I. L. Garland

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Research Interests

Galaxy Formation and Evolution • Active Galactic Nuclei • Merger-Free Processes • Galaxy Morphology • Galactic Bars • Science Outreach • Equity, Diversity & Inclusion • 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: Prof. B. D. Simmons
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.

2015 – 2019 MPhys., Lancaster University (First Class) Supervisor: Prof. B. D. Simmons
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.

Employment

Aug 2024 – present Postdoc Fellow, Masaryk University, Czech Republic. *In Dr. Michal Zajaček's and Prof. Norbert Werner's groups.*

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*

2023 Private Tutor, High School Physics

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 excellent high school grades and maintained a high academic standard in subsequent years.

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

2024 – present Supervision of Bsc Students, including L. Szakszonová, L. J. Sládková
2021 – 2023 Co-supervision of MPhys Students, including A. Imaz-Blanco, M. Silcock, L. Potts
2019 – 2023 Post Graduate Teaching Assistant, including practical lab demonstrating, and marking

Outreach and Service

2025 – present EquiTea Coordinator for Department of Theoretical Physics and Astrophysics. *I started this initiative to focus on issues affecting underrepresented demographics both in our department and the wider Astrophysics community.*
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 12 invited seminars and colloquia since March 2023, including:
Jul 2025 University of Oxford, UK, "Fuelling black hole growth through large-scale bars", *Seminar*
Sep 2023 ICE-CSIC, Barcelona, Spain, "Merger free co-evolution of black holes and galaxies", *Seminar*

Conference Presentations

I have attended 15 conferences since January 2020. Highlights include:
July 2025 National Astronomy Meeting, Durham, UK, "Bar-driven fuelling of AGN", *Talk*
"Report on EAS 2025 Session 'An Intersectional Approach to EDI Strategies'", *Talk*
June 2025 European Astronomy Society Annual Meeting, "An Intersectional Approach to EDI strategies", *Session Convener*
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*

Broader Skill Development

2016 - 2024 GirlguidingUK Volunteer. *Involved commitment over an extended period of time, people and project management and evaluation, responsibility, worthing with 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

As Lead Author

4. "The complex relationships between AGN, bars and bulges", **I. L. Garland**, et al. in prep
3. "Structural Decomposition of Merger-Free Galaxies Hosting Luminous AGNs"**,** M. J. Fahey, **I. L. Garland** (shared first authorship), et al., 2025, MNRAS, 537(4), 3511.
2. "Galaxy Zoo DESI: large-scale bars as a secular mechanism for triggering AGN"**, I. L. Garland**, et al. 2024, MNRAS, 532(2), 2320.
1. "The most luminous, merger-free AGNs show only marginal correlation with bar presence"**, I. L. Garland**, et al., 2023, MNRAS, 522(1), 211.

As Co-Author

16. "Euclid Quick Data Release (Q1), A first look at the fraction of bars in massive galaxies at z<1", Euclid Collaboration, M. Huertas-Company, M. Walmsley, M. Siudek, P. Iglesias-Navarro, J. H. Knapen, S. Serjeant, H. Dickinson, L. Fortson, **I. Garland**, et al., A&A submitted Mar. 2025, arXiv:2503.15311
15. "Euclid Quick Data Release (Q1): First Visual Morphology Catalogue", M. Walmsley, M. Huertas-Company, L. Quilley, K. Masters, S. Kruk, K. Remmelgas, J. Popp, E. Romelli, D. O'Ryan, H. Dickinson, C. Lintott, R. Smethurst, B. Simmons, J. Shingirai Makechemu, **I. Garland**, et al. A&A, submitted Mar. 2025, arXiv:2503.15310
14. "High-cadence observations of galactic nuclei by the future two-band UV-photometry mission QUVIK", M. Zajaček, N. Werner, H. Best, J. E. L'Heureux, J. Řípa, M. Pikhartová, M. Mondek, F. Münz, L. Stofanová, P. Kurfürst, M. Labaj, **I. L. Garland**, et al., JATIS, accepted Aug. 2025, arXiv: 2501.19365
13. "COSMOS-Web: The emergence of the Hubble Sequence", M. Huertas-Company, M. Shuntov, Y. Dong, M. Walmsley, O. Ilbert, H. J. McCracken, H. B. Atkins, N. Allen, C. M. Casey, L. Constantin, E. Daddi, A. Dekel, M. Franco, **I. L. Garland**, et al., A&A, accepted Jul. 2025, arXiv: 2502.035352
12. "Galaxy Zoo CEERS: Bar fractions up to z~4.0", T. Géron, R. J. Smethurst, H. Dickinson, L. F. Fortson, **I. L. Garland**, et al., 2025, ApJ, 987(1), 74
11. "Timescales for the Effects of Interactions on Galaxy Properties and SMBH Growth", D. O'Ryan, B. D. Simmons, A. L. Faisst, **I. L. Garland**, et al., 2025, MNRAS, 539(4), 2967
10. "Galaxy Zoo JWST: Up to 75% of discs are featureless at 3 < z < 7", R. J. Smethurst, B. D. Simmons, T. Géron, H. Dickinson, L. Fortson, **I. L. Garland**, et al., 2025, MNRAS, 539(2), 1359
9. "Through the Citizen Scientists' Eye: Insights into Using Citizen Science with Machine Learning for Effective Identification of Unknown-Unknowns in Big Data" K. B. Mantha, H. Roberts, L. Fortson, C. Lintott, H. Dickinson, W. Keel, R. Sankur, C. Krawczyk, B. Simmons, M. Walmsley, **I. Garland**, et al. 2024, Citizen Science: Theory and Practice, 9(1), 1.
8. "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. 2024, ApJ, 973(2), 129.
7. "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.
6. "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.
5. "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.

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.