research Associate](#)

This researcher must start an appointment within 5 years of Doctor of Philosophy degree.

Salary Range Determination: [\\$103,000-\\$105,000](#)

Based on candidate's education and experience, the candidate is equivalent to a NIST grade level as indicated above.

Start Date: [2024-09-1](#)

End Date: [2027-09-30](#)

Length of Term:

The position is for up to four years, subject to performance-based annual renewal.

Summary of Position:

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The associate will design and perform theoretical and computational studies of heat transport in nanoscale semiconducting systems in support of the CHIPS effort (<https://www.nist.gov/programs-projects/molecular-dynamics-simulation-heat-transport-gate-all-around-transistors>). They will perform computational and theoretical studies of phonon transport in nanoscale semiconductor devices comprised of silicon, gallium nitride, and potentially other materials. They will use a combination of analytical theory, molecular dynamics simulations, density functional theory calculations, as well as

other methods to achieve their research goals. They will obtain high-quality data and prepare quarterly progress reports, manuscripts, presentations, and other outputs in a timely and professional manner.

Key Responsibilities:

Key responsibilities will include but are not limited to:

- Computational model development and refinement of existing models.
- Design and execution of scientific computations with the goal of presenting experimentally testable predictions to benefit the US semiconductor device manufacturers.
- Data storage, preparation, and processing.
- Preparation of reports and manuscripts.
- Participation in relevant meetings/conferences aimed at disseminating scientific and engineering results.

Qualifications:

We are seeking qualified candidates with interest and background in particle-based (molecular dynamics) simulation of heat transport in semiconducting devices/materials, using simulation packages such as LAMMPS.

This is a postdoctoral research associate position requiring a minimum of PhD in Engineering / Materials Science / Physics or related field. Although not required, experience and interest in the following will strengthen the application:

- Heat transport in nanoscale thermal junctions, especially in the context of promising transistor geometries (*e.g.*, the gate-all-around arrangement).
- Monte Carlo simulation methodology, including phonon scattering by local boundaries.
- Applying Boltzmann transport equation and other continuum approaches to thermal mapping.
- Using density functional theory packages (*e.g.*, CP2K, VASP) to obtain electron and phonon properties of semiconductors.

For possible consideration and to process this position, qualified candidates should send resumes to Professor Hamid Fardi at the department of electrical engineering hamid.fardi@ucdenver.edu.

<https://engineering.ucdenver.edu/research/prep-research-program>