

COMMUNITY EXTREME TONNAGE USER SERVICE (CETUS): A 5000 TON OPEN RESEARCH FACILITY IN THE UNITED STATES

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Large sample volume 5000 ton multi-anvil presses have contributed to the exploration of deep Earth and planetary interiors, synthesis of ultra-hard and other novel materials, and serve as a sample complement to pressure and temperature regimes already attainable by diamond anvil cell experiments. However, no such facility exists on the North American continent. We propose the establishment of an open user facility for COMPRES members and the entire research community, with the unique capability of a 5000 ton (or more) press, supported by a host of extant co-located experimental and analytical laboratories and research staff.

We offer wide range of complementary and/or preparatory experimental options. Any required synthesis of materials or follow up experiments can be carried out controlled atmosphere furnaces, piston cylinders, multi-anvil, or experimental impact apparatus. Additionally, our division houses two machine shops that would facilitate any modification or custom work necessary for development of CETUS, one for general fabrication and one located specifically within our experimental facilities. We also have a general sample preparation laboratory, specifically for experimental samples, that allows users to quickly and easily prepare samples for ebeam analyses and more.

A service we can offer to COMPRES community members in general, and CETUS visiting users specifically, is a multitude of analytical instrumentation literally steps away from the experimental laboratories. This year we will be pursuing site funding of our laboratories through NASA's Planetary Science Directorate, which should result in substantial cost savings to all visiting users, and supports our mission of interagency cooperation for the enhancement of science for all (see companion PSAMS abstract).

The PI is in a unique position as an employee of Jacobs Technology to draw funding from multiple sources, including those from industry and commerce. We submitted a Planetary Major Equipment proposal to the NASA Emerging Worlds solicitation for the full cost of a press, with competitive bids submitted from Sumitomo, Rockland Research, and Voggenreiter. Additional funding is currently being sought from industry sources through the Strategic Partnerships Office at NASA JSC, External Pursuits Program Office on the JETS contract, and Jacobs corporate in the United States. Internal funding is available for JETS contract personnel to travel to large press locations worldwide to study set-up and operations. We also anticipate a fortuitous cost savings in installation of the large press because plans are already underway for major renovations to the entire experimental petrology suite within the next 2 years in order to accommodate our growing user base.

Our focus as contract staff is on serving the scientific needs of our users and collaborators. We are seeking community expert input on multiple aspects of this proposed facility, such as the press type and design, access management, immediate projects, and future innovation initiatives.