Postdoctoral Fellows at Johns Hopkins University in Experimental Characterization and Computational Modeling of Dynamic Deformation Mechanisms of Concrete

We are seeking two highly motivated Postdoctoral Fellows with interests in experimental and/or computational studies of dynamic deformation mechanisms of concrete. Successful candidates will be appointed as Postdoctoral Fellows in the Hopkins Extreme Materials Institute (HEMI) at Johns Hopkins University, and will be associated with the Materials Science in Extreme Environments University Research Alliance (MSEE URA). HEMI is an interdisciplinary institute which seeks to develop the science and technology to protect people, structures, and the planet. The MSEE URA is an alliance of research institutions led by JHU working in close collaboration with the Defense Threat Reduction Agency to understand, predict, and control the behavior of materials in extreme environments caused by weapons of mass destruction.

One Postdoctoral Fellow will lead an experimental effort to understand the fundamental deformation mechanisms in cement and concrete subjected to high pressures, high strain-rates, and impact scenarios. A suite of tools will be available for this effort, including state-of-the-art static and dynamic testing facilities containing high-pressure triaxial compression equipment, gas guns, Kolsky bars, and the Hypervelocity Facility for Impact Research Experiments (HyFIRE). Diagnostics available include static and dynamic X-ray imaging, high-speed imaging, emission and Raman spectroscopy, scanning electron microscopy, and particle size analyzers. We expect that some experiments will be performed at synchrotron facilities such as the Advanced Photon Source (APS) or the Cornell High Energy Synchrotron Source (CHESS).

The second Postdoctoral Fellow will lead a theoretical and computational modeling effort with the goal of developing a mechanism-based and data-driven/physics-constrained computational model for concrete subjected to high pressures, high strain-rates, and impact scenarios. Approaches that integrate data from experiments and unit process simulations using data science and machine learning are of particular interest. This Postdoctoral Fellow will also leverage existing knowledge and code in HEMI for this class of models, and will also collaborate closely with industry partners to develop material models for predicting dynamic responses of concrete materials and structures.

The Postdoctoral Fellows will work in close collaboration with each other and with an engaging group of researchers in the MSEE URA and in HEMI. Both fellows will receive mentoring from the PIs of this group, which include JHU Profs. KT Ramesh (ramesh@jhu.edu), Michael Shields (michael.shields@jhu.edu), Ryan Hurley (rhurley6@jhu.edu), and Todd Hufnagel (hufnagel@jhu.edu).

Candidates should have a Ph.D. in mechanics, engineering, physics, materials science, computer science or a related field. The Fellow appointed for experimental work should have a strong track-record of using advanced material testing and characterization tools to study the dynamic behavior of materials. The Fellow appointed for computational work should have a strong track-record of developing and using material models to predict behavior in complex loading scenarios.

If you are interested in this position, please email Ryan Hurley or any of the other PIs with a single PDF containing your curriculum vitae, the names of at least three references, and a 1-page research statement. Please use the subject line "HEMI Postdoctoral Fellow in Dynamic Behavior of

Concrete". Review of applications will begin December 1, 2023, but will continue until the positions are filled.

Johns Hopkins University is an Equal Employment Opportunity and Affirmative Action employer and is committed to building a diverse environment. We are deeply committed to the dignity and equality of all persons—inclusive of sex, gender, marital status, pregnancy, race, color, ethnicity, national origin, age, disability, religion, sexual orientation, gender identity or expression, and veteran status.

Johns Hopkins and HEMI provide a highly supportive environment for postdoctoral fellows, including carefully curated workforce development events, short courses, seminars, workshops, teaching and mentoring opportunities, and networking opportunities. Your success is our success, and we hope you will join us!