

Workshop on "Modeling in Life- and Material Sciences and in Technology"

8 March - 2 April, 2004

(Miramare - Trieste, Italy)

Industrial mathematics is not a new discipline of mathematics, but it is another view on mathematics: it considers mathematics as a technology to solve industrial problems. It is, therefore, problem driven instead of method driven.

Modeling can only be learnt by doing; therefore nine real world problems from life sciences, material sciences, technology and finance are presented. The participants will work in groups to find models, as complex as necessary and as simple as possible, to evaluate the models in general with the help of computer simulations, and to reinterpret the results with respect to the original problem.

During the first week, the problems, and some mathematics of general interest which is needed to deal with these problems, is presented. Weeks two and three are dedicated to intense group work. The supervisor will provide a "soft" guidance, but the main work has to be done by the participants. The fourth week will be used for the presentation of the solutions to the problems, final survey lectures and conclusions.

This one-month Workshop may be considered as a continuation of a similar workshop on industrial mathematics, which was held at the Abdus Salam ICTP in 1999. It offers a hands-on experience in a field which has become extremely popular in Europe, Australia and the USA during the last 20 years. Mathematics now has the role of a "Key Technology" in itself, and in almost all countries, mathematicians and scientists are expected to contribute to the welfare of their country by applying their competence in mathematics.

Since presenting solutions of an industrial problem, both in mathematical and non-mathematical terms, is an integral and very important part of industrial mathematics, participants will also be asked to write a report about their work and give an oral presentation during the last week of the course.

In the following, we list problem areas and corresponding mathematical topics (which will be presented in the first week, but about which the participants in the respective group should at least have some basic knowledge):

<u>Problem Area</u>	<u>Mathematical Area</u>	<u>Group Leader</u>
Polymers	Stochastics	V. Capasso, Milano
Medicine	Differential Equations	F. Kappel, Graz
Option Pricing	Financial Mathematics	R. Korn, Kaiserslautern
Shape Design	Optimization, Topology	M. Masmoudi, Toulouse
Glass	Differential Equations	R. Mattheij, Eindhoven
Biochemistry	Differential Equations	D. Praetzel-Wolters, Kaiserslautern
Character Recognition	Geometry, Data Analysis	G. Sparr, Lund
Fire Detection	Partial Differential Equations	J. Struckmeier, Hamburg
N.N.	N.N.	N.N.

Necessary pre-knowledge of the participants:

Participants should have a proper mathematical education, at least at a master's level. In Particular, they should have knowledge of at least two of the mathematical areas mentioned above. Also, computer experience is absolutely necessary. The programme is especially designed for lecturers who wish to introduce the field of Industrial Mathematics at their respective universities.

Those interested in participating should complete and return the "Request for Participation" form, appended to this announcement (also obtainable from the ICTP WWW server: <http://agenda.ictp.trieste.it/smr.php?1556> (which will be constantly up-dated) or from the activity Secretariat, before **7 December 2003** to:

smr1556@ictp.trieste.it (please save and send file attachments in RTF format)
or

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Deadline:

7 December 2003