

Postdoc Opening in the Physics and Chemistry of Molten Salt at UIUC

(updated: October 1, 2019)

Motivated and ambitious researchers are invited to apply for a postdoc position to work on the *Physics and Chemistry of Molten Salts* with Prof. Brent Heuser and Prof. Yang Zhang at University of Illinois at Urbana-Champaign.

Despite increasing excitement of Molten Salt Reactors (MSRs), the fundamental thermophysical and thermochemical behaviors and the transport properties of molten salts identified for MSR applications are still not well understood. Large variations are evident across existing data sets for many of these properties. For instance, the variation of the melting point, the heat capacity, the free energy for potential corrosion reactions, the solubility of fission and corrosion products, and the effect of tritium cannot be accurately predicted as a function of temperature and composition with current data sets. This knowledge gap of molten salt behavior poses a major roadblock in the development and commercialization of MSR technology. The objective of this project is to obtain the thermophysical, thermochemical, and transport properties, construct the phase diagrams, and build empirical physical models of molten salts that are relevant to Molten Salt Reactors (MSRs) with first-principles accuracy using Molecular Dynamics (MD) simulations driven by Machine-Learned (ML) high-dimensional Neural Network Potentials (NNPs) combined with neutron/X-ray scattering and thermodynamic experimental validations. The achievement of this proposed project can help eliminate some of the basic obstacles towards the design and construction of MSRs.

The ideal candidate is expected to have the following skills or experiences:

- Experience in neutron or X-ray scattering experiments (high priority)
- Knowledge of molten salt chemistry, especially FLiNaK or FLiBe (high priority)
- Knowledge of first-principle calculations and MD simulations (secondary priority)
- Basic knowledge of machine learning methods and packages (secondary priority)

The position is a full-time benefits-eligible position appointed on a 12-month service basis. The initial appointment is for one year with the possibility of extension based on performance and funding. The anticipated start date is January 1, 2020. The closing date to apply for this position is Nov. 1, 2019, although applications received after this date may be considered. Salary is commensurate with experience and qualifications.

To apply for this position, please submit a cover letter, CV, code samples, and contact information for three references to Prof. Heuser (bheuser@illinois.edu) and Prof. YZ (zhyang@illinois.edu).