NISHA GREWAL

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EDUCATION

University of Edinburgh, Scotland, UK
PhD: Astrophysics   *Sept 2020 - Nov 2024**
MSc: Particle & Nuclear Physics   *Sept 2019 - Aug 2020*

Wesleyan University, Middletown, CT   *Aug 2013 - May 2017*
BA: Physics, Economics

RESEARCH EXPERIENCE

University of Edinburgh School of Physics & Astronomy, Scotland, UK
Doctoral Researcher, Supervisor: Joe Zuntz   *Sept 2020 - present*
Exploring the Dark Sector with Higher-Order Statistics in Weak Lensing Analyses
Measure a suite of two-point and higher-order statistics from weak lensing and clustering maps. Evaluate different shear to convergence reconstruction methods, measuring baryonic systematics.

MSc Student Researcher, Supervisor: Joe Zuntz   *Sept 2019 - Aug 2020*
Evaluating the Effectiveness of Clustering Maps in Minkowski Functional Analysis
Measured higher-order statistics Minkowski functionals (MF) from KiDS, DES, and LSST-like weak lensing and clustering maps. Built an interpolator for MFs.

College of William & Mary, Williamsburg, VA   *June 2015 - Aug 2015*
National Science Foundation REU Physics Intern
Compared squeezed light quantum state from a simulation of coherent light passing through a rubidium cell with experimental data using lenses, wave plates, and a polarizing beamsplitter.

Wesleyan University, Middletown, CT   *Jan 2015 - May 2015*
Undergraduate Student Researcher
Simulated ionization of small molecules at highly energized quantum states from a pulsed laser in a molecular beam machine.

WORK EXPERIENCE

University of Edinburgh School of Physics & Astronomy, Scotland, UK   *Sept 2020 - present*
Teaching Assistant
Lead tutorials for undergraduate and masters students and mark assessments.

Earthwave, Scotland, UK   *Jan 2024 - Jun 2024*
Data Science Intern
Developed a pipeline to calculate glacier mass changes from radar interferometry, involving preprocessing, interpolation, and denoising of complex geospatial datasets.

Pleasanton Unified School District, Pleasanton, CA   *Mar 2020 - Mar 2022*
Data Engineering Consultant
Built extensive data management tool to track symptoms, exposures, and cases of COVID-19, send case-specific automated letters, and calculate return dates for 15,000 students and staff. Created comprehensive reports and data visualisations.

IBM, Washington, D.C.   *Oct 2017 - Aug 2019*
Advanced Analytics Consultant
Developed and utilized code in SAS, SQL, and Excel to produce performance reports for the United States Postal Service and led a team to generate over 50 reports per quarter. Established data standards, maintained data quality, and created visual analytic tools as Technical Lead for the Office of Personnel Management Data Team.

Amador Valley High School, Pleasanton, CA   *Aug 2017 - Sept 2017*
Math and Physics Substitute Teacher
Led high school Physics, Advanced Placement Statistics, and Honors Pre-Calculus classes. Created, adapted, and implemented lesson plans and assigned and evaluated coursework and assessments.

PUBLICATIONS

Minkowski Functionals in Joint Galaxy Clustering & Weak Lensing Analyses
N. Grewal, J. Zuntz, T. Tröster, A. Amon, *Open Journal of Astrophysics, 2022*

Comparing Mass Mapping Reconstruction Methods with Minkowski Functionals
N. Grewal, J. Zuntz, T. Tröster, *Open Journal of Astrophysics, 2024*

Impact of Baryons in Higher-Order Measurements from LSST Weak Lensing (in prep)
N. Grewal, J. Zuntz, N. Robertson

AWARDS

Student Experience Grant, £5,000 - University of Edinburgh   *Jan 2022*
A one-off contribution of up to £5,000 to support innovative projects and initiatives that will enhance students' academic, entrepreneurial, or cultural development.

Karl Van Dyke Award - Wesleyan University   *May 2017*
Awarded each year to a student majoring in physical science or having a predominant interest in physical science and technology and who shows outstanding achievement in academic work and a promise of productivity in a professional career.

Edgar Beckham Excellence in the Sciences - Wesleyan University   *Apr 2016*
Awarded to a student who has dedicated themselves to improving inclusivity in the sciences, contributing to Edgar Beckham's work of promoting diversity in the name of social justice at Wesleyan.

LEADERSHIP AND SERVICE

President, Postgraduate Society of Physics & Astronomy   *Sept 2022 - Aug 2023*
University of Edinburgh School of Physics & Astronomy
Earned £3000 from the School of Physics & Astronomy to organise a full day soft skills seminar for 90 PhD students including postdoc applications, talks, academic writing, and mental health sessions.

Elected Postgraduate Representative   *Sept 2020 - Aug 2022*
University of Edinburgh School of Physics & Astronomy
Applied for and earned £5000 of funding from the Student Experience Grant and £4000 from the School of Physics & Astronomy. Organised and led a three-day conference for 50 PhD students, which included workshops, discussions, presentations, and team-building activities. Top three finalist for the university-wide *Student Event of the Year Award.*

Chair, MSc Representative - Student Staff Liaison Committee   *Sept 2019 - Aug 2020*
University of Edinburgh School of Physics & Astronomy

Community Service Chair, Network for Emerging Women   *July 2018 - Aug 2019*
IBM Washington, D.C.

Founder, President - Society for Physics Students   *Mar 2016 - May 2017*
Wesleyan University

OUTREACH

Student Ambassador, *James Clerk Maxwell Foundation*   *Sept 2021 - present*
Lead tours at the James Clerk Maxwell's museum, sharing insights about his life and scientific achievements.

Speaker, *Edinburgh Pint of Science*   *May 2022*
Delivered a talk Seeing the Dark Universe for the *From Atoms to Galaxies series*.

Speaker, *Edinburgh Science Festival*   *April 2022*
Covered for Royal Astronomer Catherine Heymans and delivered the talk Scotland's Einstein with
Prof Martin Hendry at the National Museum of Scotland.

Astronomy Mentor, *Artlink Foundation*   *Sept 2021 - Dec 2021*
Mentored a neurodivergent student, discussing astronomy concepts and career pathways in the field.

Physics Outreach Team, *University of Edinburgh*   *Sept 2019 - Aug 2020*
Engaged local school students in hands-on science activities.

TALKS

Invited Reading Group Talk   *Sept 2024*
Newcastle University, UK

LSST Europe Meeting   *Sept 2023*
Porec, Croatia

Invited Reading Group Talk   *Jul 2023*
Princeton University, NJ

Cosmology on Safari   *Mar 2023*
University of KwaZulu-Natal, South Africa

Cosmology from Home   *Jun 2022*
Virtual

Scottish Universities Physics Alliance Meeting, Astronomy & Space Science   *May 2022*
Virtual

UK Cosmology Meeting   *May 2022*
Newcastle University

Invited talk, Cosmology with Weak Lensing: Beyond the Two-point Statistics   *Apr 2022*
Yukawa Institute for Theoretical Physics, Kyoto University

Highlands PhD Student Conference   *Feb 2022*
University of Edinburgh

Edinburgh Women in Space Conference   *Mar 2021*
Virtual

TECHNICAL EXPERIENCE

Data Analysis: parameter estimation, hypothesis testing, weighted performance analytics
Machine Learning: neural networks (deep learning, convolutional learning)
Parallel Programming: microprocessing
Data Science: data mining, data management, data visualisation

PROGRAMMING SKILLS

Intermediate Proficiency: C++, Matlab, Mathematica
Advanced Proficiency: Python, LaTeX, CCL, Emcee, SQL, SAS, VBA, Stata, Watson Analytics,
Slurm

*expected graduation