

ELLIS R. OWEN

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RIKEN Astrophysical Big Bang Laboratory (ABBL) \diamond Pioneering Research Institute (PRI)
2-1 Hirosawa \cdot Wako-shi \cdot Saitama \cdot 351-0198 \cdot Japan

ACADEMIC APPOINTMENTS

RIKEN Special Postdoctoral Research Fellow (SPDR), Wakō-shi, Saitama, Japan Dec. 2024 – Present
Independent institutional fellowship

Host researcher: Prof. Shigehiro Nagataki (Astrophysical Big Bang Laboratory)

JSPS Research Fellow, Theoretical Astrophysics Group, Osaka University, Japan 2022-2024
Independent fellowship

Host researcher: Prof. Yoshiyuki Inoue

CICA Research Fellow, Institute of Astronomy, National Tsing Hua University, Taiwan 2019-2022
Institutional personal fellowship leading an independent research program

Host researcher: Prof. Shih-Ping Lai

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

Research Assistant 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
Graduated with distinction

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

Supervisors: Prof. Ofer Lahav, Dr. Donnacha Kirk

BA in Natural Sciences (Astrophysics) University of Cambridge, UK 2009-2012
Graduated with honours (Class II)

Postgraduate Diploma in Education University of Bath, UK (distance learning) 2021-2024
Graduated with distinction

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

AWARDS, SCHOLARSHIPS & FELLOWSHIPS

RIKEN SPDR Fellowship 2024
Value approx. 25M JPY, selection ratio across all science fields \sim 15%

Selected Candidate: MEXT Leading Initiative for Excellent Young Researchers (LEADER) 2023
10M JPY per year for 5 years if matched with tenure-track/permanent employment at a university in Japan

JSPS Postdoctoral Research Fellowship 2022
Value approx. 12M JPY (including Grant-in-Aid of Research), selection ratio across all fields \sim 10%

NCTS Postdoctoral Paper Prize 2022
One of two awards for top postdoctoral research paper, selected across all Physical Science subjects in Taiwan

UK Science & Technology Facilities Council PhD Scholarship
Stipend, research budget and tuition fees for duration of PhD programme (2014-2019) 2014

COMPETITIVELY AWARDED FUNDING, COMPUTING AND OBSERVING TIME

Dunlap Institute for Astronomy & Astrophysics, University of Toronto, Visitor Funding 2025
Funding towards a 1 week collaborative visit in September 2025

Value: 1,500 CA\$

Joint MAGIC-CTAO LST1 Observations Cycle 20 - MAGIC / Cycle 3 - LST (2025)
Search for TeV emission from the Globular Cluster M28 (NGC 6626)

PI: E. R. Owen; Co-I: C.-Y. Hui (CNU), M. Strzys (ICRR), R. Lopez-Coto (IAA-CSIC), M. Peresano (MPP), A. K.-H. Kong (NTHU), B. Wlodzimierz (Lodz), J. Shin (CNU), K. Oh (MSU), S. Kim (CNU)

40 hours joint LST and MAGIC observations.

Atacama Large Millimeter/submillimeter Array (ALMA) Cycle 11 (2024)
Cosmic ray irradiation of a molecular cloud near a high-energy TeV source

PI: E. R. Owen; Co-I: S.-P. Lai (National Tsing Hua University), S.-J. Lin (Academica Sinica IAA)

15.7 hours in receiver Band 6 and 7 (priority C)

Atacama Large Millimeter/submillimeter Array (ALMA) Cycle 11 (2024)
Cosmic ray ionization and feedback in the HyLIRG F1437+1950

PI: E. R. Owen; Co-I: T. Michiyama (Shunan University)

4.0 hours in receiver Band 8 and 9 (priority C)

University of Tokyo ICRR Inter-University Research Program 2023-2024
Investigating the γ -ray signatures of feedback microphysics in star-forming environments

Value: 300k JPY

PI: E. R. Owen; Co-I: M. Strzys (ICRR, University of Tokyo), Y. Inoue (Osaka University)

University of Tokyo ICRR Inter-University Research Program 2020-2024
Understanding the GeV-TeV signatures of star-forming galaxies in the extra-galactic γ -ray background with CTA

Value: 710k JPY

PI: E. R. Owen; Co-I: A. K.-H. Kong (National Tsing Hua University), M. Teshima (ICRR, University of Tokyo)

Center for Computational Astrophysics, National Astronomical Observatory of Japan FY 2023A - 2024A
Magnetohydrodynamical modeling of feedback and diffuse structures in the high energy γ -ray and neutrino sky

364k node hours on Cray XC50; adoption category XC-B

PI: E. R. Owen

Cybermedia High Performance Computing Center, Osaka University 2023-HPC-A02
Simulating the macroscopic impacts of cosmic ray microphysics in diffuse jet-remnant structures around galaxies

190k node hours

PI: E. R. Owen

James Clerk Maxwell Telescope (JCMT) Cycle 2023B
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), M. Strzys (ICRR, University of Tokyo), S.-T. Chen (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 SERVICE & LEADERSHIP

Scientific peer review

- Referee for *Nature Astronomy*, *ApJ*, *MNRAS*, *A&A*, *Astrophysics & Space Science*, *Galaxies*, *Universe*, *Symmetry*, *Astronomy*, *Advances in Space Research*, *Cent. Eur. astrophys. bull.*
- Reviewer for the Speakers and Publications Office, Cherenkov Telescope Array Observatory consortium
- Scientific reviewer of postdoctoral research fellowship proposals:
 - (1) Dutch Research Council (NWO), Netherlands
- Observational proposal review:
 - (1) External scientific evaluation reviewer for the JCMT Time Allocation Committee (cycles 24A and 24B)
 - (2) ALMA cycles 8, 9, 10 and 11 distributed review

Guest Co-editor of special issue of the journal *Universe* 2023-2025
Studying Astrophysics with High Energy Cosmic-Particles

Session co-organizer at the UK National Astronomy Meeting 2025
Session: *Physical effects and multi-messenger signatures of energetic particles in galactic environments*

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 NT\$

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 NT\$

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

TEACHING, SUPERVISION & MENTORSHIP

LECTURING

- Guest lecturer, Osaka University, Graduate School of Science, Japan
High Energy Astrophysics, M.S. Astrophysics program Semester 1, 2023
- Invited lecturer for the NCTS-TCA Summer School Introductory Workshop, online, Taiwan
An Introduction to High Energy Astrophysics July 2022

STUDENT MENTORING & SUPERVISION

Long-term research supervision and mentoring:

- Primary research supervisor of 2 master's and 1 undergraduate student 2020-2025
Students enrolled at *Natl. Tsing Hua University*, *UCL* and the *Chinese University of Hong Kong*
- Supervisory assistance for 2 Masters students 2022-2025
Students enrolled at *Osaka University*

Short-term summer research students (each 2–3 months):

- Primary supervisor of 7 summer students since 2017

School students:

- Primary supervisor of 2 secondary school summer students 2016 - 2017
- Co-supervisor of 2 secondary school summer students since 2017

SCIENTIFIC TALKS & PRESENTATIONS

Invited Workshop/Conference Talks and lectures

- (*Upcoming*): Invited talk at ‘Magnetic Fields and Cosmic Rays across Diverse Scales: What’s Next?’
Center for Astrophysics — Harvard & Smithsonian, Cambridge, MA, USA
Cosmic Ray Highways: Particle Transport and Confinement in Large-Scale Cosmic Filaments Sept. 2025
- Invited plenary talk at the ‘IOP High Energy Particle Physics and AstroParticle Physics Conference 2025’
University of Cambridge, UK Apr. 2025
What is the status of multi-messenger astronomy? Recent updates and future prospects in the UK landscape
- Invited talk at ‘Theory meeting experiment: particle astroparticle and cosmology (TMEX2025)’
International Conference Center ICISE, Quy Nhon, Vietnam
Cosmic rays as a feedback agent in galaxy formation Jan. 2025
- 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 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 (previous 3 years)

- Lunch Seminar, Astrophysics Unit, Physics Department, University of Milano Bicocca, Italy Apr. 2025
Cosmic rays in halos and beyond: Astroparticle physics in the large-scale structures of the Universe
- Seminar at the International Center for Hadron Astrophysics, Chiba University, Japan Apr. 2025
From Galaxies to Cosmological Structures: The Multi-Scale Influence of Cosmic Rays
- Colloquium at Chungnam National University, Dept. of Astronomy & Space Science, Korea Oct. 2024
The Influence and Fate of Cosmic Rays: tracing the hidden architects of galaxies and beyond
- Seminar at the Center for Extragalactic Astronomy, University of Durham, United Kingdom Oct. 2024
Cosmic rays in galaxies and beyond: from local impacts to their cosmic journey
- Seminar at the Instituto de Astrofísica de Canarias (IAC), Tenerife, Spain Sept. 2024
Cosmic rays in galaxies and beyond: from local impacts to their cosmic journey
- Special Seminar in the Theoretical Astrophysics Group, IAC, Tenerife, Spain Sept. 2024
Cosmic rays: Modeling approaches, physical effects, and observational prospects
- Lunch Seminar, Astrophysics Unit, Physics Department, University of Milano Bicocca, Italy Sept. 2024
Cosmic rays in galaxies and beyond
- Seminar at Graduate School of Engineering, Osaka University, Suita, Japan June. 2024
Cosmic rays in astrophysical and cosmological structures
- Seminar at UCL Mullard Space Science Laboratory, Surrey, UK Mar. 2024
Exploring the signatures of cosmic ray feedback effects in galaxy ecosystems
- Astroparticle Physics Colloquium, Norwegian U. of Science and Technology, Trondheim, Norway Mar. 2024
Exploring the signatures of cosmic ray feedback effects in galaxy ecosystems
- Colloquium at Ruhr University Bochum Astronomical Institute, Bochum, Germany Mar. 2024
Exploring the signatures of cosmic ray feedback effects in galaxy ecosystems
- Seminar at Erlangen Center for Astroparticle Physics, Erlangen, Germany Mar. 2024
Exploring the signatures of cosmic ray feedback effects in galaxy ecosystems

• Seminar at the University of Hong Kong, Department of Physics, Hong Kong <i>Exploring the signatures of cosmic ray feedback effects in galaxy ecosystems</i>	Mar. 2024
• Colloquium at the Chinese University of Hong Kong, Hong Kong <i>Cosmic magnetism and its effects on the observed properties of ultra high-energy cosmic rays</i>	Dec. 2023
• Astronomical Institute Colloquium at Tohoku University, Sendai, Japan <i>Exploring the signatures of cosmic ray feedback effects in galaxy ecosystems</i>	Oct. 2023
• Department of Astronomy Colloquium at the University of Tokyo, Hongo, Tokyo, Japan <i>Exploring the signatures of cosmic ray feedback effects in galaxy ecosystems</i>	Sept. 2023
• Lunchtime seminar at SWIFAR, Yunnan University, PR China <i>Cosmic magnetism and its effects on the observed properties of ultra high-energy cosmic rays</i>	Mar. 2023
• ABBL-iTHEMS joint seminar at RIKEN, Wakō-shi, Saitama, Japan <i>Cosmic magnetism and its effects on the observed properties of ultra high-energy cosmic rays</i>	Mar. 2023
• Seminar at ICRR, University of Tokyo, Kashiwa, Japan <i>High energy signatures of cosmic rays in and around galaxies</i>	Dec. 2022
• Colloquium at National Tsing Hua University, Hsinchu, Taiwan <i>Cosmic magnetism and the origins of the isotropic ultra high-energy cosmic ray background</i>	Sept. 2022
• Colloquium at Chungnam National University, Daejeon, Korea <i>Cosmic rays in and around star-forming galaxies: observational signatures and physical effects</i>	June 2022
• Colloquium at Osaka University, Theoretical Astrophysics Group, Osaka, Japan <i>The effects and signatures of cosmic rays in star-forming galaxy ecosystems</i>	May 2022
• Colloquium at Korea Astronomy and Space Science Institute, Daejeon, Korea <i>Cosmic rays in and around star-forming galaxies: observational signatures and physical effects</i>	April 2022
• Colloquium at the Chinese University of Hong Kong, Hong Kong <i>Cosmic rays in and around star-forming galaxies: observational signatures and physical effects</i>	April 2022
• HEP Seminar at Academia Sinica Institute of Physics, Taipei, Taiwan <i>The signatures and physical effects of cosmic rays in and around star-forming galaxies</i>	Mar. 2022
• Colloquium at LMU Observatory, Munich, Germany <i>Observational signatures and physical effects of cosmic rays in and around galaxies</i>	Jan. 2022
• Colloquium at NAOJ Division of Science, Mitaka, Japan <i>Cosmic rays as active players in star-formation in and around galaxies</i>	Nov. 2021
• Seminar at UCL Mullard Space Science Laboratory, Surrey, UK <i>Signatures of cosmic ray processes in the high-energy sky</i>	Oct. 2021
• Colloquium at NCTS Physics Division, Hsinchu/Taipei & online, Taiwan <i>The Universe at high energies: cosmic rays as active players in astrophysics</i>	Oct. 2021
• Special seminar at Hong Kong University, Hong Kong <i>Signatures of star-forming galaxies in the gamma-ray background</i>	Oct. 2021
• Colloquium at CITA, Toronto, Canada <i>De-coding signals in the extragalactic gamma-ray background</i>	June 2021
• Colloquium at OAA, Florence, Italy <i>De-coding signals in the extragalactic gamma-ray background</i>	Mar. 2021

Contributed Talks at Conferences (previous 3 years)

• The 28th European Cosmic Ray Symposium, Hvar, Croatia	Sept. 2024
• 8th Heidelberg International Symposium on High-Energy Gamma-Ray Astronomy, Milan, Italy	Sept. 2024
• Cosmic Magnetism in the Pre-SKA Era, Kagoshima, Japan	May 2024
• The extreme Universe viewed in very-high-energy gamma rays 2023, Kashiwa, Japan	Feb. 2024
• Theoretical Astronomy and Astrophysics Symposium (Rironkon), Hiroasaki, Japan	Dec. 2023
• International Cosmic Ray Conference, Nagoya, Japan	July 2023
• 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, Greece (online), 2 talks	July 2022
• 27th European Cosmic Ray Symposium, Nijmegen, Netherlands (online)	July 2022
• International Cosmic Ray Conference, Berlin, Germany (online), 3 talks	July 2021

OUTREACH & PUBLIC ENGAGEMENT

Science Communication and Education

JSPS Science Dialogue Program

Since June 2023

Delivering outreach talks on science and astrophysics at high schools in Japan (talks in English)

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>

Invited Public Outreach Talks

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

WORKSHOPS & TRAINING

- **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- α as an astrophysical and cosmological tool
- 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