

CAS in a New Transnational Project

In March 2014 the Warsaw University of Technology signed a grant agreement with the National Centre for Research and Development to conduct a project called *Supporting Educational Initiatives of the Warsaw University of Technology in Teaching and Skill Improvement Training in the Area of Teleinformatics*.

The project, which is addressed to WUT MSc and PhD students as well as academics, provides opportunities for maintaining transnational scientific relations between the Warsaw University of Technology and three foreign institutions of higher education, i.e. the University of Luxembourg, Polytech Nantes and the Technical University of Denmark. The following leading ICT enterprises will also be closely cooperating with the WUT: Huawei Poland, IBM Poland, Samsung Electronic Poland – the R&D Center, Systemics-Pab, Orange (TP S.A.), and the Office of Electronic Communications. The main aim of the project, i.e. strengthening the didactic (including a practical mode of teaching) and scientific potential of the WUT academic community, will be achieved by implementing diversified forms: specialised courses, internships at enterprises specialising in innovative teleinformatics techniques, running regular postgraduate studies with the use of distance learning techniques, organising training sessions, organising *Do It Yourself* workshops, and granting targeted international research scholarships. All of the methods, innovative technological solutions and know-how to be used within the tasks of the project will be designed in collaboration with transnational partners.

The project leader is the Faculty of Electronics and Information Technology. Other WUT units collaborating within the project are the WUT Distance-Learning Centre and the Center for Advanced Studies. The latter is responsible for organising the task of Targeted International Research Scholarships. Scholarship winners will be selected via a competition. The laureates will be offered a 3-month-long study visit at one of the transnational partners.

The time framework for the project is March 2014 – June 2015.

The project is financed by the European Union within the European Social Fund.



CAS Advanced Studies Offer

Throughout the academic year the Center provides, within the CAS Advanced Studies Offer, a range of interdisciplinary basic and special lectures for WUT academics, MSc as well as PhD students. It is also addressed to representatives of other academic circles. The offer is to enrich and complement WUT students' knowledge acquired during their courses and to serve as inspiration in their scientific development.

Lectures delivered in the 2013/2014 autumn semester.

BASIC LECTURES

- Professor Piotr Przybyłowicz (WUT) – *Elements of Analytical Mechanics*
- Professor Marian Grynberg (UW) – *Semiconductors and their Role in the Information Age**
- Professor Jerzy Garbarczyk (WUT) – *Rudiments of the Physics of Solids*
- Professor Lucjan Piela (UW) – *Quantum Methods in Chemistry*
- Professor Jerzy Kijowski (PAS) – *Differential Geometry as a Tool in Understanding the Life Sciences**
- Professor Piotr Wolański (WUT) – *Cosmonautics**

SPECIAL LECTURES

- Piotr Bujak MSc Eng. Arch. (WUT), Kinga Zinowicz-Cieplik PhD Eng. (WUT), Professor Andrzej Kulig (WUT), Michał Pawlaczyk PhD Eng. (Schreder Polska), Jan Słyk PhD Eng. Arch. (WUT), Professor Elżbieta D. Ryńska (WUT), Professor Krystyna Guranowska-Gruszecka (WUT), Dariusz Gotlib PhD, DSc Arch. (WUT) – *Building Information Modelling (BIM)*
- Professor Marek Demiański (UW) – *The Universe – How Does it Work?**
- Piotr Bogorodzki PhD, DSc Eng. (WUT), Ewa Piątkowska-Janko PhD Eng. (WUT), Wojciech Obrębski MSc Eng. (WUT), Błażej Sawionek PhD Eng. (WUT), Wojciech Gradkowski MSc Eng. (WUT), Professor Paweł Grieb (PAS), Michał Fiedorowicz PhD (PAS) – *MRI in Biomedical Applications*
- Tadeusz Ciecierski PhD (UW) – *Philosophy of Mind, Cognition and Action**

For more information please visit:
<http://www.konwersatorium.pw.edu.pl/oferta/index.html>

* Lectures co-financed by the European Union within the European Social Found

Calendar of Events

- NOVEMBER 2013**
 - > WUT Colloquium Lecture: *1913 – A Breakthrough Year?* by Professor Andrzej Kajetan Wróblewski, Faculty of Physics, University of Warsaw
 - > Top Engineering series: *RFID in Monitoring Objects – the Know-How of Commercialising Research Results* by Professor Tadeusz Uhl, AGH University of Science and Technology (Cracow), EC Group
 - > International research scholarships for PhD students and academics – two competitions, 23 and 20 scholarship winners, respectively
 - > Academia Scientiarum Principalium – open lectures on mathematics and computer science addressed to secondary school pupils, students and teachers
 - > Publishing of the 5th issue of the CAS Newsletter
 - > *Interpersonal Communication and Creating Self-Image* – training session for WUT PhD students
- DECEMBER 2013**
 - > WUT Colloquium Lecture: *Stem Cells and their Application in Regenerative Medicine* by Professor Maciej Kurpisz, Institute of Human Genetics, Polish Academy of Sciences, Poznań
 - > The 4th workshop co-organised by the Polish Children's Fund and the Center for Advanced Studies
 - > Publishing of a book within the CAS *Lecture Notes* series titled *On the Mathematical Modeling of Complex Systems* by Professor Jonathan D. H. Smith
- JANUARY 2014**
 - > Top Engineering series: *Cryogenics in Physics, Technology and Medicine* by Professor Maciej Chorowski, Faculty of Mechanical and Power Engineering, Wrocław University of Technology
- FEBRUARY 2014**
 - > The Young Scientist Medal – the ceremony of awarding Szymon Kozłowski, PhD, Faculty of Physics, University of Warsaw
 - > A ceremony of awarding CAS scholarship holders with letters of congratulations. A special lecture titled *Working on the Large Hadron Collider at CERN and the 2013 Nobel Prize in Physics* by Professor Adam Kisiel, Faculty of Physics (WUT), member of the ALICE Collaboration team (CERN)
 - > Launching of the CAS Advanced Studies Offer for the 2013/2014 spring semester, 5 basic and 6 special lectures
 - > International research scholarships for PhD students and academics – two additional competitions, 15 and 7 scholarship winners, respectively
- MARCH 2014**
 - > Special seminar – *Large-scale Problems, Methods and Calculations as well as IT Challenges Supporting Such Tasks* – a series of lectures co-organised by the Center for Advanced Studies and the WUT Centre for Information Technology
 - > Top Engineering series: *Chematica: an Automatic Chemist for the 21st Century* by Professor Bartosz Andrzej Grzybowski, Northwestern University, USA
 - > Setting up a CAS team for interdisciplinary implementation projects
 - > Academia Scientiarum Principalium – open lectures on mathematics and computer science addressed to secondary school pupils, students and teachers
- APRIL 2014**
 - > WUT Colloquium Lecture: *The Brain and Its Consciousness* by Professor Andrzej Wróbel, Nencki Institute of Experimental Biology, Polish Academy of Sciences
 - > In the Center of Attention – presenting the Center's current activities and integrating academic communities around innovative ideas and projects

CAS Newsletter

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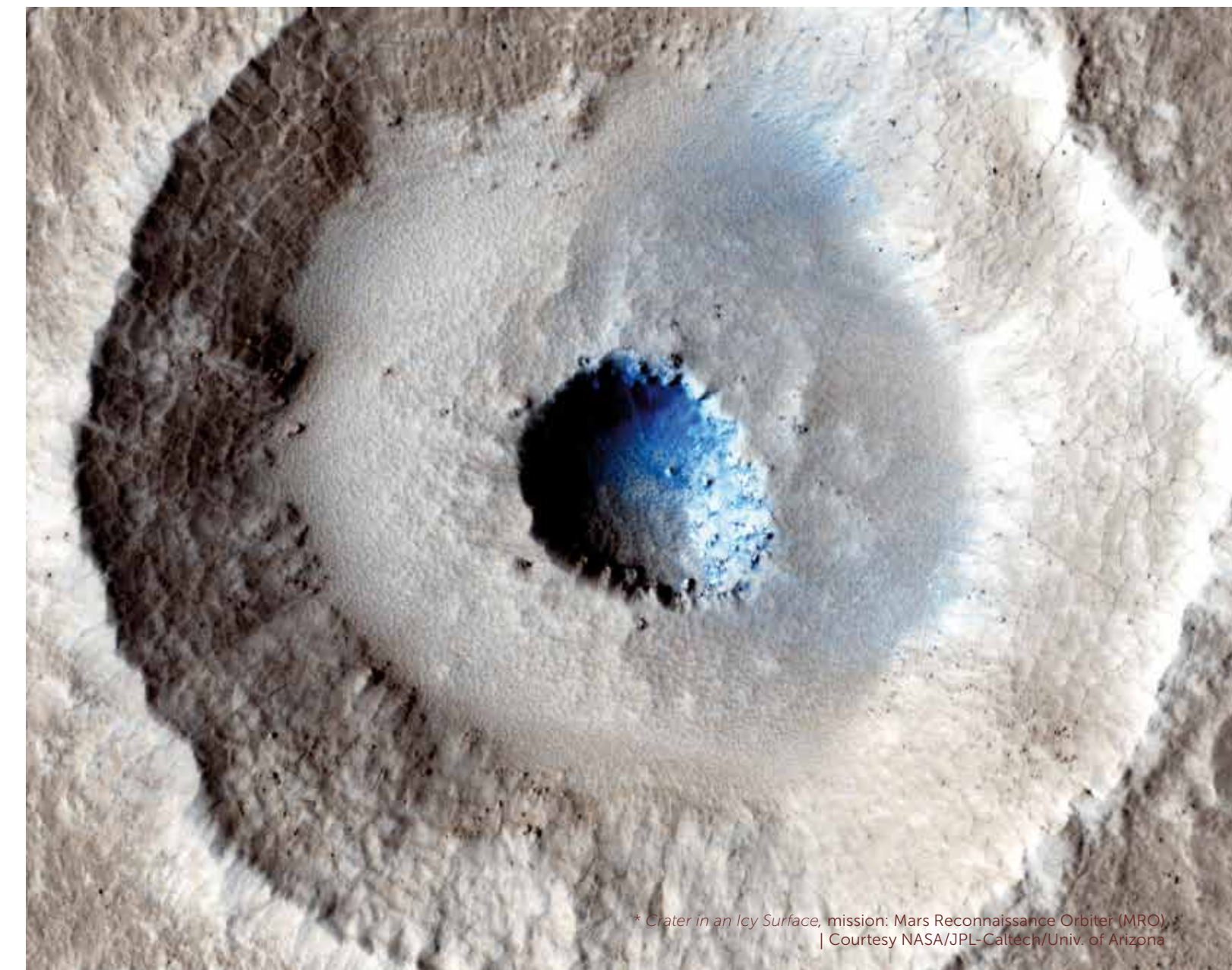
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Center for Advanced Studies

OF WARSAW UNIVERSITY OF TECHNOLOGY



* Crater in an Icy Surface, mission: Mars Reconnaissance Orbiter (MRO) | Courtesy NASA/JPL-Caltech/Univ. of Arizona

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In the Realm of Hypnos

Based on an interview given by Professor Peter Achermann which was published in the *Profundere Scientiam* CAS bulletin, issue no. 9.

For centuries, scientist have been striving to learn the mechanisms of sleep, yet, although we know quite a lot, there are still many undiscovered spots on the map of this scientific area. Thus, many researchers have attempted to solve the puzzles of sleep and Professor Peter Achermann is one of them.

By means of EEG and fMRI, Professor Achermann examines the physiological aspects of sleep and his attention is drawn to sleep homeostasis, which is a fundamental principle of sleep regulation tracing the relation of sleep quality, duration and degree of sleep pressure in relation to the prior history of sleep and waking. No less of a crucial part is played by the circadian rhythm – a self-sustained oscillatory mechanism, a clock, that is sensitive to light and which does not need to be “wound up”. It works independently of our sleep need. Humans are determined to sleep during the night and attempts to violate this predisposition may result in grave sleep disturbances. It is difficult to sleep at a different phase of the circadian cycle, i.e. during daytime because our most prominent sleep phase takes place at night. Sleep duration is an individual feature and if we try to shorten the duration of our sleep phase, at one point we will not be able to function properly. Fatigue is invincible and no matter how hard we try to stay awake, we will sooner or later fall asleep anyway.

Professor Peter Achermann – is a distinguished specialist in the mechanism of sleep regulation, including signal analysis of the EEG, mathematical modelling of sleep processes and circadian rhythms, imaging of sleep (brain mapping, PET studies, simultaneous EEG and fMRI measurements), sleep regulation during infancy, preschool age and adolescence as well as the effects of electromagnetic fields as emitted by mobile phones on sleep; in collaboration with clinicians, Professor Achermann examines the processes related to narcolepsy, sleep in Parkinsonian or stroke-affected patients, patients before and after stereotactic surgeries and patients who are in a comatose state. He is co-director of the Human Sleep Laboratory at the Institute of Pharmacology and Toxicology, University of Zurich, a member of the Steering Committee the Center for Integrative Human Physiology, group leader within the Neuroscience Center Zurich and a senior research associate. Professor Achermann is also the author of over 100 peer-reviewed publications and is fellow in numerous scientific associations, including the World Federation of Sleep Research and Sleep Medicine Societies, the European Sleep Research Society, the International Brain Research Organization (IBRO) and many others. Currently, he is the president of the Swiss Society for Sleep Research, Sleep Medicine and Chronobiology.

Professor Achermann is also interested in getting to know how sleep changes with age, in particular during infancy, preschool age and adolescence. He explained that we may be mistaken by making the assumption that older people sleep much less when compared to younger generations because often we do not count the naps people take during the daytime. Furthermore, in the course of the interview Professor Achermann unveiled a few more facts and hypotheses: sleep duration is individually determined, so is being the proverbial lark or owl, hibernation is not sleep but a far from it energy-consuming state that serves as a safety vault for animals living in severe environmental conditions, a long sleeper's brain may not act as efficiently during sleep as a short sleeper's brain, and that the close neighbourhood to cellular antennas does not disturb our sleep that much. Professor Achermann is convinced that although a great number of sleep aspects are fully known, many still remain unreversed cards – and it is his task as a scientist to shed some light upon some of them.

The Polish Leap Up

Based on an interview given by Professor Piotr Wolański which was published in the *Profundere Scientiam* CAS bulletin, issue no. 9.

Professor Wolański shares with readers his opinion on Poland's position in the contemporary space research. Space exploration has always been, and not without reason, associated with the most remarkable and laudable achievements in technology and has attracted the most prominent specialists. It is in this field that spectacular breakthroughs are being made and Poland, according to Professor Wolański, should be a player in this league too. Our country should engage more actively in space exploration – we possess nearly all the prerequisites, i.e. the intellectual potential of Polish engineers, students and scientists. As Prof. Wolański exemplifies, more than 70 complicated made-in-Poland devices were launched into space. Yet, wisdom, hard work and faith in our scientists are not enough – the last element to complete the picture is financing. And here Professor Wolański sees Poland's membership in the European Space Agency as a promising opportunity for obtaining funds so that Polish scientists can continue creating and developing top-notch devices that will be applied in modern space technologies. Although the membership fee is relatively high, the benefits of being an ESA member – access to state-of-the-art technologies and know-how – cannot be overrated.

Being aware of how vital it is to be in ESA is so enormous that even Polish politicians acknowledged its importance and ratified our membership in the ESA unanimously. Now we have to gain wider social support for investing in space exploration, and to do so tangible proof that it is worth the effort should be delivered to public opinion. As a result, more people will appreciate Polish commitment in this field and fewer will grumble about the sums of money being invested in such projects. Moreover, the ESA's financial resources are mostly allocated for the cognitive aspects of space surroundings that are nearest to Earth, for studying phenomena influencing the world's climate, weather and the Sun as well as for developing omnipresent technological solutions which will facilitate our lives to a great extent. Let us imagine a day without the Internet, bank transfers, paying by credit card, weather forecasts, satellite television and many more. It would be virtually impossible to perform our daily routines with-

out the benefits of the space conquest. Poland needs to take part in the advancement of space exploration. However, let us not think that getting our piece of this “pie” can be done from the ‘Earth’ vantage point. Knowledge obtained by looking at space through a telescope is only complementary of what we can achieve by marking our presence “out there”.

Professor Piotr Wolański – eminent specialist in mechanics, aeronautics (propulsion, internal combustion engines, combustion, combustion in micro-gravity, explosions, geophysics); recently affiliated with the Institute of Aviation in Warsaw and the Institute for Heat Engineering of Warsaw University of Technology. Professor Wolański is Chairman of the Committee of Space Research of the Polish Academy of Sciences and Second Vice-Chairman of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), member of the: International Academy of Astronautics (Paris), the Engineering Academy in Poland, the Warsaw Scientific Society, the Committee for Thermodynamics and Combustion of the Polish Academy of Sciences and also the Honorary President of the Polish Astronautical Society. Professor Piotr Wolański is laureate of numerous awards, including Doctor Honoris Causa of Azerbaijan Technical University (Baku), the A.K. Oppenheim Prize, the International Colloquium on the Dynamics of Explosions and Reactive Systems (ICDERS), USA, and he is recipient of the Dionizy Smolenski and Wactaw Cybulski Medals awarded by the Committee of Thermodynamics and Combustion of the Polish Academy of Sciences. He was also awarded the Golden Cross of Merit and the Bachelor Cross by the President of Poland. He received Award for the Whole Scientific Achievements by the Minister of Science and Higher Educations. Professor Wolański was the Dean of Faculty of Power and Aeronautical Engineering and Vice-Rector for Scientific Research of the Warsaw University of Technology. He is co-initiator of education in the Aerospace at WUT and supervised the manufacture of the first Polish artificial satellite PW-Sat which was launched in 2012; the author or co-author of more than 300 scientific publications.

CAS scholarships for visiting professors

The aim of the scholarship programme is to invite world-renowned scientists representing international research institutions who, by delivering lectures on innovative solutions and modern technologies as well as by running seminars with students, PhD students and academics, will strengthen the WUT academic community's intellectual potential.

IN THE AUTUMN SEMESTER OF 2013/2014 the Center for Advanced Studies hosted the following scientists:

- > Professor Adam KOWALCZYK, Victoria Research Laboratories, National ICT Australia (NICTA), The University of Melbourne, Australia
- > Professor Tomasz ŁĘTOWSKI, U. S. Army Research Laboratory, USA
- > Professor Mircea SOFONEA, Laboratoire de Mathématiques et Physique, Université de Perpignan Via Domitia, France
- > Professor Takuo FUKUDA, Tokyo Institute of Technology & Department of Mathematics, Nihon University, Japan
- > Professor Vyacheslav SEDYKH, Department of Higher Mathematics, Russian State Gubkin University of Oil and Gas, Russia
- > Professor Shuichi IZUMIYA, Department of Mathematics, Faculty of Science, Hokkaido University, Japan.

IN THE SPRING SEMESTER OF 2013/2014 the following professors will be visiting the Warsaw University of Technology:

- > Professor Michael GIERSIG, Department of Physics, Freie Universität Berlin, Germany
- > Professor Wojciech KNAP, University of Montpellier 2 & National Center for Scientific Research, France
- > Professor Ehrenfried ZCZECHE, Technical University Dresden & Fraunhofer IKTS Dresden, Germany
- > Professor Franck LEPRÉVOST, University of Luxembourg, Luxembourg
- > Professor Osamu SAEKI, Institute of Mathematics for Industry, Kyushu University, Japan
- > Professor Meir SHILLOR, Department of Mathematics and Statistics, Oakland University, USA
- > Professor Sabu THOMAS, School of Chemical Science, Centre for Nanoscience and Nanotechnology, Mahatma Gandhi University, India
- > Professor David DJURDO, National Center for Scientific Research, France

- > Professor Gaetano ASSANTO, Department of Electronic Engineering, University of Rome “Roma Tre”, Italy
- > Professor Adam KOWALCZYK, Victoria Research Laboratories, National ICT Australia (NICTA), University of Melbourne, Australia
- > Professor Christopher LECKIE, Department of Computing and Information Systems, University of Melbourne, Australia
- > Professor Ilan RIESS, Physics Department, Technion Israel Institute of Technology, Israel
- > Professor Maria del Carmen ROMERO FUSTER, Department of Geometry and Topology, University of Valencia, Spain
- > Professor Joachim RUBINSTEIN, Department of Mathematics and Statistics, University of Melbourne, Australia
- > Professor Bill BRUCE, Edge Hill University, Great Britain
- > Professor Michael BERRY, HH Wills Physics Laboratory, University of Bristol, Great Britain
- > Professor Joaquim Joao JUDICE, Instituto de Telecomunicações, Polo de Coimbra, Portugal
- > Professor Mutsuo OKA, Tokyo Institute of Technology, Japan
- > Professor Gerd RUDOLPH, Institute for Theoretical Physics, University of Leipzig, Germany
- > Professor Farid TARI, Instituto de Ciências Matemáticas e de Computação – USP, Brazil
- > Professor Tam Kam WENG, Faculty of Science and Technology, University of Macau, China
- > Professor Keizo YAMAGUCHI, Hokkaido University, Japan
- > Professor Tomoyoshi SHIMOBABA, Chiba University, Japan
- > Professor Goo ISHIKAWA, Department of Mathematics, Hokkaido University, Japan
- > Professor Seiji KURODA, National Institute for Materials Science, Japan
- > Professor Terence LANGDON, Department of Aerospace and Mechanical Engineering, University of Southern California, USA.

To find more information on scholarships for visiting professors please visit: <http://www.csz.pw.edu.pl/index.php/cszeng/Scholarships/Visiting-Professors>

The CAS scholarships are co-financed by the European Union within the European Social Fund