



## 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)

The awardees are also eligible for further support from the FONDATION MERAC.

The MERAC Prize Committee was impressed by the high quality of all the 24 nominated candidates for the three MERAC Prizes of 2014.

## 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 thesis 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).*



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.