

MINISTERUL EDUCAȚIEI NAȚIONALE



UNIVERSITATEA TEHNICĂ
DIN CLUJ-NAPOCA

LAUDATIO

Technical University of Cluj-Napoca
is awarding the title of
DOCTOR HONORIS CAUSA



Univ. Prof. Dr. Manfred HUSTY
Leopold – Franzens - Universität Innsbruck
AUSTRIA



Good afternoon Ladies and Gentlemen,
Mr. President of the Senate,
Mr. Rector,
Dear members of the Senate,
Distinguished guests,

On behalf of the Technical University of Cluj-Napoca, we are honoured to present the Laudatio for Professor Manfred HUSTY upon the award of the title of Doctor Honoris Causa.

Please allow us to begin with Platon' words:

“A grateful mind is a great mind which eventually attracts to itself great things”

Thus can Professor Husty' personality be described, whose brilliant collaboration, friendship and influence is linked to the Technical University of Cluj-Napoca for more than a decade.

Professor Manfred Husty is an outstanding scientific personality both in the University he represents in Austria (holding the position of Dean of the Faculty of Engineering from 2004-2008), and especially worldwide, where he is currently considered the most valuable specialist in series and parallel robot kinematics, being permanently invited for lectures at prestigious industry events in the U.S., Canada, Brazil and Argentina, from the West to the East, in far away corners of Russia, Australia, New Zealand and Japan, and known throughout the world due to outstanding contributions over the last 20 years in the development of robot kinematics.

Like every person of extraordinary value, Professor Manfred Husty's is of a paramount simplicity, as all those who had the great honor and privilege to work with him received all the attention, interest and vast knowledge that Professor Husty had to offer.

Professor Manfred Husty has a remarkable research and education experience in the domain of machines and mechanisms, especially in theoretical and applied kinematics, with excellent results in the field of robotics, automotive and aerospace engineering.

Professor Husty obtained his Ph.D. in 1983 at the University of Graz, a university of great tradition and the largest in Styria, exceeded only by the University of Vienna, which is the oldest German-speaking university in the world, founded by Duke Rudolf IV in 1365.

Collaboration with the Technical University of Cluj-Napoca began in year 2000, shortly after Professor Husty received the position of Director of the Institute for Geometry and CAD in the Faculty of Engineering, "Leopold-Franzens" University of Innsbruck, after an extended experience at another prestigious institution in Austria, the Montan University of Leoben, Austria. Within this collaboration it is considered also the establishment of a new



specialization in Mechatronics, at the University of Innsbruck in 2008, where the students exchanges and the development of international education increase permanently.

Professor Manfred Husty is a friend of the Technical University of Cluj-Napoca being a strong supporter of Romania in the international forums, of the Romanian School of Mechanics, particularly in terms of Robotics and Mechanisms/Machines Theory. It is important to mention the long-lasting successful cooperation between the Technical University of Cluj-Napoca and the University of Innsbruck, Austria, both in research and teaching.

Highly esteemed lecture was held at the Faculty of Machine Building, then at the AQTR International Conference 2006 organised by the Faculty of Automation and Computer Science.

Starting with 2011, there is operating a new cooperation agreement in research and teaching between University of Innsbruck and the Technical University of Cluj-Napoca, and in 2012 a new bilateral Erasmus convention was signed, which allows the exchange of students and teachers between the two universities and openness to international studies activities in the field of robotics and mechatronics.

The close collaboration of over a decade has been materialized through:

- Conducting joint papers;
- Working as guest Editor with professor Doina Pisla at the special edition „New Trends in Advanced Robotics” in “ROMANIAN JOURNAL OF TECHNICAL SCIENCES - APPLIED MECHANICS”, Nr.1-2/2013, Publishing House of the Romanian Academy;
- Organizing of the „European Conference on Mechanism Science (EUCOMES 2010)” in Cluj-Napoca, an event that has enjoyed great success with over 110 participants from around the world. The initiative of this conference belongs to Professors Husty and Ceccarelli, the first conference being held at Innsbruck, Austria in 2006, the second at Cassino in Italy in 2008 and fourth at Santander, Spain, in 2012;

The Cluj Gazette wrote on September, 13 2010 about the conference: "The best engineers in the world are gathering in Cluj", ... "Romania is the first country in Eastern Europe to receive permission to be an organizer of this event "... almost 60% of participants are specialists from Germany, Spain, Austria, Russia, Italy, France, Japan, Netherlands, Poland, Portugal, Czech Republic, USA, Taiwan and Turkey. "Among the foreign personalities present we mention the President of the International Federation for the Promotion of Mechanisms and Machines Science Prof. Dr. Marco Ceccarelli, the President of the Scientific Committee EUCOMES Prof. Dr. Burkhard Corves, the President of the Award Committee, Prof. Dr. Manfred Husty, the scope of EUCOMES is to ensure the best conditions for the dissemination of results of European science mechanisms of mechanical systems, robotics and mechatronics”;

- From the bilateral research projects it is important to mention the last approved project: Romania-Austria, No: 544/31.05.2012 “Development of innovative kinematic and dynamic models for parallel robots in surgical applications”;
- We also like to remind the joint organization of the "International Summer School on



Models and Methods in Kinematics and Robotics", Cluj-Napoca, 2012 where more than 40 Pd.D. and M.Sc. students from worldwide attended. Professor Husty was the co-chairman of this school and during the summer school he has been visiting professor at Cluj with highly regarded lectures on robot kinematics. Professor Husty was the initiator of this type of summer school in 2009 when he organized the Summer School in Innsbruck, Austria, event continued in 2012 by the Technical University of Cluj-Napoca, hopefully followed in 2015 in England by Jon Selig;

- The continued support of the Robotics specialization of Faculty of Machine Building, the Technical University of Cluj-Napoca, as well the English- medium and the Romanian-medium programs of study:
 - His excellent teaching skills led to an invitation to deliver lectures in this academic year for specialized courses in Mechatronics, in the Robotics, 4th year. This initiative had the approval of the Dean of the Machine Building Faculty, Professor Daniela Popescu and the Vice-rector Professor Stelian BRAD who is also the coordinator of the Robotics program of study.

This initiative allows access for the students to the latest techniques in the world of design and modeling of robot kinematics and increases the quality of the specialization "Mechatronics-Robotics" with a larger international openness.

The first Cluj-Napoca meeting will be held on 3 to 6 April 2013, when Professor Husty's lectures will be heard by both robotics students and all doctoral students enrolled in robotics research topics and related fields;

- Starting with the academic year 2013-2014, Professor Husty's lectures will be extended and adapted to the activity of "Robotics" M.Sc. level. Besides his great scientific activity, Professor Manfred HUSTY is an extremely pleasant and attentive person to the problems of young researchers and students, who can always find him a real support both for the professional and the human side.

The willingness to engage in the support of our Technical University of **Professor Manfred HUSTY** is over what we could ever allow ourselves to request.

After becoming totally acquainted with his scientific, educational and organizational work, we must say that Professor Manfred Husty is a distinguished scientist whose position in the world of science has already been established. Allow me to say that the International Science World is proud to have within its community such an eminent scientist and noble person as Professor Husty.

Thus we can understand why someone so dedicated in everything undertaken, as few experts of the international scientific community are, can manifest the desire to support the development of the Faculty of Mechanical Engineering, of the Technical University of Cluj-Napoca in parallel with that of Innsbruck, to achieve a level that would allow inclusion among the best universities in Europe, by reaching key points that will influence the higher ranking of our universities: **de aici Doina**



Outstanding contributions to the development of knowledge and / or institutions and academics

For over 20 years, Professor Husty is known to be extremely active in the international scientific community. The developments in the field of Kinematics, with a direct influence on robotics, machine tools, telecommunications, automotive and aerospace industry, from the mid-90s of the twentieth century is largely due to **Professor Manfred Husty** with his exceptional research; he continuously contributed to the development of IFToMM (International Federation for the Promotion of Mechanism and Machine Science - International Federation for the Promotion of Science Mechanisms and Machines, Romania being a founding member - 1969), being also the founder of the Technical Committee "Computational Kinematics", currently under Romanian presidency.

In Professor Husty's research activity, a very difficult domain of radical importance, that of parallel robots, drew his attention in the early '90s, contributing to innovative models and control algorithms oriented towards practical applications.

From early times, **Professor Husty** becomes active in the science of machines and mechanisms, synthesis of robot kinematics, quickly gaining a worldwide reputation.

Professor Husty is an advocate and promoter of the importance of geometry in kinematic analysis, maintaining the rich tradition of the Austrian Geometry School. He constantly underlines the importance of "old" geometry treaties which, more often than one might think, offer great solutions and ways to solve theoretical and practical problems of kinematics.

Starting from these premises, he uses the most modern tools such as symbolic computation programs, which showed outstanding results at the prestigious event in Ferrara - ARK 1992. On this occasion he demonstrated successfully the reduction of the number of equations necessary to calculate the direct kinematics of a Gough-Stewart parallel platform (a platform present also at the Technical University of Cluj-Napoca, Faculty of Machine Building) solving a difficult polynomial equation of order 40, confirming what was known to be the maximum number of solutions to this problem, but offering as a world first solution method.

The solution was so great that organizers of the exclusive ARK event (Advances in Robot Kinematics) changed for the first and only time their conference program and offered Professor Husty unlimited time for presenting this revolutionary solution.

Attention to youth is another defining feature of Professor Husty. He constantly tries to find a place for young talents, who are encouraged by all means. In this respect, it should be noted that he is the promoter of Summer schools in kinematic calculation which attracts personalities for lectures from around the world (Stanford, McGill, Sophia Antipolis, Bologna etc.) and many international PhD students.

Professo Husty has organized under IFToMM in 2009 in Innsbruck the first International Summer School "Mathematical Methods in Computational Kinematics", which was attended by students from Canada, Austria, Spain, France, Germany, Italy, Netherlands, China etc. and financial conditions were created for 5 PhD students of the Technical University of Cluj-Napoca, Faculty of Machine Building to participate. Also he had great involvement in organizing the Summer School "International Summer School on Models and Methods in



Kinematics and Robotics" in Cluj-Napoca, organised by the Research Center for Industrial Robots Simulation and Testing, under the patronage of the Technical University of Cluj-Napoca, Faculty of Machine Building, .

Here is what Professor Jean-Pierre Merlet, INRIA, Sophia Antipolis, France, a referential name throughout the literature involving parallel robots and control systems, tells about the first Summer School:

"In the two weeks we achieved an enormous task of teaching the elements of algebraic geometry with its applications in kinematics, elements of numerical continuity and interval analysis. Through lectures, examples and exercises, the students could learn about the basics and the fundamentals of geometric algebra (ideals and varieties), ordering terms and Groebner bases, elimination theory, dimensioning of ideal components and basic decomposition, such as numerical geometric algebra like homotopies, solution pathways, general homotopies, parametric continuity, irreducible number decomposition and use of specialized software packages such as HomLab or Bertini."

We can add the famous words of Professor Paul Zsombor-Murray, from the prestigious McGill University in Montreal, Canada:

"Manfred has done more than all the people I know, for promoting applications of classical geometry, especially with the original representations of Study and Blaschke, with particular reference for mechanical engineers. He combined classical geometry with modern calculation (both symbolic and that of numerical algebra) to create spectacular results."

Just listing the types of activities organized and conducted by Professor Husty, it gives us a comprehensive view of the complexity, diversity and intensity of their operation and allows us to better understand their full extent.

Professor Husty's activity is not limited to the group of specialists in mechanical transmission, kinematics and robotics, but also addresses the wider community of mathematics, with the most recent large-scale participation at the annual meeting of SIAM's (Society for Industrial and Applied Mathematics) from Pittsburgh, where Professor Manfred HUSTY certainly manifested as a true scientific leader, highly recognized in the international scientific community with a very important role in the dissemination of new and revolutionary results in the field.

Outstanding professional achievements

Professor Manfred Husty achieved outstanding results in the science of machinery and mechanisms, especially in robot kinematics geometry, kinematics, workspace analysis of planar and spatial mechanisms. The results have been materialized in many valuable publications, that is more than 35 articles published in prestigious ISI journals and international databases; 28 book chapter contributions; more than 50 papers published at international conferences all subjected to a rigorous review process; 5 books; and many other publications like Project Reports, Course Notes etc. All over the world, from Canada to India



and further on to Australia and Japan, his works have enjoyed great success over the last 20 years with more than 300 citations in prestigious publications from all over the world.

The volume and value of Professor Husty's knowledge determined that not only his works to be appreciated and cited in other works of value but his personality and pedagogical skills to be appreciated as a visiting professor at many universities in the world, among which we could mention the National University of Seoul, Korea, Bauman Moscow State Technical University, Russia, Technische Universität Graz, Technische Universität Dresda, Chennai University, Madras, India; Universidad National Lima, McGill University Montreal, Canada (where he also became a member of CIM - Centre of Intelligent Machines) and of course (which gives us a great honor) at the Technical University of Cluj-Napoca.

As another form of Professor Husty's recognition of merits is the request to take part in numerous international scientific committees such as: ARK (Advances in Robot Kinematics), CK (Computational Kinematics), EuCoMeS (European Conference on Mechanism Science), MUSME (Multibody Simulation and Mechatronics), Forum Mechatronics, IEEE San Francisco in 2001, NaCoMM (National Conference on Machine and Mechanisms) India and AQTR-Romania etc.

Professor Husty had and still has the quality of membership to committees and editorial offices of widely read journals used by researchers from major universities. Among them we should mention: CSME (Transactions of the Canadian Society of Mechanical Engineers), chief editor of IBDG (Informationsblätter der Geometrie), member of the editorial committee of EJCK (Electronic Journal for Computational Kinematics), editor of books resulting from the selection of valuable works from conferences like EUCOMES 2010, ARK 2008, ARK 2012, and last but not least Editor of the Special Edition "New Trends in Advanced Robotics" in "ROMANIAN JOURNAL OF TECHNICAL SCIENCES - APPLIED MECHANICS" formerly "REVUE ROUMAINE DES SCIENCES TECHNIQUES-SERIE DE MECANIQUE APPLIQUEE"), Vol 1-2, published by the Romanian Academy.

From this position, by imposing rigorous and high standards, he reviewed numerous papers in the field of robot kinematics, machines and mechanisms. All those who had the "misfortune" to have their work reviewed by him came to know the exemplary thoroughness and depth paid to reviews. In the same extent, he was concerned with the development and selection of highly qualified scientific reviewers, which raised the value of published and presented articles.

The most important awards of Professor Husty range between the International Scientific Exchange Award 1993-1994, awarded for outstanding achievements by the National Sciences and Engineering Research Council of Canada, and the 2010 IFToMM Dedicated Service Award, awarded by the President of IFToMM, Prof. Marco Ceccarelli.

Outstanding contributions or services to society and international community

Professor Manfred Husty is a reference figure in the community of Machinery and Mechanisms Science (MSS), which is deeply rooted in the activities of the International



Federation for the Promotion of Machines Science and Mechanisms (IFTToMM), where he was and still is extremely active with numerous services towards the society.

Professor Husty served from different positions inside the prestigious organizations below:

- President of IFTToMM Austria;
- Founding member of the International Technical Commission “Computational Kinematics” of IFTToMM;
- President of the Technical Commission “Computational Kinematics” (2005-2008);
- President of International Conferences, ARK 1998, EUCOMES 2006, ARK 2012;
- Co-president of EUCOMES 2010, Austrian Robotics Workshop 2011, conferences;
- President of the “Summer School on Mathematical Methods in Computational Kinematics”, 2009, Austria;
- Co-president of the “International Summer School on Models and Methods in Kinematics and Robotics”, 2012, Romania;
- Member in the scientific committees of numerous conferences: ASME (American Society of Mechanical Engineering), ARK (Advances in Robot Kinematics), EUCOMES (European Conference Mechanisms Science), REMAR (IEEE Conference Reconfigurable Mechanisms and Robots IEEE), NACOM (National Conference on Machine and Mechanisms-India), AQTR (IEEE International Conference on Automation, Quality and Testing, Robotics) etc;
- Active participant at International Congresses like IFTToMM and many others;
- Organizer of International Conferences and Workshops of great importance, such as:
 - History in Mechanisms and Machines, Admond (Austria);
 - Austrian-Yugoslavian conference on geometry;
 - Austrian-Czech Symposium on geometry.

We believe that all the issues raised constitute both strong and detailed arguments in support of the merit and also the honor of our university to obtain permission for awarding the title of Doctor Honoris Causa of the Technical University of Cluj-Napoca, to Professor Manfred Husty, as a recognition of his personality, scientific excellence and closeness shown to our institution.

In the end, we cordially congratulate Professor Manfred Husty for his great contribution to the world of science. We wish Professor Husty excellent health and we sincerely thank him for his outstanding contribution in the field, assuring him that we will continue our collaboration with the same enthusiasm and good results as before.

Cluj-Napoca, April 04, 2013

presented by

Daniela POPESCU, Prof. Dr. Ing., Dean of Machine Building Faculty

Doina PISLA, Prof. Dr. Ing., Vice-Dean of Machine Building Faculty