

# Team in breakthrough research to discover new planets

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Scientists from Queen's University Belfast have partnered with leading astrophysicists across Europe for a ground-breaking space research project that will form a crucial step in the quest to study small, rocky planets orbiting other stars and discover new planets.

The Next-Generation Transit Survey (NGTS) has achieved first light at the European Southern Observatory's (ESO) Paranal Observatory in Chile, and will reach a level of accuracy never before attained under observatory conditions. A suite of highly sensitive telescopes - parts of which have been manufactured in Belfast - will search for 'transiting exoplanets' which are [planets](#) that pass in front of their parent star and hence produce a small, periodic dimming of that star's light. Only a few such very delicate observations have ever been made, but NGTS should provide many more opportunities.

NGTS will focus on discovering Neptune-sized and smaller planets, with diameters between two and eight times that of Earth, that orbit relatively nearby bright stars - making detailed follow-up of the planets possible. The NGTS data will flow into the ESO archive system and will be available to astronomers worldwide for decades to come.

Designed to operate in robotic mode, the Paranal site will continuously monitor the brightness of hundreds of thousands of stars in the southern skies and should reach a level of accuracy—one part in a thousand—that has never before been attained with a ground-based wide field survey instrument.

One of those involved, Dr Christopher Watson from the Astrophysics Research Centre at Queen's University Belfast, said: "This is a truly exciting time and a major coup for Queen's. NGTS will not only discover a whole host of [new planets](#), including 'super-Earths' a little larger than our own planet, but some of these will be amongst the best planets with which to perform more detailed investigations. Are we looking at a rocky, terrestrial-like planet? What are their atmospheres like? It was not so long ago that answering such questions was unthinkable - NGTS discoveries will keep us occupied for many years."

Belfast-based Andor Technology, a spin-out company from Queen's University and now a multinational with offices in China, Japan and the USA, has provided the scientific camera equipment at the Paranal site. These cameras are specially modified versions of the iKon-L 4 Megapixel CCD, combining additional near infra-red sensitivity with a capability to accurately quantify signal ranging from bright to extremely weak. Product Manager for scientific cameras, Dr Colin Coates said: "This is great for our company and great for Belfast. We have been supplying detectors to this prestigious consortium for several years, during which time Andor has become a very strong solution provider to the broader astronomy community."

Professor Stephen Smartt, Director of the Astrophysics Research Centre at Queen's said: "Being part of this novel and ground-breaking project reflects Queen's global standing in astrophysics research. There is potential to make some remarkable discoveries with this system. The School of Mathematics and Physics at Queen's was recently placed 3rd in the UK physics departments in the Times Higher REF 2014 rankings for research intensity while the university as a whole was ranked in the top ten for research intensity. Our research scientists are making an impact in international projects and it's tremendous to see Belfast-made detector technology at the heart of these machines."

This is the first private facility to be installed on Paranal. ESO already operates the Very Large Telescope (VLT) - the world's most advanced visible-light astronomical observatory - at the site. The discoveries of NGTS will be studied further using other larger telescopes, including the VLT. In particular, it may be possible to probe the atmospheres of the exoplanets whilst they are in transit. At this time some of the star's light passes through the planet's atmosphere, if it has one, and leaves a tiny, but detectable, signature.

Along with Queen's University Belfast, the NGTS Consortium is composed of academics from the University of Warwick, UK; the University of Leicester, UK; the University of Cambridge, UK; Geneva University, Switzerland; and DLR Berlin, Germany.

Provided by Queen's University Belfast

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