Sownak **Bose**

60 Garden St., MS-51, Cambridge, MA 02138, USA

☐ (+1) 617-899-8765 | ✉ sownak.bose@cfa.harvard.edu | ⌂ sownakbose.github.io | ADS profile

British citizen, DOB: 22 January, 1992

Employment

Institute for Computational Cosmology, Durham University   *Durham, DH1 3LE, UK*
ASSISTANT PROFESSOR & UKRI FUTURE LEADERS FELLOW   *Oct. 2021 - PRESENT*

Center for Astrophysics | Harvard & Smithsonian   *Cambridge, MA, USA*
ITC POSTDOCTORAL FELLOW   *Sept. 2017 - Aug. 2021*

- Current research interests include: large-scale structure, the galaxy-halo connection, reionisation and the formation of the first galaxies, ultra-faint dwarf galaxies and near-field cosmology, the formation and evolution of globular clusters.
- Extensive experience in the running and analysis of cosmological simulations, generating initial conditions for cosmological zoom simulations, expertise in the development and use of semi-analytic galaxy formation models, simulations of non-standard dark matter and modified gravity.

Education

Institute for Computational Cosmology, Durham University   *Durham, UK*
PHD IN ASTROPHYSICS   *Oct. 2013 - Mar. 2017*

- Thesis: "Beyond ΛCDM: Exploring Alternatives to the Standard Cosmological Paradigm"
- Advisors: Prof. Carlos Frenk, Prof. Baojiu Li, and Prof. Adrian Jenkins
- Examiners: Prof. Matteo Viel and Prof. Carlton Baugh

St. Catherine's College, University of Oxford   *Oxford, UK*
MASTER OF PHYSICS (MPHYS)   *Oct. 2009 - Jun. 2013*

- Thesis: "Gauge theories and *dessins d'enfants*: beyond the torus"
- Advisor: Prof. Yang-Hui He

Awards & Scholarships

PERSONAL

2021	**Buchalter Cosmology Prize (third prize)** Rewarding 'new ideas or discoveries that have the potential to produce a breakthrough advance in our understanding of the origin, structure, and evolution of the universe'; awarded for co-authored publication *"First star-forming structures in fuzzy cosmic filaments"*.	*Buchalter Research Foundation*
2018	**Royal Astronomical Society Michael Penston Prize** Awarded for the 'best doctoral thesis in astronomy and astrophysics in the UK'	*RAS*
2018	**Springer Thesis Prize** Award recognising 'outstanding PhD research' internationally. Thesis published by Springer	*Springer*
2018	**Winton Doctoral Prize** Awarded for the 'best PhD in Physics using computational methods'	*Winton Capital*
2016	**Keith Nicholas Postgraduate Prize** Awarded for 'outstanding overall performance' by a postgraduate student in the Physics department	*Durham University*
2012	**Master's Book Prize** Awarded by St. Catherine's College for undergraduate exam performance	*Oxford University*
2012	**IoP/Nuffield Bursary** Awarded to facilitate undergraduate summer research	*Institute of Physics*
2011	**Master's Book Prize** Awarded by St. Catherine's College for undergraduate exam performance	*Oxford University*
2011	**Physics Oral Prize** Awarded for the 'best student talk' as voted by undergraduates in St. Catherine's College	*Oxford University*

GRANTS

2021-25	**UKRI Future Leaders Fellowship** Awarded an independent research fellowship worth £1.2m for the programme entitled "Fundamental Cosmology in the Era of Surveys: a Multi-scale Numerical Campaign" (PI)	*UK Research and Innovation*
2017-21	**ITC Fellowship** Awarded an independent research fellowship worth $344,000 for the programme entitled "Testing the nature of dark matter and dark energy in the era of precision cosmology" (PI)	*Harvard University*
2019/20	**ASCR Leadership Computing Challenge** Awarded 300,000 node hours on Summit Supercomputing Facility for "Abacus2020: N-body Simulations for Precision Cosmology with DESI." (Co-I; PI: Daniel Eisenstein)	*Oak Ridge National Laboratory*
2018-20	**Beyond Ultra-deep Frontier Fields and Legacy Observations (BUFFALO)** Awarded 101 orbits, Proposal ID: #15117 (Co-I; PI: Charles Steinhardt, Mathilde Jauzac)	*Hubble Space Telescope Cycle 25*

Press coverage

The universal structure of cold dark matter haloes

ARXIV:1911.09720, *Nature*   *Sep. 2020*

- Research establishing the universal structure of cold dark matter haloes using state-of-the-art zoom simulations spanning a total dynamic range of over 20 orders of magnitude. Featured on **Business Insider**, **Axios**, **Inverse**, BBC Radio and others.

Formation of the first galaxies

ARXIV:1802.10096, *The Astrophysical Journal*   *Aug. 2018*

- Research on the identification of pre- and post-reionisation populations of dwarf galaxies reported extensively in world media (TV, radio, print and Internet), including coverage on the **BBC**, Sky News, The Independent, The New Scientist, **USA Today**, **Popular Mechanics**, **Gizmodo** and more than 100 other media outlets.

Mentorship

SUPERVISION

2020 - PRESENT	**Graduate advisor** (PhD, with Prof. Lars Hernquist), Ana Maria Delgado, on proposed thesis on "Machine Learning Approaches to the Galaxy-Halo Connection"	*Harvard University*
2018 - PRESENT	**Graduate advisor** (PhD, with Prof. Daniel Eisenstein, Prof. Lars Hernquist), Boryana Hadzhiyska, on proposed thesis on "The Clustering of Galaxies in Hydrodynamical Simulations"	*Harvard University*
Summer 2020	**Research advisor** (PRISE Fellowship recipient), Ali Kurmus on "High Redshift Galaxy Formation in Interacting Dark Matter Cosmologies"	*Harvard University*
Summer 2020	**Research advisor** (HCRP Fellowship recipient), Victoria Ono, on "Simulating Globular Cluster Evolution to Probe the Assembly of the Milky Way"	*Harvard University*
Summer 2020	**Co-advisor** (with Dr. Sandro Tacchella, PRISE Fellowship recipient), Diana Khimey, on "Using High Redshift Galaxies and Dark Matter Simulations to Determine the Degeneracy of Dark Matter Models"	*Harvard University*
2019 - PRESENT	**Thesis advisor** (Senior), Mahlet Shiferaw, on "Generating Mock Galaxy Catalogs in Modified Theories of Gravity"	*Harvard University*
2019/20	**Thesis advisor** (Senior), AJ Cohn, on "Testing Observational Systematics in Inferring the Density Profiles of Rich Clusters"	*Harvard University*
Fall 2019	**Thesis advisor** (Junior), Gennie Weiler, on "Numerical Simulations of Globular Cluster Disruption in Galactic Haloes"	*Harvard University*
Fall 2018	**Thesis advisor** (Junior), Mahlet Shiferaw, on "The Large-Scale Clustering of Galaxies in a Warm Dark Matter Universe"	*Harvard University*
Summer 2018	**Co-advisor** (with Dr. Idan Ginsburg) for REU summer student, Thomas Boudreaux, on "The Effects of Primordial Binary Fraction on Globular Cluster Evolution"	*Harvard University*
2015/16	**Co-advisor** (MSc., with Prof. Tom Theuns), Adam Welsh, on "Astrophysical Constraints on the Nature of Dark Matter"	*Durham University*

TEACHING

2019 - PRESENT	**Online Course Creator** in Standard & Higher Level Physics for the International Baccalaureate	*IB Better*
2011 - PRESENT	**Teacher** in Higher Level Physics & Mathematics for the International Baccalaureate	*Lanterna Education*
Fall 2019	**Guest lecturer** for Ay98 (Research Tutorial in Astrophysics for undergraduates)	*Harvard University*
Summer 2019	**Guest lecturer** at summer school in astrophysics for high school students	*Harvard University*
Summer 2019	**Guest lecturer** at the Banneker Institute Summer Program	*Harvard University*
Fall 2018	**Guest lecturer** for Ay98 (Research Tutorial in Astrophysics for undergraduates)	*Harvard University*
2016/17	**Workshop demonstrator** in Planets & Cosmology, for undergraduates in their penultimate year	*Durham University*
2014/15/16	**Workshop demonstrator** in Classical & Quantum Mechanics, for undergraduates in their second year	*Durham University*
2013/14	**Marker** for Large-Scale Structure & General Relativity, for Masters students in Theoretical Astrophysics	*Durham University*