

Michael O' Riordan

Curriculum Vitae

Field of Research

Theoretical high-energy astrophysics, focusing on dynamical and radiative properties of relativistic, highly-magnetized plasmas in the strong-gravity regime of accretion flows and jets near rotating black holes.

Education

2013–2018 **PhD**, *University College Cork*, Ireland.

Field: Theoretical High-Energy Astrophysics

Thesis title: “Radiative Signatures of the Jet Launching Region in Astronomical Objects”

Supervisor: Dr. Asaf Pe'er

2009–2013 **BSc**, *University College Cork*, Ireland.

Field: Physics

Grade: First Class Honours

Final-year project: “Software Development For Electroabsorption Modulator Simulations”

Supervisor: Prof. Frank Peters

Scholarships and Awards

- 2017 – Significant contribution to a proposal resulting in an 800,000 CPU-hour award (ucast008b) on the ICHEC Fionn supercomputer (PI: Dr. Asaf Pe'er)
- 2016 – PI on a 60,000 CPU-hour award (ucast007c) on the ICHEC Fionn supercomputer
- 2015 – PI on a 60,000 CPU-hour award (ucast005c) on the ICHEC Fionn supercomputer
- 2013 – Government of Ireland Postgraduate Scholarship (IRC GOIPG/2013/315 – €96,000)
- 2013 – UCC College Scholar academic distinction
- 2013 – UCC Physics Department Summer Scholarship
- 2012 – UCC College Scholar academic distinction

Conference Presentations

Talks

- 2017 – “High-Energy Radiation From Accretion Disks and Jets Near Rotating Black Holes”, Porquerolles Workshop on Microquasars, Île de Porquerolles, France
- 2017 – “Effects of Spin on High-Energy Radiation From Accreting Black Holes”, Irish National Astronomy Meeting (INAM), Dublin, Ireland
- 2016 – “High-Energy Radiation From Jets and Accretion Disks”, International Symposium on High-Energy Gamma-Ray Astronomy (Gamma2016), Heidelberg, Germany

- 2016 – “High-Energy Radiation From Accreting Black Holes”, Workshop on Relativistic Plasma Astrophysics, Purdue University, USA

Posters

- 2015 – “Identifying Jets in the Spectra of Accreting Black Holes”, Krakow Jet Meeting, Krakow, Poland

Teaching Experience

- Teaching assistant for the following undergraduate courses
 - PY1052 - Introductory Physics I
 - PY2105 - Introduction to Computational Physics
 - PY2106 - Introduction to Astrophysics and Special Relativity
 - PY3109 - Observational Astrophysics
- Substituted lectures for the following undergraduate courses
 - PY4112 - Gravitation and Cosmology
 - PY2106 - Introduction to Astrophysics and Special Relativity
- Peer Assisted Learning (PAL) leader – helped non-physics majors with their physics courses
- Assisted Dr. Asaf Pe’er in the supervision of an undergraduate student’s final-year project

Service

- Referee for the Astrophysical Journal

Additional Relevant Skills and Experience

- Computational skills
 - Experienced in C/C++, Python, Haskell, Matlab, and Mathematica
 - Familiar with OpenMP and MPI for parallel programming
 - Experienced in using the TACC “Stampede”, and ICHEC “Fionn” supercomputers
 - Extensive use of the general-relativistic magnetohydrodynamics code **HARM** (Gammie et al. 2003), and the general-relativistic radiative transport code **grmonty** (Dolence et al. 2009)
 - Attended the 2015 ICHEC course on “High-Performance Computing and Parallel Programming”
- Attended the 2017 Moscow Summer School on Modern Astrophysics
- Attended the UCC course on “Teaching and Learning Module for Graduate Studies”

Publications

Refereed Journal Publications

- **O' Riordan, M.**, Pe'er, A., & McKinney, J. C., “*Observational Signatures of Mass-Loading in Jets Launched by Rotating Black Holes*”, 2018, ApJ, 853, 44
- **O' Riordan, M.**, Pe'er, A., & McKinney, J. C., “*Blazar Variability From Turbulence in Jets Launched by Magnetically Arrested Accretion Flows*”, 2017, ApJ, 843, 81
- **O' Riordan, M.**, Pe'er, A., & McKinney, J. C., “*Effects of Spin on High-Energy Radiation from Accreting Black Holes*”, 2016, ApJ, 831, 62
- **O' Riordan, M.**, Pe'er, A., & McKinney, J. C., “*Jet Signatures in the Spectra of Accreting Black Holes*”, 2016, ApJ, 819, 95

Conference Proceedings

- **O' Riordan, M.**, Pe'er, A., & McKinney, J. C., “*High Energy Radiation From Jets and Accretion Disks Near Rotating Black Holes*”, 2017, AIP Conference Proceedings, 1792, 040042