LEHIGH
UNIVERSITY

Mechanical Engineering & Mechanics
Packard Laboratory
19 Memorial Drive West
Bethlehem, PA 18015-3085
Tel: (610) 758-5253 Fax: (610) 758-6224
http://www6.lehigh.edu/~eus204/schuster.php

POST-DOCTORAL RESEARCH ASSOCIATE

High-performance Scenario Physics – NSTX-U

Lehigh University (LU), in collaboration with the Princeton Plasma Physics Laboratory (PPPL), is seeking to fill a Post-Doctoral Research Associate position in the area of High-performance Scenario Physics and Controls at the National Spherical Torus Experiment Upgrade (NSTX-U). In order to answer key physics questions arising from the Spherical Tokamak concept, and to eventually provide a compact design path for future fusion power reactors, the NSTX-U program at PPPL is interested in developing high-confinement, low-disruptivity, advanced scenarios characterized by large bootstrap fractions and high β_N values leading to steady-state, high-performance operation with enhanced magnetohydrodynamic stability. The successful candidate will work within a team to develop these advanced scenarios via *physics-based modeling*.

The postdoctoral researcher will be permanently located at PPPL in Princeton, NJ, USA. This is a two-year postdoctoral appointment with the possibility of subsequent renewals. The position is funded by the Office of Fusion Science at the US Department of Energy.

Major Duties
The Post-doctoral Research Associate will participate in the development of transport models and simulation capabilities by carrying out different tasks associated with the problem such as:
- Contribute to the development of reduced anomalous thermal, particle, and momentum transport models for LU's Multi-Mode-Model (MMM) multi-fluid anomalous-transport module.
- Perform gyrokinetic simulations to verify/calibrate the MMM transport coefficients.
- Conduct MMM-TRANSP-based predictive runs for NSTX discharges to compare MMM simulated current/temperature/density/rotation profiles to NSTX data.
- Identify transport and stability mechanisms that determine the pedestal profiles.
- Examine the dependence of temperature/density pedestals height/width on plasma parameters.
- Plan, optimize, and understand the new high-current-drive discharge scenarios in NSTX-U.
- Supervise students' work on the development of reduced-order plasma response models.

Required Qualifications
- PhD in physics, engineering or a related field.
- Knowledge of basic plasma physics, tokamak operation, MHD equilibrium and stability.
- Experience conducting original research and publishing in peer-reviewed scientific journals.
- Excellent oral and written communication skills to deliver presentations at scientific venues, write technical reports/proceedings/journals, effectively interact with group members & collaborators.
- Ability to work independently and supervise PhD students, as well as to collaborate with colleagues in a multidisciplinary team to accomplish research goals in a timely fashion.
- Coding/programming experience.

Desired Qualifications

- Experience in both physics-based modeling and computational physics.
- Successful collaboration with experimentalists.
- Experience running transport codes like TRANSP.
- Experience coding in Fortran and/or Matlab.

Compensation and Benefits

Lehigh University offers competitive compensation and benefits, which include health care, life and disability insurance, tax-advantaged accounts, retirement plan with university contribution and match, tuition assistance, vacations/holidays, and flexible schedule (https://hr.lehigh.edu/benefits).

Application Materials Required

Please send 1) letter of interest (describing applicants' research experience and interests), 2) CV with a list of publications, 3) contact info of three references (name and email) to schuster@lehigh.edu. The position will remain open until filled.

About Lehigh University

For 150 years, Lehigh University has combined outstanding academic and learning opportunities with leadership in fostering innovative research. The institution is among the nation's most selective, highly ranked private research universities. Lehigh's four colleges provide graduate and undergraduate education to approximately 7,000 students. Located in Bethlehem, Pennsylvania, Lehigh is 80 miles west of New York City and 50 miles north of Philadelphia, providing an accessible and convenient location that offers an appealing mix of urban and rural lifestyles. The Lehigh Valley International Airport is just six miles from campus. Lehigh Valley cities and towns are regularly listed as among the best places to live in the country. Lehigh's MEM Department is consistently ranked among the best in the country.

About Lehigh University Plasma Control Group

The LU Plasma Control Group, directed by Prof. Eugenio Schuster and co-directed by Dr. Tariq Rafiq, conducts research at the boundary of theory-based modeling, predictive simulation, and plasma control. Group members combine backgrounds in plasma physics, applied mathematics, computational methods, machine learning, and controls. They work closely with colleagues at experimental facilities to integrate the fields of nuclear fusion, physics-based modeling, and model-based control. Present collaborations include the DIII-D tokamak (San Diego, CA, USA), the NSTX-U tokamak (Princeton, NJ, USA), the KSTAR tokamak (Daejeon, South Korea), the EAST tokamak (Hefei, China), and the ITER tokamak (St. Paul-lez-Durance, France).

Equal Employment Opportunity

Lehigh University is an Equal Opportunity/Affirmative Action Employer, and women and members of minority groups are strongly encouraged to apply. Lehigh provides a wide range of networking, mentoring and development opportunities for early-career scientist, and promotes a healthy work- life balance (see http://www.lehigh.edu/~inprv/faculty/worklifebalance.html). Lehigh is a recipient of the 2006 Alfred P. Sloan Award for Faculty Career Flexibility and a 2010 National Science Foundation ADVANCE Institutional Transformation Award to increase the advancement of women faculty in science, engineering, and math (see http://advance.cc.lehigh.edu). Lehigh offers excellent benefits, including domestic-partner benefits, and Lehigh is a founding member of the Lehigh Valley Inter-Regional Networking & Connecting Consortium to assist highly qualified couples who face the dual career challenge.