

## News

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## “Mathematical Methods in Materials Science” at IMA

The Institute for Mathematics and its Applications (=IMA) is, to a large extent, a worldwide unique institution: having no permanent staff (except a director, associate director, and some administration staff) and being supported by NSF, by University of Minnesota, by a consortium of approximately 30 universities over the United States and 14 related industrial corporations and also (depending on particular events) agencies such as the U.S. Army Research Office, organizes each year a series of workshops devoted to a special selected topic. The aim is to promote an application of mathematics as well as to provide applied mathematics with new stimulating impulses coming from the application areas. Applied mathematicians are thus brought together with experts in applications, being invited to stays ranging from a week to a few months. Besides, there are a lot of postdoctorates for visits of one or two years.

The academic year 1995/96, organized by R. D. James, G. Milton, J. Moloney and S. Whittington, is devoted to “Mathematical Methods in Materials Science”. The goal is to convey ideas from various levels of understanding solid phase physics, ranging from the scale of Angströms ( $=10^{-10}$  m) handled by an electronic approach based on the Schrödinger equation, via the scale of fractions of microns ( $=10^{-6}$  m) and millimeters treated respectively by atomistic and microstructural approaches, to the scale of meters treated by the continuum mechanics approach usually exploited in engineering. Mathematical techniques involved in these topics range from partial differential equations, variational problems, homogenization, stochastic techniques, geometric and topological methods for polymers, and related numerical techniques and analysis. New trends are very intimately related with available fast supercomputing techniques to handle usually an enormous amount of calculations as well as fascinating graphical outlets.

The whole year is split into the three following quarters.

The Fall quarter, called “Phase Transitions, Optimal Microstructures and Disordered Materials”, consists of a main one-week tutorial “Atomic Forces, Microstructure and Weak Convergence” delivered by V. Šverák, R. Kohn and A. Sutton, and of two one-week workshops, named “Mechanical Response of Materials of Angströms to Meters” and “Phase Transformations, Microstructure and Optimal Materials”, followed by another tutorial, held by G. Milton and K. Golden, about “Disorder Media and Percolation in Materials Science” and by a workshop about “Disordered Material: Percolation and Effective Moduli”.

The Winter quarter “Materials for Nonlinear Optics and Applications” contains three workshops, entitled “Particulate Flows: Processing and Rheology”, “Interface and Thin Films”, and “Low-dimensional Structures for Nonlinear Optics Applications”.

Finally, the Spring quarter “Numerical Methods and Topological/Geometrical Properties in Polymers” is composed of two workshops devoted to “Numerical Methods in Materials Science” and “Topology and Geometry in Polymer Science”.

Altogether, this outstanding event to join applied mathematicians with physicists and materials scientists reflects a new trend in theoretical solid-phase mechanics and related mathematical modelling, and will certainly considerably shape future development in this area.

*Tomáš Roubíček*

*Preliminary Announcement and Call for Papers*

The 2nd IEEE European Workshop on  
**Computer-Intensive Methods in  
Control and Signal Processing CMP'96**

The Workshop will be organized by the Institute of Information Theory and Automation, Academy of Sciences of the Czech Republic and the School of Engineering & Information Sciences, University of Reading, U.K., with participation of the IEEE Control Systems Society on August 28-30, 1996 in Prague, the Czech Republic.

The aim of this IEEE Workshop is to bring together researchers and practitioners working in academic or governmental institutions and in industry. Particular emphasis will be placed on the "curse of dimensionality", i.e. the extreme dimensionality of computations related to the practical implementation of theoretically optimal mathematical procedures of inference and decision making.

Because of the strongly inter-disciplinary character of the Workshop, we plan to give a considerable space to invited lectures by leading specialists in various fields. The Workshop will further include several sessions of contributed papers, poster sessions and computer demonstrations.

Topics relevant to the Workshop include:

- Parallel algorithms and architectures
- Neural nets
- Approximation methodologies
- Finite-dimensional estimation, filtering and control
- Complexity
- Multivariate integration and optimization
- Statistics and approximations
- Non-traditional approaches

Deadline for three copies of the extended abstract (about 2 pages): February 15, 1996.

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