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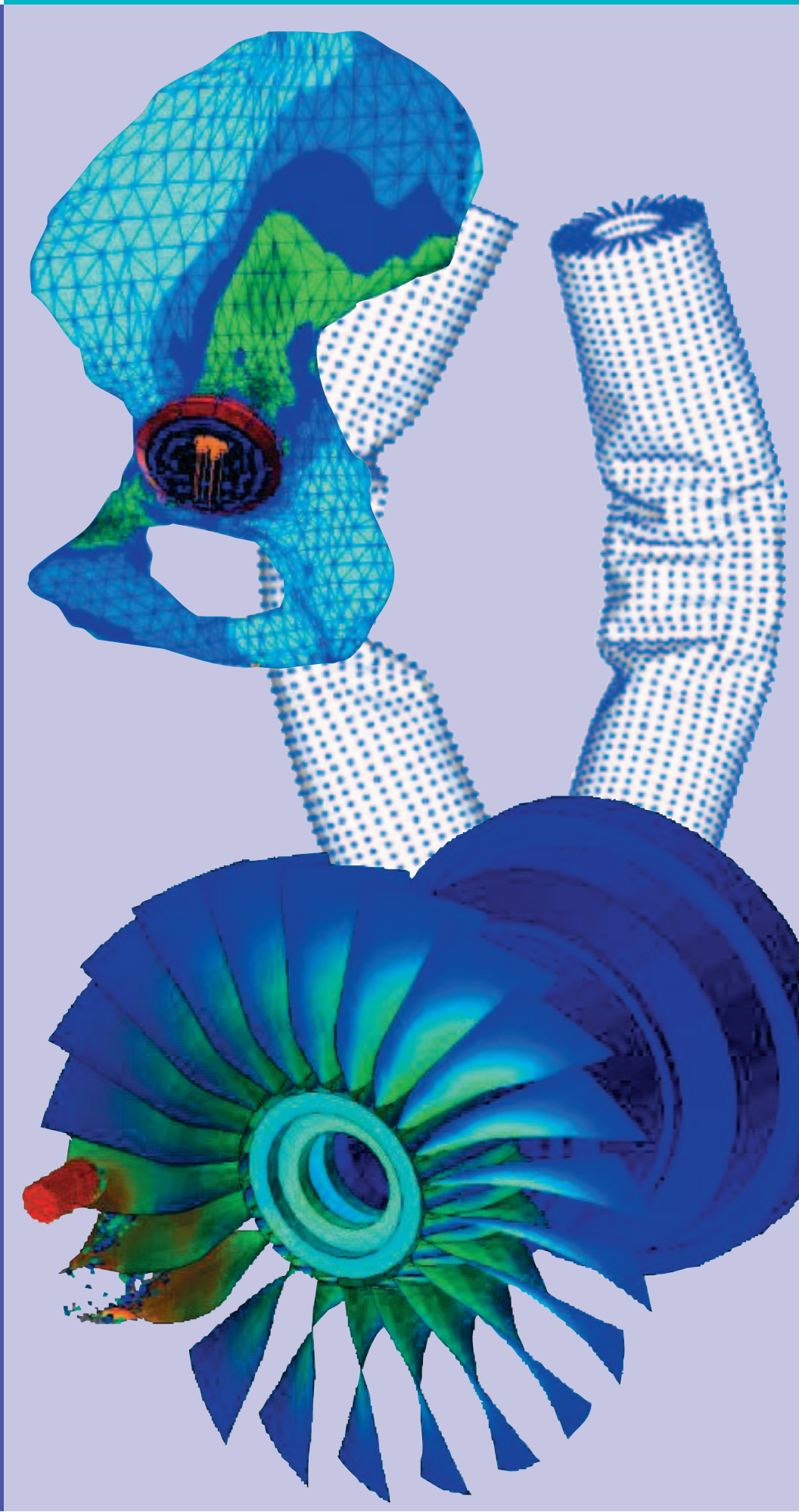

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contents

editorial

Computational mechanics has been, over the years, an attractor for a number of disciplines in many different fields. In the early days the name computational mechanics was invariably linked to solving structural engineering problems involving design, analysis and construction of individual elements or assembled parts (buildings, machinery, airplanes, ships, etc.). The generalisation of powerful computational methods, such as the finite element method, for solving a variety of problems in a unified manner broadened the scope of computational mechanics to encompass all fields in classical mechanics (solids and structures, heat transfer, fluids, electromagnetics, etc.) with application to most engineering problems. Adjacent disciplines such as mathematics, informatics and material modelling, among others, have found in computational mechanics many opportunities for the development of models, methods and software which are nowadays used everywhere in research and practice in engineering.

The expansion of computational mechanics has continued in recent times as traditional methods are found to be more and more applicable to problems in areas as distant from the classical mechanics fields as biology, physics, chemistry, medicine, pharmacy and social sciences. This has favoured the constitution of multidisciplinary teams for solving new problems in science and engineering, bringing together the complementary expertise in the "classical" computational mechanics topics and the new disciplines. Examples of these "multiphysics" applications are regularly found in the pages of this magazine.

The Information Society era is today bringing in new opportunities to enlarge the broad computational mechanics family. Software codes written following the classical steps of "input - compute - output" are nowadays treated as modules within a more complex system linking, for instance, data acquisition methods and databases, geographic information systems, artificial intelligence modules and optimisers, advanced visualization tools, distributed computing techniques and internet. Examples of these new integrated environments are found in decision support systems for weather prediction, for risk assessment and management of emergencies in natural hazards, for traffic control, for support to medical surgery and in many other applications.

The need in our modern society to change "information" into "knowledge" opens an unlimited number of opportunities for computational mechanics in association with the new information technologies. To play a leading role in these new partnerships is the challenge for the computational mechanics community.

Eugenio Oñate
President of IACM

Towards Supra-Real World by Computational Mechanics

by
Takashi Yabe
Tokyo Institute of Technology
Japan

" ... capable of capturing the sharp complex interface .... by simply solving the hydrodynamic equation without any reconstructing procedure time ... "

The key challenge of computation is to precisely replicate a real world to its extreme extent on the microchips. This challenge will not succeed without seam-less description of all phases of matter like solid, liquid and gas in a compact and simple way. Once this description is realized, the world of computation will then extend to an unknown world, which we call the supra-real world beyond the present comprehension, as well as the scientific computation and virtual reality in game and movie film.

In 1985, the author proposed a numerical method CIP to solve hyper-bolic-type equation. At that time, no one, including the author, did not fore-saw the evolution of the scheme as in its present form. This scheme is capable of capturing
the sharp complex interface even in the Cartesian grid system including phase transition by simply solving the hydrodynamic equation without any reconstructing procedure like VOF or level set. In addition to this, the CIP is now applied to hyperbolic, parabolic and elliptic equations including Shroedinger equation [1].

The principle of the CIP is to approximate the analytical solution inside a grid cell by polynomial or other simple functions. Suppose the wave propagates as in *Fig.1(a)*. The profile moves like the solid line in a continuous representation and the solution at grid points is denoted by circles. However, if we eliminate the line as in *Fig.1(b)*, then the information of the profile inside the grid cell has been lost and it is hard to imagine the original profile. It is natural to reconstruct a profile like that shown by the line in *Fig.1(c)*. Higher order polynomial does not help being suffered from unphysical overshooting.

The CIP method predicts the time evolution of spatial derivatives according to the original equation as shown by the arrows in *Fig.1(d)*, then the profile is limited to a specific profile. It is easy to imagine that by this constraint, the solution becomes very closer to the real solution. Most importantly, the solution thus created gives a profile consistent with the original equation even inside the grid cell. Importance of this constraint is demonstrated in the phase error shown in *Fig.1*. The phase speed in the CIP method is accurately reproduced up to the wave of only two grid sizes.

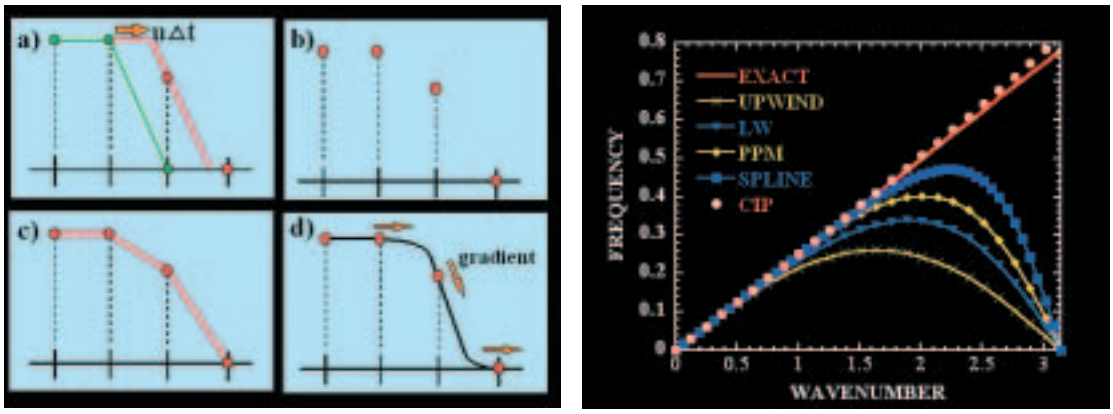


Figure 1:
(Left) The principle of the CIP method. *(Right) Phase error of various schemes*

Among several demonstrations of the structure-liquid-gas interaction, we shall choose some examples that can illustrate the performance of the CIP method. *Fig. 2* shows a disk falling on the water surface. The key issues of this simulation are the calculation of pressure force and air entrapment. Although the thickness of the disk is only 4 mesh-sizes in the Cartesian grid, the pressure force on the surface is accurately calculated because the pressure profile inside a grid cell is interpolated by polynomial that approximates real solution. Therefore the time evolution of the disk movement agrees well with the experiment. The second point is that water and air are successfully solved even if the density difference is 1000, and entrapment of air is correctly described.

" The key issues of this simulation are the calculation of pressure force and air entrapment. "

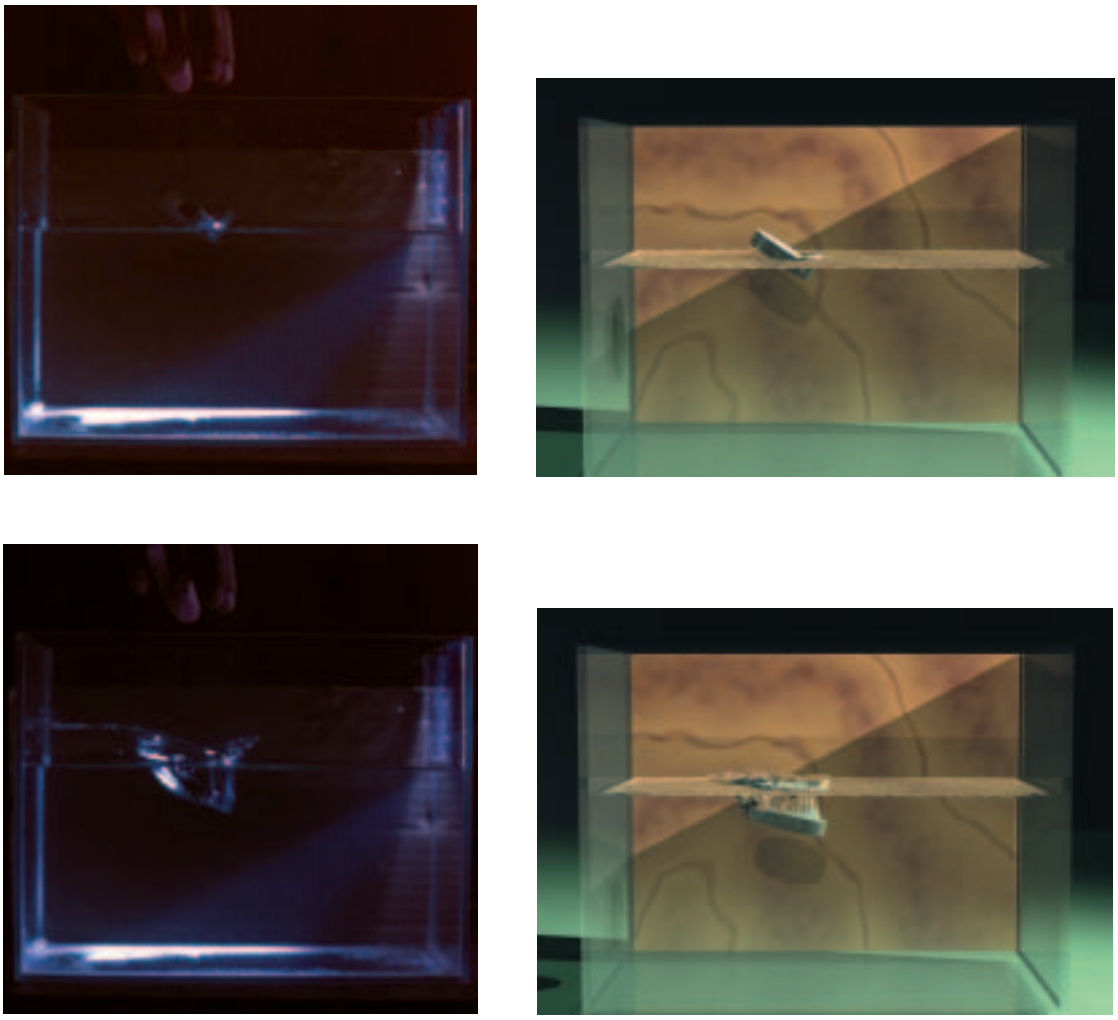
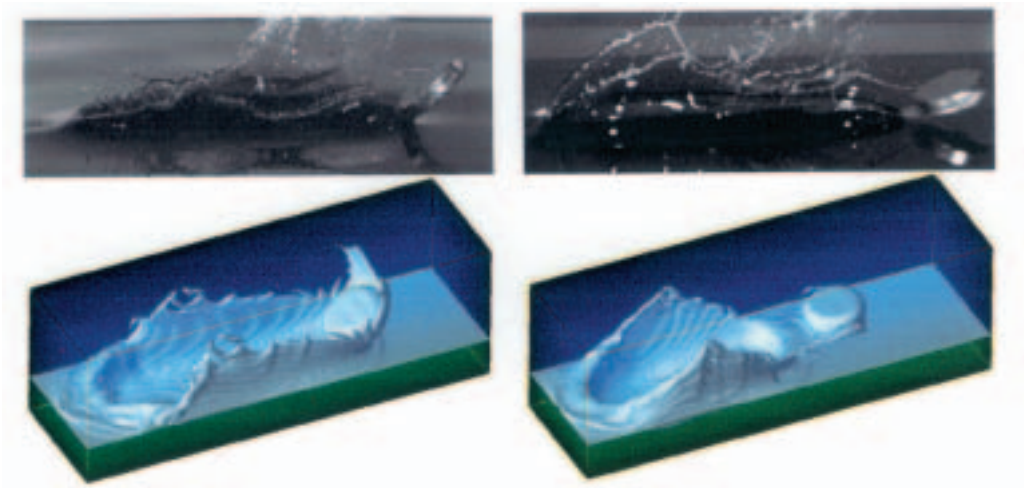


Figure 2:
Simulation (right) and experiment (left). From the top, 63msec, 78msec, 141msec

Figure 3:
Experiments and simulations of skimmer. Two pairs of figure represent the cases with different attack angle



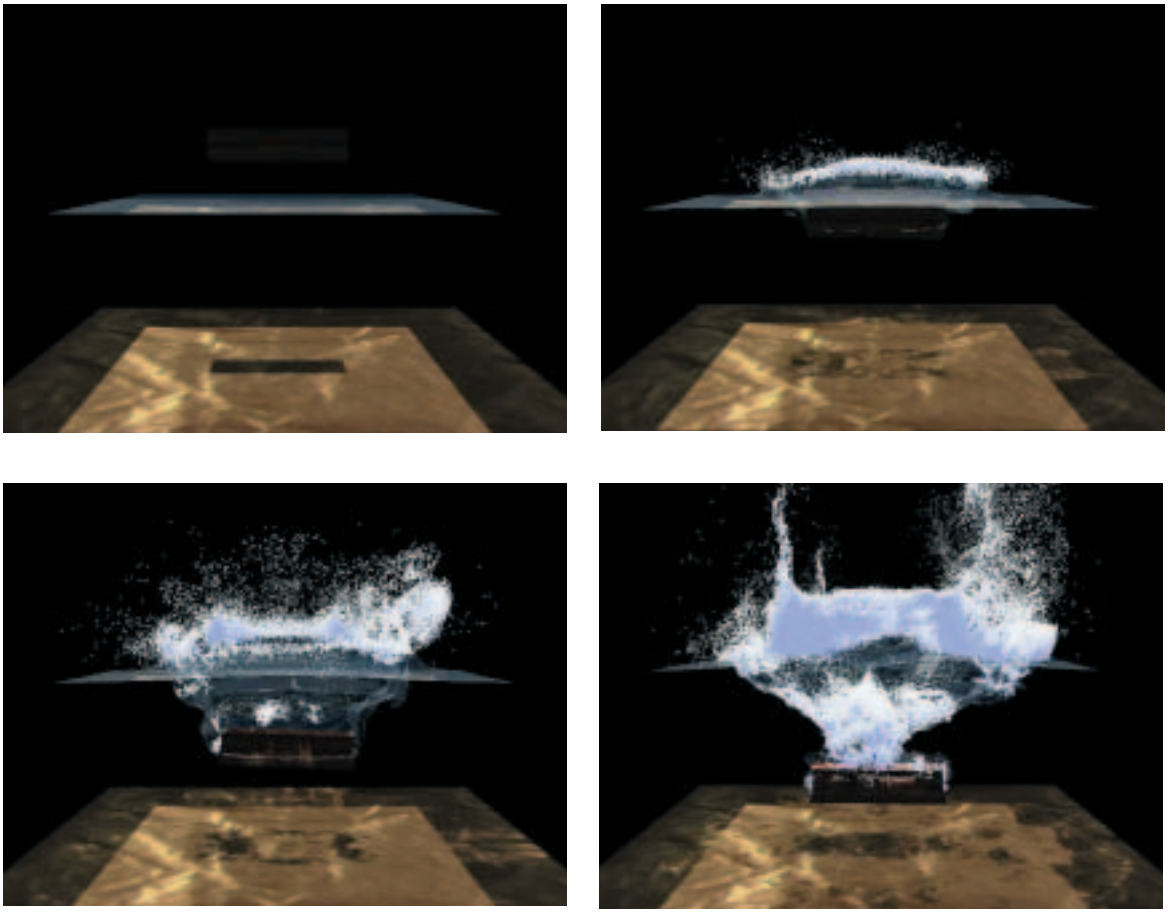
"... a simple folding and unfolding motion around the mass center of the killifish."

If this disk flies almost horizontally, this leads to a well known phenomena called skimmer. The impact of the disk on water lifts up the disk but the lifting force depends on the attach angle as shown in *Fig.3*. It is worth noting that the structure of 4 mesh-size moves through the fixed Cartesian grid without diffusion receiving correct lifting force on the surface that lies inside grid cell.

Although the detailed structure of splashing water in both cases is not well replicated owing to coarse grid, another approach can resolve this problem. In the next example shown in *Fig.4*, the particles take part in. When the curvature of the water surface exceeds some critical value, this part is replaced by several particles which interact with the ambient air [2].

Such an accurate simulation can sometimes reveal important physics. One of such interesting examples is the quick turn of a killifish. *Fig. 5* shows the time evolution of the killifish movement. In order to shed light on the physics of the motion, we idealized its motion to clarify the driving force in the quick turn. We imposed a simple folding and unfolding motion around the mass center of the killifish. Then we compared two different shapes. One shape has an equal mass along the body. Another shape is set to be close enough to the real figure.

Figure 4:
Simulation of splashing phenomena (Courtesy of Toshiba Corporation)



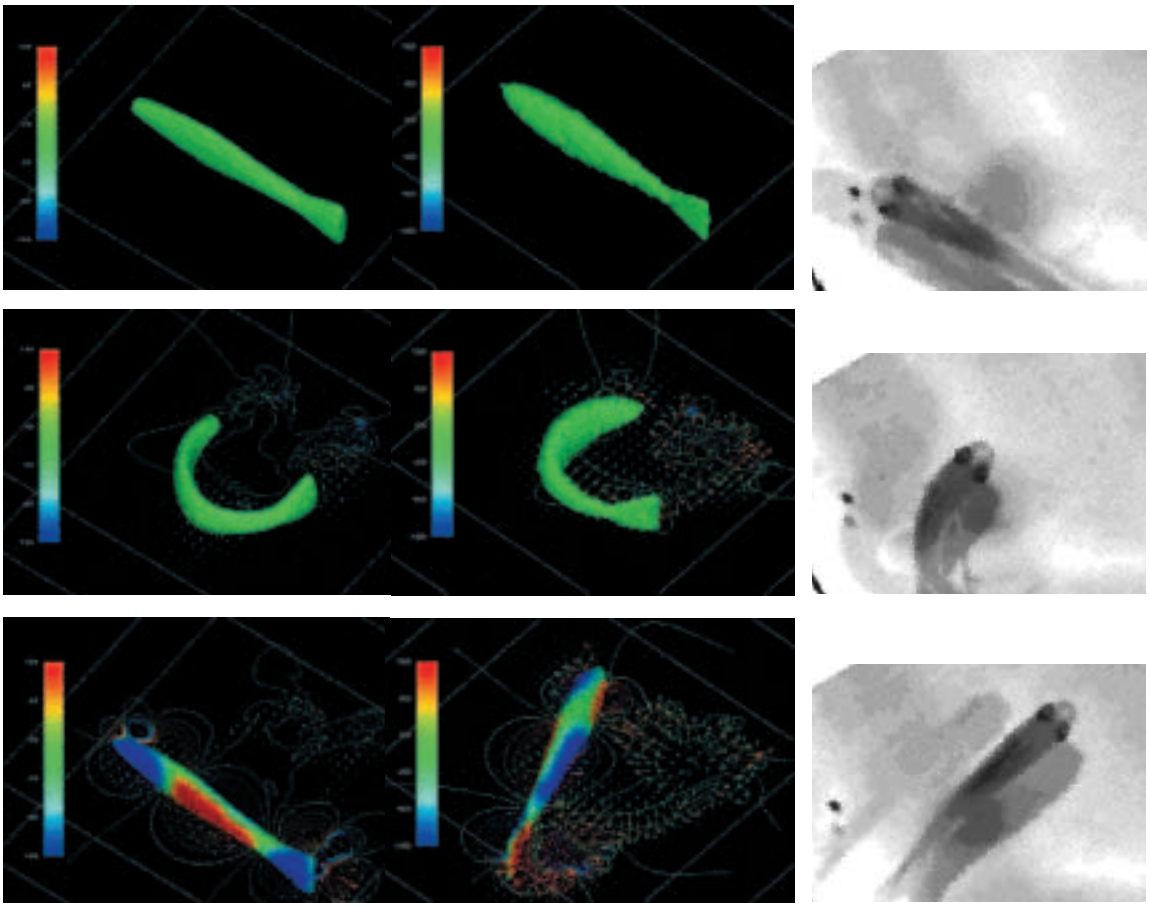


Figure 5:
The motion of the killifish.
(Left) Equal-mass simulation, (Middle) measured-shape simulation and (Right) real killifish. Colour shows pressure contour and velocity vector is plotted by the arrows

As shown in *Fig.5*, equal-mass fish returns to its original direction without turn, while measured shape shows a turn by 90 degree. It is too early to simply attribute this turn to a large drag in the tail side because the force in folding phase will be cancelled out by that in unfolding phase. Therefore, the quick turn of the killifish can be achieved by small difference of water response in folding and unfolding motion.

The final example is the most interesting one in which the solid melts and then evaporates under the irradiation of laser as shown in *Fig.6*. In this case, we must describe the sharp interface between liquid and vapor but this interface continuously changes according to evaporation. In addition, the solid phase must be treated as an elastic body whose motion can be described in the same manner as in liquid-gas interface [1].

Our challenge is still in progress and next evolution has just started at the advent of mesh-free CIP method with higher-order accuracy in time and space [3]. •

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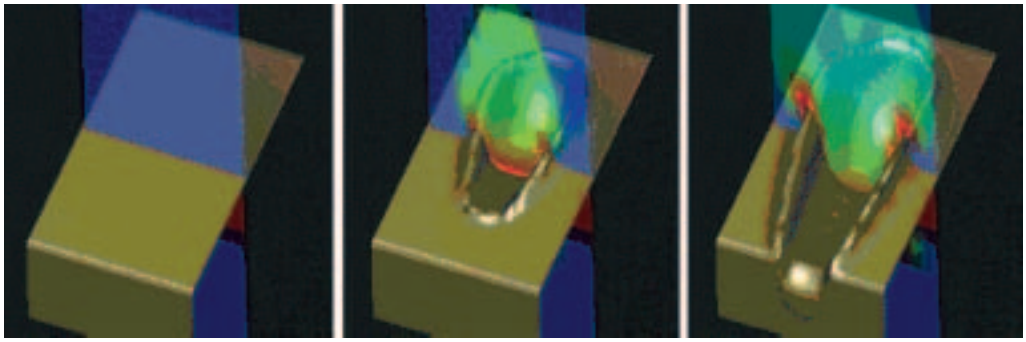
Figure 6:
Simulation of melting and evaporation of metal under laser irradiation



Bridging Scale Mechanics and Materials

by
Wing Kam Liu
Walter P. Murphy
and
Eduard Karpov
Northwestern University, Illinois, U.S.A.

"...we are particularly concerned about the technological engineering interest by combining engineering technology and basic sciences through modelling and simulations."

Rapid advances in nanotechnology, nanomaterials and nanomechanics offer huge potentials in private industry, homeland security, and national defense. An emphasis on nanoscale entities will make our manufacturing technologies and infrastructure more sustainable in terms of reduced energy usage and environmental pollution. Continuum-based approaches are clearly not applicable over the full range of operational conditions for these nanoscale devices, as non-continuum behavior is observed in the large deformation behavior of carbon nanotubes, ion deposition processes, and material mechanics, amongst many others. More crucially, nanoscale components will likely be used in conjunction with components that are larger, and therefore have a mechanical response that is on much larger length and time scales than the nanoscale component. In such hybrid systems, typical single scale methods such as molecular dynamics or quantum mechanics may not be applicable due to the disparity in length and time scales of the structure. For such systems, the engineering tools must be able to span length scales from nanometers to microns, and time scales from femtoseconds to microseconds. Therefore, these systems cannot be modeled by continuum methods alone, because they are too small, or by molecular and quantum mechanical methods alone, because they are too large.

Many arenas of research are rapidly advancing due to a combined effort between engineering and science. In some cases, fields of research that were stagnating under the exclusive domain of one discipline have been imbued with new discoveries through collaboration with practitioners from the second discipline. In computational mechanics, we are particularly concerned about the technological engineering interest by combining engineering technology and basic sciences through modeling and simulations. These goals have become particularly relevant due to the emergence of the field of nanotechnology, and the related burst of interest in nanoscale research. As a result, the set of essential tools currently used by nanoscale researchers includes the broad areas of quantum mechanics, molecular dynamics and multiple-scale approaches, based on coupling the atomistic and continuum models [1]. Atomistic simulation tools themselves are often not sufficient for many of the interesting and fundamental problems that arise in computational mechanics; these deficiencies have led to the current thrust of multiple-scale methods.

Multiscale simulation methods

Engineering new nanomaterials may be the only way to meet the stringent demands for light weight, high strength structural components in the next generation of engineering systems. Nanomaterials can play a pivotal role in applications where light weight, high strength, high temperature resistance, high conductivity and other impressive properties cannot be achieved by c onventional materials. For example, polymers that are reinforced by carbon nanotubes have considerable potential for aerospace applications. Nanoscale sensors are capable of achieving simultaneous high actuation and high work density, one of the major hurdles in the current devices, with less perturbation to the activated system. Understanding how structure and mechanisms couple together at the nanoscale affects the functionality and reliability of engineering materials and is one of the greatest challenges in modeling and simulation.

The limitations of atomistic simulations and continuum mechanics, along with practical needs arising from the heterogeneous nature of engineering materials, have motivated research on multiscale simulations that bridge atomistic simulations and continuum modeling. In order to make the computations tractable, multiscale models generally make use of a coarse-fine decomposition. An atomistic simulation method, such as MD, is used in a small

subregion of the domain in which it is crucial to capture the individual atomistic dynamics accurately. A continuum simulation is used in all other regions of the domain in which the deformation is considered to be homogeneous and smooth. Since the continuum region is usually chosen to be much larger than the atomistic region, the overall domain of interest can be considerably large. A purely atomistic solution is normally not affordable on this domain, though the multiscale solution would presumably provide the detailed atomistic information only when and where it is necessary. The key issue is then the coupling between the coarse and fine scales. Depending on the method of information exchange between the coarse and fine regions, multiscale methods can be classified into three groups: *hierarchical, concurrent,* and *multiscale boundary conditions* [1].

Hierarchical techniques are based on the assumption of homogeneous lattice deformation; therefore they are more effective for elastic single-phase problems. Difficulties typically arise from modeling defects in atomic lattices, dislocations, and failure phenomena.

The heterogeneous nature of engineering materials calls for a multi-field decomposition technique in modeling material deformation and failure. A general feature of hierarchical methods is that simulations at different length scales are performed separately. The coupling between scales is realized by embedding the information gained from the fine-scale simulation into the coarser scale simulation.

A hierarchical model has been proposed for quantum design of Cybersteel that contains particles at different length scales [2], as shown in *Fig. 1*. The primary inclusions, which improve the yielding strength of the material, are on the order of 1 micron; the secondary particles, which enhance the ductility of the material, are on the order of 0.1 micron. Failure of the Cybersteel involves particle-matrix interface debonding, void nucleation and growth, shear localization, and ductile fracture. These failure phenomena occur on different length scales: the particle-matrix interface debonding takes place at the quantum scale, void nucleation and growth at the submicron scale, shear localization at the micro scale and fracture at the macroscopic scale.

Fig. 1 presents a bottom-up multi-scale strategy for modeling the macroscopic fracture of the Cybersteel. Starting from the quantum subatomic scale, the particle-matrix interface decohesion is characterized by a first-principles based traction-separation law, which is embedded into the simulation of the submicro-cell that contains secondary

" Hierarchical techniques are based on the assumption of homogeneous lattice deformation; therefore they are more effective for elastic single-phase problems."

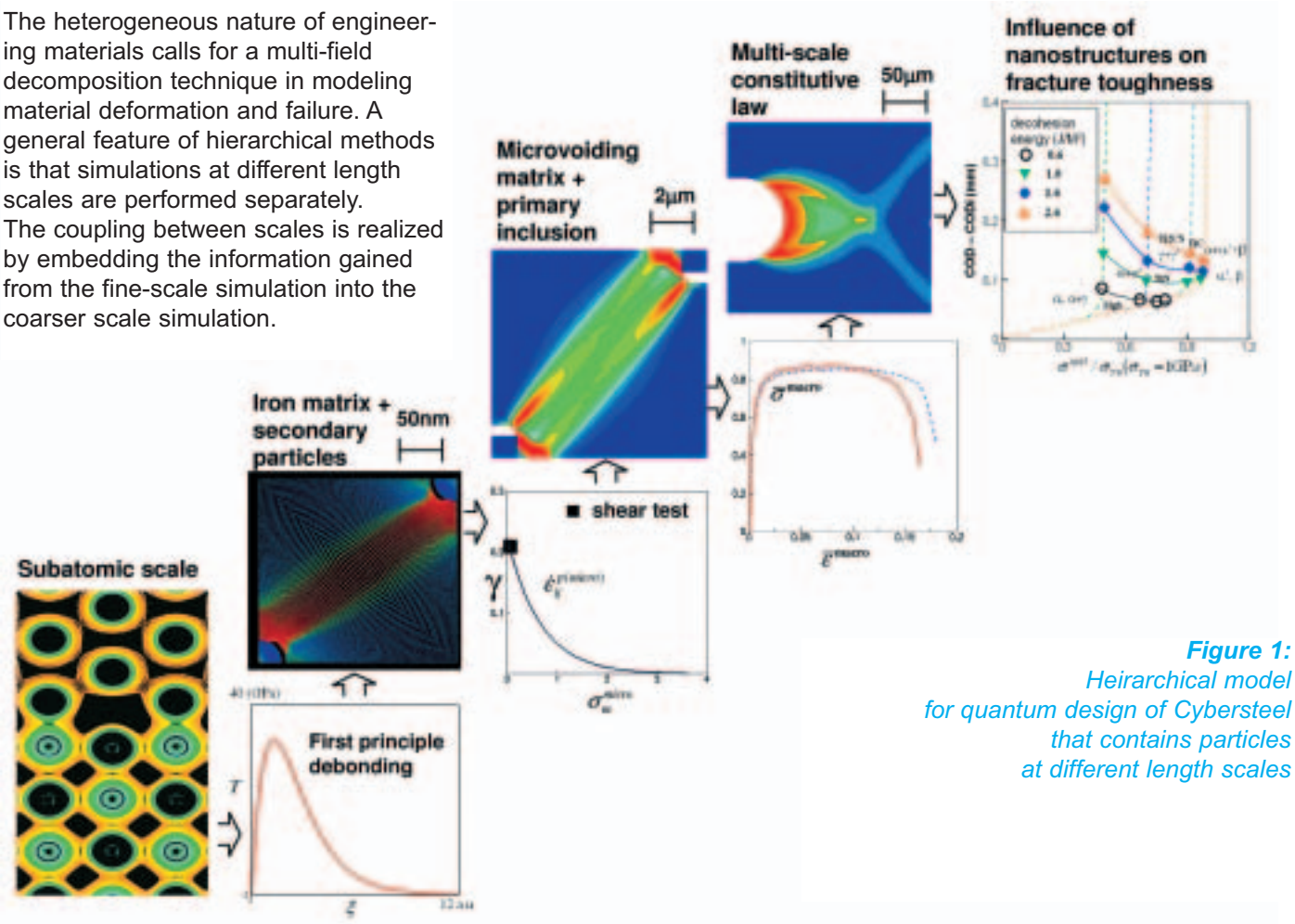


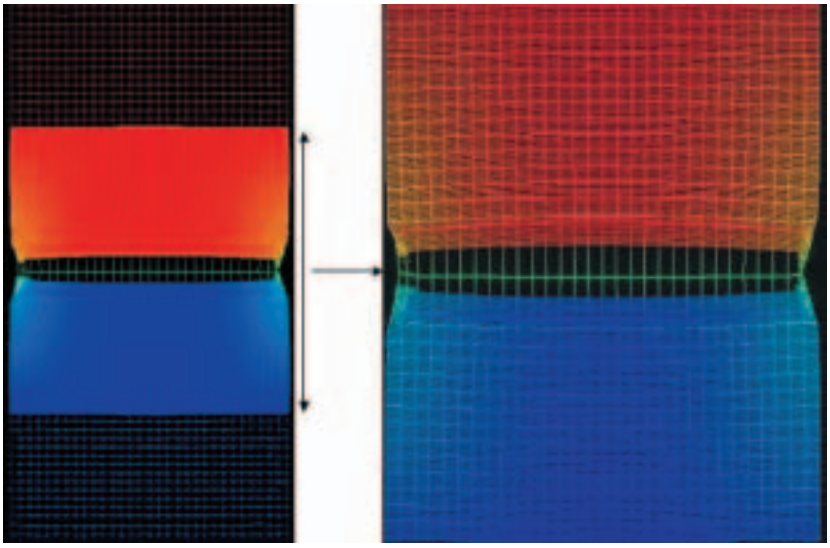
Figure 1:
Heirarchical model for quantum design of Cybersteel that contains particles at different length scales

"Within concurrent methods, the behaviour at each length scale depends strongly on the others."

particles. This procedure is repeated hierarchically for the micro-cell that contains the primary inclusions to establish the macroscopic constitutive law that is in turn used to simulate the macroscopic fracture of the Cybersteel.

Within **concurrent** methods, the behavior at each length scale depends strongly on the others. An appropriate model is solved at each length scale simultaneously (continuum mechanics for macro elastic media, molecular dynamics for large groups of atoms and quantum mechanics for bond breaking), while a smooth coupling is introduced between the different scales. The inter-scale dependence is complicated, and it is not pre-assigned. Concurrent approaches are more relevant for studying complicated problems, involving inhomogeneous lattice deformation, fracture in multiphase macroscopic materials, and nano fluidics. One of the recent achievements is the bridging multiple scale method [3]. A distinguishing feature of this method is to formally assume that the FE and MD models exist simultaneously in the entire computational domain, and MD calculations are performed only in the regions that are necessary. This concept is illustrated on the crack simulation snapshot shown in *Fig. 2*.

Figure 2:
Crack Simulation



The bridging scale method has been successfully used in modeling buckling of multi-walled carbon nanotubes [4]. In these simulations, two regions of large deformation along the nanotube are enriched with the relevant molecular structure, in addition to the continuum meshfree model for the entire tube. The position of the enrichment region is determined by an adaptive multi-resolution analysis of the coarse scale simulation. The multiscale configuration is illustrated in *Fig. 3 (left). Fig. 3 (right)* shows the buckling pattern approximated by meshfree approximation at the final stage of loading, as compared with experimental results. This multiscale simulation allows revealing details of the molecular structure, which cannot be resolved by the coarse scale representation alone.

Multiscale boundary conditions for molecular dynamic simulations is an emerging approach that does not involve the explicit continuum model, so that the issues of separating the scales and coupling the simulations do not arise [1,5]. In this case, the coarse grain behavior is taken into account on the fine/coarse grain interface at the atomistic level through the lattice impedance techniques. Alternatively, the multiscale boundary conditions are employed within concurrent coupling methods, such as the bridging scale [3] to represent atomistic behavior in the continuum domain. That results in a smooth FE/MD coupling, without involving an artificial handshake region at the atomistic/continuum interface and a dense FE mesh scaled down to the chemical bond lengths.

Future challenges

Fundamental nanoscale research is being performed all around the world, and as this research increasingly being turned into viable engineering applications, our ability to model the performance of nanoscale structures remains limited. Continuum-based computational approaches are clearly not applicable over the full range of operational conditions for these nanoscale devices, as non-continuum behavior is observed in the large deformation behavior of carbon nanotubes, ion deposition processes, material mechanics, amongst many others.

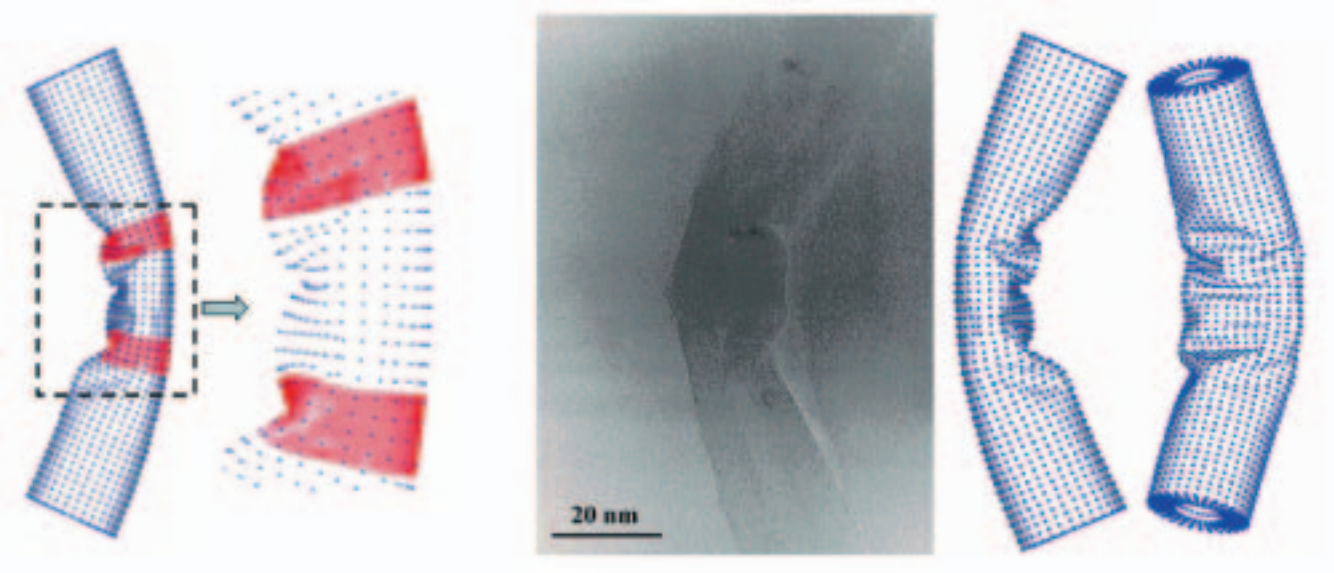
To support the design and qualification of nano-structured materials, a range of simulation tools must be available to designers just as they are today available at the macroscopic scales in general purpose software. However, considerable research is still required to establish

the foundations for such software and to develop computational capabilities that span the scales from the atomistic to continuum. These capabilities should include a variety of tools, from finite elements to molecular dynamics and quantum mechanical methods, in order to provide powerful multiscale methodologies.

In great generality, three major issues are still to be challenged by future researchers in the area of multiple scale simulations. The first is to correctly account for the non-harmonic high frequency information that emanates from the molecular simulation when the information reaches the continuum. The second is multiscale formulations with temperature dependent continuum phase. The third is extending the time range currently available in standard MD simulations, so that the continuum and atomistic simulations may each evolve naturally on their natural time scale. And the fourth is plausible approaches to concurrently couple the ab initio and classical MD simulations.

Nanotechnology will undoubtedly have a profound impact on the basic research being performed in medicine, electronics, materials science and many other areas in the upcoming years. However, in order to make nanotechnology a basic aspect of product design, it will be imperative that engineering software that can be used for nanoscale design be developed. Similar to the computer-aided design tools that are readily available for larger scale engineering simulations, we envision that nanoscale design tools will provide the engineer with similar capabilities in nanoengineering. ●

Figure 3:
Adaptive multi-resolution analysis of the coarse scale simulation. The multiscale configuration is illustrated *(left)* while *(right)* shows the buckling pattern approximated by meshfree approximation at the final stage of loading.



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[4] D. Qian, G.J. Wagner, Wing Kam Liu, *A multiscale projection method for the analysis of carbon nanotubes*, *Computer Methods in Applied Mechanics and Engineering*: Special Issue on Multiple Scale Methods for Nanoscale Mechanics and Materials, 2003.

[5] Karpov EG, Yu H, Park HS, Wing Kam Liu, Wang JQ. *Multiscale Boundary Conditions in Crystalline Solids:* Theory and Application to Nanoindentation. Submitted to Physical Review B, 2003.

A Look at Recent Activities of the French Association on Computational Structural Mechanics - CSMA

by
Olivier Allix
LMT/ENS de Cachan
President of CSMA

and
Marc Bonnet
LMS/Ecole Polytechnique
Chairman of the Sixth National Conference on Computational Structural Mechanics

Context
In France, the structural analysis community came into existence in 1985 when the "Computational Structural Mechanics and Artificial Intelligence GRECO-GIS" was created by Pierre Ladevèze. The community brought together by the GRECO-GIS decided to continue the close cooperation which already existed among academic and industrial teams in the field of computational mechanics and, in 1990, created the Computational Structural Mechanics Association (CSMA), affiliated with the IACM. The successive boards of CSMA, were chaired by R. Ohayon (90-96), N.Q. Son (96-99), P. Chauchot (01-03) and Olivier Allix (99-01 and since 03). The main recurring event of the association is the organization, every other year, of a National Colloquium on Structural Analysis in Giens, on the French Riviera. The Administrative Council of CSMA strives to encourage a large participation of the French community to major international events, such as the WWCCM, ECCM, ECCOMAS Congresses. The scientific production of the Giens conference and of those International Congresses is used to analyze the strength and weaknesses of the French community in order to promote one-day workshops on specific topics which are not sufficiently treated on the national level. The aim of this short paper is to give some insight of this policy through the discussion of the Sixth National Conference on Computational Structural Mechanics (NCCSM) and the benefits it brought to our community.

Figure 1:
A short period of leisure

This congress was co-organized by CSMA and the Laboratory of Solid Mechanics (LMS) of Ecole Polytechnique, under the supervision of Marc Bonnet.

The Sixth NCCSM attracted 295 delegates (including 18 from non-French institutions, 58 from companies and national laboratories, and more than 80 doctoral students), a level of participation about 25% higher than the preceding previous events of the same series. The fact that NCCSMs attract a mix of experienced scientists from academia, engineers and students largely contributes to the overall success of this series. The traditional venue of the NCCSMs (VVF Giens, near Toulon, on the Mediterranean coast) provides a relaxed and pleasant environment, conducive to informal sharing of ideas and experience. In particular, all delegates are accommodated on-site, which also facilitates interactions outside of the formal sessions *(fig 1&2)*. The sessions of this conference were well-attended and eagerly followed *(fig3)*. The fee of 580 euros (senior participants) or 360 euros (students) was all-inclusive (in particular covering full accommodation), making the participation relatively inexpensive. The conference proceedings were delivered in book form (over 1,500 pages in 3 volumes) as well as on a CD-ROM, on which some authors offered longer versions of their contributions.

The program featured 176 communications: 4 invited general lectures (see appendix), 6 software demonstrations and 166 contributed papers (38 in three thematic poster sessions and 128 in four parallel oral sessions), moreover an evening session is devoted to software presentation *(fig4)*. This represented again an increase of more than 25% over the previous NCCSMs. An unusual feature about NCCSMs is the strong involvement of Industries which most of the time directly support academic research. In fact, about 60 communications came from non-academic authors - a figure which,

we believe, underestimates the real participation of industry and other non-academic entities, as these supported a substantial proportion of the research presented, often through doctoral research programs. Another aspect is that the main scientific leaders of the French community are present at Giens. As already mentioned, many doctoral students, most of whom are formally affiliated with academic research departments, attended the event. Finally, one notes with satisfaction that the delegates came from many institutions from all over the country and beyond.

Analysis

Session themes. The attendance figures witness the fact that computational structural mechanics is a very active field on the national level, involving many people and institutions. The conference program reflects quite accurately the main research topics currently being investigated nationally. The richest sessions in terms of the number of communications presented (given in parentheses) were devoted to:

- Contact and friction (16)
- Dynamics (15)
- Vibrations and damping (14)
- Simulation of manufacturing or assembly processes (14)
- Fatigue, fracture and damage mechanics (12)
- Identification, inverse problems (12)
- Beams, plates and shells (10)
- Domain decomposition, parallel computing (8)
- Reliability and sensitivity analysis (8)
- Constitutive relations (8)

In addition to the factual information already provided above, a few remarks can be made:

In France, academic research in the field of computational structural mechanics is influenced by the tight relationships which exist between academia and industry. Consequently, the scientific issues considered are closely related to industrial needs. The sizes of the sessions devoted to vibrations and damping, dynamics and the simulation of assembly processes, among others, corroborate that fact. Similarly, from one edition of the NCCSM to the next, the new techniques presented are illustrated by increasingly complex and realistic examples.

Figure 2:
At the end of the Banquet - and perhaps some wine!

Figure 3:
During a general conference

The comparison of the topics which are currently active on the international level with those represented in the program of the Sixth NCCSM leads to the following comments:

- The French community is very active in areas such as (i) reliability-based approaches and (ii) identification, model verification and validation, inverse problems and methods.
- On the other hand, research at the national level on areas such as (i) partition of unity methods and extended finite element methods, or (ii) multiscale approaches for nanomechanics.

"... scientific issues considered are closely related to industrial needs."

Figure 4:
Around midnight during the session devoted to research software presentation

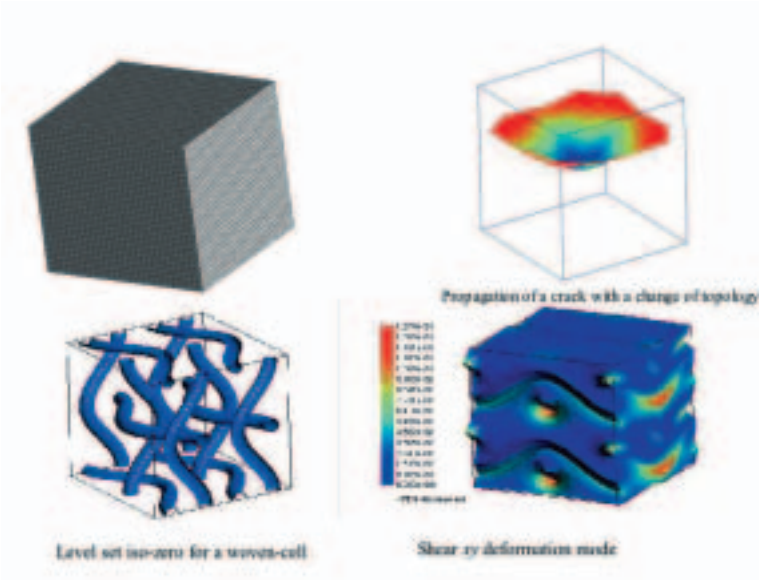

Figure 5:
Example of XFEM computation, EC Nantes

- The mechanics of materials is a popular topic nationally by tradition, with significant expertise in the theory of constitutive relations. Conversely, the research effort devoted to the computational mechanics of materials nationwide appears insufficient to keep up with the pace of developments in other countries, especially the USA.
- The program of the Sixth NCCSM featured only few communications on coupled and/or multiphysics problems, which are clearly not yet widely perceived, in France, as a component of computational structural mechanics.

CSMA strives to promote awareness and interest in selected techniques or subfields via the organization of thematic workshops. In other countries, much stronger incentives exist, such as the National Science Foundation grants in the USA. Also, possibly because of the high level of French industrial support since the eighties, our community is not very involved on the international level, especially in terms of the number of publications. It is also true that the writing standards of Anglo-Saxon papers are quite different from the French and that until recently the degree of proficiency in English in France was far below the European average. The quality of the works produced by our community is not in question, as demonstrated by the extremely laudatory comments made on the scientific worth of the works presented in Giens by E. Onate, President of IACM and ECCOMAS, who was attending the Colloquium.

In order to motivate the French community to address certain issues more thoroughly, CSMA organizes various one-day workshops, usually attended by around fifty researchers and engineers. For example, in 2003, three such meetings were organized on:

- Modeling and constitutive interface laws for contact problems (LMA, CNRS-Marseille, January 30, 2003, organized by P. Chabrand, M. Raous, I. Rosu)
- Structural computations in biomechanics (Laboratoire Roberval, Université de Technologie de Compiègne, organized by M.C. Ho Ba Tho, A. Rassineux).
- New trends in finite elements and the use of the partition of unity, Ecole Centrale de Nantes., organized by N. Moës and P. Cartraud.

To give an idea of the contents of these workshops, we present a short abstract of the last meeting. Twelve talks were given both by French and by foreign researchers, among whom were M. Jirasek and J. Dolbow. Four talks were given by managers from industrial companies (Airbus, EDF, Principia Marine and Snecma). The topic of the day was mainly the application of the partition of

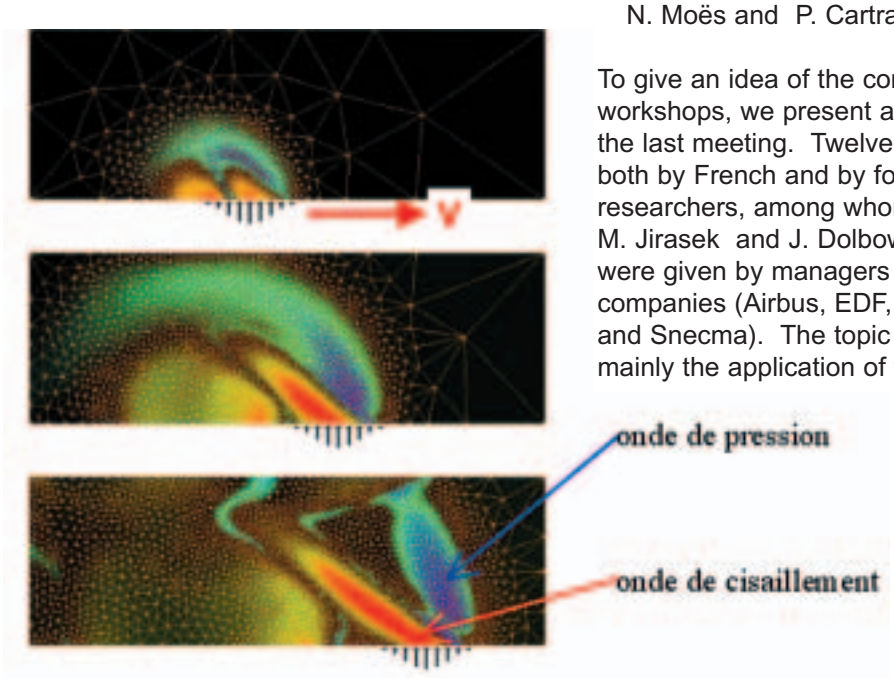

Figure 6:
Some aspects of the modelling and computation of wave propagation in shells

unity (introduced by J.M. Melenk and I. Babuska) to the enrichment of finite elements in order to improve their accuracy or to introduce physical surfaces inside these elements. *(fig.5)*. During the discussion session, chaired by O. Allix, some of the issues examined were the relation between the partition of unity approach and the Arlequin approach, anticipated improvements of mesh generators, error estimation in the context of the partition of unity and the relative advantages of meshless approaches vs. XFEM approaches.

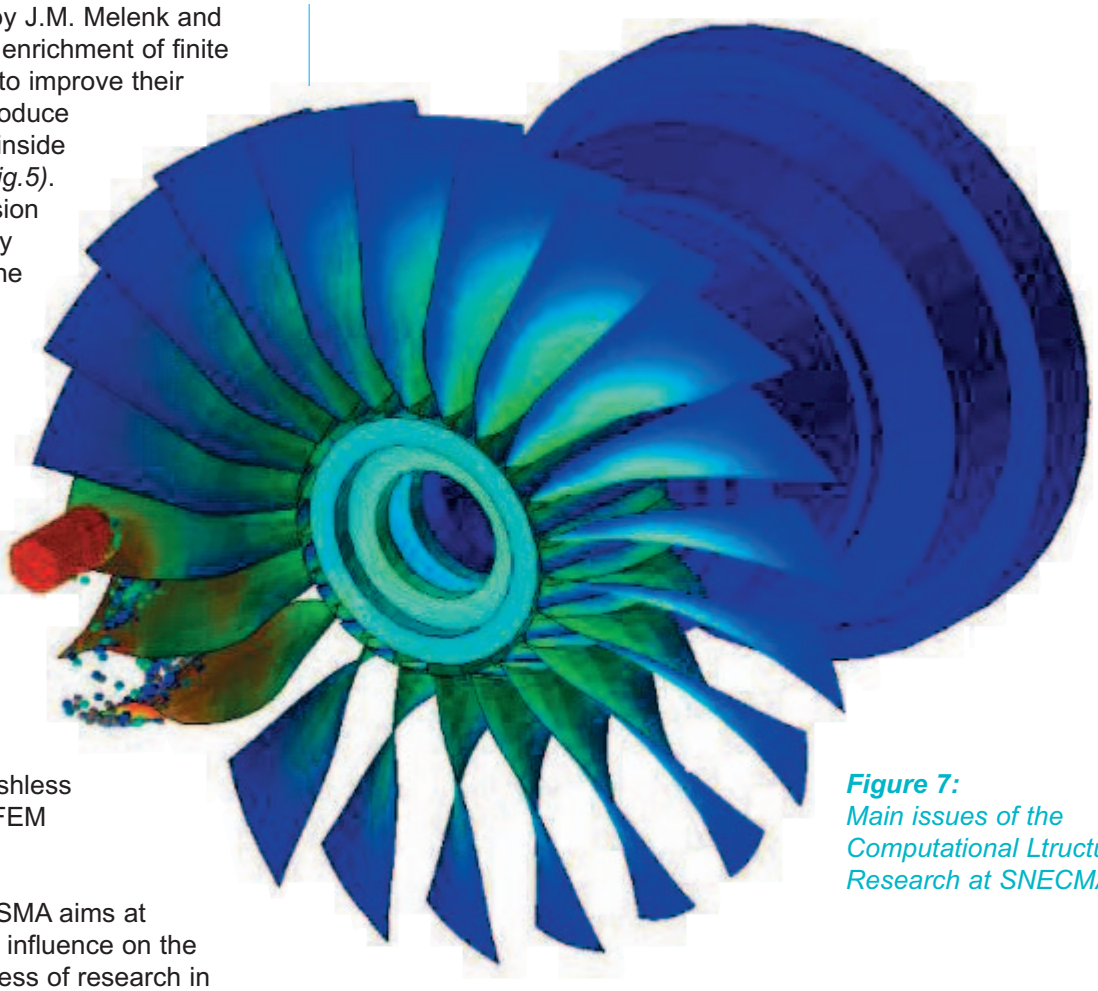

Figure 7:
Main issues of the Computational Ltructural Research at SNECMA

With this policy, CSMA aims at exerting a positive influence on the quality and timeliness of research in computational mechanics undertaken at the national level and to contribute to a better recognition of the French community on the international level. Indeed, despite a high French participation at major international events, the relatively low numbers of general and keynote lectures given by French scientists reflect an unsatisfactory recognition at the international level. CSMA is actively involved in analyzing the factors that may explain this fact in an effort to help reverse that trend. Moreover, the possibility of organizing a new series of events, at the European level, focusing on the interaction between the modelling and computation of materials and of structures, with strong and active participation from industry, is currently studied by CSMA. •

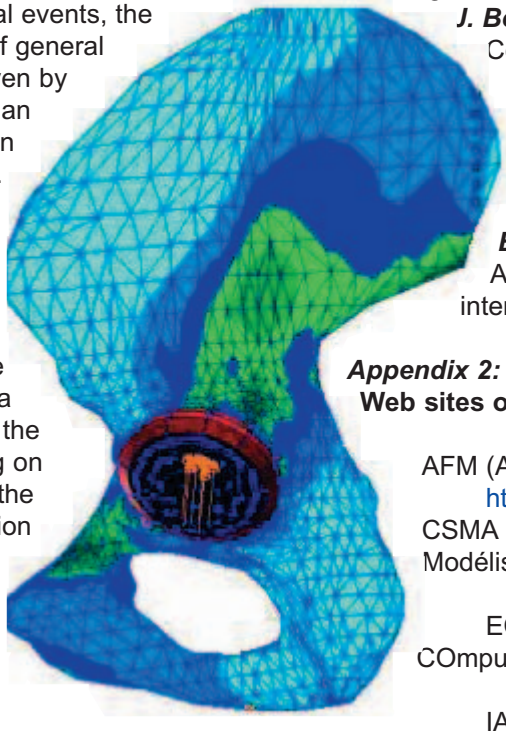

Figure 8:
Development of biomechanical models including geometrical and mechanical individual properties

Appendix 1:
Invited general lectures presented at Giens 2003

D. Aubry, Ecole Centrale de Paris: "Some aspects of the modelling and computation of wave propagation in shells"(fig 6).

J. Bonini, SNECMA Moteurs: "Main issues of the Computational Structural Research at SNECMA" (fig7)

M.C. Ho Ba Tho, Université de Technologie de Compiègne: "Development of biomechanical models including geometrical and mechanical individual properties" (fig8).

E. Oñate, University of Barcelona, Spain: Advances in the analysis of fluid-structure interaction problems.

Appendix 2:
Web sites of the associations mentioned in the text

AFM (Association Française de Mécanique):
http://www.afm.asso.fr/
CSMA (Association Calcul des Structures et Modélisation) :
http://www.afm.asso.fr/calcul-modelisation
ECCOMAS (European Community on COmputational Methods in Applied Sciences)
http://www.eccomas.org
IACM (International Association for Computational Mechanics):
http://www.iacm.info

ENIEF'2004

XIV Congress on Numerical Methods and their Applications
Bariloche, Argentina, 8-11 November 2004

For all inclusions under AMCA please contact:

Victorio Sonzogni
Güemes 3450
3000 Sante Fe
Argentina

Tel: 54-342-451 15 94
Fax: 54-342-455 09 44
Email:
sonzogni@intec.unl.edu.ar
http://venus.arcride.edu.ar/AMCA

Organized by: Centro Atómico Bariloche, Comisión Nacional de Energía Atómica, Argentina.

Sponsored by: Asociación Argentina de Mecánica Computacional and Comisión Nacional de Energía Atómica.

Organizing Committee: G. Buscaglia (Chairman), D. Arnica, E. Dari, L. Guarracino, C. Mazufri, C. Padra, N. Silin and O. Zamonsky.

Topics: Submissions are encouraged in all areas of numerical methods, in particular in Solid and Fluid Mechanics; Heat and Mass Transfer; Structural Analysis; Bioengineering; Industrial and Environmental Applications; Mathematical Foundations; Optimal Design; Software Development; High Performance Computing.

Language: Submissions are accepted in Spanish, Portuguese and English. Most of the talks will be in Spanish, but participants of ENIEF conferences have good understanding of Portuguese and English.

Figure 1:
A summer view of Lake Nahuel Huapi, at Bariloche

Congress Location: Bariloche is one of the most important touristic centers of Argentina. It is a beautiful city in northern Patagonia, located in the majestic Andes mountains, on the southern shore of Nahuel Huapi Lake and at 770 meters above sea level. Located in the Patagonia ecotone, the scenery around Bariloche is extremely varied. The arid low hills and valleys of the steppe to the east merge with the snow-capped Andes with its typical Valdivian cold wet forest. Possible outdoor activities in November include sightseeing, trekking, biking, golfing, wild-trout fishing, among others. Frequent flights connect Bariloche with Buenos Aires, the capital and largest city of Argentina.

Student Paper Awards: Both graduate and undergraduate students are encouraged to submit papers to the Student Poster Session. Awards instituted by the AMCA will be granted at this Session for the first time. For the paper to be eligible, the student must be the its first author.

Instructions and deadlines: Participants should submit a 200-word abstract not later than March 10, 2004. Both printed and electronic abstracts are acceptable. Some Invited Sessions will be hosted. Proposals for Invited Sessions should be submitted not later than February 10, 2004. Full papers must be received by August 11 to be included in the conference proceedings.

Further information: G. Buscaglia, Centro Atómico Bariloche, 8400 Bariloche, Argentina. gustavo@cab.cnea.gov.ar. Or visit the web page: www.cab.cnea.gov.ar/enief. •

ENIEF'2003

A SUCCESSFUL AND FRUITFUL MEETING OF FRIENDS

The XIII Congress on Numerical Methods and their Applications (ENIEF 2003) took place in Bahía Blanca, Argentina from 4 to 7 November 2003. AMCA (Argentine Association of Computational Mechanics) together with the Department of Engineering of the Universidad Nacional del Sur and the Bahia Blanca Regional Faculty of the Universidad Tecnológica Nacional were responsible for the organization. Marta B. Rosales (President), Victor H. Cortínez (Vice-President), Diana V. Bambill (Secretary) and the following members: Patricia M. Bellés, Mario J. Maurizi, Néstor F. Ortega, Raúl E. Rossi and Carlos A. Rossit composed the local committee.

More than 170 researchers and students gathered in this southern city. The papers presented covered topics such as Fluid Mechanics, Industrial Applications, Dynamic of Structures, Optimization, Structural Analysis, Dynamic of Systems and Control, Environmental Fluids and Porous Media, Heat Transfer, Damage and Fracture Mechanics, Algorithms, Visualization, Mesh Generation and Solid Mechanics. The proceedings, which included 190 papers (2911 pages), were issued in CD format and as a printed book of abstracts (207 pages).

Five international researchers were invited as plenary speakers: Rubens Sampaio and Guillermo Creus from Brazil, Gregory Kopp from Canada and, Antonio Huerta and Manuel Pastor Pérez from Spain. A very interesting videoconference was given by Eugenio Oñate from Barcelona, Spain. Unfortunately, Antonio Huerta was not able to attend the meeting due to personal reasons. The inaugural lecture by Manuel Pastor Pérez dealt with landslides (Modelización Numérica de Deslizamientos Rápidos). Prof. Sampaio gave a lecture on flexible bodies (Dinamica de Corpos Flexiveis: Desenvolvimento e Novos Desafios). The topic of Prof. Creus lecture was anisotropic plasticity (Modelos y Estratégias Numéricas en Plasticidad Anisotrópica). Gregory Kopp's lecture was entitled Simulating Pressure and Velocity Time Series with Artificial Neural Networks: Some Advantages and Pitfalls. Eugenio Oñate was "virtually" present with a videoconference about information and communications in technologies (ICT) entitled Las Nuevas Tecnologías en el Campo de la Ingeniería Civil y la Construcción.

The oral presentations were organized in three parallel sessions (44 altogether). There were also ten keynote lectures. Participants came from almost every part of Argentina and also from other countries (Brazil, Chile, Venezuela, Bolivia, Colombia, España, United States).

The Congress was a big success both in terms of the number of accepted papers, which surpassed the previous ENIEF's, and the number of participants. As usual, the quality of the presentations was excellent. The ENIEF's congresses as well as the MECOM's, have become a necessary place to disseminate knowledge and for researchers from Argentina and Latin America to keep in touch and promote new contacts. The multidisciplinary character of the event makes it an ideal forum to exchange techniques and approaches among different fields. This intense activity will continue during the next ENIEF 2004 in Bariloche, Argentina. •

Figure 1:
Participants at the Congress venue entrance

Figure 2:
A boat tour of Bahía Blanca harbour

Figure 3:
Invited Speaker Gregory Kopp with organisers

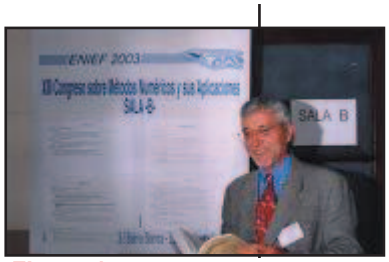

Figure 4:
Guillermo Creus before his plenary lecture.

Figure 5:
Manuel Pastor Perez chats to participants.

Figure 6:
R. Sampaio gives his plenary lecture.

USACM Chronicle

United States Association for Computational Mechanics

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8th USNCCM 2005

Eighth US National Congress on Computational Mechanics

July 24-28, 2005

Over the past thirteen years, there have been seven national congresses devoted exclusively to computational mechanics: Chicago 1991; Washington 1993; Dallas 1995; San Francisco 1997; Boulder 1999; Dearborn 2001 and Albuquerque 2003. The USACM is pleased to announce that the 8th National Congress on Computational Mechanics will be held in the Austin Convention Center in Austin, Texas, July 24-28, 2005. The Austin meeting will occur at a time of increasing interest in computational mechanics, spurred by innovative approaches in materials engineering, geosciences, nanotechnology, biology and medical science and by the availability of powerful new parallel and distributed computing systems. The event will be hosted by the Institute for Computational Engineering and Sciences (ICES) at The University of Texas. Prof. J. Tinsley Oden, director of the Institute, and Prof. Jacob Fish, vice-president of USACM, will be the congress general co-chairs. Prof. Leszek Demkowicz and Prof. Clint Dawson from ICES will co-chair the technical program. The Local Organizing Committee is comprised of Professors Oden, Dawso, Demkowicz, Tom Hughes and Graham Carey, Dr. Jon Bass and Dr. Yusheng Feng from UT Austin, and Prof. Joe Flaherty from RPI.

The main objective of the congress is to bring together the diverse communities that are active in computational mechanics and to promoteinter actions between government, academia and industry. The organizers will make a concerted effort to attract new participants from consulting engineering firms and from key computer and software companies, while retaining the Congress's core constituency of scientists from academia and government laboratories.

Scientific Program: The major themes of the Congress are recent developments in computational methodologies and innovative applications. The specific topics encompass a wide spectrum of disciplines, including non-traditional numerical methods, multiphysics problems in science and engineering, and high-performance computing. The technical program will be structured around a number of special symposia, with ample room for contributed papers on computational methodologies and applications

Program Format: The daily program will consist of two 60-minute plenary lectures and three sets of approximately twenty parallel sessions, with five papers in each session. The three-day Congress will include roughly 180 sessions and 900 papers. The papers will be organized into roughly 60 symposia, each devoted to a specific topic of current interest in computational mechanics. Each symposium may feature a limited number of papers as keynote lectures.

Pre and Post-Conference Workshops: The organizers expect to invite several eminent computational mechanicians to present extended feature lectures as part of pre and post-conference workshops scheduled for Sunday, July 24 and Thursday, July 28. The workshops will include hands-on computing sessions, and detailed course notes will be distributed to all workshop participants.

Proposed Symposia: The Congress will feature symposia in three emerging areas: 1. Computational Nanotechnology 2. Computational Biotechnology 3. Computational Multiphysics among others.

The organizing committee would like to extend an invitation to everyone interested in the continually evolving field of computational mechanics to participate in this exciting conference.More information on the conference and on Austin can be found at the ICES web site at www.ices.utexas.edu.

See you in Austin!

Ted Belytschko's

60th Birthday Celebration

On 27 July 2003, about 125 students, friends and colleagues gathered together to celebrate Ted Belytschko's 60th Birthday. The celebration was held in conjunction with the 7th USACM National Congress in Albuquerque, New Mexico. The celebration included an excellent four course dinner at the exclusive Petroleum Club, reminisces, and gift presentations.

The evening was presided over by Brian Moran, Chairman of the Northwestern University Department of Mechanical Engineering. The speakers were:

- Len Schwer - representing all of Ted students and recalling the start of Ted's teaching career at the University of Illinois at Chicago.
- John Hallquist - discussing Ted's numerous research contributions that have contributed to general purpose explicit finite element programs.
- Tom Hughes - reflected on his long association with Ted and some tales related to the nonlinear finite element short course they teach together.
- Tinsley Oden - his reflections on their long association and some highlights of Ted's contributions to computational mechanics.

Ted received several personal gifts from those attending. The collective gift, from the attendees, was a crystal book laser etched with the cover of Ted's recent finite element book "Nonlinear Finite Elements for Continua and Structures." This gift was presented by Brian Moran who recounted some of Ted's contributions to Northwestern University and the Department of Mechanical Engineering. •

MIND BENDER

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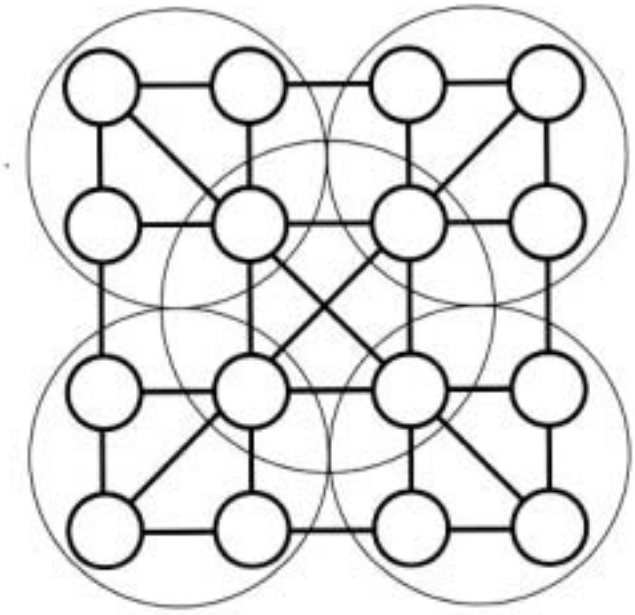

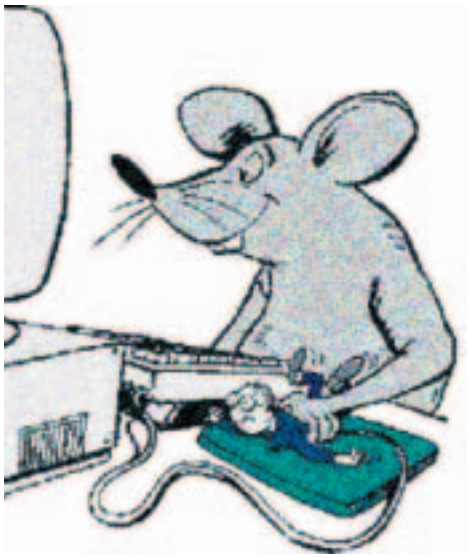

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NEWS

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http://www.gacm.de

Fellowship fosters collaborative research between members of *GACM and AACM*

Funded by an Australian Research Council Linkage professorial fellowship, Peter Wriggers is visiting Australia during his sabbatical 2003 to 2004. The fellowship provides a link to the Geotechnical Research Group, led by Professor Scott Sloan, in the Faculty of Engineering and Built Environment at the University of Newcastle.

This German-Australian collaboration in Computational Mechanics has started a number of research projects that are shared between the groups of Professors Sloan and Wriggers. The topics are related to contact problems in soil mechanics, on both the macro- and micro-scale. The main focus is on the development of robust algorithms for nonlinear contact, as well as software solutions to some longstanding geotechnical engineering problems.

Figure 1:
The beachside location for the Civil Engineering Xmas function. From left - Goran Simundic, Peter. Wriggers, Scott Sloan, Enrique Romero.

Scott and Peter hope the fellowship will lead to a longer-term relationship between the University of Newcastle and the University of Hannover and, more globally, between the Australian Association for Computational Mechanics (AACM) and the German Association for Computational Mechanics (GACM). They are discussing future collaboration between the two civil engineering disciplines that could begin with an exchange of PhD students. In 2004, Scott will become the Vice-President of the AACM.

Besides his work at the University of Newcastle, Peter and his family are enjoying the Australian summer and the special atmosphere that prevails "Down Under". ●

Peter Wriggers , University of Hannover

Honorary Doctors Degree for Prof. Klaus-Jürgen Bathe Ph.D, D.Sc

On December 5th, 2003 the Technische Universität Darmstadt in Germany awarded the honour of a "Doktor-Ingenieur Ehren halber" (Dr.-Ing. E. h.) to Klaus-Jürgen Bathe, Professor of Mechanical Engineering at the Massachusetts Institute of Technology (M.I.T.), Cambridge (USA).

The award was launched by the Department of Civil Engineering and Geodesy of the Technische Universität Darmstadt in recognition of Professor Bathe's outstanding contributions in research, teaching and education in Computational Engineering and the wide use of these major contributions in the fields of Civil Engineering, Mechanical Engineering, Mathematics and Mechanics.

We congratulate Klaus-Jürgen Bathe and wish him continued success in his scientific work. ●

Udo F. Meißner,
Professor of Numerical Methods and Informatics in Civil Engineering,
Technische Universität Darmstadt

Figure 1: *(from left to right) Professor Johann-Dietrich Wörner, President of the TU Darmstadt, Professor Klaus-Jürgen Bathe from M.I.T. and Professor Udo F. Meißner from the TU Darmstadt during the academic ceremony on 5 December.*

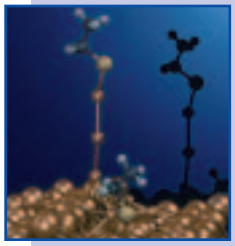

Fig.1: *Car-Parrinello Density Functional Calculations of the Bond Rupture Process of Thiolate on Gold; Physikalisches Institut Westfaelische-Wilhelms-Universitaet Muenster, Germany*

Fig. 2: *Virtual Reality Environment COVISE; High Performance Computing Center Stuttgart (HLRS), Germany.*

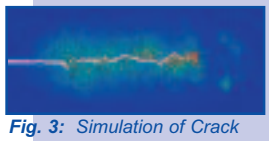

Fig. 3: *Simulation of Crack Propagation; Institut für Theoretische und Angewandte Physik, Universität Stuttgart, Germany.*

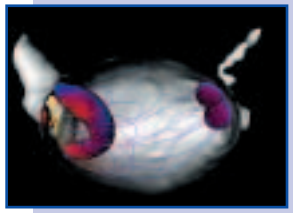

Fig. 4: *Blood Flow in an Abdominal Aortic Aneurysm; High Performance Computing Center Stuttgart (HLRS), Germany.*

Fig. 5: *NEC SX-6 Cluster; NEC.*

Michael Resch
Head of Höchstleistungs-rechenzentrum Stuttgart (HLRS) and Institute for High Performance Computing University of Stuttgart

National Supercomputing Centres in Germany - Innovation Engines for Science and Engineering

In 1995 the German Wissenschaftsrat (Science Council) gave recommendations for supercomputing in Germany. Its finding was that supercomputing is a key technology to achieve scientific progress. Because of that the Wissenschaftsrat recommended to set up national supercomputing centres. It proposed an open tender for proposals from the German states in order to stir a competition between several centres. In order to integrate the raw performance with actual science the Wissenschaftsrat required that such centres be enmeshed in networks of excellence. This positive attitude was reiterated in 2000 by the recommendations for the further usage of supercomputers in Germany [1]. Therein the Wissenschaftsrat emphasized the need for coordination among the national centres both in terms of hardware installation and in terms of expertise in various fields of applications.

Following the request of the Wissenschaftsrat, the Höchstleistungsrechenzentrum Stuttgart (HLRS) was establishes as a first national centre in 1996. In 1998 the John-von-Neumann Institute (NIC) for Computing was established as a co-operation of the Forschungszentrum Jülich (FZJ) und die Stiftung Deutsches Elektronen-Synchrotron (DESY). The two were followed by the Höchstleistungsrechen-zentrum Bayern (HLRB) in 2000.

Following a common strategy, the three centres decided to coordinate their activities in a number of ways.

In order to avoid duplication of work each centre developed its special focus:

NIC: Since the NIC has its background in the physical and chemical research community of its funding organisations it naturally has a focus on natural sciences. It has thus built up a user base in these communities. Furthermore it has tailored its hardware support for the special needs of its user community with a focus on cluster-like architectures.
HLRS: The key background of the HLRS is the strong engineering and aerospace faculties at the University of Stutt-gart at which HLRS is located. In addition HLRS traditionally has strong ties with German car and aerospace industry. Hence the focus of the HLRS is on engineering science. Its computational resources reflect this strategy with an emphasis on vector systems on the one hand and low cost clusters on the other hand.
HLRB: HLRB is part of the Bavarian Leibniz Rechenzentrum (LRZ). Its role is to support national users on the one hand but also to provide computational resources to researchers in the state of Bavaria. As a consequence a focus of the HLRB is on throughput computing for a mix of scientific applications.

A key issue for the three centres is a coordination of procurements. On the one hand this implies a timing of acquisitions. On the other hand the three centres see to provide their users with a variety of architectures. This guarantees that German research has continuously access to at least one world class supercomputer. The current situation of technology in supercomputing in Germany is the following:

NIC: Procurement was conducted in 2001 and a new IBM system was installed in 2002 and 2003. This cluster of SMP nodes provides a peak per-formance of up to 8 TFLOP/s.
HLRS: Procurement was conducted in 2003 and a new NEC system will be installed in 2004 and 2005. The cluster of systems will be a workbench concept that integrates vector systems and clusters of 64bit and 32bit systems. The overall system will have a peak perform-ance of more than 16 TFLOP/s with more than 10 TB of main memory.
HLRB: Procurement will be started in 2004 with a new system expected to be installed in early 2006. A potential second phase is envisaged to come 1-2 years later. This system is supposed to at least double the performance of the HLRS system in peak performance and size of main memory.

Common Workshops: The three centres have set up a series of workshops on various topics related to supercomputing [2][3]. This co-operation is extended to other smaller centres.

To inform users and disseminate the results of German computational science the centres launched a biannual journal called INSIDE (http://inside.jukasisters.com/).

In order to promote new technologies the three centres work together to further push the limits of computational science. This includes activities in the field of Grid computing. All three centres are consequently leading partners in the German D-GRID activity which aims at the tight interconnection of the National Supercomputer Centres and the integration of competence centres of scientific computing. ●

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IndACM

Indian Association for Computational Mechanics

A REVIEW

by

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Editor IndACM

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Tarun Kant, Founder President, IndAcm

Ashwini Kumar

N.G.R. Iyengar

The dawn of this millennium brought an exciting gift to the scientific community of India - Indian Association for Computational Mechanics (IndACM). In a land, which contributed significantly to the computational mechanics during the last two decades, this association came to be a common and formal meeting ground for academicians, researchers, industrialists and practicing engineers.

On the first of January 2000, this organization was formally established, with its headquarters at Indian Institute of Technology Bombay, Powai, Mumbai-400 076 with the following objectives:

1. To bring together people having a common interest in computational mechanics but belonging to different disciplines.

2. To liaise with other bodies having common interest (such as International Association for Computational Mechanics, Asia- Pacific Association of Computational Mechanics, etc.)

3. To have free exchange of views in the area of computational mechanics.

4. To organize meetings/seminars/conferences/conventions/ symposia in the area of computational mechanics.

5. To engage in other activities meant to promote development of computational mechanics as a branch of science and engineering.

The first general body meeting, convened during the first week of Jan 2000, decided to extend its invitation to eminent scientists and researchers in this field to become founder members of IndACM. The response had been quite overwhelming with close to hundred people becoming members of this association, before the end of that month itself. Later, IndACM became an affiliate of IACM (International Association for Computational Mechanics).

An e-mail group has been launched to enable the members of this association to exchange their ideas amongst them. A website is also being planned for this association.

To further the growth of computational mechanics in different disciplines (as well as to meet its fourth objective), this association recently announced the First International Congress on Computational Mechanics and Simulation (ICCMS-04). This is being organized at the Indian Institute of Technology Kanpur, India (IITK) during 9-12 December 2004 (Convenors: Professor N G R Iyengar **ngri@iitk.ac.in** and Professor Ashwini Kumar **ashwini@iitk.ac.in**).

This congress would focus on emerging areas such as new computational techniques, high performance computing, nonlinear & damage mechanics, composites, smart structures, etc.

Having got the groundwork ready, the association would now be focusing on promoting computational mechanics in the country. With the strong academic and industrial push, already in place, in areas such as computational mechanics (FEA/ CAE) for analysis and computational geometry (CAD/ CAM) for design & manufacturing, IndACM would be focusing on promoting new areas, which may become the potential enablers of growth for the country. High performance computing, damage mechanics, smart structures are few examples, in this direction.

Moving forward, IndACM might coordinate with other societies in India, for organizing annual/biennial events apart from encouraging research in the frontier areas and bringing out papers through appropriate journal(s). •

The solutions of last editions alphabetic CM glossary is given below. You will now be able to check your definitions as well as read the mystery phrase in the marked column which expresses a well known current dilemma.

Thanks to Dan Givoli
Technonn - Israel Institute of Technology and
Israel Association of Computational Mechods in Mechanics (IACMM)

CM Glossery - A Riddle

By Dan Givoli

Argyris	One of the FE pioneers
Bubble	A type of an enriching function
Contact	Close encounter of solids
Deformation	A key tensor in continuum mechanics
Error	The difference between what we want and what we get
Frontal	Type of an algebraic linear solver of FE equations
Geometry	Whatever it is, FEM can deal with it!
H-version	Family of FE methods based on mesh refinement
Integration	A key operation found in any FE scheme
Jacobian-matrix	Transformation array
Kode	A computer program with a bug
Line-search	An algorithm for accelerating Newton iterations
Mesh	Collection of nodes and elements
Nano	Very small scale, yet a hot Buzz-word
Operator	Appears in the PDE
Pum	A general enrichment-based procedure (shortening)
Quasi-Newton	A family of nonlinear algebraic solvers
Residual	What is left from an unsatisfied equations
Symmetry	An important property of matrices, bilinear forms, etc.
Turbulence	A great challenge in CFD
Unstructured	The property of a "non-organized" mesh
Vanish	What we want the E-word to do
Weight-function	Multiplies the residual to obtain a weak form
X-coordinate	A typical axis in 1D problems
Yield	Associated with a surface in plasticity
Zienkiewicz	No definition needed for him...

NEWS

JACM - Japan Association for Computational Mechanics

For all inclusions please contact:

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The JACM (http://www.mech.titech.ac.jp/~ryuutai/jacmeng.html) started on 17th December 2002 is a union of researchers and engineers working in the field of computational mechanics in Japan. The JACM is an umbrella organization covering almost all computational mechanics related societies in Japan. Currently 23 societies send 31 Executive Committee members to the JACM. On 18th May 2002, Professor Valliappan (President of APACM (Asian-Pacific Association for Computational Mechanics) visited some key members of the JACM, i.e. Professor G. Yagawa (Executive council member of IACM, University of Tokyo), Professor T. Yabe (President of JACM, Tokyo Institute of Technology) and Professor S. Yoshimura (Vice President of JACM, University of Tokyo).

The JACM has been active to participate several IACM-affiliated conferences. The JACM organizes 26 minisymposia in WCCM VI&APCOM 2004 to be held in Beijing during September 5-10 2004 and 4 minisymposia in ECCOMAS 2004 to be held in Finland during July 24-28, 2004.

In commemoration of the first anniversary of the JACM, the JACM has started JACM Awards in order to praise outstanding achievements of Japanese researchers in the field of computational mechanics. The Awards include the JACM Gold Medal, the JACM Award, the JACM Award for Computational Mechanics, the JACM Award for Young Investigators in Computational Mechanics, the JACM Fellows Award. Applications will be accepted by the end of March 2004. •

Figure 1:
Profs. Yabe, Valliappan, Yagawa and Yoshimura in Tokyo in May 2003.

EPMESC XI MACAU

The 9th International Conference on Enhancement and Promotion of Computational Methods in Engineering and Science was organized by the University of Macau during November 25-28,2003 under the Chairmanship of Professor V. P. Iu, Rector of the University of Macau.

Participants from fourteen countries presented papers dealing with topics related to computational methods in solid mechanics, fluid mechanics, geomechanics, biomechanics, environmental problems, artificial intelligence, CAD, physical and material sciences. A number of keynote lectures by experts in various fields of computational methods were delivered. The keynote lecturers included some of the Executive Council Members of IACM - Prof. S. Valliappan (Vice-President), Prof. H. Mang (Vice-President), Prof. Y. K. Cheung (Former Vice-President), Prof. W. K. Liu,

Figure 1:
Opening Ceremony - Prof. Valliappan, Prof. Oliveira, Dr. Chui Sai On (Secretary for Social Affairs and Culture, Macau SAR), Prof. Cheung, Prof Lu.

TSCM - Thailand Society of Computational Mechanics

The TSCM organized Workshop on Nano, Material, Continuum and Computational Mechanics was on 11-12 December 2003. In recent years, there have been a number of significant breakthroughs in experimental and modelling aspects of nano-mechanics. A workshop on Nano, Material, Continuum and Computational Mechanics was organized by Thailand Society of Computational Mechanics (TSCM), at the beautiful campus of Asian Institute of Technology (AIT) in cooperation with the National Science Foundation (NSF) and the Columbia University. The workshop covered a broad perspective ranging from atomistic and nano-technological developments, the forefront and limitations of current methodologies. This pioneer workshop served as a platform for researchers from cross-disciplinary areas to share their first-hand experiences, focusing on the potential of nanotechnology in the design of new engineering materials

The workshop was led by a group of renowned experts in many disciplines, including Ken P. Chong of NSF, James M. Kelly and Ron Rusay of University of California Berkeley, Ming Wang of University of Illinois, Gautam Dasgupta of Columbia University, Alexander Wagner of North Dakota State University, Joseph Zarka, Ecole Des Mines De Paris, France, and Masao Arakawa of Kagawa University. Around 30 engineers and scientists participated from the region, led by TSCM President Worsak Kanok-Nukulchai. Key players from Thailand include William Barry and Joydeep Dutta of AIT, Teerakiat Kerdchareon of Mahidol University, and Cattaleeya Pattamaprom of Thammasat University.

Figure 1: *Opening Session. G. Dasgupta of Comumbia made his point while Director of Thailand´s National Nanotechnology Centre - T. Wieat, NSF Team Leader Ken P. Chong, AIT´s President J.L. Armand and TSCM President W. Kanok-Nukulchai watched on.*

The two-day workshop has presented an opportunity for an open and friendly exchange of experiences, viewpoints and expectations. At the end, it was agreed that due to the highly cross-disciplinary nature at nanoscale level, there are still many unresolved issues in the multi-scale, multi-physics computation and simulation. This workshop has indeed served as a manifestation of the link between fundamental science and engineering applications. With engineering computations as a common tool, it is a challenge that the traditional boundary of each field may have to be redefined, or removed entirely, to establish the new forefront of nanotechnology. •

Figure 2: *Group of delegates and key members of TSCM taken during the workshop.*

Prof. W. Zhong, Prof. E. R. Arantes e Oliveira and Prof. M.W.Yuan (Chairman, WCCM VI/APCOM'04). The salient feature of this particular conference in this series was awarding prizes for the best papers written and presented by students. Among 18 papers from the students, 3 papers were selected for the awards on the basis of contents as well as oral presentation by the students, by a panel of experts which included IACM Council Members. The three prizes were awarded to students from Singapore, Hong Kong and Portugal. •

Figure 2:
IACM Executive Council Members - Prof. Yuan, Prof. Oliviera, Prof Zhong, Prof. Liu, Prof Valliappan and Prof. Mang.

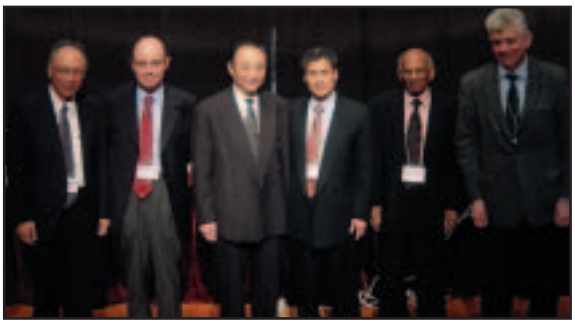

Figure 3:
Prof Lu and Prof. Oliviera.

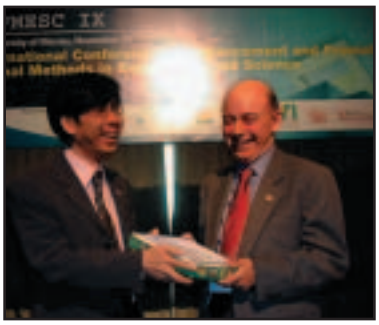

Figure 4:
Prof. Valliappan presenting the award to the student from Singapore.

by
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16th Nordic Seminar on Computational Mechanics

in combination with the

Pål G. Bergan Anniversary Seminar

Professor Pål G. Bergan was 60 on **October 29, 2003,** and we decided to use this occasion to honour an outstanding teacher and researcher with a one-day international seminar.

During his more than 30 years at the Norwegian University of Science and Technology (NTNU) Pål has won friendship and respect from numerous students, co-workers, and colleagues from all over the world. In order to make it a memorable occasion, we invited some of the most prominent personalities of the finite element and computational mechanics community, who have also had close contacts with Pål and NTNU through the years, to contribute to the Bergan Anniversary Seminar with presentations of their most recent developments within the field of computational mechanics: Professors Thomas J. R. Hughes (University of Texas at Austin), Ted Belytschko (Nortwestern University), Niels Saabye Ottosen (Lund University), Alf Samuelsson (Chalmers Tekniska Høgskole), Nils-Erik Wiberg (Chalmers Tekniska Høgskole), Ekkehard Ramm (University of Stuttgart), Eugene Oñate (Universitat Politècnica de Catalunya, Barcelona), Carlos Felippa (University of Colorado at Boulder), Tore H. Søreide (NTNU and Reinertsen Engineering AS) and Pål G. Bergan (NTNU and Det Norske Veritas AS). A main event of the Bergan Anniversary Seminar was the Banquet that took place at the Archbishops Palace located next to the Nidaros Catedral centrally down-town Trondheim. The seminar participants were invited to the Bergan Anniversary Seminar Banquet by the the Mayor of Trondheim.

Figure 1:
Many old friends met at the Bergan Anniversary Seminar, here at the conference venue Rica Nidelven Hotel, Profs. P. Kr. Larsen, C. Felippa and P. G. Bergan (the jubilant)

Figure 2:
The jubilant Prof. P. G. Bergan delivering the final plenary lecture at the Bergan Anniversary Seminar

The Nordic Association of Computational Mechanics (NoACM) held its yearly seminar, which was the **16th Nordic Seminar on Computational Mechanics** (NSCM XVI) on **October 17-18, 2003** in Trondheim, Norway. In agreement with NoACM, NSCM XVI was combined with the Bergan Anniversary Seminar that took place on October 16. Last time Trondheim had the honor and pleasure of hosting the Nordic Seminar on Computational Mechanics was in 1994 (NSCM VII). NSCMVII was combined with the Ivar Holand Anniversary Seminar. This years combined seminar was attended by more than 90 registered active participants from 13 different countries, and comprised ten invited plenary lectures at the Bergan Anniversary Seminar, and four invited keynote lectures and 40 contributed presentations organized into 10 sessions at NSCM XVI, respectively. Extended abstracts of the invited keynote lectures and all the contributed papers to NSCM XVI are available from the local organizer (e-mail: kjell.mathisen@bygg.ntnu.no).

The papers of the invited plenary speakers at the Bergan Anniversary Seminar will, together with seven papers by former Dr.ing students of Pål G. Bergan, be made available in a book that is dedicated to Professor Bergan on his 60th anniversary. The title of the book is “Computational Mechanics – Theory and Practice”, and it will be published by the International Center for Numerical Methods in Engineering, Barcelona (CIMNE).

The next NoACM Seminar will take place in October 2004, in Stockholm at KTH with Prof. Anders Eriksson as the local organizer.

e-mail: **anders.eriksson@mech.kth.se**

Figure 3:
Technical ass. L. Wollebæk assisting invited speakers Profs. T. Belytschko, T.J.R. Hughes and E. Onate during the Bergan Anniversary Seminar

Figure 4:
The Bergan Anniversary Seminar Banquet in the Archbishops Palace showing Mrs. and Prof P.G. Bergan and Deputy Major of Trondheim K. Fagerbakke

Figure 5:
The Bergan Anniversary Seminar Banquet in the Archbishops Palace showing Profs. E. Onate, E. Ramm and N.E. Wiberg

Figure 6:
The Bergan Anniversary Seminar Banquet in the Archbishops Palace showing Profs. A. Samuelsson, T. Belytschko, Ms. K. Wullt and Prof. N. S. Ottosen

Figure 7:
Former students of the jubilant Profs. G. Horrigmoe, K.H. Holthe and S. Sævik at the Bergan Anniversary Seminar Banquet in the Archbishops Palace

Book Report

Lagrangian and Hamiltonian Methods in Nonlinear Control

A Astolfi, F Gordillo and A.J van der Schaft (Eds.)
ELSEVIER 2003, ISBN 0-08-044278-1
Price EUR 96.00 USD 96.00

Contents:
Control of mechanical, electro-mechanical and electrical systems; control of autonomous vehicles; Hamiltonian and Lagrangian control systems; use of symplectic, Poisson and Dirac structures in control; role of symmetry, reduction and integrability in control; analysis of global phase space structure and qualitative phenomena with application to control; quantum mechanical control systems; optimal control; effect of physical and feedback-controlled dissipation; nonholonomic control systems; geometric nonlinear control of Hamiltonian and Lagrangian systems; tracking and regulation for Hamiltonian and Lagrangian systems; infinite dimensional Hamiltonian and Lagrangian systems; control of mechanical and electro-mechanical systems in the presence of delays and transmission lines. •

Fluid Dynamics and Aeronautics. New Challenges

J. Periaux, M. Champion, J.J. Gagnepain, O. Pironneau
B. Stoufflet, Ph. Thomas (Eds.)
CIMNE, 2003, 585pp., ISBN:84-95999-12-9
Price EUR 75 €

This book contains original contributions of internationally recognized experts in Fluid Dynamics with applications in Aerospace Engineering. "Towards a New Fluid Dynamics with its Challenges in Aeronautics" points out a new CFD with the emergence of advanced computational, experimental and information technologies and provides a road map for young scientists and engineers involved in the fields of Aerospace Engineering.

The main objectives of this volume is to introduce new mathematical models, computational, experimental and validation techniques in order to simulate and control processes, while optimizing computer resources for solving problems of increasing complexity. Mastering new advanced industrial and societal applications will require innovative theoretical, experimental and numerical methods and tools using Coupled Systems of Partial differential Equations, Active Control, Muldisciplinary Design Optimization, Laser technology, Data Processing and distributed Grid Computing.

The content of the book provides an overall perspective of the State of the Art of Fluid Dynamics in the first decade of the 21st century. •

Multibody 2003

Advances in Computational Multibody Dynamics

The area of Multibody Dynamics is a part of the Computational Mechanics scientific fields associated to solid mechanics. It can be argued that among all the fields in solid mechanics the methodologies and applications associated to multibody dynamics are those that provide a better framework to aggregate different disciplines. This idea is clearly reflected in the multidisciplinary applications in biomechanics, that use multibody dynamics to described the motion of the biological entities, or in finite elements where the multibody dynamics provide powerful tools to describe large motion and kinematic restrictions between system components, or in system control, where the methodologies used in multibody dynamics are the prime form of describing the systems under analysis, or even in many applications that refer to fluid-structures interaction or aeroelasticity. The **ECCOMAS thematic Conference on Multibody Dynamics 2003**, hosted by the Instituto Superior Técnico, **Lisbon** from **1 - 4 July**, gathered together 127 participants from 22 countries, including Japan, Korea, India, USA, Mexico, Canada and many of the European countries. In order to address the topics of the conference and reach its objectives the communications where selected from a pool of 130 abstracts that have been offered by the participants and reviewed by all the members of the scientific committee. The quality of the work promised in the abstracts forced the acceptance of 90 communications that have been delivered during the 4 days of the conference as oral and poster presentations. The 70 oral presentations where delivered in 14 sessions of 100 minutes and the 20 posters where presented in two sessions of 100 minutes each. All the oral and poster presentations are supported by full length papers included in the proceedings of the conference, and distributed during the registration. The quality of the work included in many of the full length papers warrants their publication in peer reviewed journals, namely in Multibody Systems Dynamics, and as chapters of a book that will be published by Springer-Verlag as a spin-off of the conference.

Figure 1:
From left to right: Manfred Hiller, Jorge Ambrósio, Sine Pedersen, Parviz Nikravesh and wife, John Hansen, John McPhee, Andrés Kecskemethy, Oliver Ottgen and Oliver Lenord

Objectives of the Conference
During the last few years, major scientific progress has been achieved in fields related to computer aided analysis of multibody systems.

SMART'03

Workshop on Smart Materials and Structures

The **SMART'03 Workshop on Smart Materials and Structures** was held in a XIX century palace in **Jadwisin near Warsaw, 2-5 September 2003**, Poland. It was organized by the Advanced Materials and Structures (AMAS) Centre of Excellence at the Institute of Fundamental Technological Research (IFTR) in Warsaw, ECCOMAS - European Community on Computational Methods in Applied Sciences and SMART-TECH Centre at IFTR.

The idea of the workshop was to bring together and consolidate the community of Smart Materials and Structures in Europe.

The workshop was attended by 65 participants from 11 European countries (Austria, Belgium, Finland, France, Germany, Italy, Poland, Portugal, Spain, U.K., Ukraine), 1 participant from Israel and 1 participant from the USA.

The workshop program was grouped into the following major topics: 4 sessions on structural control (18 presentations), 3 sessions on vibration control and dynamics (14 presentations), 2 sessions on damage identification (10 presentations) and 2 sessions on smart materials (9 presentations). Each session was composed of an invited lecture and some contributed papers. Every paper scheduled in the program was presented, so altogether 51 presentations were given. No sessions were run in parallel.
The workshop was attended not only by researchers but also by people closely related

Recent developments of computer hardware and general purpose software motivated a demand for efficient analysis and simulation tools by the industry, specially aerospace and automotive, which in turn provoked the need to include in such tools advanced features such as: real-time simulation capabilities, highly non-linear control devices, work space and path planning, active control of machine flexibility and multidisciplinary features increasing the reliability and accuracy of the analysis results. Not only these factors were responsible for the increasing activity in the area but they also set the pace for research. It is now widely recognized that the classical equations governing multibody systems dynamics must be derived and presented in a computer oriented manner using either modern symbolic manipulators or advanced assemblage and solution algorithms interfacing in a modular manner with other types of software in the areas of control, finite elements and optimization. Related developments and applications in solution methods in the fields of numerical analysis, software, hardware platforms, time integration methods applicable to differential-algebraic systems and problems related to time integration of flexible systems with high frequency content are also of primary importance for this field. Computer graphics and parallel computing methodologies using emerging computer technologies extend the scope of applications and help to speed up and post-process the numerical solution of large and complex systems.

Topics

The aim of the conference is to address the recent developments in the field of multibody systems, with emphasis in the following areas: Flexible multibody dynamics; Contact and impact problems; Optimization and sensitivity analysis; Biomechanics; Walking machines; Vehicle dynamics; Education of multibody dynamics; Multidisciplinary applications; Real-time simulation; Methodologies; Solution algorithms and numerical issues; Experimental procedures; Theoretical and computational methods in multibody systems; Control issues in multibody systems and mechatronics; Crashworthiness analysis; Aerospace technology

Jorge Ambrósio
Chairman

Figure 2:
Conference Banquet by the Engineering students tuna of the Instituto Superior Técnico

Figure 3:
Conference Banquet at St. Jorge Castle, Lisbon

to the industry. There were interesting discussions on scientific merits of the presented papers as well as on future development of the field and its possible industrial applications.

Apart from the sessions there was also a one-afternoon exhibition on smart materials and devices prepared by commercial companies working in the field i.e. LORD Corp. (USA), CEDRAT (France) and by the Wroclaw University of Technology (Poland). Commercial and academic applications of smart materials (magneto-rheological, piezo-electric, magneto-strictive) and software tools relevant for the field were demonstrated.

Proceedings of the SMART'03 Workshop will be published by Springer Verlag (invited lectures) and by AMAS (contributed papers).

P. Kilakowaski
SMART'03 Secretary

conference debrief

4th AI-METH 2003
Symposium on Artificial Intelligence Methods

On **5-7 November, 2003** in **Gliwice, Poland** the fourth AI-METH 2003 Symposium was held. This was also one of the ECCOMAS Thematic Conferences organised in 2003.

The Symposium provided the opportunity to bring together researchers from diverse fields to present the state-of-the-art in the AI field and new applications of AI methods in such domains as: mechanical, material, civil, biomedical, and other engineering, computer science, optimisation, control, management, ecology, etc. The Symposium was a valuable forum of intensive and efficient exchange of new ideas and concepts. The scope of the Symposium covered theoretical foundations, feasibility studies, comparative studies and practical applications of AI methods, and included but it was not limited to: appropriate descriptions and representations of problems and problem spaces, representation, acquisition, verification and validation of knowledge, imprecise, uncertain and incomplete as well as quantitative and qualitative data, models and knowledge, data and knowledge granularity, knowledge based inference and/or search (solving) strategies, symbolic and numerical computation based on concepts underlying biological processes, and AI-supported pattern recognition.

Figure 1:
Prof. W.Pedrycz (Canada) delivers the opening keynote.

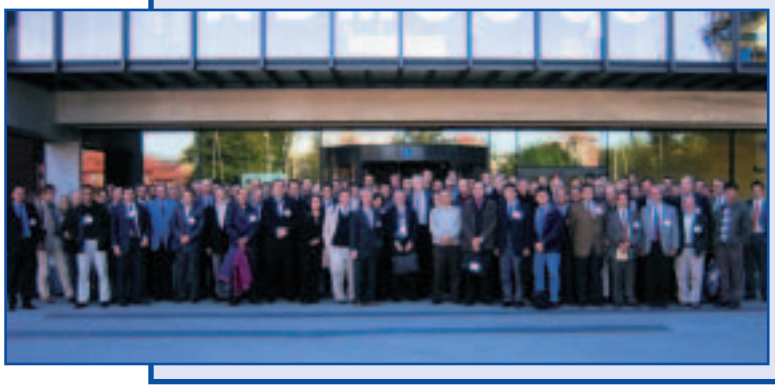
The Symposium was arranged under the auspices of ECCOMAS, the Ministry of Scientific Research and Information Technology and the Polish Academy of Sciences - Department of Technical Sciences. It was organised by the Silesian University of Technology represented by the Department for Strength of Materials and Computational Mechanics and Department of Fundamentals of Machinery Design, and Polish Association for Computational Mechanics.

The Scientific Committee of the Symposium consisted of outstanding scientists from all over the world. The Programme Committee co-chaired T. Burczynski, W. Cholewa and W. Pedrycz. The Organising Committee was chaired by W. Moczulski.

During the Symposium 77 papers were presented, including 8 keynote lectures, 24 contributed

ADMOS 2003
Adaptive Modelling and Simulation

The first edition of the **ECCOMAS** Thematic Conference on **Adaptive Modelling and Simulation** (ADMOS 2003) was held at **Chalmers University**, in Göteborg (**Sweden**) from **September 29 to October 1, 2003**. The airy and bright architecture of the Chalmers' Student Union building, designed by the well-known Swedish architect Gert Wingardh, hosted the conference. The attendants enjoyed a tight scientific program and relaxing social events (welcome reception at the magnificent Town Hall and conference dinner). The size of the conference, 110 registered participants, allowed a fruitful interaction and discussion. The informal discussions were strongly pushed forward during the lunches. During the conference banquet, the ECCOMAS award for the best European thesis of 2002 in the field of Computational Methods in Applied Sciences was delivered. Sybille Muller and Paul David Ledger shared the award.



The thematic spectrum of the conference was quite large, including different topics under the common umbrella of Adaptivity. One of the bases of the success of the conference was precisely this broad spectrum: we had

papers and 45 poster presentations. The subject matter of the keynote lectures was a review of important issues in the field of AI:

- Granular computing and logic processing in intelligent systems, W. Pedrycz *(Fig. 1)*,
- Pattern classification with a compromise fuzzy reasoning, K. Cpalka and L. Rutkowski,
- Parallel evolutionary algorithms in optimization of thermoelastic structures in the presence of radiation, R. Bialecki, Z. Ostrowski, T. Burczynski, W. Kus and A. Dlugosz,
- Idea of fuzzy fault detectors, sensors and analysers, M. Bartys and J. Koscielny,
- Interpretation of bayesian confirmation measures in rough set terms, S. Greco, Z. Pawlak and R. Slowinski,
- Computational methods of gene expression analysis for DNA microarray data, K. Simek, A. Swierniak, M. Kimmel, K. Fujarewicz, B. Jastrzab and M. Wiench,
- Genetic clustering in optimal structure design, K. Adamska, R. Schaefer and H. Telega,
- Computational tools based on artificial neural networks for analysis of composite materials, M .Lefik and M. Wojciechowski.

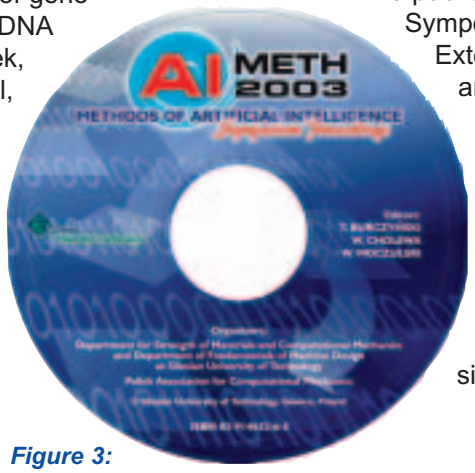


Figure 3:
CD containing Proceedings of AI-METH 2003.

One of the most interesting sessions was the poster one. It presented the authors in the poster form, with an excellent opportunity to enter into detailed discussions during visits. Not only famous professors, but also young participants of the event, such as graduate and PhD students took advantage of this unique possibility *(Fig. 2)*.

Figure 2:
Poster Session: D.Slawik (Poland) - Ph.D. student discuses with Prof. M.Sidahmed (France).

The publications connected with the Symposium consist of: the book of Extended Abstracts, book of full papers and CD *(Fig. 3)* containing relevant information about the last Symposium, extended abstracts and full papers.

The detailed information about the AI-METH Symposia (previous, current and the next in 2004 and 2005) is available on the Symposium website: http://www.ai-meth.polsl.gliwice.pl.

T.Burczynski

contributions ranging from applied mathematics to practical industrial applications.

One of the main conclusions of the conference is that quality control and adaptivity are among the open issues and challenges in Computational Mechanics for the 21st century. The Computational Mechanics community is able to simulate numerically almost every problem or phenomenon one could imagine. Now, the challenge is to get a quality certificate on the numerical result. This quality control affects both the physical model (validation) and the discrete solver (verification). The contributions to ADMOS 2003 include the state of the art ideas in the topic. The main teams working in this subject where represented in the conference.

The next edition of the conference, ADMOS 2005, will take place in Barcelona (Spain), hosted by Universitat Politècnica de Catalunya (UPC), in September 2005. The chairmen of both ADMOS 2003 and 2005 are happy to invite scientists working in the field to contribute to the next edition.

N.E. Wiberg and P. Díez

Figure 2:
Award ceremony at the Conference Dinner. Profs. N.E. Wiberg and E. Oñate with two ECCOMAS awardees

Figure 3:
Reception at City Hall

conference notices

ICCMS - 04
International Congress on Computational Mechanics and Simulation

The advances in computational mechanics have transformed the way problems in engineering and science are tackled today. Problems in mechanics of solids, structure-fluid interaction and their scientific disciplines are investigated through computational mechanics and implemented in engineering design and manufacturing. Computational mechanics has emerged as a key area of research and application.

ICCMS-04 is being organized at the **Indian Institute of Technology Kanpur, India (IITK)** during **9-12 December, 2004.** The purpose of the Congress is to provide a forum for scientists, engineers and designers in universities, laboratories and industry to share their research findings to further the cause of computational mechanics. *Themes include:* New computational techniques, High performance computing , Transient dynamic problems, Nonlinear mechanics, Fibre-reinforced composite materials , Fracture and Damage Mechanics, Soil-structure interaction, Fluid-solid interaction and Smart structures
Contact: Prof. N.G.R.Iyengar
at: ngri@iitk.ac.in or www.iitk.ac.in ●

iass2004
Shell and Spatial Structures from Models to Realization

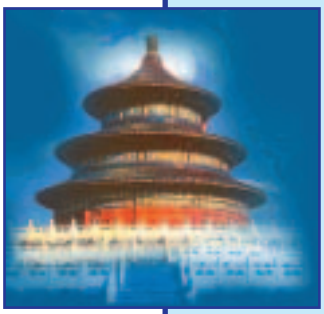
iass2004 is to be held on **20 - 24 September, 2004**, in **Montpellier, France** and is organized by the University of Montpellier II and the School of Architecture of the Languedoc Roussillon. It is also co-organized by "Numerical Methods" and "Structural Morphology" IASS Working Groups.

This Symposium aims to provide a forum for presentation of models in the field of Shell and Spatial Structures. These models can be analytic, numerical, experimental…Realization is the last model. They can be associated to design, mechanics, morphology, materials and construction.

The scope of the symposium covers all aspects of Shell and Spatial Structures and will provisionally include topics in the five following themes with international leaders : Design Mechanics Morphology Materials Realization

Please send any correspondence to :
Professer René Motro
Tel : 33 467 14 45 32
Fax : 33 467 14 45 55
Web: www.IASS2003.org ●

VI World Congress on Computational Mechanics - WCCM VI
2nd Asia-Pacific Congress on Computational Mechanics - APCOM04



The International Association for Computational Mechanics (IACM) and the Asian-Pacific Association for Computational Mechanics (APACM) are pleased to announce that the **first combined World Congress (WCCM)** and the regional congress **(APCOM)** will be held in **Beijing, China** from **September 5-10, 2004**.
Targeted Applications are Aeronautics, Space systems, Transport systems, Energy, Telecommunications Medicine and Bio Engineering, Environment, Material processes, Automobile Manufacture and Building & Construction

Bolow are the Deadlines to remember:
March 15 - for organizing of minisymposia
March 1- for abstract submission
April 1- for notification of final acceptance for abstracts and minisymposia
April 1- for submission of full length papers
April 1 - Open for early registration and sending invitation letter for visa application
July 1- for early registration

Please contact Prof. Mingwu Yuan, Chairman of the Congress on:
+86 10 6275 1826(Phone)
+86 10 6275 9806(Fax)
www.wccm6-apcom04.org.cn/
yuanmw@pku.edu.cn ●

iacm news news news news news news news

Seminar honouring Dr. Pal Bergan's 60th anniversary.

A Computational Mechanics Seminar was held at Trondheim University (Norway) on **October 15-16, 2003** to celebrate the 60th anniversary of Dr. Pal Bergan. Dr. Berganis a distinguished scientist in the international computational mechanics community. After receiving his Ph.D. in Berkeley University he worked for a number of years as a professor in structural mechanics at Trondheim University. In the last years he has worked as research director at the prestigious Norwegian company Det Norske Veritas.(see page 24).

The Bergan Seminar was organised by the Nordic Association of Computational Mechanics (NOACM). This was followed by the conference regularly organised by the NOACM in northern European countries.

Retirement of Prof. Nils-Erik Wiberg

Prof. Nils-Erik Wiberg has recently retired from his chair of Structural Mechanics at Chalmers University (Göteborg, Sweden). A number of seminars and functions have been organised in Göteborg to honour Prof. Wiberg. Some of these activities took place during the conference on Adaptive Modelling and Simulation (**ADMOS**) held in **Chalmers on 29 September – 1 October 2003** (see page 28).

Prof. Wiberg is a leading scientist at international level in the field of computational structural mechanics field in which he has contributed a number of new ideas and methods. He is the author of many books and papers in international journals. After his retirement, Prof. Wiberg will still keep some research activity at Chalmers.

ECCOMAS Awards

The European Community in Computational Methods in Applied Sciences (ECCOMAS) has announced an open call for the best Ph.D. Thesis in 2003 and two Awards for Young Scientists: the O. C. Zienkiewicz Award in Computational Engineering Sciences and the J. L. Lions Award in Computational Mathematics. Candidates for the Ph.D. Awards must be nominated by the ECCOMAS affiliated organisations, whereas application for the two Awards for Young Scientists can be submitted at individual level.
For more information and deadlines visit **www.eccomas.org**

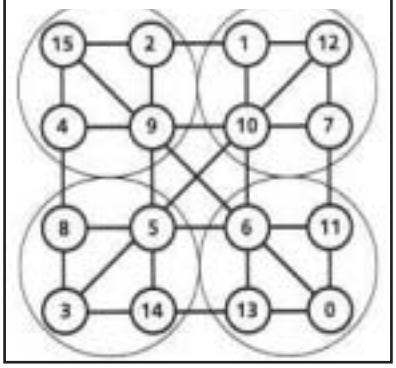
WCCM VI

Over 350 abstracts have been already received for the Sixth World Congress on Computational Mechanics (WCCM VI) to be held in Beijing (China) from 5 to 10 September 2004. The possibility to send and Abstract has been extended up to March 15, 2004. The technical programme will be completed with some 80 Invited Sessions and Minisymposia on different topics of current interest to the computational mechanics community. WCCM VI is the sixth world congress of the IACM and follows the success of previous similar events in Austin (1986), Stuttgart (1990), Tokyo (1994), Buenos Aires (1998) and Vienna (2002).

WCCM VI will be held in conjunction with the 2nd Asian-Pacific Congress on Computational Mechanics (APCOM 04).
For more information visit **www.wccm6-apcom04.org.cn**

SOLUTION to MIND BENDER

from page 21



"I´m never having kids - I hear they take nine months to download."

What will you see in Beijing?

Welcome to Beijing for WCCM VI and APCOM'04

The Sixth World Congress on Computational Mechanics and the **Second Asian-Pacific Congress on Computational Mechanics** will be held in **Beijing, China** from **September 5-10, 2004**. This is a spectacular event and festival for the scientists and engineers in the fields of computational mechanics. Welcome all the participants to Beijing, China. Perhaps it is your first time or you have visited Beijing many years ago. ***What will you see in Beijing?***

As a city, Beijing has about 3,000 years of history, so it is an old city. Beijing, however, is also one of the worlds' modern cities, a mixed civilization. In the 19th and 20th centuries, China had a disgraceful time. It was weak and very closed. Science and democracy were far behind developed countries. In the last 25 years, this country has developed at high speed and people's lives have improved dramatically. You will see a prosperous markets and smiling people.

However you will also see poor beggars, which indicates that the society is not well balanced and the difference between people is getting larger. You will see the dragon car (just like New York City) and you will also find the the worst vehicle accidents in the world. When you go to some "Hutong", you will find the traditional way of living. High rise buildings brought modern, comfortable living standard to most of Beijings´ residents and this revolutionary change has happened in the past 10 years. Chinese are proud of their progress and are ready to work harder and create their own future. Of course, you may well also find the darkness of society. I can say that you may find that all the bad things which happened in western countries also happened here.

Mingwu Yuan
Chairman, Organizing Committee of WCCM VI and APCOM'04
Professor, Peking University, Beijing, China

If you go to a restaurant, you will find the best food in Asia, perhaps in the world. You can have distinctive cuisines. The best way to try Chinese food is to go to some of clean and small Chinese snack food stalls. You will find a variety of choices and quite cheap. Taxies are quite cheap as well.

If you talk with Chinese friends, they are hospitable and polite. Each of them has their own story of how they lived in the past decades. You may encounter their feelings, culture backgrounds and emotional changes.

Besides of professional exchange in the Congress, please go out and observe the street, stores and people. You may discover something. ●

Discover Beijing and it´s people!

conference diary planner

31 May - 2 June 2004	**International Congress on Computational Methods in Engineering** *Venue:* Lisbon, Portugal *WWW:* www-ext.lnex.pt/APMTAC/cmce2004/
24 - 28 July 2004	**ECCOMAS 2004 - Eccomas Congress on Computational Methods in Applied Sciences and Engineering** *Venue:* Jyväskylä, Finland, *WWW:* www.eccomas.org
31 August - 2 September 2004	**XI International Conference on the Theory of Machines and Mechanisms in association with the II CEACM Conference on Computational Mechanics** *Venue:* Liberac, Chez Republic *Contact:* http://www.kts.vslib.cz/conf.html
6 - 11 September 2004	**IASS 2004 - Shell and Spatial Structures from Models to Realization** *Venue:* Montpellier, France *Contact:* motro@Image.univ-montp2.fr
5 - 10 September 2004	**WCCM VI - 6th World Congress on Computational Mechanics** *Venue:* Beijing, China *Contact:* Prof. M. Yuan Email: yuanm@pku.edu.cn, *WWW:* www.wccm6-apcom04.org.cn/
9 - 12 December 2004	**ICCMS 04 - International Congress on Computational Mechanics and Simulation** *Venue:* Kanpur, India *Contact:* ngri@iitk.ac.in, ashwini@iitk.ac.in WWW: www.iitk.ac.in
25 - 28 May 2005	**Computational Methods for Coupled Problems in Science and Engineering** *Venue:* Santorini, Greece *Contact:* www.eccomas.org
1 - 4 June 2005	**IASSIACM - 5th Int. Conference on Computation of Shell & Spatial Structures** *Venue:* Salzburg, Austria *Contact*: info@iassiacm2005.de *WWW:* http://www.iass-structures.org
14 - 17 June 2005	**Third M.I.T. Conference on Computational Fluid and Solid Mechanics** *Venue:* Massachusetts Institute of Technology, Cambridge, U.S.A. *Contact:* http://www.thirdmitconference.org
21 24 June 2005	**ECCOMAS Thematic Conference on Computational Combustion** *Venue:* Lisbon, Portugal *Contact:* www.eccomas.org
21 - 24 June 2005	**II International Conference on Advances in Computational Multibody Dynamics** *Venue:* Madrid, Spain *Contact:* www.eccomas.org
27 - 29 June 2005	**Computational Methods in Marine Engineering** *Venue:* Oslo, Norway *Contact:* P. Bergan at Pal.Bergan@dnv.com
4 - 7 July 2005	**VII Congreso de Métodos Numéricos en Ingeniería** *Venue:* Granada, Spain *Contact:* www.semni.org
11 - 14 July 2005	**ECCOMAS Thematic Conference on Meshless Methods** *Venue:* Lisbon, Portugal *Contact:* www.eccomas.org
18 - 21 July 2005	**II ECCOMAS Thematic Conference on Smart Structures and Materials** *Venue:* Lisbon, Portugal *Contact:* www.eccomas.org
24 - 28 July 2005	**USNCCM'05 - 8th US National Conference on Computational Mechanics** *Venue:* Austin, Texas, USA *Contact:* www://www.ices.utexas.edu/usnccm8.html
5 - 8 September 2005	**COMPLAS VIII - VIII International Conference on Computational Plasticity** *Venue:* Barcelona, Spain *Contact*: Secretariat, complas@cimne.upc.es *WWW:* http://congress.cimne.upc.es/complas
8 - 10 September 2005	**ADAMOS II - International Conference on Adaptive Modelling Simulation** *Venue:* Barcelona, Spain *Contact:* www.cimne.com
12 - 14 September 2005	**EUROGEN 2005 - Evolutionary Methods for Design, Optimisation and Control with Applications to Industrial Problems** *Venue:* Munich, Germany *Contact:* www.eccomas.org
14 - 16 September 2004	**ECCOMAS Thematic Conference on Computational Bioengineering** *Venue:* Lisbon, Portugal *Contact:* www.eccomas.org
4 - 8 June 2006	**CSSM 2006 - III European Congress on Computational Solid and Structural Mechanics** *Venue:* Lisbon, Portugal *Contact:* Prof. Carlos A. Mota Soares. eamil: carlosmotasoares@dem.ist.utl.pt WWW: www.dem.ist.utl.pt/~cssm2006
16 - 22 July 2006	**WCCM7 - VII World Congress on Computational Mechanics** *Venue:* Century City, California, USA *Contact:* WCCM7@mail.mech.northwestern.edu.
5 - 8 September 2006	**Computational Fluids Dynamics - ECCOMAS CFD 2006** Venue: Rotterdam, The Netherlands *Contact:* www.eccomas.org

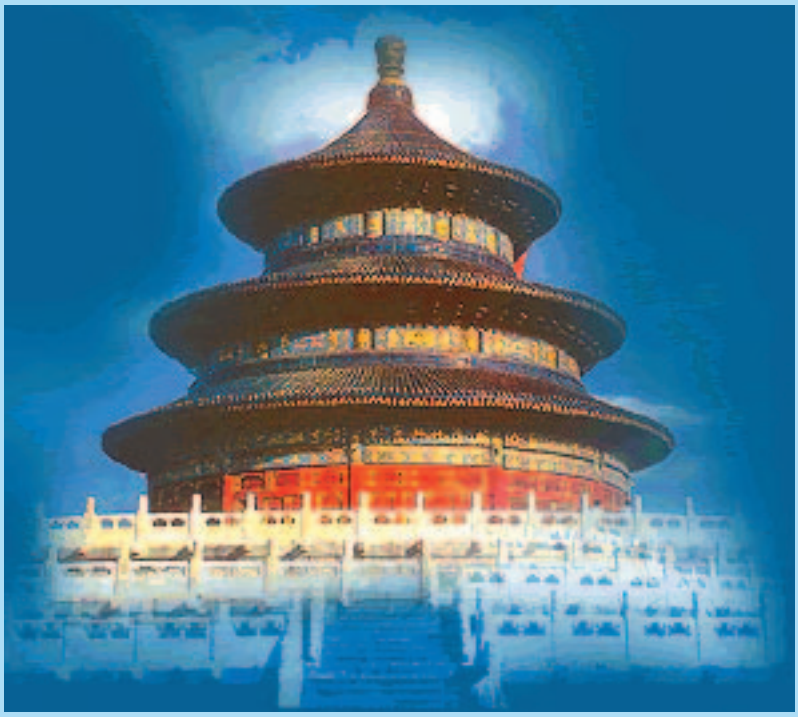
Six World Congress on Computational Mechanics

WCCM VI

Beijing, China

5-10 September 2004

Incorporating the Second Asia-Pacific Congress on Computational Mechanics



Important Dates

1 March 2004	Deadline for organising of minisymposia
15 March 2004	Deadline for abstract submission
1 April 2004	Notification of final acceptance for abstracts & minisymposia
1 April 2004	Deadline for submission of full length papers
1 April 2004	Open for early registration & sending invitation letter for visa application
1 July 2004	Deadline for early registration