

ANTHONY ROBERT PULLEN

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RESEARCH GOAL

To discover cosmic history with theoretical and observational studies of large-scale structure.

EDUCATION

Ph.D., Physics, California Institute of Technology, Pasadena, CA 2011
Thesis: A Survey of Results in Modern Precision Cosmology
Advisor: Marc Kamionkowski

B. S., Physics, Southern University and A&M College, Baton Rouge, LA 2004

PROFESSIONAL APPOINTMENT

McWilliams Postdoctoral Fellow, Carnegie Mellon University 2014-present

Postdoctoral Fellow, Jet Propulsion Lab/ Caltech 2011-2014
Mentor: Olivier Doré

RESEARCH INTERESTS

- Dark energy, modified gravity.
- Cosmic dark ages, reionization, star formation.
- Non-Gaussianity, statistical isotropy.
- Dark matter, neutrinos, missing baryons.

FELLOWSHIPS & AWARDS

McWilliams Postdoctoral Fellowship 2014-present
NASA Postdoctoral Program Fellowship 2011-2013
National Science Foundation Graduate Research Fellowship 2005-2008
Student Researcher of the Year: Natural Sciences, Southern University 2004

COLLABORATIONS

SPHEREEx, Science Team Collaborator 2013-present

- Forecasted intensity mapping signal, noise, and foregrounds for emission line galaxies.
- Developed a viewer that predicts the survey coverage of SPHEREx given the scanning strategy.

LSST Dark Energy Science Collaboration, Analysis Group Member 2013-present

- Investigated removing systematic error in clustering from LSST photometric galaxies by testing methods on photometric galaxies from SDSS-III.

Prime Focus Spectrograph, Collaboration Member 2011-present

- Predicted the interloper (contamination) rate for PFS galaxies using the COSMOS Mock Catalog.

Planck, HFI Core Team Member 2011-2015

- Constructed maps of WISE galaxies that were cross-correlated with the *Planck* CMB lensing map.

TEACHING/MENTORING EXPERIENCE

Teaching

1. Teaching Assistant, California Institute of Technology

- Course: “Classical Mechanics and Electromagnetism.” 2009-2010
- Designed and performed lectures twice a week.

2. Teaching Assistant, California Institute of Technology

- Course: “Waves, Quantum Mechanics, and Statistical Physics.” 2008-2009
- Designed and performed recitations with lecture reviews twice a week.

3. Instructor, Timbuktu Academy, Southern University

- Taught calculus-based introductory physics to high school students. 2004

Mentoring

1. Kaze Wong, Physics undergraduate, Chinese University, Hong Kong 2015-present

- Designed program to predict interloper rates for user-defined emission line galaxy survey

2. Shadab Alam, Physics graduate student, Carnegie Mellon University 2014-present

- Measured redshift-space distortion parameter for E_G constraint of gravity.
- Constructing joint E_G constraint from galaxy lensing and CMB lensing.

3. Siyu He, Physics graduate student, Carnegie Mellon University 2014-present

- Measured galaxy angular power spectrum for E_G constraint of gravity.

DEPARTMENTAL SERVICE

Team Member, McWilliams AstroLunch Seminar Committee 2015-present
Organizer, Darksector Journal Club, Jet Propulsion Lab 2012-2014
Chapter President, Society of Physics Students, Southern University 2003-2004

SERVICE TO SCIENTIFIC COMMUNITY

Team Member, NSF/SDSS FAST Program, partnered with Jesus Pando, DePaul University 2015-present
Proposal Reviewer, NASA Earth and Space Science Fellowship Program
Article Reviewer, *Galaxies*, *Monthly Notices of the Royal Astronomical Society*, *Physical Review Letters*

PUBLIC LECTURES

Space Out! Astronomy Weekend, Carnegie Science Center, Pittsburgh, PA Oct. 2014

REFERENCES

Olivier Doré	Jet Propulsion Lab/ Caltech	olivier.p.dore@jpl.nasa.gov
Christopher Hirata	Ohio State University	hirata.10@osu.edu
Marc Kamionkowski	Johns Hopkins University	mhall64@jhu.edu
Leonidas Moustakas	Jet Propulsion Lab	leonidas@jpl.nasa.gov

SEMINAR/ CONFERENCE PRESENTATIONS

LSS Conference, European Space Observatory, Garching, Germany Jul. 2015
SDSS-IV Collaboration Meeting, Instituto de Física Teórica, Madrid, Spain Jul. 2015
DESI Collaboration Meeting, Fermilab, Batavia, IL May. 2015
LSST DESC TJP Meeting, University of Pittsburgh, Pittsburgh, PA Apr. 2015
Colloquium, University of Southern California, Los Angeles, CA Dec. 2013
Lunch Seminar, Lawrence Berkeley Lab, Berkeley, CA Nov. 2013
Seminar, University of Pennsylvania, Philadelphia, PA Nov. 2013
Seminar, University of Michigan, Ann Arbor, MI Oct. 2013
Seminar, University of Chicago, Chicago, IL Oct. 2013
Santa Fe Cosmology Workshop, St. Johns College, Santa Fe, NM Jul. 2013
LSST-DESC Meeting, SLAC National Accelerator Lab, Stanford, CA Jan. 2013
Astrophysics Seminar, Jet Propulsion Lab, Pasadena, CA Jan. 2013
OBSCOS Seminar, California Institute of Technology, Pasadena, CA Dec. 2012
PFS All-Hands Meeting, California Institute of Technology, Pasadena, CA Aug. 2012
ITC Seminar, Harvard University, Cambridge, MA Dec. 2010
Seminar, Princeton University, Princeton, NJ Dec. 2010
Seminar, Institute for Advanced Study, Princeton, NJ Dec. 2010
Seminar, University of California, Berkeley, CA Oct. 2010
KICP Cosmology Seminar, Stanford University, Stanford, CA Oct. 2010
Astrophysics Seminar, Jet Propulsion Lab, Pasadena, CA Sept. 2010
UCLA Dark Matter '06 Conference, Marina Del Ray, CA Feb. 2006

POSTER PRESENTATIONS

Postdoc Research Day, Jet Propulsion Lab, Pasadena, CA

Jul. 2012

Near Infrared Background and the Epoch of Reionization,

May 2012

University of Texas, Austin, TX

PUBLICATIONS

First-Author Journal Articles

1. **A. Pullen**, S. Alam, S. He, S. Ho, “Constraining Gravity at the Largest Scales through CMB Lensing and Galaxy Velocities,” submitted to *Nature*.
2. **A. Pullen**, C. Hirata, O. Doré, and A. Raccanelli, “Interloper bias in future large-scale structure measurements,” arXiv:1507.05092, submitted to Publications of the Astronomical Society of the Pacific.
3. **A. Pullen**, S. Alam, S. Ho, “Probing gravity at large scales through CMB lensing,” *Monthly Notices of the Royal Astronomical Society* 449:4326 (2015).
4. **A. Pullen**, A. Benson, and L. Moustakas, “Nonlinear evolution of dark matter subhalos and applications to warm dark matter,” *Astrophysical Journal* 792:24 (2014).
5. **A. Pullen**, O. Doré, and J. Bock, “Intensity mapping across cosmic times with the Lyman-alpha line,” *Astrophysical Journal* 786:111 (2014).
6. **A. Pullen** and C. Hirata, “Systematic effects in large-scale angular power spectra of photometric quasars and implications for constraining primordial nongaussianity,” *Publications of the Astronomical Society of the Pacific* 125:705 (2013).
7. **A. Pullen**, O. Doré, T.-C. Chang, and A. Lidz, “Cross-correlations as a cosmological carbon monoxide detector,” *Astrophysical Journal* 768:15 (2013).
8. **A. Pullen** and C. Hirata, “Non-detection of a statistically anisotropic power spectrum in large-scale structure,” *Journal of Cosmology and Astroparticle Physics* 1005:27 (2010).
9. **A. Pullen** and M. Kamionkowski, “Cosmic microwave background statistics for a direction-dependent primordial power spectrum,” *Physical Review D* 76:103529 (2007).
10. **A. Pullen**, R.-R. Chary, and M. Kamionkowski, “Search with EGRET for a gamma ray line from the Galactic center,” *Physical Review D* 76:063006 (2007).

Contributing-Author Journal Articles

1. O. Doré *et al.*, “Cosmology with the SPHEREx All-Sky Spectral Survey,” arXiv:1412.4872.
2. Planck Collaboration, “Gravitational lensing by large-scale structure,” *Astronomy & Astrophysics* 571:17 (2014).

3. P. Serra, G. Lagache, O. Doré, **A. Pullen**, and M. White, “Cross-correlation of cosmic infrared background anisotropies and large-scale structures,” *Astronomy & Astrophysics* 570:98 (2014).