

# ELLIS R. OWEN

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## ACADEMIC APPOINTMENTS

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**JSPS Research Fellow**, Theoretical Astrophysics Group, Osaka University, Japan Since Nov. 2022

*Independent fellowship*

Conducting independent research focused on

- Micro- and meso-physics of cosmic ray feedback in and around galaxies
- Evolution of galaxies in compact groups
- Thermal and non-thermal emission from particles, bubbles and flows in galaxy ecosystems
- Thermodynamics and properties of circumgalactic and intergalactic media

**CICA Fellow**, Institute of Astronomy, National Tsing Hua University, Taiwan 2019-2022

*Institutional personal fellowship leading an independent research program*

## EDUCATION

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**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

**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 Diploma in Education** University of Bath, UK (distance learning) Since 2021

*Topics include: Educational psychology, learners and learning, education in international contexts, assessment, curriculum design and critical self-reflection on teaching/supervision practice*

## HONOURS, AWARDS, SCHOLARSHIPS & GRANT FUNDING

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**JSPS International Research Fellowship** 2022

Value approx. 11M JPY

**NCTS Post-doctoral Paper Prize** 2022

One of two awards for top post-doctoral research paper, selected across all Physical Science subjects in Taiwan

**University of Tokyo ICRR Inter-University Research Program** 2022-2023

*Understanding the GeV-TeV signatures of star-forming galaxies in the extra-galactic  $\gamma$ -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  $\gamma$ -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  $\gamma$ -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)

**UK Science & Technology Facilities Council PhD Scholarship** 2014-2019

## AWARDED OBSERVING TIME

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### 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), I. Ferreras (IAC), Q. Han (UCL)

## SCIENTIFIC LEADERSHIP

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### ACADEMIC SERVICE

#### Co-chair and convener

Feb. 2023

*2nd NCTS/UCAT/NTHU Winter School: Magnetism in star-forming & galactic environments*

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

**188 participants** from 34 countries; budget 400k NTD

#### Chair and convener

Jan. 2021

*1st NTHU/NCTS Winter School: High Energy Astrophysics*

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

**346 participants** from 48 countries; budget 210k NTD

#### 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*, *ApJ*, *MNRAS*, *Galaxies*, *Universe*, *Symmetry*
- Observational proposal review: ALMA cycles 8 and 9 distributed review

## COLLABORATION MEMBERSHIP

#### • JCMT large program:

Since 2021

B-fields In STar-forming Region Observations Consortium (BISTRO)

#### • Cherenkov Telescope Array Consortium and CTA-LST (since 2023)

Since 2020

#### • H.E.S.S. Collaboration member

2013-2014

## SCIENTIFIC TALKS & PRESENTATIONS

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### Invited Workshop/Conference Talks and lectures

- Invited talk at ‘The extreme Universe viewed in very-high-energy gamma rays 2022’  
ICRR, University of Tokyo, Kashiwa, Japan  
*Exploring the role of cosmic rays in galaxies with high energy signatures*

Feb. 2023

- Director's invited talk at NCTS Post-doctoral research workshop  
National Center for Theoretical Sciences, Taipei, Taiwan  
*Observational signatures of cosmic rays in molecular cloud environments* Feb. 2023
- Invited highlight science talk at the '2nd NCTS/UCAT/NTHU International Winter School'  
National Center for Theoretical Sciences (Physics division), Taipei, Taiwan  
*Magnetic fields, cosmic rays and star-formation in evolving galaxy ecosystems* Jan. 2023
- 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

- ABBL-iTHEMS joint seminar at RIKEN, Tokyo, Japan Mar. 2023  
*Cosmic magnetism and its effects on the observed properties of ultra high-energy cosmic rays*
- Lunchtime seminar at SWIFAR, Yunnan University, PR China Mar. 2023  
*The multi-scale effects and observational signatures of cosmic ray feedback in galaxy ecosystems*
- Seminar at ICRR, University of Tokyo, Japan Dec. 2022  
*High energy signatures of cosmic rays in and around galaxies*
- Colloquium at National Tsing Hua University, Hsinchu, Taiwan Sept. 2022  
*Cosmic magnetism and the origins of the isotropic ultra high-energy cosmic ray background*
- Colloquium at Chungnam National University, Daejeon, Korea June 2022  
*Cosmic rays in and around star-forming galaxies: observational signatures and physical effects*
- Colloquium at Osaka University, Theoretical Astrophysics Group, Osaka, Japan May 2022  
*The effects and signatures of cosmic rays in star-forming galaxy ecosystems*
- Colloquium at Korea Astronomy and Space Science Institute, Daejeon, Korea April 2022  
*Cosmic rays in and around star-forming galaxies: observational signatures and physical effects*
- Colloquium at the Chinese University of Hong Kong, Hong Kong April 2022  
*Cosmic rays in and around star-forming galaxies: observational signatures and physical effects*
- HEP Seminar at Academia Sinica Institute of Physics, Taipei, Taiwan Mar. 2022  
*The signatures and physical effects of cosmic rays in and around star-forming galaxies*
- Colloquium at LMU Observatory, Munich, Germany Jan. 2022  
*Observational signatures and physical effects of cosmic rays in and around galaxies*
- Colloquium at NAOJ Division of Science, Tokyo, Japan Nov. 2021  
*Cosmic rays as active players in star-formation in and around galaxies*
- Seminar at UCL Mullard Space Science Laboratory, UK Oct. 2021  
*Signatures of cosmic ray processes in the high-energy sky*
- Colloquium at NCTS Physics Division, Hsinchu/Taipei & online, Taiwan Oct. 2021  
*The Universe at high energies: cosmic rays as active players in astrophysics*
- Special seminar at Hong Kong University, Hong Kong Oct. 2021  
*Signatures of star-forming galaxies in the gamma-ray background*
- Colloquium at CITA, Toronto, Canada June 2021  
*De-coding signals in the extragalactic gamma-ray background*
- Colloquium at OAA, Florence, Italy Mar. 2021  
*De-coding signals in the extragalactic gamma-ray background*
- Colloquium at National Tsing Hua University, Hsinchu, Taiwan Nov. 2020  
*De-coding signals in the extragalactic gamma-ray background*

- 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*

### Contributed Talks at Conferences

- The 9th Galaxy Evolution Workshop, Kyoto, Japan Feb. 2023
- Cosmic Rays II: The salt of the star-formation recipe, Florence, Italy Nov. 2022
- 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

## OUTREACH & PUBLIC ENGAGEMENT

### Science Writing

*Astronomy & Geophysics* **invited feature article**: ‘The secret agent of galaxy evolution’, Volume 64, Issue 1, February 2023, pp. 29-25, <https://doi.org/10.1093/astrogeo/atac090>

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

## WORKSHOPS & TRAINING

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- **Invited:** Munich Institute for Astro- and Particle Physics (MIAPP), Germany Oct. 2022  
*Star-Forming Clumps and Starbursts across Cosmic Time*
- 46th Saas-Fee Advanced Course, Les Diablerets, Switzerland Mar. 2016  
*Lyman- $\alpha$  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

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- **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

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- 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