JamesMcCormac

Curriculum Vitae

Contact

Department of Physics
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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

Queen's University Belfast, BT7 1NN, U.K.

2008 – 2012 **Doctor of Philosophy** in Astronomy
2004 – 2008 **Master of Science** in Physics with Astrophysics with First Class Honours

Experience

2014 – 2018 **Department of Physics, University of Warwick** Gibbet Hill Road, Coventry, CV4 7AL
Postdoctoral Research Fellow: NGTS project, Cerro Paranal, Chile

- Construction & commissioning of a robotic observatory
- Routine operation & opto-mechanical maintenance of 12 telescopes
- Development of operational software and environment monitoring
- Development of observatory web interface in Python, Flask and MySQL
- Development of web-based survey strategy tool (Javascript, HTML, CSS)
- Write & maintain TWiki-based documentation
- Exploitation of scientific results through exoplanet discoveries from *NGTS*

2011 – 2018 **Department of Physics, University of Warwick** Gibbet Hill Road, Coventry, CV4 7AL
NITES telescope manager, ORM, La Palma, Canary Islands, Spain

- Construction & commissioning of the semi-robotic observatory
- Routine operation & opto-mechanical maintenance of 0.4m telescope
- Development of operational software and environment monitoring
- High-precision photometric follow-up of *SuperWASP* exoplanets
- Provide training and support to postgraduate student users
- Co-supervised 2 masters projects – characterising galactic stellar clusters
- Data analysis of large survey for exoplanets in the globular cluster M71

2015 – 2017 **Department of Physics, University of Warwick** Gibbet Hill Road, Coventry, CV4 7AL
Python Programming Lab Demonstrator

- Supervise practical lab sessions for 1^{st} year Python programming course
- Demonstrating basic operations and how to think programmatically
- Demonstration of pseudo-code for sounding out initial ideas
- Provide one-on-one support for students with difficulty

2016 – 2017 **Department of Physics, University of Warwick** Gibbet Hill Road, Coventry, CV4 7AL
Public Outreach: Warwick Astro Planetarium

- Visit local primary schools with the department's inflatable IMAX-style planetarium and present a series of immersive videos on astronomy.
- Interact with young children and answer questions about the universe.
- Aim to engage with children and promote STEM subjects.

2012 – 2014 **Isaac Newton Group of Telescopes** Santa Cruz de La Palma, Canary Islands, Spain
Telescope Operator & Support Astronomer, 4.2m William Herschel Telescope

- Responsible for both ING telescopes for up to 100 nights per year
- Provided expert training and support to visiting international astronomers
- Responsible for minimising technical downtime at the observatory
- Routine configuration and calibration of the *ACAM*, *IDS*, *LIRIS* & *WYFFOS* spectrographs, plus the *ACAM*, *PFIP* & *WFC* CCD cameras.
- Developed of Python scripts for efficient observing and data calibration
- Developed of Raspberry Pi driven auxiliary camera for the RoboDIMM astronomical seeing monitor

- Supervised summer student project in 2013. The project was 50% python programming: developing an automated calibration process for the ACAM imager; and 50% science: measuring accurate colours for stars in the M71 globular cluster.
- Completed multiple first-responder medical courses, driving safety, fire safety and general health & safety courses, required for remote site work.

2008 – 2010 **Queen's University Belfast** University Road, Belfast BT7 1NN
PhD Research Project: The Next Generation Transit Survey Prototype

- Designed and built the prototype telescope for newly proposed transiting exoplanet survey *NGTS*.
- Commissioned the prototype at the ORM, La Palma, Canary Islands, Spain and operated it remotely from my home at sea level on La Palma between 2009 and 2010.
- Developed a telescope, camera, focuser and dome control system in C.
- Analysed photometric data using Python and demonstrated the prototypes ability to detect super-Earth and Neptune-sized exoplanets. The commencement of the full £3M NGTS project was based in part on the results of this prototype.

2009 – 2010 **Isaac Newton Group of Telescopes** Santa Cruz de La Palma, Canary Islands, Spain
Student Support Astronomer, 2.5m Isaac Newton Telescope

- Provided expert training and support to visiting international astronomers.
- Configured the *IDS* spectrograph and *WFC* CCD camera as per the visiting astronomer's requirements.
- Developed various Python scripts to automate observing and calibration tasks and increase the overall efficiency of the limited telescope time.
- Provided technical feedback to visiting astronomers based on their telescope time application.

Awards

2013 & 2014 **Exceptional Performance Award** Isaac Newton Group of Telescopes
Award for exceptional performance in my position as Telescope Operator & Support Astronomer at the ING.

2008 – 2012 **Department of Employment & Learning PhD scholarship** Queen's University Belfast
Funding for tuition fees and a stipend during a 3 year PhD degree.

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

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

Publications

First-author refereed publications:

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

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

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

Selected co-authored refereed publications:

2017 Rayleigh scattering in the transmission spectrum of HAT-P-18b
Kirk, J., et al. 2016, MNRAS, 468, 3907

2017 From Dense Hot Jupiter to Low Density Neptune: The Discovery of WASP-127b, WASP-136b and WASP-138b
Lam, K. W. F., et al. 2017, A&A, 599, A3

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 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

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

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

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

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

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, Nottingham, UK
Presented the current status of the NGTS project and our first planet candidates to the professional community.

2016 **Poster** UK Exoplanet Meeting, Exeter, UK
Presented the current status of the NGTS project.

2015 **Oral Presentation** European Week of Astronomy and Space Science (EWASS), Tenerife
Presented a technical overview of the NGTS facility.

2015 **Poster** UK Exoplanet Meeting, Warwick, UK
Presented an NGTS project overview poster.

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 PhD 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