

Alan Campbell Peel

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Teaching Experience **Co-Director** College Park Scholars Living and Learning Program, “Science, Discovery and the Universe,” University of Maryland *Fall 2007-present*

- “Science and Pseudoscience” (freshman colloquium to engender critical thinking skills and to discuss the philosophy of science; in part, achieved by analyzing topics of pseudoscience, religion and human psychology)
- Administrative duties include supervising two instructors, and organizing a curriculum and program activities outside the classroom for 140 students in a two-year living and learning program

Lecturer, University of Maryland

- “The Physics of Light” core science course for non-majors *Spring 09*
- “The Physics of Sound” core science course for non-majors *Fall 08*
- “The Solar System” core science course for non-majors
Spr. 09, Spr. 08, Fall 07

Supervisor, Cambridge University *Fall 2004*

- Mathematics Tripos students studying Complex Analysis, Mathematical Methods, Quantum Mechanics

Lecturer, San Francisco State University

- Physics 220 introductory dynamics for majors *Summer 1999*

Teaching Assistant, UC Davis *1997–2003*

- Physics 10 “Cosmology”: Designed, developed and implemented a discussion/laboratory focused general education course covering modern cosmology.
- Introductory Honors Physics series: Coauthored laboratory portion of calculus-based section to reflect “active learning model” in current physics education theory and practice.
- Nine semesters of actively contributing as a TA during the formative process of creating active learning laboratory discussion sections for Physics for Life Science Majors.

**Education
& Work Exp.**

University of California at Davis *Davis, CA* 1997–2003
 • PhD Physics 2003 Supervisor: Lloyd Knox

Parsons Engineering Science *Oakland, CA* 1991–1997
 • Environmental Scientist

San Francisco State University *San Francisco, CA* 1993–1996
 • MS Physics 1996

Occidental College *Los Angeles, CA* 1986–1990
 • BA Physics 1990; BA Mathematics 1990

Research

Research Associate, Univ. of Maryland Astronomy Dept. 2005–present
 Space Interferometry Mission Dynamics of Galaxies (SIMDOG)

- *Numerical Action (NA)* - Modeling the mass distributions of the local 30 Mpc radius sphere using NA coupled with the most current local galaxy catalogs; these models constrain the fluctuations in density at the scale of a few Megaparsecs which aids in modeling and understanding velocity flow and the local voids, and “local” values of cosmological parameters.
- *Constrained N-body Simulations* - Reproducing local group positions and velocities by “creating” initial conditions generated by NA from real galaxy catalogs.

Research Associate, DAMTP General Relativity Group 2003–2005

- *Peculiar Velocities* - Modeling nonlinear contributions to the 2-point velocity tensor via N-body simulations; defining how these modified statistics affect parameter estimation for galaxy cluster velocity surveys from the kinetic Sunyaev-Zel’dovich effect.
- *Modeling Simulations* - Developing semi-analytic methods to characterize structure growth in simulations at large scales.
- *Weak Lensing* - Using well-constrained real space information to decorrelate bins in tomographic weak lensing measurements improving constraints on parameters such as w and Ω_m .
- *Halo Handling Software* - Developing parallel computer code which handles the characterization of halos found in N-body simulations.

Research Assistant, UC Davis Cosmology Group 1999–2003

- *Large Scale Structure* - Cosmological parameter estimation and potential reconstruction from galaxy cluster peculiar velocities; simulating kinetic and thermal SZ experiments to mock the measurement of galaxy cluster peculiar velocities.

- *Cosmic Microwave Background (CMB)* - Optimizing modern data analysis techniques for large pixel number experiments (such as NASA's MAP satellite) including analysis of polarization maps.
- *Braneworld Models* - Feasibility of unified dark energy/dark matter theories (*e.g.*, Chaplygin gas) using large scale structure and the CMB as a testing ground.

Publications (refereed)

1. **Tully, R. et al.** "Our Peculiar Motion Away from the Local Void" (2008) *ApJ* v676, p. 184
2. **Peel, A.** "Mass Selection Bias in Galaxy Cluster Peculiar Velocities from the Kinetic Sunyaev-Zel'dovich Effect" (2006) *MNRAS* v365, p. 1191
3. **COMPASS Collaboration** "COMPASS: An Upper Limit on CMB Polarization at an Angular Scale of 20 arcminutes" (2004) *ApJ* v610, p. 625
4. **COMPASS Collaboration** "COMPASS: an instrument for measuring the polarization of the CMB on intermediate angular scales" (2003) *Workshop on The Cosmic Microwave Background Radiation and its Polarization, Minneapolis, MN*, *New Astronomy Reviews*, v47 p. 1033
5. Doré, O., L. Knox, **A. Peel**, "The Gravitational Potential Reconstruction from Peculiar Velocity and Weak Lensing Measurements" (2003) *ApJ* 585, L81
6. Doré, O., L. Knox, **A. Peel**, "CMB Power Spectrum Estimation via Hierarchical Decomposition" (2001) *PRD* 64:083001

Professional Talks

1. "Analytical and Numerical Models of Turnaround Densities in Λ CDM" AAS Meeting 209 #53.07 *Seattle, WA* *January 2007*
2. "Mass Bias in the kinetic Sunyaev Zel'dovich Effect" *May 2005*
Weekly Seminar *Institute of Astronomy Cambridge, UK*
3. "Nonlinear Contributions to Massive Halo Velocities" *September 2004*
COSMO 04 *Toronto, Canada*
4. "Nonlinear Contributions to Massive Halo Velocities" *January 2004*
Oxford-Princeton Meeting *Oxford, UK*
5. "Cluster Peculiar Velocity Simulations: Caveats" *November 2003*
UK Cosmology Meeting *Portsmouth, UK*
6. "Cosmology from Galaxy Cluster Peculiar Velocities" *March 2003*
Weekly Seminar *Fermilab* and Lunchtime Seminar *CFCP, U. Chicago, IL*

7. “Cosmological Parameters from Cluster Peculiar Velocities” *July 2002*
SF02 Cosmology Summer Workshop *Santa Fe, NM*

8. “Cluster Peculiar Velocities as a Probe of Dark Energy” *February 2002*
Dark Matter 2002 *Marina Del Rey, CA*

9. “The Arrow of Time: What’s the Point?” *April 2000*
UC Davis Physics Student Colloquium *Davis, CA*

Proceedings, posters

1. Shaya, E., **A. Peel**, R.B. Tully, P.J.E. Peebles, “Dynamics of Galaxy Motions: Numerical Action and SIM” (2006) *Galaxy Evolution Across the Hubble Time, IAU Symp. 235, Prague, Cz., #363*

2. **A. Peel**, E. Shaya, S. Phelps, R.B. Tully, P.J.E. Peebles, “Improvements in Numerical Action and New Orbit Reconstructions” (2005) *AAS Meeting 207, Washington D.C., #30.01*

3. **A. Peel** “How to Deliver the Promise of Cosmology from Galaxy Cluster Peculiar Velocities” (2002) *AAS Meeting 201 Seattle, WA., #149.06*

4. **A. Peel** “Separating the CMB from Cluster Peculiar Velocities” (2002) *Challenges to the Standard Paradigm: Fundamental Physics and Cosmology NAS Sackler Colloquium, Irvine, CA*

5. **A. Peel**, L. Knox, “Using Galaxy Cluster Peculiar Velocities to Constrain Cosmological Parameters” (2002) *Dark Matter 2002, Marinal del Ray, CA*

Public Talks

1. “The Biggest Wiggles in the Universe” *September 2007*
Univ. of Maryland Observatory Open House

2. “The Universe is a Big Bowl of Chicken Noodle Soup” *January 2006*
Kehila Congregation, BCC High School, Bethesda, MD

Honors

- **Grants:** NASA Graduate Student Research Program Fellowship *2001-2003*
- **Recognition:** Graduate Student Teaching Award Finalist, UC Davis *2001*
- **BA Honors:** *magna cum laude*, ΦBK, ΣΠΣ, ΠΙΕ *1990*

Research References

Dr. Edward Shaya, Univ. of Maryland Astronomy Dept. *eshaya@umd.edu*
Dr. Lloyd Knox, UC Davis Physics Dept. *lknox@physics.ucdavis.edu*
Dr. Neil Turok, DAMTP Univ. of Cambridge *n.g.turok@damtp.cam.ac.uk*
Dr. Martin White, UC Berkeley Phys. & Astro. Dept. *mwhite@astron.berkeley.edu*

Teaching References

Dr. Stuart Vogel, Univ. of Maryland Astronomy Dept. *vogel@astro.umd.edu*
Dr. John Trasco, Univ. of Maryland Astronomy Dept. *jtrasco@umd.edu*
Dr. Wendell Potter, UC Davis Physics Dept. *potter@physics.ucdavis.edu*
Dr. Andreas Albrecht, UC Davis Physics Dept. *albrecht@physics.ucdavis.edu*