c. Early Achievements Track-record

Dr. Nicholas P. Ross's (*NPR*) research focuses on implementing novel algorithms and techniques in order to discover and study the physical processes in quasars. After spending 7 years in the United States (working at Penn State, Lawrence Berkeley National Lab and then as an Assistant Research Professor at Drexel University) he returned to the U.K. with the award of an STFC Ernest Rutherford Fellowship, one of the most senior personal astrophysics fellowships in the UK, which has an application oversubscription of ~20:1 and is over £500,000 (€630,000) on award.

The P.I. has established himself as an independent lead investigator and has led the discovery of a new types of quasars: the **Extremely Red Quasars**, (*NPR* et al. 2015) with his research team leading the discovery of the first sample of the new **Changing Look Quasars** (MacLeod, *NPR* et al. 2016). The P.I.'s team has also led the production of the largest areal space-based survey using NASA's *Spitzer Space Telescope* (Timlin, *NPR* et al. 2016). This has led to the first measurement of infrared quasar clustering at high-redshift (Timlin, *NPR* et al. 2017).

The P.I. led the team that was responsible for obtaining the quasar data necessary for the SDSS-III BOSS cosmology experiment, leading to the first measurement of baryon acoustic oscillations at high-redshift. The P.I.'s leadership includes leading science teams such as the SDSS-III BOSS Quasar Science Working Group which has resulted in an extremely high publication output including 118 peer-review journal articles with 15,000 citations and an *h*-index of 59 (SAO/NASA Astrophysics Data System). This is world-leading for any astrophysicist and virtually unparalleled by his contemporaries at a similar career stage.

Dr. Ross has become an expert in a suite of research methodologies in **data science** and machine learning. In particular, at the heart of Dr. Ross's research with the SDSS-BOSS project, was anomaly detection in extremely large datasets. Dr. Ross was a co-founder and Chief Data Scientist of, **String Security *Inc.*** There he built a predictive threat detection and remediation platform for cyber security teams by applying machine learning and predictive algorithms. The P.I. is currently in discussion with Informatics at the UoE on novel potential joint projects and research avenues.

Relevant Selected Journal Publications ***(N.B. None of these with PhD supervisor)***

Pâris, Isabelle; Petitjean, Patrick; **Ross, Nicholas P.** et al "*The Sloan Digital Sky Survey Quasar Catalog: Twelfth data release",* 10.1051/0004-6361/201527999, **2017A&A...597A..79P** **88 citations**

Hamann, Fred; Zakamska, Nadia L.; **Ross, Nicholas P.** et al. *"Extremely red quasars in BOSS"*, 10.1093/mnras/stw2387, **2017MNRAS.464.3431H**, **13 citations**

Timlin, John D.; **Ross, Nicholas P.** et al. "*SpIES: The Spitzer IRAC Equatorial Survey",* 10.3847/0067-0049/225/1/1 **2016ApJS..225....1T**, **13 citations**

MacLeod, Chelsea L.; **Ross, Nicholas P** et al. "*A systematic search for changing-look quasars in SDSS",* 10.1093/mnras/stv2997, **2016MNRAS.457..389M**. **42 citations**

Ross, Nicholas P. et al. *"Extremely red quasars from SDSS, BOSS and WISE: classification of optical spectra"*, **2015MNRAS.453.3932R**, 10.1093/mnras/stv1710, **25 citations**

Font-Ribera, Andreu; Kirkby, David; Busca, Nicolas; Miralda-Escudé, Jordi; **Ross, Nicholas P.** et al. "*Quasar-Lyman α forest cross-correlation from BOSS DR11: Baryon Acoustic Oscillations",* 10.1088/1475-7516/2014/05/027 **2014JCAP...05..027F** **164 citations**

Pâris, Isabelle; Petitjean, Patrick; Aubourg, Éric; **Ross, Nicholas P.** et al. "*The Sloan Digital Sky Survey quasar catalog: tenth data release"* 10.1051/0004-6361/201322691, **2014A&A...563A..54P** **153 citations**

Ross, Nicholas P. et al. "*The SDSS-III Baryon Oscillation Spectroscopic Survey: The Quasar Luminosity Function from Data Release Nine",* 10.1088/0004-637X/773/1/14 **2013ApJ...773...14R**, **98 citations**

Ross, Nicholas P et al. "*The SDSS-III Baryon Oscillation Spectroscopic Survey: Quasar Target Selection for Data Release Nine",* 10.1088/0067-0049/199/1/3, 2012ApJS..199....3R **177 citations**

Pâris, I.; Petitjean, P.; Aubourg, É.; Bailey, S.; **Ross, Nicholas P.** et al. "*The Sloan Digital Sky Survey Quasar Catalog: Ninth Data Release*", 10.1051/0004-6361/201220142, 2012A&A...548A..66P **182 citations**

Schneider, Donald P.; Richards, Gordon T.; Hall, Patrick B.; Strauss, Michael A.; Anderson, Scott F.; Boroson, Todd A.;, **Ross, Nicholas P.** et al. "*The Sloan Digital Sky Survey Quasar Catalog. V. Seventh Data Release*", 10.1088/0004-6256/139/6/2360
2010AJ....139.2360S **585 citations**

Ross, Nicholas P et al. "*The SDSS-III Baryon Oscillation Spectroscopic Survey: Quasar Target Selection for Data Release Nine*", 10.1088/0067-0049/199/1/3, **2012ApJS..199....3R**, **178 citations**

Ross, Nicholas P et al. "*Clustering of Low-redshift (z <= 2.2) Quasars from the Sloan Digital Sky Survey*, 10.1088/0004-637X/697/2/1634, **2009ApJ...697.1634R** **158 citations**

PRIZES AND AWARDS

2014 - 2019	STFC Ernest Rutherford Senior Fellowship
2009 - 2016	*Architect* SDSS-III: Baryon Oscillation Spectroscopic Survey (BOSS)
2003 - 2008	PPARC Student Fellowship, *Durham University*

SELECTED LEADERSHIP

2018	P.I. Liverpool Telescope program: *The Optical Monitoring of IR-variable Quasar*s
2018 -	P.I. *JWST* Cycle 1 GO program: *Quasar Physics with the MIRI MRS* (to be submitted)
2017 -	P.I. WISE W4 Compendium (WW4C)
2016 - 2017	Co-founder and Chief Data Scientist of *String Security Inc.*
2014 - 2019	P.I., STFC Ernest Rutherford Fellowship
2013 - 2016	Co-P.I., *Spitzer Space Telescope* program "SpIES: The Spitzer-IRAC Equatorial Survey"'
2012 - 2014	Co-P.I., *Hubble Space Telescope,* program "High-Luminosity Obscured Quasars at z~2.5"
2011	Chapter Editor, *BigBOSS* NOAO Proposal, arxiv.org/abs/1106.1706v1
2011	P.I., SDSS-IV: BOSS-Plus (accepted Nov 2011; merged into SDSS-IV: eBOSS)
2009 - 2012	Chair, SDSS-III BOSS Quasar Working Group
2008 - 2010	Lead, SDSS-III BOSS Quasar Target Selection Group
2008 - 2010	P.I., NASA *Swift* Cycle 5 Long-term local AGN monitoring program

SELECTED PRESENTATIONS

2017 Nov	*Dealing With Data 2017 Workshop,* Selected Oral Contribution	
2017 Jul	Unveiling the Physics Behind Extreme AGN Variability, Conference Summary	
2017 May	University of Cambridge	Galaxies Discussion Group
2017 Apr	University of Glasgow	Weekly Seminar
2016 Jun	JWST@ROE conference	Contributed talk
2016 May	University of Michigan	Astrophysics Seminar
2016 May	Great Lakes Quasar Symposium	Oral Contribution
2016 April	Liverpool John Moores University	Astrophysics Seminar
2015 Sep	Multiwavelength AGN Conference, Crete, Invited Review	
2015 Jun	ICG, Portsmouth	Cosmology Colloquium}\\
2015 Apr	Adler Planetarium, Chicago,	Astrophysics Seminar
2015 Jan	225th AAS, Seattle	Special Session talk
2014 Sep	Princeton University	CosmoLunch talk & Invited talk "Heritage of Stripe 82" meeting
2014 May	Harvard University	HEAD talk
2014 Apr	University of Pennsylvania	Astrophysics Seminar
2013 May	Stanford University	KIPAC Tea Talk
2013 Jan	University of Washington	Colloquium
2012 Apr	Trieste, Italy	"Interacting Galaxies and Binary Quasars"
2012 Jan	New York University	Plenary Talk, BOSS Collaboration meeting
2011 Jul	Oxford University	BICAP Cosmology Seminar
2011 May	Yale University	YCAA Seminar