



## **Postdoctoral Researcher: mesh generation, adaptation, and geometry representation with dynamic overset meshes**

The Center for Exascale Simulation of Plasma-coupled Combustion (XPACC — <http://xpacc.illinois.edu>) at the University of Illinois at Urbana-Champaign seeks a Postdoctoral Research Associate to investigate mesh generation and adaptation technology, possibly drawn from high-performance methods used in computer graphics. The center employs high-order-accurate discretizations on structured grids across a broad range of applications. Automating the generation of such meshes is a challenging problem in computational geometry with applications far beyond the Center. Specific tasks will be to

- Investigate the generation of structured, overlapping computational meshes from high-fidelity CAD or CAD-like descriptions.
- Evaluate collision finding algorithms from computer graphics (e.g., ray or collision based) to locate intersections of overlapping segments of the structured mesh and to determine mapping functions between such segments,
- Design, analyze, and implement approaches to adaptivity in structured discretization of differential equations. In order to achieve and maintain rigorously defined accuracy bounds, the center's simulation software needs to dynamically adjust the amount of computational resolution, and
- Develop approaches to adaptivity that lend themselves to their application in a distributed-memory setting.

Faculty working in this area within XPACC include Andreas Kloeckner, Luke Olson, Jonathan Freund, Daniel Bodony, and Bill Gropp.

This is a large center-level effort, and there will be tremendous opportunities for leadership and career development within the center. There will also be opportunities for close collaborative interaction with computer scientists, computational scientists, and experimentalists, as well as the international high-performance computing community. Interest and ability to interact productively with our DOE sponsors is essential. The center also includes more senior staff-level personnel, which provides opportunities for promotion within XPACC.

XPACC researchers have access to state-of-the-art computing platforms at all DOE/NNSA labs and the Blue Waters system (<https://bluwaters.ncsa.illinois.edu/>) at the University of Illinois.

Applicants should have a PhD in Computer Science or a related field. A competitive salary will be set in accordance with University of Illinois policy. Appointments will be for 1 year, with the possibility of renewal for additional years.

To apply, email applications in PDF format to [xpacc@illinois.edu](mailto:xpacc@illinois.edu). These should include a full CV (including publications and details of graduate studies) and at least 3 references. The target start date is November 15, 2015. Please be sure to indicate the specific position to which you are applying.

Illinois is an equal opportunity employer and all qualified applicants will receive consideration for employment without regard to race, religion, color, national origin, sex, age, status as a protected veteran, or status as a qualified individual with a disability. Illinois welcomes individuals with diverse backgrounds, experiences, and ideas who embrace and value diversity and inclusivity ([www.inclusiveillinois.illinois.edu](http://www.inclusiveillinois.illinois.edu)).

