

Advertised in: *The Australian (HES) Wednesday 20 May 2009*  
*Times (HES) Thursday 21 May 2009*

**RESEARCH ASSOCIATE (REF: 2796)**  
**SCHOOL OF CIVIL AND RESOURCE ENGINEERING and**  
**SCHOOL OF MECHANICAL ENGINEERING**

- 2 year appointment with further employment of 12 months dependent on funding
- Salary range: Level A \$51,895 - \$70,424 p.a.
- **Closing date: Friday, 17 June 2009**
- minimum starting salary for appointee with PhD will be \$68,017 p.a.

School of Civil and Resource Engineering and School of Mechanical Engineering of The University of Western Australia are conducting cutting edge research into the 'Energy dissipation and vibration-assisted self-healing in structures with topological interlocking.' The project involves analytical study and numerical modelling assisted by laboratory experiments on vibration and wave propagation in physical models of interlocking structures. The appointee will develop analytical and computational models to analyse vibrations and resonances in interlocking structures. Academics with strong theoretical background in vibrations, wave propagation in solids and related analytical and numerical techniques are invited to apply. Applicants must have a PhD in a relevant field. Some assistance with relocation expenses (if applicable) may be negotiated.

**For further information regarding the position please contact** Arcady Dyskin on (08) 6488 3987, fax (08) 6488 1014 or email [arcady@civil.uwa.edu.au](mailto:arcady@civil.uwa.edu.au).

**APPLICATION DETAILS:** For copies of the position description please access the website <http://jobs.uwa.edu.au/>. Written applications quoting the reference number, personal contact details, qualifications and experience, along with contact details of three referees should be sent to Director, Human Resources, The University of Western Australia, M350, 35 Stirling Highway, Crawley WA 6009 or emailed to [jobs@uwa.edu.au](mailto:jobs@uwa.edu.au) by the closing date.

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The topological interlocking is a principle whereby structural elements of special smooth shapes are arranged in such a way that no internal element can be pulled out of the structure without disturbing the neighbours. Subsequently, if the structure is constrained at the periphery it maintains its integrity without the help of any binder or connectors. The main feature of interlocking structures, pertinent to the proposed project, is the ability of separate blocks to move (and rotate) independently within the geometric constraints imposed by the neighbouring blocks. This affects the way the oscillations are induced and propagate within the structure and one expects some unusual phenomena associated with vibrations. It was indeed discovered that interlocking structures show considerable energy absorption in impact which makes the interlocking an ideal design principle for safety barriers and protective shields. The aims of the project are to: (a) model the mechanisms of energy absorption, vibration-assisted self-healing and wave propagation in interlocking structures (and generally fragmented materials); (b) determine spectral signatures of the oscillations and; (c) investigate the role of physical and geometrical controlling parameters, viz. lateral pressure, contact non-linearity, spatial block arrangement and resulting different types of anisotropy as well as the degree of interlocking.