

ArAS News

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EUROPEAN ASTRONOMICAL SOCIETY PRIZES 2014



Tycho Brahe Prize. The 2014 Tycho Brahe Prize is awarded to **Prof. Antoine Labeyrie** in recognition of his innovative concepts and inventions now widely used in modern optical imaging at high angular resolution.

Lodewijk Woltjer Lecture. The 2014 Lodewijk Woltjer Lecture is awarded to **Prof. Rashid Sunyaev** for his outstanding career in theoretical and high-energy astrophysics, cosmology, X-ray astronomy and space research.

MERAC Prizes. The 2014 MERAC Prizes for the Best Doctoral Thesis are awarded in:

Theoretical Astrophysics to **Dr. Claudia Del P. Lagos** for her thesis on the treatment of star formation and feedback in simulations of galaxy formation.

Observational Astrophysics to **Dr. Amaury Triaud** for his thesis on the discovery and characterisation of many new exoplanetary systems.

New Technologies to **Dr. Boon Kok Tan** for his thesis on detector technologies for sub-millimetre wave astronomy.

Tycho Brahe Prize

Klaus Tschira Stiftung
gemeinnützige GmbH



The 2014 Tycho Brahe Prize is awarded to **Prof. Antoine Labeyrie** in recognition of his innovative concepts and inventions now widely used in modern optical imaging at high angular resolution.



The Tycho Brahe Prize is awarded in recognition of the development or exploitation of European instruments or major discoveries based largely on such instruments. The Tycho Brahe Prize is funded by the *Klaus Tschira Stiftung*, a German foundation, which was established by the physicist Klaus Tschira in 1995 as a non-profit organisation. Its primary objective is to support projects in natural sciences, mathematics, and computer sciences, raising public awareness and appreciation for these fields.

The European Astronomical Society awards its 2014 Tycho Brahe Prize to Professor Antoine Labeyrie in recognition of his outstanding contributions to modern optical imaging at high angular resolution. Having invented holographic gratings, Antoine Labeyrie proposed the technique of speckle interferometry, which allowed reach the diffraction limit of even the largest telescopes. Next, he was first to obtain interference fringes between two separate telescopes after the early single-telescope demonstration by A. Michelson et al. nearly a century ago. He continues to produce an amazing variety of innovative concepts for optical interferometry with large diffracting pupils.

Antoine Labeyrie is French by nationality. He did his studies at the University of Paris and at the Institut d'Optique Théorique et Appliquée, where he obtained his Master's. He received his PhD

from the University of Orsay in 1968, before starting his career as an optical engineer at the CNRS in 1971. He was appointed Professor at the Collège de France in 1991 and became a member of the Académie des Sciences in 1994. Throughout his career, Labeyrie has proved that he is an astronomer of singularly innovative genius, the source of the most important breakthroughs in the field of high angular resolution astronomy. Reaching the diffraction limit in optical light, then breaking through even this frontier by the practical application of interferometry was revolutionary, although it appears commonplace now.

Lodewijk Woltjer Lecture

The 2014 Lodewijk Woltjer Lecture is awarded to **Prof. Rashid Sunyaev** for his outstanding career in theoretical and high-energy astrophysics, cosmology, X-ray astronomy and space research.



Rashid A. Sunyaev was born and finished secondary school in Tashkent, before graduating from the Moscow Institute of Physics and Technology in 1966. He then became the PhD student of Yakov Borisovich Zel'dovich, who knew how to inspire his young colleague. The two scientists collaborated tightly over 22-years at the interface of theory and experiment. Sunyaev was Full Professor at the Moscow Institute of Physics and Technology from 1975 to 2001. He was first the Head of the Laboratory of Theoretical Astrophysics at the Space Research Institute of Moscow (1974-1982) and then of the High Energy Astrophysics Department in the same institute (1982-2002). Since 1992 he is Chief Scientist at this institute of the Russian Academy of Sciences. He became director of the Max-Planck Institute for Astrophysics in 1996 and then Maureen and John Hendricks Visiting Professor at the Institute for Advanced Study of Princeton in 2010. During his extremely successful career, Sunyaev has received numerous honours and awards all around the world.



MERAC Prizes

FONDATION MERAC (Mobilising European Research in Astrophysics and Cosmology) is a non-profit foundation started in 2012 with headquarters in Switzerland to recognize and support young European astronomers.



There are yearly three MERAC Prizes awarded by the European Astronomical Society. The prizes of €20,000 are for each of the three categories:

- ★ Theoretical Astrophysics
- ★ Observational Astrophysics
- ★ New Technologies (Instrumental/Computational)

The prizes alternate by year for:

- ★ Best Early Career Researcher Prizes (on odd years)
- ★ Best Doctoral Thesis Prizes (on even years)

Best Doctoral Thesis in Theoretical Astrophysics

The 2014 MERAC Prize for the Best Doctoral Thesis in Theoretical Astrophysics is awarded to **Dr. Claudia Del P. Lagos** for her thesis in the field of galaxy formation. Dr. Lagos' thesis represents two major breakthroughs that overhaul the treatment of star formation and feedback in the simulations of galaxy formation.



Her work has allowed the physical predictions of the galaxy formation models to be confronted directly with observations. Claudia Lagos is a Chilean who gained an undergraduate degree in 2007, followed by a Master's in 2009, both at Universidad Católica de Chile. With three publications at the end of her master's, Lagos was awarded a prestigious studentship jointly funded by the Science and Technology Facilities Council and the Gemini Observatory to carry out a PhD at Durham University. Lagos completed her PhD at the Institute for Computational Cosmology in November 2012. She was awarded the Department of Physics Keith Nicholas Prize for Outstanding Academic Achievement and

a Springer Thesis Prize, awarded to the three best theses in all physics each year. She recently took up a highly competitive fellowship at the European Southern Observatory in Germany. She continues to play a leading role in the development of state-of-the-art models of galaxy formation.

Claudia Lagos' PhD thesis focused on the galaxy formation model, GALFORM, which can implement essentially all existing theoretical models of star formation. Her work overhauls the two key processes at the centre of how galaxies are made: the formation of stars and the regulation of star formation following the injection of energy into the interstellar medium. These calculations represent the first real advances in these areas in over a decade. Lagos' work allows the physical predictions of the galaxy formation model, such as the content of the interstellar medium, to be confronted directly by observations from new major telescopes, such as the Atacama Large Millimetre Array (ALMA).

The PhD thesis of Claudia Lagos was carried out at the Institute for Computational Cosmology at Durham University (UK) between October 2009 and September 2012, under the supervision of Prof. Carlton Baugh and Dr. Cedric Lacey.

Best Doctoral Thesis in Observational Astrophysics

The 2014 MERAC Prize for the Best Doctoral Thesis in Observational Astrophysics is awarded to **Dr. Amaury Triaud** for his thesis in the field of exoplanets. During his doctorate, Dr. Triaud conducted the radial velocity confirmation of transiting exoplanet candidates produced by the



WASP survey, confirming 48 new systems. By measuring the angle between the stellar rotation spin and the planet's orbital spin, he discovered that many hot Jupiters occupy non-coplanar orbits, a result that has a big impact on planet formation and orbital evolution models.

Amaury Triaud is currently doing a postdoctoral fellowship supported by the Swiss National Science Foundation, at the Massachusetts Institute of Technology, in the USA. His path is an example of contemporary youth in Europe: born and schooled in France, he then decided to pursue his

undergraduate studies at the University of St Andrews in Scotland graduating in 2007 with a Masters of Physics. His summers were spent in France (2003 & 2004), Germany (2005) and Switzerland (2006) doing research internships that nurtured his scientific career and produced his first papers. He moved to Geneva in 2007 for a four-year PhD program that was completed in August 2011. The number, variety and citation rate of his publications are a testimony of his achievements during and since his thesis. He also applied his skills to the service of multiple outreach activities to bring science to the wide public.

Amaury Triaud conducted the radial velocity confirmation of transiting exoplanet candidates produced by the Wide Angle Search for Planets (WASP). This led to the confirmation of 48 new nearby exoplanetary systems, which are prime targets for characterisation. Triaud chose to focus on measuring the angle between the star's rotation axis and the planet's orbit. Multiple observations using ESO's HARPS spectrograph unveiled the earliest evidence for planets on retrograde orbits and found that a large fraction of hot Jupiters do not occupy orbits coplanar with their star. Those results shacked widely held believes about planet formation and migration scenarios and triggered a flurry of theoretical papers and additional observations.

The PhD thesis of Amaury Triaud was carried out at the Observatory of the University of Geneva (Switzerland) between August 2007 and August 2011, under the supervision of Prof. Didier Queloz.

Best Doctoral Thesis in New Technology

The 2014 MERAC Prize for the Best Doctoral Thesis in New Technology is awarded to **Dr. Boon Kok Tan** for his thesis in the field of sub-millimetre wave astronomy.

Dr. Tan's research for the PhD has contributed significantly to the advancement of the state of the art of coherent detector technologies. This includes fully integrated SIS mixer chips with wide RF and IF bandwidth, which are suitable for future heterodyne arrays, and advanced designs such as balanced and single side-band mixers.



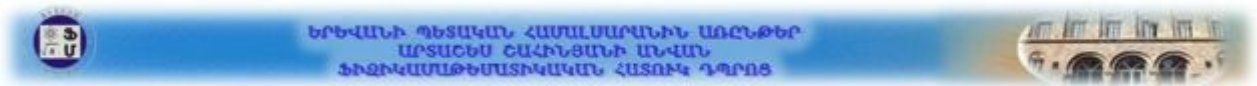
Boon Kok Tan was born in a small town (Taiping) in Malaysia. At the age of 17, he was selected to become already an undergraduate student at the University of Technology Malaysia, due to his exceptional school performance. After completing the Bachelor degree in Electrical and Electronic Engineering in 2001, he was offered a postgraduate position in Solar Engineering, and was awarded the Master degree in 2002. Following a lecturing career at Tunku Abdul Rahman University in Kuala Lumpur, he was offered a D. Phil position – funded by the prestigious King of Malaysia awards – at Oxford Astrophysics to work on the development of quantum limited coherent detectors for submillimetre astronomy. B. K. Tan obtained the D. Phil degree at Oxford in 2012. He is currently a member the Millimetre Detectors group of Oxford Astrophysics, leading the development of coherent THz detectors for the Atacama Large Millimetre Array (ALMA) and collaborates also with the Wawasan Open University, Malaysia.

Boon Kok Tan's thesis describes the development of receiver technologies for sub-millimetre astronomy instruments, focusing on high performance coherent cryogenic detectors operating close to the superconductor gap frequency. The mixer receiver developed in his thesis work contributed novel ideas in all three major parts of Superconductor-Insulator-Superconductor (SIS)

mixers. These novel detector systems pave the way into high performance THz mixers, which will have a strong impact on sub-millimetre wave astronomy.

The PhD thesis of Boon Kok Tan was carried out at the Department of Physics and Astrophysics of the University of Oxford between October 2007 and June 2012, under the supervision of Dr. Ghassan Yassin.

REPUBLICAN SCHOOL ASTRONOMICAL OLYMPIAD



The final (Republican) phase of the Astronomical School Olympiad was held at Yerevan , Phys.-Math. School (PMS) after A. Shahinyan on April 5-6. In total 28 pupils from Yerevan, Aragatzotn, Ararat, Armavir, Kotayk and Shirak provinces took part, including International Astronomical Olympiads 2011-2013 medal winners (Martirosyan Gevorg, Vasilyan Arsen, Mambreyan Vardges, Topchyan Hrant, Babakhanova Siranush and Mabreyan Ara). Dr. Ashot Hakopian, BAO senior researcher, was the Chair of the Jury and the other members were BAO researchers Dr. Ararat Eghikian, Dr. Marietta Gyulzadian, and Dr. Areg Mickaelian, Yerevan State University lecturer Dr. Emilia Karapetian, Armenia State Pedagogical University lecturer Dr.Sergei Nersisyan, International Astronomical Olympiad 2004 winner and BAO PhD student Tigran Nazaryan and International Astronomical Olympiads 2001-2003 triple winner Zhirayr Avetisyan.

Five problems were offered from the fields of celestial mechanics, astrometry, astrodynamics and radiation theory. Most of the participants showed deep knowledge and displayed high results. Pupils from PMS, the Armenian State Engineering University (ASEU) College and the “Quantum” college showed the best results. As a result, First-rank diploma were awarded to Vasilyan Arsen (ASEU), Vardanyan Edgar (PMS), Mambreyan Vardges (PMS) and Martirosyan Gevorg (PMS), Second-rank diploma to Topchyan Hrant (PMS), Matevosyan Ashot (“Quantum”), Grigoryan Eduard (“Quantum”), Khalafyan Edvard (“Quantum”), Babujyan Hrachya (PMS), Harutyunyan Hayk (“Quantum”), Mambreyan Ara (PMS) and Babakhanova Siranush (PMS) and Third-rank diploma to Fyodorov Eduard (PMS), Aslanyan David (PMS), and Mkrtumyan Karen (PMS).

The participants received certificates, as well as Avetik Grigoryan awarded his popular science book *"From the Deep of Ages to the Universe"* to the First-Rank winners. In addition all participants received books and booklets about BAO and Armenian astronomers and astronomical calendars on behalf of ArAS.

This Olympiad was also a qualifying phase for International Astronomical Olympiad (IAO) that will be held this fall in Kyrgyzstan. Let us remind that the Armenian pupils have excellent traditions at IAO, having 8 gold, 5 silver and 18 bronze medals in total and by team counts being one of the best during the whole 18-year history of Olympiads.

ANNIVERSARIES

Ruben SAHAKIAN – 100. On February 15, it was 100th anniversary of one of the first researchers of the Byurakan Astrophysical Observatory (BAO) *Dr. Ruben Sahakian.* Ruben Harutyun Sahakian was born on 15 February 1914 in the village Ttu-jur (Krasnoselsk). He graduated from Yerevan State University (YSU) Physics-Mathematics Department in 1940 with the specialization of Mathematics. Sahakian started working at BAO in 1946, just since its foundation. He was a member of the Department of Theoretical Astrophysics. He had his PhD fellowship in 1948-1950 and defended his thesis in 1952 with the specialization of Astrophysics. Since 1953 he was a senior research associate. Sahakian's works related to the solution of the problem of falling bodies, the influence of external forces on the inertial acceleration in the relative motion of two bodies, the additional acceleration in the motion of celestial bodies, the probability of capture in the three-body problem and other topics of celestial mechanics and astrodynamics. He published a number of papers in Astronomy Reports (Soviet Astronomical Journal), Communications of BAO, and proceedings of meetings. Sahakian published a book "*The influence of external forces on the inertial acceleration in the relative motion of two bodies*" (Publ. BAO, 1969, 47 p.). He retired in 1988 and passed away in 1999 in Yerevan.