

Actualities

We have a great pleasure to announce that professor Tadeusz Kaczorek, member of the Polish Academy of Sciences associated with our Division IV Technical Sciences PAN has been honoured with the exceptional title of the Doctor Honoris Causa of the Technical University of Szczecin.

On this day we would very much like to congratulate professor T. Kaczorek and wish him further successes.

50th Conference on Civil Engineering and Building, 12–17 September 2004, Krynica

Since 1955 the general conferences on Civil Engineering and Building are organized every year in September. Over 460 participants, mostly from Poland but also 26 from other countries attended the 50th Conference held in Krynica from 12 to 17 September 2004. The Conference was organised by the Faculty of Civil Engineering of the Warsaw Technological University under the joint auspices of the Committee for Civil Engineering of the Polish Academy of Sciences and of the Scientific Committee of the Polish Association of Civil Engineers. Professor Marian Abramowicz chaired the Organization Committee.

During 33 sessions 141 papers were presented and discussed; the sessions were run simultaneously in two conference halls. The papers were selected by the scientific committee out of 197 contributions submitted. Careful selection of the accepted papers is traditionally ensured to maintain high level of the Krynica conferences.

As usual, the sessions in two first days were themed and this year bridges and tunnels were the main subjects of that part of the conference. In the first session representatives of the Ministry of Infrastructure presented large program of roads and highways prepared for near future starting with year 2005. Next, problems of design, execution and maintenance of bridges and tunnel were considered in several interesting lectures.

In the next days the sessions covered various problems, namely: structural mechanics, concrete and metal structures, geotechnics and building materials, transportation engineering, building physics including fire resistance and management in the building construction. There were lively discussions after all presentations.

During the afternoons participants joined several ad-

ditional sessions and meetings of various specialized commissions. Several building materials, products and equipment were presented at special sessions and on an exhibition, arranged close to the main conference hall.

Along with the whole building community the organisers were saddened by the loss of professor Roman Ciesielski in June 2004 who had been a great supporter of the past conferences since 1955, so that the organising committee decided to mark his contribution with a commemorative paper published with the conference materials.

The final session dealt with a number of interesting topics in the form of a general discussion. These included: future development of bridge and tunnel construction, problems related to the accession of Poland to the European Union, application of Eurocodes in Poland, etc.

There were many important and valuable papers presented at all sessions and a few of them are mentioned in the following.

Józef Głomb and Wojciech Radomski in two separate papers presented trends in the bridge construction in Poland and in the world. Eugeniusz Dembicki discussed the methods of reinforcement of the soil for bridges and tunnels. Wojciech Grodecki presented a viewpoint of a big construction company on the problems related to sustainable development. Andrzej S. Nowak (Univ. of Michigan) discussed deterministic and probabilistic approaches in design and exploitation of bridges in the USA. Problems of paraseismic actions caused by mining activity were considered in two papers by Roman Ciesielski (late) and Zenon Waszczyszyn with their co-workers. The influence of imperfections in steel structures was considered in the papers by Zenon Waszczyszyn with co-workers and by Andrzej Machowski with Izabela Tylek. In the session of building materials Paweł Łukowski considered the continuity of polymeric phase in polymer-cement composites and Artem Czkwianianc with co-workers presented tests on self-condensed concretes. Szczepan Woliński considered the influence of the control in situ on the reliability of concrete structures. Dariusz Gawin with co-workers presented a paper on the influence of creep on the behaviour of concrete structures subjected to high temperature. Dariusz Skorupka and Artur Duchaczek applied artificial neural networks to the management problems on the construction sites. Joanna Żukowska proposed models for the risk analysis in the road traffic. Antoni Szydło with Jarosław Kuźniewski presented tests on mineral-asphalt mixes and

the influence of temperature. Antoni Florczak and Jacek Ścigallo considered problems of deep foundations.

The conference was sponsored by several companies working in the building and construction fields. As the principal sponsor PERI Poland may be mentioned.

In the opinion of the participants the conference was very well organized and was interesting for the participants.

A. M. Brandt

XXXI Congress of the European Society for Artificial Organs, 8–11 September 2004, Warsaw

The beginning of the new century is usually used for introduction of new ideas and new technological visions. Therefore, the motto of the XXXI Congress of ESAO in Warsaw was "Towards Medical Technology of the Future". The Congress was organized under the honorary patronage of the Minister of Scientific Research and Information Technology professor Michał Kleiber, President of the Polish Academy of Sciences professor Andrzej Legocki and the President of the City of Warsaw professor Lech Kaczyński.

The opening ceremony of the ESAO Congress was organized in the Porczynski Art Gallery. The mixture of culture and science composed a very special beginning of this gathering. After welcome addresses, a plenary lecture entitled "Cell transplantation as possible future technology in regenerative medicine" was delivered by professor Tomasz Siminiak from Poznan Medical Academy. After plenary lecture a prestigious award granted by German company Membrana was handed over. The award winner, dr Vincenzo dIntini from Ospedale San Bortolo (Vicenza, Italy) was announced by dr Schuster from Membrana. Then, short presentation of the awarded project entitled "Blood purification modalities plasma apoptotic capacity" was delivered.

The last part of the opening ceremony featured a very special "Classic Piano Show" performed by Waldemar Malicki. Scientific part of the Congress was followed by Get Together Party in the museum rooms of the Porczynski gallery.

The main part of the Congress took place at the premises of the Institute of Biocybernetics and Biomedical Engineering and the International Center of Biocybernetics, Polish Academy of Sciences, the biggest biomedical engineering research center in Poland. Our Institute is located in the, so called "Ochota Campus" comprising several research institutes and clinics devoted to medicine, life sciences and bioengineering. We believe that the scenery of Congress venue helped to create a unique

scientific atmosphere during this scientific meeting.

Scientific Program of the ESAO Congress comprised:

- Four plenary lectures: "Cell transplantation as possible future technology in regenerative medicine", "Genotyping for prediction and understanding of outcomes of the patients with renal diseases", "Clinical needs for heart support" and "Current status of the artificial pancreas" were delivered by worldwide recognized scientists each day of the Congress, professor Tomasz Siminiak (Poznan, Poland), professor Bengt Lindholm (Huddinge, Sweden), professor Berd Meyns (Leuven, Belgium) and professor David Klonoff (San Francisco, USA), respectively.
- 21 sessions with 124 oral presentations and 165 poster presentations, which were discussed in 14 chaired sessions.
- Ten symposia:
 - The traditional ESAO Corporate Members lunch symposium: "New therapeutic tools with a potential for clinical benefits",
 - Six symposia sponsored by industry: "How to prevent and treat fluid and sodium overload in peritoneal dialysis" sponsored by Baxter, "Cardiac assist devices: from development to clinical application" sponsored by Arrow, MicroMed and VentraCor as well as "Cardiac assist devices: towards destination therapy" sponsored by arrow, Berlin-Heart, Thoratec and World-Heart, "Anticoagulation" and "Liver Support" both sponsored by sponsored by Fresenius Medical Care and finally "Diabetes treatment: how to prevent hyperglycemia" sponsored by Novo Nordisk and Medtronic MiniMed.
 - Three symposia organized by the ESAO Working Groups, which were held just before (Pre — Congress Heart Support Working Group Symposium) and during the Congress (Uremic Toxins and Apheresis Working Group).

All scientific presentations delivered during the Congress can be divided on topics related to the traditional ESAO fields of interest like: Artificial Kidney and Dialysis, Apheresis, Artificial Pancreas and Diabetes Treatment, Cardiac Assist Devices, Total Artificial Heart, Anticoagulation, Biomaterials, Modelling and Simulation, Artificial Lung and Gas Exchange and Respiratory Systems and Liver Support. The second part was devoted to topics related to a relatively new directions of society interest, that is: Tissue Engineering, Regenerative Medicine and Cell Therapy.

Organizing committee expressed great appreciation to all colleagues who supported organization of the Warsaw Congress during so called "Presidential dinner" organized at the premises of the Royal Castle. This event was supported by Fresenius Medical Care.

During the last evening all participants have had a chance to take part in the "Festive Dinner", which was organized at the beautiful Mazovian Castle in the

city Pultusk, 50 km from Warsaw. During this event a prestigious Bucherl Award was handed over to professor Daniel Loissance from Paris, France.

The closing ceremony and the Farewell Lunch were organized at the Congress site.

During the closing ceremony the ESAO Innovation Award and 3 Poster Awards were announced and handed over to winners. The ESAO Innovation Award of 500,- Euro was won by dr W. Kerkhoffs from Aachen, Germany for the presentation entitled "MicroVAD: ultra-small axial pump for long term cardiac assist". The first 500,- Euro Poster Award was won by dr O. Toporova from Kiev, Ukraine for poster "Human preproinsulin gene delivery into mammalian liver cells *in vivo*", the second 300 Euro by prof. M. Tanihara from Nara, Japan for poster "Engineered collagen-like polypeptide scaffolds controlling proliferation and differentiation of bone marrow stromal cells" and the third 200 Euro by dr A. Henseler from Aachen, Germany for poster "Non equilibrium O₂-dissociation curves (ODC): a new approach".

At the Congress there were 328 registered participants from 25 countries, that is from: Austria, Belgium, Brazil, Canada, China, Czech Republic, France, Germany, Greece, Hungary, Iran, Italy, Japan, South Korea, Macedonia, The Netherlands, Poland, Russia, Serbia and Montenegro, Spain, Sweden, Switzerland, Ukraine, United Kingdom, United States.

Professor Jan M. Wojcicki was a president of the Congress and professor Maciej Nalecz was a honorary president. Professor Jan M. Wojcicki and professor Andrzej Werynski were Program Chairmen and dr Piotr Ladyzynski was a chairman of the Local Organizing Committee.

During the Congress several companies took part in the industrial exhibition.

We noticed that our meeting in Warsaw resulted in many presentations of new ideas. We hope that our Congress will give not only a hope but will lead in the near future to more efficient than today substitution or regeneration of the lost functions of the organism.

All abstracts and Congress information are printed in the special issue of the International Journal of Artificial Organs vol. 27/No. 7, July 2004 (edt. Wichtig Editore, Milano-Birmingham-Osaka) available on-line (<http://www.artificial-organs.com>).

Fresenius Medical Care was major sponsor of the XXXI ESAO Congress. The Congress was also sponsored by Arrow International, Baxter, Berlin-Heart, MicroMed Tech., VentraCor, Thoratec, World-Heart, Novo Nordisk i Medtronic MiniMed.

J. M. Wójcicki

The International Congress of Theoretical and Applied Mechanics, 15–21 August 2004, Warsaw



The International Congress of Theoretical and Applied Mechanics took place between 15–21 August 2004 in Warsaw. The Congress venue was historical building of the Warsaw University of Technology. The congress brought together 1515 scientists from 55 countries of the whole World, and with 1417 papers confirmed, and 1274 presentations was one of the largest events in mechanics. It is worth to note a large number of Polish participants (194), delivering 141 contributions and three invited lectures.

The Warsaw meeting was the largest in number of participants and presentations ever in the long history of ICTAM. The congress in Warsaw was the twenty first congress of a series started eighty years ago in Delft, Netherlands. The idea of congresses devoted to mechanics, can be traced back to a conference devoted to the problems of fluid mechanics in Innsbruck, 1922. It was organized by four individuals, whose names, are and will, remain very well known to next generations of scientists, C. W. Oseen, T. Levi-Civite, T. von Kármán, and L. Prandtl. This first meeting was so fruitful, that the organizers decided to arrange similar meetings in the future, every four years, and to extend their scope to include solid mechanics.

Contemporary mechanics poses both, the fundamental problems from the area of pure science, and its strong links with modern technology. International Congress Theoretical and Applied Mechanics is the most important scientific event in mechanics and related disciplines, creating a unique opportunity for scientists to have an overview of the latest achievements in a broad spectrum of disciplines in which mechanics is playing an important role.

The scientific program of the 21st Congress consisted of plenary opening and closing lectures, sectional lectures, mini-symposia, and contributed papers presented in lecture and seminar presentation sessions. It covered all aspects of mechanics. The list below, showing 63 pre-selected topics of the lecture sessions, demonstrates the

broad field of theoretical and applied problems covered by the meeting:

Biological fluid dynamics • Combustion and flames • Complex and smart fluids • Convective phenomena • Drops and bubbles • Environmental fluid dynamics • Flow in porous media • Flow in thin films • Fluid mechanics of materials processing • Fluid mechanics of suspensions • Granular flows • Magnetohydrodynamics • Solidification and crystal growth • Stirring and mixing • Turbulence • Waves • Contact and friction mechanics • Control of structures • Damage mechanics • Fatigue • Impact and wave propagation • Mechanics of composites • Mechanics of porous materials • Mechatronics • Multibody dynamics • Rock mechanics and geomechanics • Solid mechanics in manufacturing • Stability of structures • Stochastic micromechanics • Structural optimization • Structural vibrations • Vehicle dynamics • Acoustics • Chaos in fluid and solid mechanics • Fluid-structure interaction • Mechanics of foams and cellular materials • Multiscale phenomena in mechanics.

Moreover 6 Mini Symposia were organized to deal with the following up to date, interdisciplinary subjects: Smart materials and structures • Tissue, cellular and molecular biomechanics • Mechanics of thin films and nanostructures • Microfluidics • Microgravity flow phenomena • Atmosphere and ocean dynamics.

The congress opening lecture was given by Prof. Wijn-gaarden. He recalled his contacts with Polish colleagues in the past and in a very impressive way commented several aspects of fluid mechanics, underlining its crucial role in understanding most of the technological and environmental processes. The main focus of several invited lectures and many contributions was directed on the last trends in the contemporary mechanics: nano-technology and interactions of nano- and micro structures in technology, as well as in biological objects. As one of the speakers (Prof. H. Gao) mentioned, there is time now to learn from nature not only how to fly but how to do it with a minimum effort. He demonstrated that the nanometer scale plays a key role in allowing biological systems to achieve their superior properties. Now this is challenge for the modern technology to understand, and to follow advices of our mother nature.

Bio-mechanics and health monitoring were one of the interdisciplinary subject very visible in the meeting. Prediction of structure damage in buildings, bridges, aerospace structures, containers became one of the most important tasks of contemporary mechanics, and several participants contributed to this fast developing discipline, which may revolutionize our safety measures for future constructions. In this field an important role of stochastic mechanics was exposed by Prof. Sobczyk, in his inspiring closing lecture.

Beside main stream of the Congress scientific program, two small events are worth to mention as well. One of them was informal meeting of the ERCOFTAC on Bio-

Fluid Mechanics and Heat Transfer (SIG 37) conjoined with Centre of Excellence for Applied Biomedical Modelling and Diagnostics (ABIOMED). The second informal meeting was Marie-Curie 6FP Session, organized to attract interest of young scientists to challenging problems of contemporary mechanics. This session was organized with great help of Prof. K. Wilmanski (WIAS, Berlin), and despite late hours gathered over 200 participants eager to discuss their problems with the prominent scientists.

During one week of the congress numerous fruitful discussions were conducted, new friendships and collaborative links were born. Participants had a fair chance to meet and discuss with specialists in almost any branch of the contemporary mechanics. This should help us to develop new interdisciplinary scientific links, the most important aim of such a huge meeting.

The Abstracts Book with CD-ROM Proceedings collecting all presentation is published by IPPT PAN, Warsaw. All information on ICTAM 2004, including all presentations, is available on the Congress website: <http://ictam04.ippt.gov.pl>.

Tomasz A. Kowalewski
ICTAM04 Secretary-General

PBZ-KBN-100/T08/2003 project ordered by Polish State Committee for Scientific Research on "Design Engineering and Manufacture of the Functionally Graded Materials"

In the domain of task 1: Development of the functionally graded materials (FGMs) technology in photonics and fuel cells (packet)

The co-ordination manager of the proposal: Prof. **Paweł Zięba**

The co-ordination organization: Institute of Metallurgy and Materials Science of the Polish Academy of Science in Krakow.

The main objective of the project to develop technology of new materials characterized by spatial irregularity of composition and microstructure assuring the specific purpose of controlling variations in thermal, structural or functional properties.

In the part concerning the photonics systems, the technology of large area emitters (ceramic multilayer structures with graded crystalline sizes) manufactured by plasma spraying method will be developed. These emitters could be applied in the image converters as flat TV tubes and display monitors. In addition, the crystallization technology of semiconductor graded materials of A^{III}B^V-N and A^{III}-N types with the quasi-continuous

change in optical parameters for application in detectors, photovoltaic devices as well as fibre optics, will be worked out.

In the domain of renewable energy sources, the technological advances in silicon solar are proposed. New generation of solar cells with graded modified structure, allowing for better utilization of the light energy spectrum, will be produced. The optimization of the chemical composition and structural parameters of the antireflection coating PECVD Si_xN_y , porous silicon PS in order to reduce reflection in the solar cell and n^+ emitter will lead to increase solar cells efficiency.

In the area of solid oxide fuel cells (SOFC), the preparation technology of solid electrolyte with CeO_2 base of optimum composition and the LaMO_3 cathode material working in the temperature range 650-800°C will be developed. Functional graded junction electrolyte/cathode material with a composition gradient assuring the continuous change in electric properties will be worked to increase considerably the durability (life-time) of the fuel cell. In the Institute of Energetics (Ceramics Department CEREL) the fuel cell prototypes with functional graded junction will be produced. Next, the prototypes obtained will be tested.

Finally, the theoretical modelling of properties of the functionally graded materials for applications in photonics and photovoltaics will be performed to predict the behaviour of ARC coatings. The analysis of graded antireflection coatings allow to select the optimal process parameters as well as elaborate the design and technological suggestions for photovoltaic structures.

Final impact of the project: elaboration of technical condition for commercial application and preparation of know-how proposal for small and medium companies.

B. Major

Knowledge based firms

New interesting research plans.

The Ministry of Scientific Research and Information Technology has instituted a new Ordered Research Project No. PBZ-KBN105/T10/2003 entitled:

AN INTEGRATED DYNAMIC SYSTEM OF RISK EVALUATION, DIAGNOSTICS AND CONTROL FOR TECHNICAL OBJECTS AND PROCESSES

The announcement inviting for tenders on the execution of this project was published in Rzeczpospolita of February 13, 2004. At present, the procedure verifying the submitted tenders is in progress.

The project is a large interdisciplinary research plan, to be executed by a chain of 32 research teams represent-

ing research centres of the Polish Academy of Sciences, and Departmental and Higher Education Institutes involved in the scientific line oriented on Machine Engineering.

The main final result of the project will be a methodology of developing "intelligent" management systems for a so called factories of the future, including a new-generation prototype of a hybrid, dynamic expert system that combines together the elements of risk evaluation, work safety control, and dynamic, material, thermal and flow diagnostics. This aspect, which can be expressed in a motto: knowledge based firms, knowledge management, makes an essential component of leading research priorities of Polish and European research space.

An important novelty of the project is a number of laboratories, such as the "Virtual Power Plant" laboratory, which allows data transmission, via internet, between scattered bases, with further preliminary verification of the developed system, and the laboratory consisting of a set of research rigs for verification of the developed active methods for controlling rotor-bearing systems with bushings made of multi-function materials.

Part of actions performed within the framework of the project aims at developing new methods of analysis for power turbine sets of new generation. Thus, it is oriented on making basis for safe, ecological, and highly efficient power industry. Making use of developed tools in the form of new hybrid expert systems in power industry seems to be very attractive from the future perspective, as large-power machines are considered critical, i.e. their possible failure affects in an extremely dangerous way the safety of work.

J. Kiciński

The new all-Polish centre of advanced technologies "RIMAMI"

As a result of the qualification procedure carried out by the Ministry of Scientific Research and Information Technology, the new Centre of Advanced Technologies „*Intelligent environments for modern systems of management, risk assessment and control in companies of the future*” acronym "RIMAMI" (**R**isk **M**anaging **A**mbient **I**ntelligence) has been established.

On the basis of the signed consortium contract, the Centre comprises 14 research institutions (Division IV of Technical Sciences of the Polish Academy of Sciences, 9 Technical Universities, 3 Institutes of the Polish Academy of Sciences, 1 Branch Institute) and 7 industry representatives (The Southern Power Concern S.A. in Katowice (PKE), Power Plant "Turow" S.A., ALSTOM Power S.A.

in Elbląg, SIEMENS Sp. z o.o. in Warsaw, ENERGO-CONTROL Sp. z o.o. in Kraków, FM-FAMUR S.A., OPTIMA-INVEST S.A.).

The Centre Co-ordinator is the Institute of Fluid-Flow Machinery of the Polish Academy of Sciences in Gdańsk and the Monitoring and Control Unit is Department IV Technical Sciences PAS.

The Centre of Advanced Technologies "RIMAMI" is an all-Polish Centre in both the thematic and territorial aspect. This characteristic of the Centre results from the performed studies and detailed identification of the needs for firms and companies representing mainly power industry and widely understood machine engineering. The performed identification of the needs took into account both big companies and concerns (such as power stations, turbine industry) and small and medium-size firms.

One of the main goals to be obtained by the Consortium is developing and implementing modern systems for management and risk control and for fast data transmission in scattered data and knowledge bases, including the entire intelligent environment that allows its proper functioning. In this context, the components of the so called environment intelligence are hybrid expert systems that bases on, among other elements, internet nano-servers and intelligent converters of ISS type (Intelligent Smart Sensors), systems for knowledge recording, storing and management, fast algorithms for detecting and evaluating states of machines and/or objects, multi-functional materials allowing introduction of new designs of machines and devices.

Management members of all firms and companies involved in the Consortium "RIMAMI" say unanimously that KNOWLEDGE BASED modern systems of manage-

ment and risk assessment are the main factor determining further development of a company and the increase of its competitiveness on the world and European arena. That is why new implementations in this area are absolutely necessary, especially in the light of integration processes taking place in the European economic space and requirements which Poland must comply with after our accession to the European Union.

The subject matter of the Consortium "RIMAMI" also includes activities oriented on new-generation power plants, i.e. safe and ecological power plants. This subject includes developing and implementing new highly effective calculation algorithms, modern methods of state description and knowledge gaining, as well as introducing new power technologies (new fuels, modified thermal cycles, new combustion techniques). The above subject is strongly recommended by domestic electric power plants and turbine industry. One of modules in the Consortium "RIMAMI" solely deals with this type of activities. The results of investigations and implementations made within the framework of this module will make components of KNOWLEDGE AND DATA BASES of modern management and risk control systems.

During the first meeting of Scientific Council of the Centre held in Warsaw, 18 November 2004, prof. W. Wlosinski has been elected as Chairman of Scientific Council (vice Chairmen: prof. Cz. Cempel, prof. T. Chmielniak) and prof. J. Kicinski as Director of the Centre (deputy directors: prof. W. Cholewa, ing. J. Tchórz). Professor W. Nowak has been elected as the Chairman of International Advisory Board.

J. Kiciński