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In memory of Prof. J.A.C. Martins
1951 - 2008

CMM 2009

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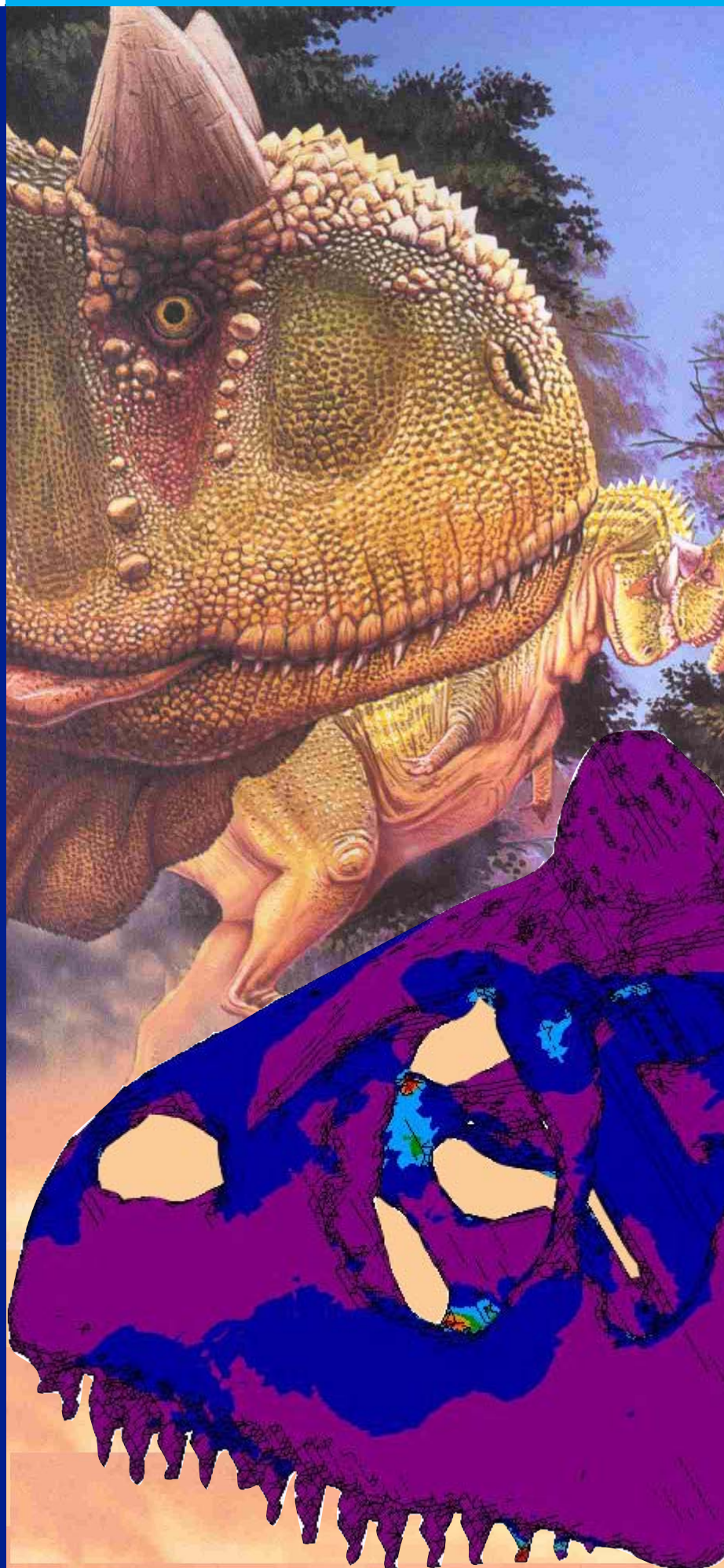
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editorial

The field of Computational Mechanics continuously broadens and embraces new areas of science and technology. Computational bio-medical-engineering has been evolving for the last two decades and can be considered an established field in computational mechanics. What is new in the bio-medical field is the fast progression of the so called *Systems Biology* (SB) community. The name refers to the study of bio-medical problems from an engineering system perspective, including the use of mechanics, computational methods and software. The views of this new generation of computational bio-scientists are clearly expressed in the revolutionary paper "Can a biologist fix a radio? Or what I learned while studying apoptosis" by Y. Lazebnik, (*Cancer Cell*, Vol. 2, 179-182, Sept. 2002). I strongly recommend its reading. The increasing number of articles on *System Biology* in recent issues of *Nature*, are an evidence of the importance of this field.

A second area of outstanding expansion is the so called *Real Time* computing. Evolving from solutions thought for the video games industry and supported by dramatic advances in computing hardware, such as GPUs, a number of algorithms for ultra-fast computing and visualization have been recently proposed as a replacement or complement to traditional numerical methods and software in computational mechanics.

One of these methods, the Proper General Decomposition, is presented in this bulletin by Prof. Chinesta and colleagues. Real time computing will certainly mean a revolution in the way we approach the solution of many problems in engineering and applied sciences.

A third area in which computational mechanics can have a big impact is *energy*. The definition of new ways for extracting energy from natural resources, as well as the design of energy-efficient and sustainable constructions, vehicles and engineering systems in general, is of paramount importance worldwide and opens unlimited possibilities for computational mechanics. Among the many recent successful stories of colleagues in our community entering the energy field we note the excellent work of Prof. T. Yabe and his group in Japan aiming to extracting energy from the magnesium in the sea (*Time*, October 2009, pp 74-75).

The presentation of new topics in science and engineering of interest to Computational Mechanics (and vice versa) clearly exceeds the length of this editorial. These challenges are an opportunity to expand the scope of the IACM and will open possibilities for new research and application of Computational Mechanics technology aiming to solving problems of high impact in the world.

Eugenio Oñate
President of IACM

CMM 2009

The 18th International Conference on Computer Methods in Mechanics

by
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The 18th International Conference on Computer Methods in Mechanics (CMM 2009) was held on May 18-21, 2009, at The University of Zielona Góra in the city of Zielona Góra, Poland, (Figure 1).

The International CMM Conferences take place in Poland every two years and have a long, 36-year tradition reaching back to the year 1973, when the first conference of this series was organized in Poznań.

The CMM conferences are jointly organized by The Polish Association for Computer Methods in Mechanics (its Polish acronym is PTMKM), The Polish Academy of Sciences (its Polish acronym is PAN) through its sections: Section of Computer Methods in Mechanics (Committee on Mechanics), and Section of Mechanics of Structures and Materials (Committee of Civil and Water Engineering).

Already at the previous conference, CMM 2007 in Łódź-Spala, it was announced that the 18th CMM Conference will be hosted by the University of Zielona Góra in 2009.

The Steering Committee of CMM 2009 (Professors T. Burczyński, Michał Kleiber, Janusz Orkisz, Zenon Waszczyszyn) has nominated Prof. Mieczyslaw Kuczma and Prof. Krzysztof Wilmański as chairmen of CMM 2009 and Dr. Waldemar Szajna as conference secretary.

Professor Olgierd C. Zienkiewicz was the honorary chairman of CMM2009. We truly hoped that Professor Zienkiewicz would be our distinguished guest at the conference and on his birthday (May 18) would collect the awarded Polish State Distinction. With deep sadness and regret we learned that Professor Zienkiewicz passed away on January 2, 2009. The vivid memories of him were perceptible during the whole meeting in Zielona Góra. Personal recollections of Olek Zienkiewicz were presented by Prof. Eugenio Oñate (Figure 2). The Zienkiewicz Memorial Lecture was instituted and the first one was given by Prof. Tadeusz Burczyński (Silesian University of Technology at Gliwice; Cracow University of Technology, Cracow, Poland),

Figure 1:
*Participants of the
CMM 2009
(after the opening session)*



who talked on *"Immune computing: intelligent methodology and its applications in bioengineering and computational mechanics"*. An award ceremony of the Zienkiewicz Medal took place during the conference. The Zienkiewicz Medal (Figure 3), issued by the Polish Association for Computational Mechanics, is awarded by the Chapter of the Medal for outstanding merit in the development of computational mechanics. The recipients of the The Zienkiewicz Medal 2009 are Professors (in alphabetic order):

- Leszek Demkowicz (The University of Texas at Austin, Austin, USA),
- Eugenio Oñate (International Center for Numerical Methods in Engineering (CIMNE), Technical University of Catalonia, Barcelona, Spain),
- Janusz Orkisz (Cracow University of Technology, Cracow, Poland),
- Erwin Stein (Leibniz University of Hannover, Hannover, Germany), and
- Zenon Waszczyszyn (Cracow University of Technology, Cracow, Poland), (Figure 4).

This was the second edition of this medal, whereas the recipients of The Zienkiewicz Medal 2007 were

- Professors: *Giulio Maier* (Politecnico de Milano, Milan, Italy),
- *Herbert Mang* (Vienna University of Technology, Vienna, Austria),
- *J. Tinsley Oden* (The University of Texas at Austin, Austin, USA), and
- *Zbigniew Kaczkowski* (Warsaw University of Technology, Warsaw, Poland),



Figure 2:
Prof. Eugenio Oñate, President of IACM presenting his personal recollections of Prof. Olek Zienkiewicz in the Zielona Góra Philharmonic Hall

- *Michal Kleiber* (Institute of Fundamental Technological Research, Warsaw, Poland) and posthumously
- Jan Szmelter (Gdańsk University of Technology, Gdańsk, Poland).

The CMM 2009 was organized under the auspices of The European Community on Computational Methods in Applied Sciences (ECCOMAS) and The Central European Association for Computational Mechanics (CEACM).



We also greatly appreciate the honorary patronage of Marshall of the Lubuskie Province - Krzysztof Jabłoński, Mayor of the City of Zielona Góra - Janusz Kubicki, and Rector of the University of Zielona Góra - Prof. Czesław Osekowski, who were the main sponsors of CMM 2009.

About 300 participants from 24 countries attended the conference, out of which 90 came from abroad, mainly from Germany (29 researches).

44 researches were under the age of 30. Over 280 papers were

Gliwice; Cracow University of Technology, Cracow, Poland), Leszek Demkowicz (The University of Texas at Austin, Austin, USA), Guilo Maier (Politecnico de Milano, Milan, Italy), Herbert Mang (Vienna University of Technology, Vienna, Austria), Tomasz Lodygowski (Poznań University of Technology, Poznań, Poland), Eugenio Oñate (CIMNE, Technical University of Catalonia, Barcelona, Spain), John Osborn (University of Maryland at College Park, USA), M.B. Rubin (Technion - Israel Institute of Technology, Haifa, Israel), Jörg Schröder (University of Duisburg-Essen, Essen, Germany), Erwin Stein (Leibniz University of Hannover, Hannover, Germany).

The prominent researches organized 14 Minisymposia that covered a wide spectrum of topics: *Meshless and Related Methods* (Janusz Orkisz), *Multiscale Modelling and Nanomechanics* (T. Burczyński, P. Dłużewski, M. Pietrzyk), *Optimization and Identification of Structures* (K. Dems, A. Garstecki, W. Gutkowski), *Computational Methods of Artificial Intelligence* (T. Burczyński, Z. Waszczyszyn, L. Ziemiański), *Topology Optimization* (T. Lewiński, A. Zochowski), *Textile Reinforced Concrete* (B. W. Zastra), *Computer Methods in Geomechanics and Granular Flow* (P. Vermeer, Z. Wiśkiewski), *Heat Transfer* (E. Majchrzak, B. Mochnacki), *Computational Mechanics of Composite Materials and Structures* (R. de Borst, T. Sadowski), *Computer Methods in Biomechanics* (R. Bedziński, K. Scigala), *Boundary Element Methods* (M. Maischak), *Computational Contact Mechanics* (P. Litewka, A. Zmitrowicz), *Adaptive Methods and Error Estimation* (W. Cecot, W. Rachowicz, G. Zbojowski), *Computational Mechanics of Multiphase Porous Materials Including Durability* (D. Gawin, F. Pesavento, B. A. Schrefler). All lectures provided exchange of ideas and induced a lot of lively discussions. The written versions of most of the plenary and keynote lectures will appear in the book dedicated to the late Professor O.C. Zienkiewicz, published by Springer-Verlag: M. Kuczma, K. Wilmański (eds.), *"Computer Methods in Mechanics - Lectures of the CMM 2009."*

Figure 3:
The Zienkiewicz Medal
(obverse)



submitted out of which, after an evaluation process, 248

contributions were finally printed in the conference proceedings of "Short papers." The CMM 2009 had a rich scientific programme encompassing 11 Plenary Lectures, 28 Keynote Lectures given within 14 Minisymposia, 8 Thematic Sessions, 2 Industrial Sessions, preceded by the 3-day course *"hp-Adaptive Finite Element Methods"* given by Prof. L. Demkowicz, and accompanied by book exhibitions of Springer-Verlag, the Scientific-Technical Publishers (its Polish acronym is WNT), and Kubicz (a book importer). Over 230 papers were presented in 53 parallel sessions in 6 rooms during the 4 days. The plenary lectures were delivered by the most distinguished researches from around the world: Rene de Borst (Eindhoven University of Technology, Eindhoven, The Netherlands), Tadeusz Burczyński (Silesian University of Technology,

This intensive technical programme was complemented by social events, which included a concert given by the Zielona Góra Philharmonic Orchestra accompanied by a soloist of the Polish National Opera, a conference banquet in the Zielona Góra Palm House, a dinner with regional specialties, and trips to interesting places in and around Zielona Góra, the Muskauer Park among others. Once again a competition for the best paper presented by a young researcher was organized. The winners were Dr. Sławomir Milewski and Mr. Łukasz Skarzyński.

Finally, we would like to express again our gratitude to the members of the International and National Scientific Committees of CMM 2009 for their kind help in the reviewing procedures, as well as to the members of the Organizing Committee for their enthusiasm and commitment to the organization of the conference. All the events of the CMM 2009 were successful, which should be attributed also to the conference participants and their high-standard presentations, as well as to all the conference supporters and sponsors, whose aid allowed us to organize the conference with substantial freedom. The next CMM conference will be held in Warsaw, Poland, in May 2011.

Please visit the conference website <http://www.cmm.uz.zgora.pl> for further details. ●

Figure 4:
Prof. Michael Kleiber, President of PAN, and Prof. Tadeusz Burczyński, President of PTMKM, awarding The Zienkiewicz Medal to Professors: Leszek Demkowicz (top right), Eugenio Oñate (middle left), Janusz Orkisz (middle right), Erwin Stein (bottom left), and Zenon Waszczyszyn (bottom right).

