

Mario Nardone

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Project Acronym: RTN
Project ID: 505226
Project Participant: Mathematical Institute, University of Oxford
Personal Information
Name: Mario Nardone
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Network Information
Start date: 1 October 2004
Duration: 2 years
Category: ER
Place: Oxford
Country: UK

Research Summary

The algebraic structure of the arithmetic symmetry for crystals has been established. An algorithm for describing the full set of equivalence classes of crystals has been determined, though exceptional cases need more work (the case of non-essential arithmetic descriptors). First explorations of the exceptional cases (the classification of their "types"). Attempt to convey the arithmetic symmetry and the 3D tiling theory of Daniel Huson and Olaf Delgado Friedrichs to a common formalism.

(Update following the end of my position within the MULTIMAT).

I am currently working as Researcher in the Department of Engineering at Oxford University in a joint project with *Rolls-Royce*. I am developing a model for crystal plasticity that accounts for size-dependent effects that is promising for the understanding of cold-dwell facet fatigue, a phenomenon still not understood that critically and negatively affects the life expectancy of important components in turbofan engines.

I also implement the relative numerical scheme for stress/strain analysis used for comparing the model predictions with experimental data.

Getting a job in the field of mechanical engineering was challenging as my background is in mathematics. However MULTIMAT provided me with training in applied mathematics - especially thermomechanics - and numerical methods for solving various type of equations that greatly helped me to face this step in my career growth.