JamesMcCormac

Curriculum Vitae

Contact

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Links

jamesjmccormac.com
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Languages

English (Native)
Spanish (Fluent)

Programming

Python, C/C++
HTML, Javascript,
PHP, CSS, MySQL,
JQuery, AngularJS,
Flask, Git

Computing

Linux, Mac, Windows
IRAF, PyRAF, LaTex,
Microsoft Office

Education

2008–2012 **Doctor** of Philosophy — Queen's University Belfast, BT7 1NN, U.K.

The Next Generation of Transiting Exoplanet Surveys

In my thesis I describe the design, construction, commissioning and testing of a prototype telescope for the Next Generation Transit Survey (NGTS), that I carried out between 2008 and 2010. I also describe the new, remotely operated 0.4m NITES telescope which I installed and commissioned on La Palma. I present the results from a 60 night survey for transiting exoplanets in the globular cluster M71 using NITES. Finally, I present a new science-frame autoguiding algorithm with sub-pixel precision, capable of autoguiding on defocused stars, DONUTS. I highlight the off and on-sky tests of DONUTS and explain why such an algorithm is essential for high-precision ground-based photometry.

2004–2008 **MSci** in Physics with Astrophysics — Queen's University Belfast, BT7 1NN, U.K.

I obtained a first class honours degree in my 4 year Masters course at Queen's University. I was awarded the Raymond Greer prize for best overall MSci in 2008.

Experience

2014–2018 **University of Warwick** — Gibbet Hill Road, Coventry, CV4 7AL

Postdoctral Research Felllow: NGTS project

My current 4-year postdoc is primarily based on the on the installation, commissioning and operation of the full NGTS facility at ESO Paranal, Chile. NGTS consists of 12 robotic 20cm red-optimised telelscopes and aims to discover Neptune and super-Earth sized exoplanets. NGTS achieved first light with the first telescope in Jan 2015 and the facility reached full capacity (12 telescopes) in Feb 2016. We are currently confirming our first round of planet candidates with radial velocities from the CORALIE and HARPS spectrographs. I have written software and webpages used in the operation of the facility. I am also responsible for the semi-robotic 0.4m NITES telescope on La Palma, which I installed and commissioned during the final year of my Ph.D. NITES is typically used in exoplanet follow-up from the SuperWASP survey, of which I am also a member. I demonstrate in 1st year Python labs and in 2014 and 2015 I co-supervised 2 groups of final year masters students, both with projects based on NITES observations. In 2015 I began leading a scientific project to discover and characterise very large planets and brown dwarfs from the SuperWASP survey. Finally, I am also involved with the University of Warwick 1m telescope project and the new Gravitational wave Optical Transient Observatory (GOTO) project.

2012–2014 **Isaac Newton Group of Telescopes** — Santa Cruz de La Palma, Canary Islands, Spain

Telescope Operator & Support Astronomer

My duties as a telescope operator involved providing expert support to visiting observers and minimising telescope downtime. As a support astronomer I was responsible for instrument setup, introducing visiting observers to the instruments and enabling them to complete their observations efficiently. I provided support for the ACAM, ISIS and LIRIS instruments on the WHT as well as supporting visiting instruments. I wrote numerous observing scripts in Python that increased efficiency at the observatory and are currently in use today. I also supervised a summer project student in 2013.

2009–2010 **Isaac Newton Group of Telescopes** Santa Cruz de La Palma, Canary Islands, Spain
Student Support Astronomer
For almost 1.5 years during my Ph.D I worked as a student support astronomer at the 2.5m Isaac Newton Telescope on La Palma. I was responsible for setting up the WFC and IDS instruments (imaging and spectroscopy) and introducing visiting observers to the telescope and instruments subsequently enabling them to complete their observations efficiently.

Awards

2013 & 2014 **Exceptional Performance Award** Isaac Newton Group of Telescopes
Award for exceptional performance in my previous position at the ING.

2008 **Raymond Greer Award** Queen's University Belfast
Awarded each year for the best overall Physics MSci.

2008 **Certificate of Entrepreneurial Studies** Queen's University Belfast
Awarded to the winners of an Entrepreneurial Studies competition.

Publications

2017 **The Next Generation Transit Survey - Prototyping Phase**
McCormac, J., et al. 2017, PASP, 129, 972

2016 Rayleigh scattering in the transmission spectrum of HAT-P-18b
Kirk, J., et al. 2016, ArXiv, 1611.06916

2016 WASP-92b, WASP-93b and WASP-118b: three new transiting close-in giant planets
Hay, K. L., et al. 2016, MNRAS, 463, 3276

2016 The Astropy Problem
Muna, D., et al. 2016, ArXiv, 1610.03159

2016 K2-30 b and K2-34 b: Two inflated hot Jupiters around solar-type stars
Lillo-Box, J., et al. 2016, A&A, 594, A50

2016 WASP-113b and WASP-114b, two inflated hot Jupiters with contrasting densities
Barros, S. C. C., et al. 2016, A&A, 593, A113

2016 The Next Generation Transit Survey Becomes Operational at Paranal
West, R. G., et al. ESO Messenger, 16, 10

2016 Supernova 2014J at M82 - II. Direct analysis of a middle-class Type Ia supernova
Vallely, P., et al. 2016, MNRAS, 460, 1614

2016 WASP-86b and WASP-102b: super-dense versus bloated planets
Faedi, F., et al. 2016, ArXiv, 1608.04225

2016 From Dense Hot Jupiter to Low Density Neptune: The Discovery of WASP-127b, WASP-136b and WASP-138b
Lam, K. W. F., et al. 2016, ArXiv, 1607.07859

2016 K2-29 b/WASP-152 b: An Aligned and Inflated Hot Jupiter in a Young Visual Binary
Santerne, A., et al. 2016, ApJ, 824, 55

2016 EPIC212521166 b: a Neptune-mass planet with Earth-like density
Osborn, H. P., et al. 2016, ArXiv, 1605.04291

2016 K2 Variable Catalogue II: Machine Learning Classification of Variable Stars and Eclipsing Binaries in K2 Fields 0-4
Armstrong, D. J., et al. 2016, MNRAS, 456, 2260

2016 SN 2014J at M82: I. A middle-class type Ia supernova by all spectroscopic metrics
Galbany, L., et al. 2016, MNRAS, 457, 525

2016 Single Transit Candidates from K2: Detection and Period Estimation
Osborn, H. P., et al. 2016, MNRAS, 457, 2273

2016 WASP-135b: a highly irradiated, inflated hot Jupiter orbiting a G5V star
Spake, J., et al. 2016, PASP, 128, 2

2015 Photodynamical mass determination of the multiplanetary system K2-19
Barros, S. C. C., et al. 2015, MNRAS, 454, 4267

2015 Characterization of the K2-19 Multiple-transiting Planetary System via High-dispersion Spectroscopy, AO Imaging, and Transit Timing Variations
Narita, N., et al. 2015, ApJ, 815, 47

2015 One of the closest exoplanet pairs to the 3:2 mean motion resonance: K2-19b and c
Armstrong, D. J., et al. 2015, A&A, 582, A33

2015 K2 Variable Catalogue: Variable stars and eclipsing binaries in K2 campaigns 1 and 0
Armstrong, D. J., et al. 2015, A&A, 579, A19

2015 Subaru and Swift observations of V652 Herculis: resolving the photospheric pulsation
Jeffery, C. S. et al. 2015, MNRAS, 447, 2836

2014 **The Next Generation Transit Survey Prototyping Phase**
McCormac, J, et al. 2014, RevMex Conference Series, 45, 98

2014 The EBLM project. II. A very hot, low-mass M dwarf in an eccentric and long-period, eclipsing binary system from the SuperWASP Survey
Gómez Maqueo Chew, Y., et al. 2014, A&A, 572, A50

2014 **A Search for Photometric Variability towards M71 with the Near-Infrared Transiting ExoplanetS Telescope**
McCormac, J., et al. 2014, MNRAS, 438, 3383

2014 A Window on Exoplanet Dynamical Histories: Rossiter-McLaughlin Observations of WASP-13b and WASP-32b
Brothwell, R. D., et al. 2014, ArXiv 1403.4095

2014 Next Generation Transit Survey
Wheatley, P. J., et al. 2014, Exploring the Formation and Evolution of Planetary Systems, Proceedings of the International Astronomical Union, 299, 311

2013 Discovery of WASP-65b and WASP-75b: Two hot Jupiters without highly inflated radii
Gómez Maqueo Chew, Y., et al. 2013, A&A, 559, A36

2013 Discovery of Five Probable Novae in M81
Hornoch, K., et al. 2013, The Astronomer's Telegram, 5489, 1

2013 Discovery of Two Apparent Novae in M81
Hornoch, K., McCormac, J., Vaduvescu, O., 2013, The Astronomer's Telegram, 5109, 1

2013 **DONUTS: A Science Frame Autoguiding Algorithm with Sub-Pixel Precision, Capable of Guiding on Defocused Stars**
McCormac, J., et al. 2013, PASP, 125, 548

2013 The Next Generation Transit Survey (NGTS)
Wheatley, P. J., et al. 2013, European Physical Journal Web of Conferences, 47, 13002

2013 WASP-54b, WASP-56b, and WASP-57b: Three new sub-Jupiter mass planets from SuperWASP
Faedi, F., et al. 2013, A&A, 551, A73

2013 WASP-52b, WASP-58b, WASP-59b, and WASP-60b: Four new transiting close-in giant planets
Hébrard, G., et al. 2013, A&A, 549, A134

2012 A hot Uranus transiting the nearby M dwarf GJ 3470. Detected with HARPS velocimetry. Captured in transit with TRAPPIST photometry
Bonfils, X., et al. 2012, A&A, 546, A27

2012 NGTS: a robotic transit survey to detect Neptune and super-Earth mass planets
Chazelas, B., et al. 2012, SPIE Conference Series, 8444

2012 A transiting companion to the eclipsing binary KIC002856960
Armstrong, D., et al. 2012, A&A, 545, L4

2011 WASP-35b, WASP-48b, and HAT-P-30b/WASP-51b: Two New Planets and an Independent Discovery of a HAT Planet
Enoch, B., et al. 2011, AJ, 142, 86

2011 WASP-40b: Independent Discovery of the 0.6 M Transiting Exoplanet HAT-P-27b
Anderson, D. R., et al. 2011, PASP, 123, 555

2011 Independent Discovery of the Transiting Exoplanet HAT-P-14b
Simpson, E. K., et al. 2011, AJ, 141, 161

2011 WASP-37b: A 1.8 M_J Exoplanet Transiting a Metal-poor Star
Simpson, E. K., et al. 2011, AJ, 141, 8

2011 WASP-38b: a transiting exoplanet in an eccentric, 6.87d period orbit
Barros, S. C. C., et al. 2011, A&A, 525, A54

Journal Referee

2015 **Monthly Notices of the Royal Astronomical Society**
Technical publication on a new scientific instrument

Conferences

2016 **Oral Presentation** European Southern Observatory, Paranal, Chile
Presented an NGTS project overview to ESO staff at Paranal.

2016 **Oral Presentation** National Astronomy Meeting, Exeter, UK
Presented the current status of the NGTS project to the professional community.

2015 **Attended** National Astronomy Meeting, Wales, UK
General astronomy meeting of UK community.

2015 **Oral Presentation** European Week of Astronomy and Space Science (EWASS), Tenerife
Presented the current status of the NGTS project to the professional community.

2013 **Oral Presentation** Third Workshop on Robotic Autonomous Observatories, Malaga
Presented the results from the NGTS prototyping phase to the amateur and professional community.

2013 **Oral Presentation** Isaac Newton Group of Telescopes, La Palma
Presented the research I conducted during my Ph.D to the staff at the ING, Nordic Optical and Mercator telescopes.

2010 **Attended** Royal Astronomical Society, London
Science with the William Herschel Telescope 2010-2020 workshop.

2008 **Attended** Royal Observatory, Edinburgh
ROE Workshop 2008: Habitability in Our Galaxy

Interests

Professional: Observational astronomy, extrasolar planets, photometry, image processing, data analysis, telescope construction and maintenance, computer programming, scripting, back/front end web development, scientific writing and public outreach. I am an advocate of open source programming and have made minor contributions to several open source projects (Astropy/CCDPROC, fswebcam and CERES), activity of which can be seen on Github. I have submitted my open source autoguiding and image alignment package DONUTS to Astropy as an affiliated package.
Personal: Trail running and photography.

References

Available on request