

Research, Informatics and Graduate Studies

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Research Fellow Position in Computational Fracture Mechanics-group of Asst. Prof. Bin Li (RF-2020005)

Description

The Mechanical Engineering (Robotics) Program (group of Asst. Prof. Bin Li) is looking for a postdoctoral researcher interested in the variational model for fracture in thin plates and shells. Contract duration: 2 years (extendable).

Project Details

Thin plates and shells are ubiquitous in nature and technology. In addition to an in-plane mode of fracture, thin plates and shells exhibit bending and tearing fracture modes, situations in which cracks propagate driven by bending orthogonal to the cracks and out-of-plane loading, respectively. Fracture of thin plates and shells is of great practical as well as theoretical interest. However, we lack a complete theoretical understanding of thin plates and shells fracture under general loading, which challenges classical theories of fracture. Furthermore, tearing is typically characterized by large geometric nonlinearity, and therefore it is not clear whether the crack tip fields of the linear theory characterized by the stress intensity factors are meaningful or if and how they determine crack propagation.

The project will include, but not limited to, the development and validation of the variational phase-field for the prediction of cracks nucleation and propagation in thin plates and shells resorting to open-source codes. More specifically, the problems of interest will be the following: 1) verifying the developed phase-field fracture models under general loading, 2) toughening of thin shells by surface topographical design, 3) guiding and controlling crack paths in thin sheets by fracturing them over a tailored bumpy substrate surface.

The duties and responsibilities include to develop mechanistic concepts and models, develop necessary codes, perform targeted simulations, analyze results quantitatively and qualitatively. You will prepare and deliver publications in high-quality peer-reviewed journals, reports and presentations of scientific results. In addition, you will participate in the mentoring of PhD, MSc/MEng students, guiding their research and providing assistance in aspects involving computational modeling of materials and mechanics of materials.

Keywords

Fracture mechanics, thin plates and shells, modeling and simulation, crack nucleation, phase-field model, variational fracture.

Selection Criteria

- PhD degree in Mechanical/Aerospace/Civil Engineering (essential)
- Strong background in computational solid mechanics (essential)
- Solid knowledge in fracture mechanics (essential)
- Expertise in at least one: FEniCS, MOOSE, DEAL.II or ABAQUS (essential)
- Good command of English both verbal and written (essential)
- High level programming (MATLAB, Python or C/C++) (preferable)

Program

Mechanical Engineering (Robotics) Program

Research Area

Computational Fracture Mechanics

Contacts

Bin Li

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[Webpage Link](#)

Application Deadline

Open till filled

Date Posted

21 Sep., 2020

- Experiences of parallel computing (OpenMP or MPI) (preferable)

Benefits

- Salary range: up to \$49,000 / year (depending on qualifications of the candidate)
- Subsidized housing at GTIIT, China
- Health insurance: regular cover for Chinese citizens or private health insurance for foreigners
- Professional conference travel allowance

Application

- Application deadline: open till filled
- Send below required documents electronically to: bin.l@gtiit.edu.cn
 1. Curriculum vitae and personal statements
 2. A publication lists
 3. Three letters of recommendation (one from the mentor for PhD and/or master's studies)
 4. A short research plan outline (up to one page in length)
 5. Degree certificates with certified English translation for both the PhD and master's degrees