

Cosmologists meet to debate over secrets of the Universe

1st Roman Juskiewicz Symposium – 'The non-linear Universe' will be held in Warsaw (Poland) during the last week of August.

A cosmology symposium bringing together 70 scientists from all over the world started in Warsaw, Poland on the 24th of August. This five-day meeting has drawn the attention of eminent researchers, who share their achievements in the spirit of the late Polish cosmologist, Professor Roman Juskiewicz.

'The meeting will give young researchers a chance to get to know their experienced and internationally active senior colleagues,' said Dr. Wojciech Hellwing from the Institute for Computational Cosmology (Durham University, UK). This year's edition inaugurates a cycle of events to be held every few years in Poland. It will promote the development of Polish cosmology and provide young scientists the opportunity to enter the world of advanced research.

Cosmology studies the origins, structure and evolution of the Universe. The discussions held at the Symposium will focus on the basic problems of modern cosmology: what were the first structures that formed in space? How do galaxies form and evolve? What is the physical nature of dark matter and dark energy? From what, and in what way, did the large-scale structure of the Universe, observed in deep and wide surveys of the sky, form? What will be the future of our Universe?

Among the most distinguished guests of the event is Professor Carlos S. Frenk from Durham University. A recipient of the Gold Medal of the Royal Astronomical Society, as well as with the Gruber Prize in Cosmology, Prof. Frenk is the Director of the Institute for Computational Cosmology, and is a world-renowned researcher into the physical nature of dark matter and its impact on the evolution and structure of galaxies. Professor Adi Nusser from the Technion (Israel Institute of Technology), an expert in the proper motions of galaxies, theories of modified gravity and the large-scale structure of the Universe will discuss 'Cosmology with Equivalence Breaking and Lorenz Violation'. Professor François R. Bouchet (Paris Institute of Astrophysics), one of leaders of the European mission Planck, will give a lecture on the microwave background radiation. Dr. Agnieszka Pollo will focus on VIPERS – one of the largest surveys of distant galaxies, in which Polish researchers are also taking part. She represents two of the institutions organizing the symposium – the National Centre for Nuclear Research and the Astronomical Observatory of the Jagiellonian University (Cracow, Poland).

Professor Roman Juskiewicz is often dubbed 'the father of Polish cosmology'. After graduating from the Lomonosov Moscow State University under the supervision of Jakow Zeldowicz, in 1976 he moved to Warsaw. His doctoral thesis is often regarded as a classic textbook in cosmology. Among his many collaborators were John Barrow, Jim Peebles and Joe Silk. He was a professor at the University of Zielona Gora and Nicolaus Copernicus Astronomical Center (CAMK PAN) in Warsaw, one of the organizers of the Symposium.

Today, CAMK PAN is the leading astronomical institute in Poland. The main research subjects include: extrasolar planets, stellar astrophysics, binary systems, circumstellar matter, dense matter and neutron stars, black holes, accretion processes, structure and evolution of active galaxies, and of course cosmology.

The Interdisciplinary Centre for Mathematical and Computational Modelling (ICM) is Poland's leading research centre for computational sciences, administering large-scale hardware and data

infrastructure. Within ICM, particular emphasis is placed upon the mathematical foundations of computational modelling and their applications to science, technology and economics. ICM's IT structure includes high-performance computers and data-processing systems, as well as a wide range of scientific and operational software. ICM computing resources are adaptable to a variety of tasks and offer cost- and time-effective solutions.

ICM has recently launched OCEAN, a data-research centre with world-class High Performance Computing (HPC) infrastructure for science (hardware, software) capable of securely handling and processing big data to enable research on a previously unavailable scale. A new Massively Parallel Processing System with Petascale computing capability along with a high bandwidth data-storage system will be installed in ICM's new Data Centre in Warsaw.

The National Centre for Nuclear Research (NCBJ), also involved in the organization of the Symposium, is the largest research institute in Poland, currently hiring over 1,000 employees. Astronomy, cosmology and cosmic radiation are studied within its Astrophysics Division. Many collaborations of institute include CERN, DESY, FAIR, GANIL, CEA and JPARC. Besides pure research in the area of elementary particle physics, nuclear physics, plasma physics, material physics and astrophysics, the institute offers advanced computational and analytical services at the Świerk Computing Centre. The Institute is also largely involved in applied sciences. NCBJ manufactures subassemblies for the largest particle accelerators in the world, as well as its own accelerators for medicine, industry and science. It develops and manufactures new radiopharmaceuticals; in fact, it is one of the leading radiopharmaceutical manufacturers in the world. NCBJ also produces dedicated machines and equipment for medicine, as well as subassemblies for space missions.

The Astronomical Observatory of the Jagiellonian University is an astronomical institute is one of the oldest in Poland, operating continuously since 1792. The Observatory is involved in collaborations with the most renowned international research centres. Employees of the Observatory are engaged in research in cosmology, high energy physics, study of the stars, the Sun and comets. They were among those in Poland who initiated the collaboration with the European South Observatory (ESO) which resulted in Polish accession to ESO in 2014.

The Centre of Theoretical Physics of the Polish Academy of Sciences (CFT PAN), another of the organizers of Symposium, was established in 1979 by professor Iwo Białynicki-Birula, a pioneer in research on quantum electrodynamics and last year's laureate of the 'Polish Nobel', awarded by the Foundation for Polish Science. The Institute is a member and coordinator of the Network of Scientific Laboratory of Physical Foundations of Information Processing and a member of the National Council for Particle Astrophysics, in which it is represented by Professor Agnieszka Janiuk. Professor Bożena Czerny, also a researcher from CFT PAN, and will give a lecture 'Quasars for cosmology' at the Symposium.

The Symposium will be recorded by ICM TV. Footage will include memories of Prof Roman Juskiewicz given by his fellow cosmologists.

More information about Symposium: <http://www.romansymposium.pl/>.

More information about ICM and OCEAN project: www.icm.edu.pl; <http://ocean.icm.edu.pl>

Further information about '1st Roman Juskiewicz Symposium': romansym2015@sciencenow.pl

Chair of the Local Organizing Committee:
Dr Wojciech Hellwing
Interdisciplinary Centre for Mathematical
and Computational Modelling,
Institute for Computational Cosmology
Durham University
e-mail: pchela@icm.edu.pl,
pchela99@gmail.com

Media contact:
Dr Kamil Złoczewski
e-mail: kamil.zloczewski@sciencenow.pl