

ELLIS R. OWEN

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Institute of Astronomy \diamond National Tsing Hua University

No. 101, Section 2 Kuang-Fu Road \cdot Hsinchu \cdot 30013 \cdot Taiwan (ROC)

EMPLOYMENT

CICA Fellow, National Tsing Hua University, Taiwan Since Dec. 2019

Institutional personal fellowship

Conducting independent research, with programs covering

- Thermodynamics and properties of circumgalactic and intergalactic media
- Sub-grid physics of cosmic rays in galaxies
- Origins of the extragalactic γ -ray background
- Leptonic and hadronic processes in galactic scale bubbles and cavities

EDUCATION

PhD in Astrophysics UCL Mullard Space Science Laboratory, UK 2014-2019

Thesis: *Hadronic Processes of Energetic Particles in Star-Forming and High-Redshift Protogalactic Environments*

Supervisor: Prof. Kinwah Wu

Exchange Student Institute of Astronomy, National Tsing Hua University, Taiwan 2017

Project: Star-formation, interstellar magnetic fields & cosmic rays

Supervisor: Prof. Shih-Ping Lai

Research Internship Astroparticle Physics Division, Max-Planck-Institut für Kernphysik, Germany 2013-2014

Research: Diffuse γ -ray emission from the Galaxy & CTA analysis software development

Supervisors: Prof. Werner Hofmann, Dr. Christoph Deil

MSc in Astrophysics UCL Department of Physics & Astronomy, UK 2012-2013

Thesis: *Modified Gravity as an alternative to Dark Energy*

Supervisors: Prof. Ofer Lahav, Dr. Donnacha Kirk

BA (Hons) in Natural Sciences (Astrophysics) University of Cambridge, UK 2009-2012

Postgraduate Certificate in International Education University of Bath, UK Since Sept. 2021

Topics include: Educational psychology, learners and learning, education in international and cross-cultural contexts, and critical self-reflection on teaching/supervision practice

SCIENTIFIC LEADERSHIP

ACADEMIC SERVICE

Co-chair, 2nd NTHU/NCTS Winter School: *Magnetism in star-forming & galactic environments* Jan. 2023

Hybrid online/on-site 1-week international winter school

Convener, 1st NTHU/NCTS Winter School: *High Energy Astrophysics* Jan. 2021

Hybrid online/on-site 1-week international winter school

346 attendees from 48 countries

Co-convener and Local Organizer, *New Results in X-Ray Astronomy* Sept. 2019

National X-ray astronomy annual meeting

50 attendees from across the UK

Local Organizing Committee, *New Results in X-Ray Astronomy* Sept. 2016

National X-ray astronomy annual meeting

45 attendees from across the UK

Departmental Seminar organizer 2016-2018
UCL Mullard Space Science Laboratory Astrophysics Group

Departmental Astronomy Journal Club organizer 2016
UCL Mullard Space Science Laboratory Astrophysics Group

Scientific peer review

- Referee: *Nature Astronomy* Since 2022
- Observational proposal review: ALMA cycles 8 and 9 distributed review Since 2021

COLLABORATION MEMBERSHIP

- **JCMT large program:** B-fields In STar-forming Region Observations Consortium (BISTRO) Since 2021
PI: Cosmic ray propagation in Gould Belt clouds
- **Cherenkov Telescope Array Consortium:** Affiliated through ICRR, University of Tokyo Since 2020
- **H.E.S.S. Collaboration member** 2013-2014

SCHOLARSHIPS & GRANT AWARDS

University of Tokyo ICRR Inter-University Research Program 2022-2023
Understanding the GeV-TeV signatures of star-forming galaxies in the extra-galactic γ -ray background with CTA
PI: E. R. Owen; Co-I: Prof Albert K. H. Kong (National Tsing Hua University), Prof Masahiro Teshima (ICRR, University of Tokyo)

University of Tokyo ICRR Inter-University Research Program 2021-2022
Understanding the signatures of cosmic ray feedback in the diffuse extra-galactic γ -ray background with CTA
PI: E. R. Owen; Co-I: Prof Masami Ouchi (ICRR, University of Tokyo), Prof Albert K. H. Kong (National Tsing Hua University), Prof Masahiro Teshima (ICRR, University of Tokyo)

University of Tokyo ICRR Inter-University Research Program 2020-2022
Investigating the origin of the diffuse cosmic γ -ray background in the CTA era
PI: E. R. Owen; Co-I: Prof Albert K. H. Kong (National Tsing Hua University), Prof Masahiro Teshima (ICRR, University of Tokyo)

UCL Mullard Space Science Laboratory International Travel Grant 2019

Royal Astronomical Society Travel Grant 2017

Institute of Physics Research Student Conference Grant 2017

Institute of Physics CR Barber Trust Grant 2017

National Tsing Hua University International Exchange Scholarship 2017

UK Science & Technology Facilities Council PhD Scholarship 2014-2019

AWARDED OBSERVING TIME

James Clerk Maxwell Telescope (JCMT) Cycle 2022B
Mapping magnetic fields of a molecular cloud complex near the high-energy TeV source HESS J1809-193 with POL-2
9.3 hours with SCUBA-2 + POL-2 (weather band 2)
PI: E. R. Owen; Co-I: S.-J. Lin (Academia Sinica IAA), S.-P. Lai (National Tsing Hua University)

Atacama Large Millimeter/submillimeter Array (ALMA) Cycle 9 (2022)
Resolving the feedback action of cosmic rays in distant star-forming galaxies
7.0 hours in receiver Band 6 and 7 (priority B)
PI: E. R. Owen; Co-I: S.-P. Lai (National Tsing Hua University), Q. Han (UCL), I. Ferreras (IAC)

OUTREACH & PUBLIC ENGAGEMENT

Invited Public Outreach Talks

- Croydon Astronomical Society talk, London, UK: *The Birth of Stars Throughout the Universe* Sept. 2017
- Vectis Astronomical Society, Isle of Wight, UK: *Cosmic Rays in a Violent Universe* July. 2016
- Croydon Astronomical Society talk, London, UK: *The Epoch of Cosmic Reionization* April. 2016

Science Writing

UCL Mullard Space Science Laboratory Science blog posts: <https://msslastro.wordpress.com>

- *Cosmic Rays: The Secret Agent of Galaxy Evolution* Feb. 2019
- *The Complicated World of Star-Formation* May. 2017
- *Gamma-Ray Astronomy with your Smartphone* Feb. 2016
- *Using Explosions to See in the Dark* June. 2015
- *Bubbles in the Early Universe* Feb. 2015

SCIENTIFIC TALKS & PRESENTATIONS

Invited Workshop/Conference Talks and lectures

- Invited lecturer for the NCTS-TCA Summer School Introductory Workshop, online, Taiwan
An Introduction to High Energy Astrophysics July 2022
- Invited highlight science talk at the ‘1st NCTS/NTHU International Winter School: High Energy Astrophysics’ National Center for Theoretical Sciences (Physics division), Hsinchu, Taiwan
Exploring starburst origins of the extra-galactic gamma-ray background Jan. 2021
- Invited review talk at the workshop ‘Multiscale Feedback on Galaxy Evolution: From Stellar Explosions to Active Galactic Nuclei’, National Center for Theoretical Sciences (Physics division), Hsinchu, Taiwan
Cosmic Rays: The Invisible Hand in Galaxy Evolution Oct. 2020

Invited Seminars & Colloquia

- Colloquium at Chungnam National University, Daejeon, Korea
Cosmic rays in and around star-forming galaxies: observational signatures and physical effects June 2022
- Colloquium at Osaka University, Theoretical Astrophysics Group, Osaka, Japan
The effects and signatures of cosmic rays in star-forming galaxy ecosystems May 2022
- Colloquium at Korea Astronomy and Space Science Institute, Daejeon, Korea
Cosmic rays in and around star-forming galaxies: observational signatures and physical effects April 2022
- Colloquium at the Chinese University of Hong Kong, Hong Kong
Cosmic rays in and around star-forming galaxies: observational signatures and physical effects April 2022
- HEP Seminar at Academia Sinica Institute of Physics, Taipei, Taiwan
The signatures and physical effects of cosmic rays in and around star-forming galaxies Mar. 2022
- Colloquium at LMU Observatory, Munich, Germany
Observational signatures and physical effects of cosmic rays in and around galaxies Jan. 2022
- Colloquium at NAOJ Division of Science, Tokyo, Japan
Cosmic rays as active players in star-formation in and around galaxies Nov. 2021
- Seminar at UCL Mullard Space Science Laboratory, UK
Signatures of cosmic ray processes in the high-energy sky Oct. 2021
- Colloquium at NCTS Physics Division, Hsinchu/Taipei & online, Taiwan
The Universe at high energies: cosmic rays as active players in astrophysics Oct. 2021
- Special seminar at Hong Kong University, Hong Kong
Signatures of star-forming galaxies in the gamma-ray background Oct. 2021
- Colloquium at CITA, Toronto, Canada
De-coding signals in the extragalactic gamma-ray background June 2021
- Colloquium at OAA, Florence, Italy
De-coding signals in the extragalactic gamma-ray background Mar. 2021
- Colloquium at National Tsing Hua University, Hsinchu, Taiwan
De-coding signals in the extragalactic gamma-ray background Nov. 2020

- AAS HEAD Frontier Seminar, online, USA Oct. 2020
Imprints of cosmic history in the extragalactic gamma-ray background
- Colloquium at ASIAA, Taipei, Taiwan July 2020
Cosmic rays in distant galaxies: the impact of the unseen
- Colloquium at NCU, Taoyuan, Taiwan Mar. 2020
Cosmic rays in distant galaxies: the impact of the unseen
- Seminar at ICRR, University of Tokyo, Japan Feb. 2020
Star-forming galaxies through cosmic time: the impacts and signatures of cosmic rays
- Lunchtime talk at University of Leicester, UK Oct. 2019
Star-forming Galaxies at High Redshift: The feedback impact of energetic cosmic rays
- Special seminar at ASIAA, Taipei, Taiwan Aug. 2019
Star forming galaxies at high redshift: the feedback impact of energetic cosmic rays
- Lunchtime talk at NAOJ Division of Science, Tokyo, Japan July 2019
Star forming galaxies at high redshift: the feedback impact of energetic cosmic rays
- Seminar at Kavli IPMU, Tokyo, Japan July 2019
Star forming galaxies at high redshift: the feedback impact of energetic cosmic rays
- Seminar at Waseda University, Tokyo, Japan July 2019
Star forming galaxies at high redshift: the feedback impact of energetic cosmic rays
- Colloquium at National Tsing Hua University, Hsinchu, Taiwan June 2019
Star forming galaxies at high redshift: the feedback impact of energetic cosmic rays
- Special seminar at the Oskar Klein Centre, Stockholm, Sweden May 2019
Star forming galaxies at high redshift: the feedback impact of energetic cosmic rays
- Seminar at the Max-Planck-Institut für Kernphysik, Heidelberg, Germany April 2019
Star-forming galaxies at high redshift in the multi-messenger era
- Seminar at UCL Mullard Space Science Laboratory, UK Jan. 2018
Cosmic Rays in High-Redshift Star-forming galaxies and their effects on the ISM
- Seminar at Kavli IPMU, Tokyo, Japan June 2017
Cosmic rays from high-redshift starbursts and their role in heating the IGM
- Seminar at ICRR, Tokyo, Japan June 2017
Cosmic Ray heating in and around high-redshift Starbursts
- Lunchtime talk at National Tsing Hua University, Hsinchu, Taiwan April 2017
Cosmic Rays in High-Redshift Starburst Galaxies
- Special seminar at ASIAA, Taipei, Taiwan April 2017
The impacts of cosmic ray heating on star formation in high-redshift galaxies
- Seminar at the Max-Planck-Institut für Kernphysik, Heidelberg, Germany July 2015
Cosmic rays in the early Universe

Contributed Talks at Conferences

- COSPAR 44th Scientific Assembly, Athens (online), 2 talks July 2022
- 27th European Cosmic Ray Symposium, Nijmegen (online) July 2022
- International Cosmic Ray Conference, Berlin (online), 3 talks July 2021
- European Astronomical Meeting, Leiden (online) June 2021
- Astronomical Society of the ROC Annual Meeting, Taipei, Taiwan Sept. 2020
- Galaxy Formation and Evolution Across Cosmic Time, Taipei, Taiwan Dec. 2019
- International Cosmic Ray Conference, Busan, Korea July 2017
- Asia-Pacific region IAU Meeting, Taipei, Taiwan June 2017
- Astronomical Society of the ROC Annual Meeting, Miao-Li, Taiwan May 2017
- East Asian ALMA Science Workshop, Hsinchu, Taiwan Mar. 2017
- Institute of Physics Joint APP/HEP conference, Brighton, UK Mar. 2016
- Science with the New Generation of High-Energy γ -ray Experiments, Lisbon, Portugal June 2014

WORKSHOPS & TRAINING

- 46th Saas-Fee Advanced Course, Les Diablerets, Switzerland Mar. 2016
Lyman- α as an astrophysical and cosmological tool
- Radiative Transfer Summer School, St. Andrews, UK Aug. 2015
Monte Carlo radiation transfer techniques
- ICTP Advanced Workshop, Trieste, Italy Mar. 2015
Cosmological Structures from Reionisation to Galaxies: Combining efforts from analytical and numerical methods
- ARCHER Workshop on parallel and high performance computing, London, UK Mar. 2015
Hands-On Introduction to High Performance Computing

SKILLS & EXPERIENCE

- **Programming languages:** Fortran 77/90 (including parallel computing experience with OpenMP and MPI), Python, Numerical simulations with FLASH4
- **Observing experience:** 28 nights, H.E.S.S. Array, Namibia
- **Languages:** Native: English; Basic conversational: Mandarin Chinese, German & French

PROFESSIONAL MEMBERSHIP

- Royal Astronomical Society, UK - fellow since 2014
- Institute of Physics, UK - since 2009; elected as MInstP in 2022
- Astronomical Society of the Republic of China, Taiwan - member since 2017
- European Astronomical Society - member since 2017
- American Astronomical Society - member since 2020