

Sophie Koudmani

Centre for Astrophysics Research, University of Hertfordshire, Hatfield AL10 9AB, UK
✉ s.koudmani@herts.ac.uk 🌐 skoudmani.github.io

RESEARCH INTERESTS	Computational astrophysics; galaxy formation and evolution, dwarf galaxies; astrophysical black holes; multi-messenger signatures; machine-learning-accelerated simulations	
EMPLOYMENT	1851 Royal Commission Fellow	Oct 2024 – present
	The Royal Commission for the Exhibition of 1851, UK Independent Research Fellowship Host Institution: University of Hertfordshire	
	Junior Research Fellow	Oct 2021 – present
	St Catharine's College, University of Cambridge, UK Independent Research Fellowship Host Department: Institute of Astronomy (IoA)	
	Flatiron Research Fellow	Aug 2022 – Dec 2023
EDUCATION	Center for Computational Astrophysics (CCA), Flatiron Institute, USA Independent Research Fellowship Member of Galaxy Formation Group led by Dr Rachel Somerville	
	UROP Summer Research Scholar	Aug 2016 – Sep 2016
	Imperial Centre for Inference and Cosmology (ICIC), Imperial College London, UK Project Title: 'Inferring Ionization Maps from 21cm Maps of the Epoch of Reionization' Supervisor: Dr Jonathan Pritchard	
	PhD in Astronomy	2017-21
	IoA and Churchill College, University of Cambridge, UK Thesis: 'Black Hole Feedback in New Regimes: Modelling Dwarf Galaxies with Active Galactic Nuclei' Supervisors: Prof. Debora Sijacki and Prof. Martin Haehnelt	
HONOURS & AWARDS	MPhys Physics (1st Class)	2013-17
	New College, University of Oxford, UK MPhys Project: 'The HI Mass Function in the Horizon-AGN Simulation' (1st Class) Supervisors: Prof. Adrianne Slyz and Prof. Julien Devriendt	
	1851 Research Fellowship, Royal Commission for the Exhibition of 1851	2024
	Flatiron Research Fellowship (<i>deferred from 2021</i>), CCA, Flatiron Institute	2022
	Junior Research Fellowship, St Catharine's College, Cambridge	2021
SELECTED GRANTS & FUNDING	Paul Murdin Prize (<i>best paper by an IoA PhD student</i>), IoA, Cambridge	2019
	Fully-funded PhD Studentship, STFC	2017-21
	UROP Research Scholarship, Imperial College London	2016
	Commendation for Laboratory Practical Work, Oxford Physics Department	2016
	Scholarship Prize, New College, Oxford	2015-17
	Physics Abitur Prize, German Physical Society (DPG)	2013
	Mathematics Abitur Prize, German Mathematical Society (DMV)	2013
	Kavli Workshop 'Massive Black Holes Across Cosmic Time', Kavli Foundation (Co-Leader w/ Übler)	2025
	JWST Large Program, Cycle 3 (137.82 hrs), STScI, Co-I, PI: Übler	2024
	CCA Workshop ' Black Holes on Broadway ', Simons Foundation (Co-Leader w/ Rennehan)	2023
	DiRAC Computing Grant (32.77 MCPUh), STFC, Co-I & Sub-Project Leader , PI: Sijacki	2023
	DiRAC Computing Grant (2.99 MCPUh), STFC, PI , [DiRAC Science Highlight]	2021
	DiRAC Computing Grant (35.72 MCPUh), STFC, Co-I & Sub-Project Leader , PI: Sijacki	2020
	Conference Travel Support (\$900), North American ALMA Science Center	2020
	Conference Travel Grants (£700), Churchill College, Cambridge	2019, 2020
	DiRAC Computing Grant (28.47 MCPUh), STFC, Co-I & Sub-Project Leader , PI: Sijacki	2018
	Undergraduate Research Bursary (£1200), Royal Astronomical Society	2016

SELECTED TALKS	Selected Conference Talks (26 in total, 9 invited):	
	<i>Invited Review</i> , MIAPbP Workshop ‘Unveiling a Universe of Black Holes’, Garching, Germany	Mar 2025
	<i>Invited</i> , Sesto Workshop ‘The Growth of Galaxies in the Early Universe’, Sesto, Italy	Jan 2025
	<i>Invited</i> , Ringberg Workshop on ‘Computational Galaxy Formation’, Ringberg, Germany	Oct 2024
	<i>Invited</i> , YAGN24 Workshop, Università degli Studi dell’Insubria-Como, Italy	Sep 2024
	<i>Invited</i> , Santa Cruz Workshop on Galaxy Formation, Santa Cruz, USA	Jul/Aug 2024
	<i>Contributed</i> , Massive Black Holes in the First Billion Years, UCC, Cork, Ireland	Apr 2024
	<i>Contributed</i> , EAS S12 ‘Breaking down the AGN frontiers’, Krakow, Poland	Jul 2023
	<i>Invited</i> , Learning the Universe Collaboration Meeting, Paris, France	Feb 2023
	<i>Invited Review</i> , The Epoch of Galaxy Quenching, Cambridge, UK	Sep 2022
	<i>Invited</i> , EAS S6 ‘Properties & impact of large-scale multiphase AGN outflows’, Valencia, Spain	Jun 2022
	<i>Invited</i> , Ringberg Workshop on ‘Breakthroughs in Galaxy Formation’, Ringberg, Germany	Apr 2022
	<i>Contributed</i> , SAZERAC SIP: ‘Models and Simulations of High-Redshift Galaxies’ [virtual]	Oct 2021
	<i>Contributed</i> , ‘Galaxy Quenching and Transformation Throughout Cosmic Time’, Aspen, USA	Feb 2020
	<i>Contributed</i> , ‘Small Galaxies, Cosmic Questions’, Durham, UK	Jul 2019
	Selected <i>Invited</i> Departmental Seminars & Colloquia (33 in total):	
	Astrophysics Colloquium, IfA, Edinburgh, UK	Jun 2025
	Astronomy Colloquium, Durham University, UK	Nov 2024
	Physics Colloquium, Maynooth University, Ireland	Oct 2024
	Cosmology/Extragalactic Seminar, UCL, London, UK	May 2024
	CCA Lunch Seminar, Flatiron Institute, NYC, USA	Apr 2024
	CTC Theory Seminar, University of Maryland, USA	Apr 2024
	Hernquist Galaxy Formation Group Meeting, CfA, Harvard, USA	Dec 2023
	Physics Colloquium, Montana State University, USA	Sep 2023
	CIERA Theory Seminar, Northwestern University, USA	May 2023
	Galread Seminar, Princeton University, USA	Oct 2022
	Fellows’ and Graduates’ Seminar, St Catharine’s College, Cambridge, UK	Mar 2022
	Lunch Talk [remote], Carnegie Observatories, Pasadena, USA	Mar 2021
	Caltech Astronomy Tea Talk [remote], Caltech, Pasadena, USA	Oct 2020
STUDENT SUPERVISION	Graduate Students:	
	<i>MPhil Project</i> , Brian Jiang, KICC, University of Cambridge	2023-24
	‘Early black hole growth: observational evidence for super-Eddington?’	
	<i>Summer & MASt Project</i> , Giulia Ortame, IoA, University of Cambridge	2023-24
	‘Unveiling Black Hole Accretion in Dwarf Galaxies’	
	Undergraduate Students:	
	<i>MSci (Part III) Project</i> , Aineias Arango, IoA, University of Cambridge	2024-25
	‘A neural galaxy: developing machine learning-enhanced simulations of the black hole – galaxy connection’	
	<i>MSci (Part III) Project</i> , Arjun Swarup, IoA, University of Cambridge	2023-24
	‘The complex interplay of stellar and AGN feedback in simulated galaxies’	
	<i>Summer Project</i> , Kasar Profit, CCA, Flatiron Institute	2023
	‘Merging Supermassive Black Holes’	
	<i>MSci (Part III) Project</i> , Guy Uong, IoA, University of Cambridge	2021-22
	‘Dynamical Friction on Supermassive Black Holes in Galaxy Formation Simulations’	
TEACHING	Substitute Lecturer , <i>University of Cambridge</i> :	
	Astrophysical Black Holes, 4th year (Part III) Astrophysics	2022
	Small-Group Tutorials & Drop-in Sessions , <i>University of Cambridge</i> :	
	Astrophysical Black Holes, 4th year (Part III) Astrophysics	2019, 2021
	Astrophysical Fluid Dynamics, 3rd year (Part II) Astrophysics	2019
	Mathematics, 1st year (Part IA) Natural Sciences	2017-18
	Examinations , <i>University of Cambridge</i> :	
	Assessor for ‘IoA Internal PhD Thesis Review’	2022, 2024
	Standards Assessor for Astrophysical Black Holes, 4th year (Part III) Astrophysics	2022
	Marks Checker for Astrophysical Black Holes, 4th year (Part III) Astrophysics	2019, 2021, 2022
SERVICE	Conference Organiser:	
	LOC Co-Chair: ‘Massive Black Holes Across Cosmic Time’ conference hosted by KICC	2025
	Co-Chair: Kavli Focus Meeting ‘Dark Matter in Astrophysical Laboratories’	2024
	SOC/LOC Co-Chair: ‘Black Holes on Broadway’ conference hosted by Flatiron Institute	2023

Co-Organiser: NAM Session ‘Linking simulations to observations to understand galaxy evolution’ 2022
 Co-Organiser: Kavli Focus Meeting ‘Feedback in and around Galaxies’ 2021
 Co-Organiser: Conference for Undergraduate Women in Physics hosted by Oxford University 2016,17

Peer Reviewer:

Reviewer for ERC Starting Grant, European Research Council 2024-
 Book Reviewer for *The Observatory* 2023-
 Reviewer for *Open Journal of Astrophysics* (OJAp) 2023-
 Reviewer for *The Astrophysical Journal* (ApJ) 2022-
 Reviewer for *Monthly Notices of the Royal Astronomical Society* (MNRAS) 2022-

Equality, Diversity and Inclusion:

Mentor for the National Society of Black Physicists (NSBP) Summer Research Programme 2023
 IoA Self Assessment Team: Juno/Athena SWAN Gender Equality Awards 2020-22
 IoA Equality, Diversity & Inclusion Committee 2018-22
 Oxford Women in Physics Society: Undergraduate Representative & Mentoring Coordinator 2015-17
 Oxford University Counselling Service: Trained Peer Supporter for New College 2014-17
 New College JCR Committee: International Student Representative 2014-15

Outreach and Public Engagement:

Invited Speaker at *New Scientist Live*, ExCeL London 2024
 Interview: ‘*Advances in our understanding of the Universe since 1473*’, St Catharine’s College 2023
 4 Outreach Talks at IoA and Churchill College 2018-22
 Volunteer at Cambridge Science Festival, IoA 2018-19
 Course Instructor at ‘Greenlight for Girls’ STEM Initiative 2017
 Volunteer for Jacari (free tutoring initiative) 2016-17
 Volunteer at Oxford Stargazing Events, Oxford Physics Department 2014-16

Other Departmental Activities:

IoA Computer Users Committee 2018-22
 Black Hole Physics Student Discussion Group (Initiator & Organizer) 2019-21
 New College Subject Representative for Physics 2014-15

COMPUTING SKILLS *Programming Languages:* Python, C, BASH scripting
Tools/Packages: numpy, scipy, matplotlib, Git, MPI

HACKATHONS & WORKSHOPS DiRAC Machine Learning Techniques for Science Workshop [virtual] Nov/Dec 2021
 HPE and NVIDIA Fundamentals of Deep Learning Workshop [virtual] Sep 2021
 DiRAC AMD GPU Hackathon [virtual] Jan 2021
 DiRAC AMD Hackathon [virtual] Jul 2020
 DiRAC ARM Mellanox Hackathon, Leicester, UK Sep 2019
 DiRAC Nvidia GPU Hackathon, Swansea, UK Sep 2018
 Amazon AWS Hackathon, Cambridge, UK Oct 2017

PROFESSIONAL International Collaborations:

MEMBERSHIPS ‘Renaissance’ Collaboration, Member of AREPO Working Group 2024-
 ‘Learning the Universe’ Collaboration, Co-Chair of Black Hole Working Group 2022-
 LISA Consortium, Member of Astrophysics Working Group 2021-

Learned Societies:

American Astronomical Society 2020-23
 Royal Astronomical Society 2019-
 Institute of Physics 2019-
 Cambridge Philosophical Society 2019-
 German Physical Society (DPG) 2013-

REFERENCES **Dr Rachel Somerville**
 Galaxy Formation Group Leader, Flatiron Institute, USA
 Email: rsomerville@flatironinstitute.org

Prof. Debora Sijacki

Professor of Astrophysics and Cosmology, University of Cambridge, UK
 Email: deboras@ast.cam.ac.uk

Prof. Adrianne Slyz

Associate Professor of Astrophysics, University of Oxford, UK

Email: adrianne.slyz@physics.ox.ac.uk

- PUBLICATIONS**
9. **Koudmani, S.**, Rennehan, D., Somerville, R. S., Hayward, C. C., Anglés-Alcázar, D., Orr, M. E., Sands, I. S., Wellons S. *'Diverse dark matter profiles in FIRE dwarfs: black holes, cosmic rays and the cusp-core enigma'*. Submitted to MNRAS, eprint arXiv:2409.02172.
 8. Martin-Alvarez, S., Irsic, V., **Koudmani, S.**, Bourne, M. A., Bigwood, L., Sijacki, D. *'Stirring the cosmic pot: how black hole feedback shapes the matter power spectrum in the FABLE simulations'*. Submitted to MNRAS, eprint arXiv:2407.18349.
 7. Juodžbalis, I., Maiolino, R., Baker, W. M., Tacchella, S., Scholtz, J., D'Eugenio, F., Schneider, R., Trinca, A., Valiante, R., DeCoursey, C., Curti, M., Carniani, S., Chevallard, J., de Graaff, A., Arribas, S., Bennett, J. S., Bourne, M. A., Bunker, A. J., Charlot, S., Jiang, B., **Koudmani, S.**, Perna, M., Robertson, B., Sijacki, D., Übler, H., Williams, C. C., Willott, C., Witstok J. *'A dormant, overmassive black hole in the early Universe'*. Nature (2024, 636 (8043): 594-597).
 6. Bourne, M. A., Fiacconi, D., Sijacki D., Piotrowska, J. and **Koudmani, S.** *'Dynamics and spin alignment in massive, gravito-turbulent circumbinary discs around supermassive black hole binaries'*. MNRAS (2024, 534 (4): 3448-3477).
 5. **Koudmani, S.**, Somerville, R. S., Sijacki, D., Bourne, M. A., Jiang, Y. and Profit, K. *'A unified accretion disc model for supermassive black holes in galaxy formation simulations: method and implementation'*. MNRAS (2024, 532 (1): 60-88).
 4. **Koudmani, S.**, Sijacki, D. and Smith, M. C. *'Two can play at that game: constraining the role of supernova and AGN feedback in dwarf galaxies with cosmological zoom-in simulations'*. MNRAS (2022, 516 (2): 2112-2141).
 3. Kristensen, M. T., Pimblett, K. A., Gibson, B. K., Penny, S. J. and **Koudmani, S.** *'Merger Histories and Environments of Dwarf AGN in IllustrisTNG'*. ApJ (2021, 922 (2): 127, 19 pp.).
 2. **Koudmani, S.**, Henden, N. A. and Sijacki, D. *'A little FABLE: exploring AGN feedback in dwarf galaxies with cosmological simulations'*. MNRAS (2021, 503 (3): 3568-3591).
 1. **Koudmani, S.**, Sijacki, D., Bourne, M. A. and Smith, M. C. *'Fast and energetic AGN-driven outflows in simulated dwarf galaxies'*. MNRAS (2019, 484 (2): 2047-2066).

[[ADS link for first-author publications](#)]

[[ADS link for all publications](#)]