

# THOMAS MOORE

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## INTERESTS

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The astrophysics and discovery of transient objects, supernovae, kilonovae. Real time searches for gravitational wave counterparts and time-domain optical surveys. Analysis and modelling of supernova light curves and spectra.

## EDUCATION

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**Queen's University Belfast, UK** *Oct. 2021 - Oct. 2024 (expected)*

PhD Astrophysics, Thesis title: Magic in the Mundane: exploring the diversity of often unregarded stripped-envelope supernovae, Supervisors: Prof. Stephen Smartt, Dr. Matt Nicholl, Dr. Stuart Sim

**Queen's University Belfast, UK** *Sep. 2016 - May. 2021*

MSci Physics with Astrophysics, First-Class Honours Thesis title: The Origin of Umbral Waves: Sub-surface Eigenmodes or Resonance Cavity Harmonics?, Supervisor: Prof. David Jess

**Saint Martin's University, USA** *Aug. 2018 - May. 2019*

Non-Degree Exchange Student (Business, Economics and Astrophysics)

## PROJECTS

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**SN 2022jli** - ongoing analysis *1 paper published, work ongoing*

Follow-up observations and modelling of the enigmatic SN 2022jli. Extensive data has already taken late time photometric monitoring is underway.

**SN 2022qh** - single object paper *paper in prep.*

Extensive follow-up of the luminous / long-lived transient SN 2022qh. This supernova links SN 2005bf and SN 2022wnt, suggesting there may be a continuum of long rise-time, luminous SN Ic without O II lines associated with SLSN-I.

**Hiding in Plain Sight: Revealing a Population of Long-Duration Stripped-Envelope Supernovae with ATLAS** *paper in prep*

Duration-luminosity phase space analysis reveals a population of luminous and slow evolving SN Ib/c supernovae in ATLAS archival data.

**ATLAS Volume Limited Survey: Duration-Luminosity Phase Space analysis of supernovae within 100 Mpc** *upcoming work*

Luminosity and duration analysis of the ATLAS VLS ( $d < 100$  Mpc) sample.

## TECHNICAL SKILLS

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Data analysis: IRAF, EsoReflex

Programming: Python, IDL (limited experience) Active user of; MOSFiT, superbol, TARDIS, and emcee packages

Languages: English (native proficiency)

## OBSERVING EXPERIENCE

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ESO New Technology Telescope / EFOSC2 + SOFI (**11 nights + 7 upcoming**); Liverpool Telescope (**20+ hours over numerous programs**); Las Cumbres Observatory (**triggering via SNEX**), ATLAS SN Discovery (**discovery of SNe in the ATLAS data stream**)

## PRESENTATIONS

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**Transients Down Under**, Melbourne (upcoming) - contributed talk *January 2024*  
 SN 2022jli: a type Ic supernova with periodic modulation of its light curve and an unusually long rise

**ePESSTO+ Meeting**, Warsaw (remote) - consortium talk *Septmeber 2023*  
 SN 2022jli: the tumultuous demise of a colliding wind binary?

**National Astronomy Meeting**, Cardiff - contributed talk *July 2023*  
 SN 2022jli: a unique Type Ic supernova with bumpy light curve

**QUB Seminar**, Belfast - Astrophysics Center Seminar *January 2023*  
 Hiding in Plain Sight: Uncovering a Population of Long-Duration Stripped-Envelope Supernovae

**ATLAS Meeting**, Belfast - consortium talk *May 2022*  
 A population of long-duration Ib/c supernovae in ATLAS

## OUTREACH AND SERVICE

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**Astrophysics Student Representative** *2022-2024*  
 Representative of all astrophysics students at QUB. Attending quarterly School Postgraduate Research Committee meetings and point of contact for graduate student issues.

**Irish Astronomical Association** - Outreach Lecture *Upcoming (December 2023)*  
 Title: Fast! Slow? Bright or Faint?: exploring the diversity of supernovae

**Irish Astronomical Association** - Outreach Lecture *November 2022*  
 Title: Discovery and Classification of Supernovae in the Local Universe

**Our Place in Space** - London Science Museum Supernova discovery and discussion at a Lates event at the museum. *October 2022*

**Supernova Discovery Live** - Outreach Activity *Multiple Events*  
 Live “eyeballing” ATLAS data as public engagement.

## EXPERIENCE AND WORKSHOPS

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**ENGRAVE Data Reduction Workshop**, Naples (remote) *April 2023*  
 Triggering and data reduction workshop including training on X-Shooter, FORS2, HAWK-I and MUSE reduction pipelines.

**ENGRAVE Meeting**, MPA, Munich *February 2023*

**ePESSTO+ Target and** , MPA, Munich *February 2023*

**ePESSTO+ Workshop**, Barcelona *June 2022*

## MEMBERSHIPS AND AFFILIATIONS

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ePESSTO+	ATLAS	LS4
ENGRAVE	Pan-STARRS	
Global Supernova Project	LSST:UK Junior Associate	

## PERSONAL REFERENCES

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Prof. Stephen Smartt - University of Oxford - PhD supervisor  
 Dr. Matt Nicholl - Queen’s University Belfast - PhD supervisor  
 Dr. Joe Anderson - European Southern Observatory  
 Dr. Stuart Sim - Queen’s University Belfast - PhD supervisor

## PUBLICATIONS

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All publications are available on the NASA Astrophysics Data System

### Publications as first author:

SN 2022jli: a type Ic supernova with periodic modulation of its light curve and an unusually long rise, **Moore, T.**, Smartt S., J., Nicholl, M., Srivastav, S., Stevance H., F., et al. (2023), ApJL, 10.3847/2041-8213/acfc25

### Publications with major contribution:

Unprecedented early flux excess in the hybrid 02es-like type Ia supernova 2022ywc indicates interaction with circumstellar material, Srivastav, S., **Moore, T.**, Nicholl, M., Magee, M. R., Smartt, S. J., et al. (2023), arXiv, 2023arXiv230806019S

Photometry and spectroscopy of the Type Icn supernova 2021ckj. The diverse properties of the ejecta and circumstellar matter of Type Icn supernovae, Nagao, T., Kuncarayakti, H., Maeda, K., **Moore, T.**, Pastorello, A., et al. (2023), A&A, 2023A&A...673A..27N

The Optical Light Curve of GRB 221009A: The Afterglow and the Emerging Supernova, Fulton, M. D., Smartt, S. J., Rhodes, L., Huber, M. E., Villar, V. A., **Moore, T.** et al. (2023), ApJL, 2023ApJ...946L..22F

### Co-authored publications:

GW190425: Pan-STARRS and ATLAS coverage of the skymap and limits on optical emission associated with FRB190425, Smartt, S. J., Nicholl, M., Srivastav, S., Huber, M. E., Chambers, K. C., et al. **incl. Moore, T.** (2023), arXiv, 2023arXiv230911340S

AT 2022aedm and a New Class of Luminous, Fast-cooling Transients in Elliptical Galaxies, Nicholl, M., Srivastav, S., Fulton, M. D., Gomez, S., Huber, M. E., et al. **incl. Moore, T.** (2023), ApJL, 2023ApJ...954L..28N

A Precursor Plateau and Pre-Maximum [O II] Emission in the Superluminous SN2019szu: A Pulsational Pair-Instability Candidate, Aamer, A., Nicholl, M., Jerkstrand, A., Gomez, S., Oates, S. R., et al. **incl. Moore, T.** (2023), arXiv, 2023arXiv230702487A

The broad-lined Type-Ic supernova SN 2022xxf with extraordinary two-humped light curves, Kuncarayakti, H., Sollerman, J., Izzo, L., Maeda, K., Yang, S., et al. **incl. Moore, T.** (2023), arXiv, 2023arXiv230316925K

The Luminous Type Ia Supernova 2022ilv and Its Early Excess Emission, Srivastav, S., Smartt, S. J., Huber, M. E., Dimitriadis, G., Chambers, K. C., et al. **incl. Moore, T.** (2023), ApJL, 2023ApJ...943L..20S

SN 2020zbf: A fast-rising hydrogen-poor superluminous supernova with strong carbon lines, Gkini, A., Lunnan, R., Schulze, S., Dessart, L., Brennan, S. J., et al. **incl. Moore, T.** (2023), arXiv, 2023arXiv231006814G

The Birth of a Relativistic Jet Following the Disruption of a Star by a Cosmological Black Hole, Pasham, D. R., Lucchini, M., Laskar, T., Gompertz, B. P., Srivastav, S., et al. **incl. Moore, T.** (2023), NatAs, 2023NatAs...7...88P

## NON-REFEREED PUBLICATIONS

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First author of 24 TNS AstroNotes available as an NASA ADS library