I. L. Garland

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Research Interests

Galaxy Formation and Evolution • Active Galactic Nuclei • Merger-Free Processes • Galaxy Morphology • Science Outreach and EDI • Citizen Science • Disaster Relief

Collaborations

Galaxy Zoo • LUDO • Planetary Response Network

Technical Skills

Spectral Data Reduction • Multi-wavelength Analysis of Complex Samples • Photometric Analysis

Education

2019 - 2024 Ph.D., Lancaster University. Supervisor: Dr. B. D. Simmons
2015 - 2019 MPhys., Lancaster University (First Class) Supervisor: Dr. B. D. Simmons

Employment

Sep 2024 — Postdoc, Masaryk University, Czech Republic.
Jan 2024 — Mar 2024 Data Analyst, Planetary Response Network. *Responsibilities include: designing workflows based on partner organisation needs, preparing before and after satellite images using GIS to present to volunteers for classifying, assist in the training of new members*

Grants & Scholarships

Oct 2023 RAS Small Grant awarded £1,000 for promoting sustainable travel during a visit to mainland Europe to visit a number of institutions and deliver seminars.
Jun 2023 Graduate College Travel Bursary awarded £150 to contribute to travel costs for attending the National Astronomy Meeting 2023.
2016-2019 Lancaster University Access Scholarship awarded £1,000 each academic year to underrepresented students who obtained *A*AA* at A-Level and maintained a high academic standard in subsequent years.
Feb 2016 Lancaster University Academic Scholarship awarded £2,000 as a one-off payment to students who obtained *A*A*A* at A-Level.

Research Projects

March 2024 PhD Thesis "Uncovering the Link Between AGN and Large-Scale Galactic Bars"
I reduce spectroscopic data, and combine this with HST imagery to show that disk-dominated galaxies that host AGN have a marginally higher bar fraction than disk-dominated galaxies lacking an AGN. I use high quality statistical methods to robustly show that in the DESI-LS catalogue, strongly barred galaxies are more likely to host AGN than weakly barred or unbarred.

May 2019 MPhys Thesis "Fuelling AGN in the Local Universe"
I find that when comparing a sample of disk-dominated galaxies to elliptical galaxies, their AGN luminosities and outflows are consistent with being drawn from the same parent sample. I use this to find that there is a higher bar fraction in AGN-host disk-dominated galaxies than inactive.

Observing Experience

Oct 2023 — 3 nights (on-site) with Intermediate Dispersion Spectrograph (INT, ING Observatory).

May 2022 — 4 nights (on-site) with Wide-Field Camera (INT, ING Observatory).

Nov 2018 — 2 nights (remotely) with Kast Double Spectrograph (Shane-3m Telescope, Lick Observatory). *Later completed the data reduction for these observations alongside the remainder of the multi-year Lick campaign.*

Teaching

2023 — Private Tutor, Physics A-Level

2019 - 2023 — Post Graduate Teaching Assistant, including practical lab demonstrating, and marking

2021 - 2023 — Co-supervision of MPhys Students, including A. Imaz-Blanco, M. Silcock, L. Potts

Outreach and Service

2020-2022 — Seminar Coordinator for Observational Astrophysics Group

2019 - 2024 — LUniverse Planetarium presenter, delivering both virtual and in-person planetarium shows to school children in the local area, and the general public. *Highlights include: JWST first science images show, UlverSTEM science fair 2022 and 2023.*

2019 - 2024 — Student Ambassador, delivering activities designed to allow KS2 children to develop an interest in physics

Seminars and Colloquia

I have given 8 invited seminars and colloquia since March 2023, most recently:

Nov 2023 — University of Hertfordshire, UK, "Merger free co-evolution of black holes and galaxies", *Seminar*

Sep 2023 — ICE-CSIC, Barcelona, Spain, "Merger free co-evolution of black holes and galaxies", *Seminar*

Conference Presentations

I have attended 11 conferences since January 2020. Highlights include:

Aug 2024 — International Astronomy Union General Assembly, Cape Town, South Africa, "LGBTQ+ Lunch Networking Session", *Session Convener;*
"The Secular Growth and Coevolution of Supermassive Black Holes and Galaxies", *Poster*

Jan 2024 — Durham-Edinburgh Extragalactic Workshop, Edinburgh, UK, "Large-scale bars as a mechanism for triggering AGN", *Talk, awarded prize for best long talk.*

Jul 2023 — National Astronomy Meeting, Cardiff, UK, "AGN Demographics and Evolution in the Era of Large-Scale Surveys", "LGBTQ+ Lunch Networking Session", *Session Convener*

May 2022 — AGNXIV Conference, Florence, Italy, "AGN Fuelling in the Merger-Free Regime", *Poster*
"Secular Black Hole Growth, AGN Feedback, and Galaxy Co-evolution", *Talk*

Broader Skill Development

2016 - 2024 — GirlguidingUK Volunteer. *Demonstrates commitment over an extended period of time, people and project management and evaluation, responsibility, involvement in the wider community, time management and organisational skills. Responsibilities include: district commissioner, safely running units with an engaging programme, financial organisation including grant applications, coordinating leadership teams* (Adult Leadership Qualification)*, planning and leading day trips and residential experiences* (Going Away with Guiding License)*, mentoring other adult members, co-ordinating and representing our local district, and assisting all members in achieving their full potential.*

Peer-Reviewed Publications

10. "The effects of bar strength and kinematics on galaxy evolution: slow strong bars affect their hosts the most", T. Géron, R. J. Smethurst, C. Lintott, K. L. Masters, **I. L. Garland**, et al., accepted for publication in ApJ, May 2024, arXiv:2405.05960.
9. **"Galaxy Zoo DESI: large-scale bars as a secular mechanism for triggering AGN", I. L. Garland, et al. 2024, MNRAS, 532(2), 2320.**
8. "Supermassive black holes in merger-free galaxies have higher spins which are preferentially aligned with their host galaxy**",** R. S. Beckmann, R. J. Smethurst, B. D. Simmons, A. Coil, Y. Dubois, **I. L. Garland**, et al., 2024, MNRAS, 527(4), 10867.
7. "Evidence for non-merger co-evolution of galaxies and their supermassive black holes", R. J. Smethurst, R. S. Beckman, B. D. Simmons, A. Coil, J. Devriendt, Y. Dubois, **I. L. Garland**, et al., 2024, MNRAS, 527(4), 10855.
6. "Galaxy Zoo DESI: Detailed morphology measurements for 8.7M Galaxies in the DESI Legacy Imaging Surveys", M. Walmsley, T. Géron, S. Kruk, A. M. M. Scaife, C. Lintott, K. L. Masters, J. M. Dawson, H. Dickinson, L. Fortson, **I. L. Garland**, et al., 2023, MNRAS, 526(3), 4768.
5. **"The most luminous, merger-free AGNs show only marginal correlation with bar presence", I. L. Garland, et al., 2023, MNRAS, 522(1), 211.**
4. "Harnessing the Hubble Space Telescope Archives: A Catalogue of 21,927 Interacting Galaxies", D. O'Ryan, B. Merín, B. Simmons, A. Vojteková, A. Anku, M. Walmsley, **I. Garland**, et al., 2023, ApJ, 948(1), 40.
3. "Gems of the Galaxy Zoos - a Wide-Ranging Hubble Space Telescope Gap-Filler Program", W. C. Keel, J. Tate, O. I. Wong, J. K. Banfield, C. J. Lintott, K. L. Masters, B. D. Simmons, C. Scarlata, C. Cardamone, R. J. Smethurst, L. Fortson, J. Shanahan, S. Kruk, **I. L. Garland**, et al., 2022, ApJ, 163(4), 150.
2. "Quantifying the Poor Purity and Completeness of Morphological Samples Selected by Galaxy Colour**",** R.J. Smethurst, K. L. Masters, B.D. Simmons, **I. L. Garland**, et al., 2022, MNRAS 510(3), 4126.
1. "Kiloparsec-scale AGN outflows and feedback in merger-free galaxies", R. J. Smethurst, B. D. Simmons, A. Coil, C. J. Lintott, K. L. Masters, E. Glikman, G. C. K. Leung, J. Shanahan, **I. L. Garland**, 2021, MNRAS, 507(3), 3985.