Dr Matt Nicholl

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Interests

Astrophysics of transient sources, superluminous supernovae, gravitational wave follow-up, tidal disruption events, fast radio bursts, time-domain surveys, optical and near-infrared observations, spectral analysis, light curve modelling, transient host galaxies

Appointments

2019–	Lecturer and Royal Astronomical Society Research Fellow
	University of Birmingham
2018–2019	Royal Astronomical Society Research Fellow
	University of Edinburgh
2015–2018	Postdoctoral Research Fellow
	Harvard-Smithsonian Center for Astrophysics

Education

2012–2015	PhD, Astrophysics
	Queen's University Belfast
	Thesis: Observations and modelling of superluminous supernovae
2008–2012	MPhys (First Class), Physics
	Oxford University

Awards and Grants

2019	Hubble Space Telescope General Observer grant, Cycle 27
2018	Royal Astronomical Society Research Fellowship · 3 years salary and research budget · Only 1-2 Fellowships awarded per year
2018	NASA Chandra Observer grant, Cycle 20

2017	Hubble Space Telescope General Observer grants (2), Cycle 25
2016	Hubble Space Telescope General Observer grant, Cycle 24
2016	Michael Penston Prize of the Royal Astronomical Society · "Best UK thesis in astronomy or astrophysics"
2014	SET for Britain finalist · Presented my work at the Houses of Parliament

Recent invited talks

Mar 2020	Liverpool John Moores University colloquium
Feb 2020	University of Southampton colloquium
Aug 2019	Hot-wiring the Transient Universe, Northwestern University
Apr 2018	EWASS Symposium on GRB-SN connection, Liverpool
Mar 2018	University of Rochester colloquium
Oct 2017	Oscar Klein Centre colloquium, Stockholm University
May 2017	Max Planck Institute for Extraterrestrial Physics seminar
Apr 2017	Harvard-Smithsonian CfA colloquium
Feb 2017	Royal Astronomical Society ordinary meeting

Telescope time as principal investigator

Hubble Space Telescope	9 orbits over 4 programs, Cycle 24-27
Chandra X-ray Observatory	60ks over 2 programs, Cycle 20
ESO Very Large Telescope	9 hours, Period 104 (2019-2020)
Liverpool Telescope	30 hours (2019-2020)
SOAR	Target of opportunity program for gravitational wave follow-up, up to 3 nights equivalent in semester 2018B, up to 6 nights equivalent in semester 2019A
Gemini	Total $\sim$8 hours over several successful proposals, 2016-2018
VLA	4 hours, 2017

Observing experience

Magellan	Optical imaging and spectroscopy using LDSS3c and IMACs · NIR imaging using FourStar and spectroscopy using FIRE · High-resolution spectroscopy using MagE
MMT	Remote observing, optical spectroscopy with Blue Channel

NTT	Optical and NIR imaging and spectroscopy using EFOSC2 and SOFI
WHT	Optical spectroscopy with ISIS
VLT	Target of Opportunity triggers and data reduction for X-Shooter and FORS2
HST	Phase II and data reduction experience with ACS, WFC3 and STIS
Gemini	Extensive data reduction experience with Gemini pipeline

Scientific responsibilities held

2019–	Phase 3 Data Reduction manager for Advanced PESSTO survey
2019	Local Organising Committee: Quasars in Crisis conference
2016–	Proposal review panels: Gemini, HST, Liverpool Telescope and others
2014–	Referee for ApJ, MNRAS and Nature Astronomy
2013–2015	Managed target of opportunity triggers for VLT program in PESSTO

Students mentored

2019-2020	James Nuttall and Evan Ridley, University of Birmingham MSci
2019	Fergus Davidson, University of Edinburgh undergraduate, via the Institute for Astronomy Summer Student scheme
2018–	Phil Short, University of Edinburgh PhD student (principal supervisor: Prof A. Lawrence)
2017–2018	Zoe Padilla and Nick Gottschlich Hawthorne, students at Cambridge Rindge and Latin High School. I supervised a year-long research project through the CfA Student Mentoring Program
2016–2017	Spencer Scott, Harvard undergraduate. I supervised a research project for Spencer resulting in a published ApJL paper with Spencer as first author
2015–2018	Peter Blanchard, Harvard PhD student (principal supervisor: Prof E. Berger)

Other teaching

2018–2019	Introductory Astrophysics (problem-solving workshops and coursework), University of Edinburgh
2012–2015	Computer lab demonstrator, Queen's University Belfast
2014	Supervised work-placement projects for high school students at QUB

Public outreach and media

- Interviewed for BBC Sky at Night Magazine about the dimming of Betelgeuse (2020) and always a willing commentator for the media
- Keynote speaker at the 2019 Northern Ireland Physics teachers annual conference
- Generated public excitement and understanding of the first joint electromagnetic–gravitational wave source through launch of a new website kilonova.org, social media, and press interviews
- Several papers leading to press releases and interviews with journalists for international and local news
- Paper on a very nearby superluminous supernova received significant media attention, the highlight being a radio interview with the Canadian Broadcasting Corporation for their weekly science show (broadcast 2017-08-12)
- Qualified as a UK STEM (Science, Technology, Engineering and Maths) Ambassador, for encouraging children to pursue scientific careers.
- Interviewed about my work live on BBC Radio, Oct 2013

Personal references

- Prof. Andy Lawrence · University of Edinburgh · Fellowship advisor
- Prof. Edo Berger · Harvard University · Postdoc advisor
- Prof. Stephen Smartt · Queen's University Belfast · PhD supervisor
- Prof. Brian Metzger · Columbia University · Collaborator
- Prof. Avishay Gal-Yam · Weizmann Institute of Science · Collaborator
- Prof. Philipp Podsiadlowski · Oxford University · MPhys supervisor
- Prof. Stefano Benetti · Osservatorio Astronomico di Padova · Collaborator

Publication Summary and selected highlights

- Total / **as first author**: 85 / **16**
- Citations: 6014 / **1021**
- h-index: 39 / **13**

See all my papers on the NASA Astrophysics Data System

First author publications

[1] The tidal disruption event AT2017eqx: spectroscopic evolution from hydrogen rich to poor suggests an atmosphere and outflow
Nicholl, M., Blanchard, P. K., Berger, E., *et al.*, 2019, Monthly Notices of the Royal Astronomical Society, 488, 1878

[2] Nebular-phase spectra of superluminous supernovae: physical insights from observational and statistical properties
Nicholl, M., Berger, E., Blanchard, P. K., *et al.*, 2018, The Astrophysical Journal, 871, 102

[3] One Thousand Days of SN2015bn: HST Imaging Shows a Light Curve Flattening Consistent with Magnetar Predictions
Nicholl, M., Blanchard, P. K., Berger, E., *et al.*, 2018, The Astrophysical Journal Letters, 866, L24

[4] SuperBol: A User-friendly Python Routine for Bolometric Light Curves
Nicholl, M., 2018, Research Notes of the American Astronomical Society, 2, 230

[5] The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/VIRGO GW170817. III. Optical and UV Spectra of a Blue Kilonova From Fast Polar Ejecta
Nicholl, M., Berger, E., Kasen, D. *et al.*, 2017, The Astrophysical Journal Letters, 848, L18

[6] The magnetar model for Type I superluminous supernovae I: Bayesian analysis of the full multi-colour light curve sample with MOSFiT
Nicholl, M., Guillochon, J., Berger, E., 2017, The Astrophysical Journal, 850, 55

[7] The Superluminous Supernova SN 2017egm in the Nearby Galaxy NGC 3191: A Metal-rich Environment Can Support a Typical SLSN Evolution
Nicholl, M., Berger, E., Margutti, R., *et al.*, 2017, The Astrophysical Journal Letters, 845, L8

[8] Empirical constraints on the origin of fast radio bursts: volumetric rates and host galaxy demographics as a test of millisecond magnetar connection
Nicholl, M., Williams, P. K. G., Berger, E., *et al.*, 2017, The Astrophysical Journal, 843, 84

[9] An Ultraviolet Excess in the Superluminous Supernova Gaia16apd Reveals a Powerful Central Engine
Nicholl, M., Berger, E., Margutti, R., *et al.*, 2017, The Astrophysical Journal Letters, 835, L8

[10] Superluminous supernova 2015bn in the nebular phase: evidence for the engine-powered explosion of a stripped massive star
Nicholl, M., Berger, E., Margutti, R., *et al.*, 2016, The Astrophysical Journal Letters, 828, L18

[11] SN 2015BN: A Detailed Multi-wavelength View of a Nearby Superluminous Supernova
Nicholl, M., Berger, E., Smartt, S. J., *et al.*, 2016, The Astrophysical Journal, 826, 39

[12] Seeing double: the frequency and detectability of double-peaked superluminous supernova light curves
Nicholl, M. & Smartt, S. J., 2016, Monthly Notices of the Royal Astronomical Society Letters, 457, 79

[13] On the diversity of superluminous supernovae: ejected mass as the dominant factor
Nicholl, M., Smartt, S. J., Jerkstrand, A., *et al.*, 2015, Monthly Notices of the Royal Astronomical Society, 452, 3869

[14] LSQ14bdq: A Type Ic Super-luminous Supernova with a Double-peaked Light Curve
Nicholl, M., Smartt, S. J., Jerkstrand, A., *et al.*, 2015, The Astrophysical Journal Letters, 807, 18

[15] Superluminous supernovae from PESSTO
Nicholl, M., Smartt, S. J., Jerkstrand, A., *et al.*, 2014, Monthly Notices of the Royal Astronomical Society, 444, 2096

[16] Slowly fading super-luminous supernovae that are not pair-instability explosions
Nicholl, M., Smartt, S. J., Jerkstrand, A., *et al*., 2013, Nature, 502, 346

Joint-first/ Second author

[17] Follow-up of the Neutron Star Bearing Gravitational Wave Candidate Events S190425z and S190426c with MMT and SOAR *
Hosseinzadeh, G., Cowperthwaite, P. S., Gomez, S., Villar, V. A., **Nicholl, M.**, Margutti, R., *et al*., 2019, The Astrophysical Journal, accepted
* *The first six authors contributed equally to this work*

[18] Bright Type IIP Supernovae in Low-metallicity Galaxies
Scott, S., **Nicholl, M.**, Blanchard, P. K., *et al*., 2018, The Astrophysical Journal Letters, 870, L16

[19] A Hydrogen-Poor Superluminous Supernova with Enhanced Iron-Group Absorption: A New Link Between SLSNe and Broad-Lined Type Ic SNe
Blanchard, P. K., **Nicholl, M.**, Berger, E., *et al*., 2018, The Astrophysical Journal, 872, 90

[20] Superluminous Supernovae in LSST: Rates, Detection Metrics, and Light Curve Modeling
Villar, V. A., **Nicholl, M.**, Berger, E., *et al*., 2018, The Astrophysical Journal, 869, 166

[21] MOSFiT: Modular Open-Source Fitter for Transients
Guillochon, J., **Nicholl, M.**, Villar, V. A., *et al*., 2018, The Astrophysical Journal Supplement Series, 236, 6

[22] Systematic Investigation of the Fallback Accretion-powered Model for Hydrogen-poor Superluminous Supernovae
Moriya, T., **Nicholl, M.**, Guillochon, J., *et al*., 2018, The Astrophysical Journal, 867, 113

[23] The Type I Superluminous Supernova PS16aqv: Lightcurve Complexity and Deep Limits on Radioactive Ejecta in a Fast Event
Blanchard, P. K., **Nicholl, M.**, Berger, E., *et al*., 2018, The Astrophysical Journal, 865, 9

[24] PS16dtm: A Tidal Disruption Event in a Narrow-line Seyfert 1 Galaxy
Blanchard, P. K., **Nicholl, M.**, Berger, E., *et al*., 2017, The Astrophysical Journal, 843, 106

[25] Complexity in the light curves and spectra of slow-evolving superluminous supernovae
Inserra, C., **Nicholl, M.**, Chen, T.-W., *et al*., 2017, Monthly Notices of the Royal Astonomical Society, 468, 4642

[26] The evolution of superluminous supernova LSQ14mo and its interacting host galaxy system
Chen, T.-W., **Nicholl, M.**, Smartt, S. J., *et al*., 2017, Astronomy & Astrophysics, 602, A9

[27] The supernova CSS121015:004244+132827: a clue for understanding super-luminous supernovae
Benetti, S., **Nicholl, M.**, Cappellaro, E., *et al*., 2014, Monthly Notices of the Royal Astronomical Society, 441, 289