



2 Postgraduate Scholarships in Materials Science and Engineering Monash University, Australia

Solid-state phase transformation is still one of the most effective and efficient way of producing nano- and micro-structures in *bulk* materials for desired properties. Typical examples include ultra-high strength steels, ultra-high temperature superalloys, ultra-light aerospace alloys, and smart materials (e.g, transformation toughened ceramics and shape memory alloys). The shape, orientation and distribution of phase transformation products are important factors in determining important properties of these advanced materials. All these features are intimately related to the crystallography of phase transformations. It is now well recognised that the crystallographic matching of the precipitate and matrix phases defines not only the shape and orientation of the precipitate phase, but also the structural constraints to the nucleation and growth, and therefore the final distribution, of the precipitate phase. While some crystallographic theories have been established to account for the precipitation crystallography, there are still some crucial questions to be answered. Recently, the Australian Research Council has provided **two** PhD scholarships to a research group at Monash University to study plate- or lath-like constituents in model two-phase materials and those representative planar interfaces that are associated with plates/laths in rational or near-rational orientation relationships. One PhD project involves theoretical comparison of similarities and differences between a recently developed edge-to-edge matching approach and the phenomenological theory of martensite crystallography, while the other PhD project involves computer simulation of precipitate microstructures by combining the crystallographic theory with the phase field microelasticity approach. These two PhD projects involve collaboration and potential travelling to the Ohio State University in USA. The PhD scholarship is \$25,000/year (tax exempt) for three years. Potential applicants should have First class Honours degree (or HIA equivalent) in a relevant discipline (e.g. materials science, materials engineering, metallurgy, or physics). Further information can be obtained from Dr Jian-Feng Nie (nie@eng.monash.edu.au).

Monash University is Australia's largest university with more than 50,000 students across ten faculties and eight campuses. It is a member of the prestigious Group of Eight research-intensive universities in Australia. The Department of Materials Engineering at Monash has an outstanding record of research performance and an exceptional record in fundamental research in metallic materials.