Steven Boada, Ph.D

Contact Information

Department of Physics and Astronomy
136 Frelinghuysen Rd
Rutgers University
Piscataway, NJ 08854

Phone: +1 (615) 200-0119
E-mail: stevenboada@gmail.com
WWW: github.com/boada
WWW: linkedin.com/in/theboada

Research Interests

Observation Cosmology, Large-area Sky Surveys (e.g., DES, LSST, SDSS, ACT, SPT), Galaxy Clusters, High Performance Computing (HPC), Galaxy Evolution, Interacting Galaxies and Morphology.

Education

Texas A&M University, College Station, Texas
- Ph.D, Physics (astronomy focus), 2016

The University of Tennessee, Knoxville, Tennessee
- M.S., Physics (astronomy focus), 2009
- B.S., Physics, 2007

Professional Experience

Dept. of Physics and Astronomy, Rutgers University, New Brunswick, New Jersey USA
Postdoctoral Research Associate **September, 2016 - Present**
- Designed and built massive, parallelized, Python pipelines to process and analyze TBs of astronomical imaging; producing calibrated, standardized data catalogs and rigorous results.
- Coordinated a team of 4, including both senior scientists and graduate students, to perform quality control tasks; deliver science products; and produce peer-reviewed publications.
- Contributed to open source Python projects including: photometrypipeline, astLib, and easyGalaxy.

Texas A&M University, College Station, Texas USA
Ph.D Candidate **August, 2010 - 2016**
- Proved simulated results for an upcoming astronomical survey could be improved, by a factor of ~ 3, over in-house statistical methods by using Random Forest regression. Implemented these ML methods and produced improved results in a pilot survey of the real sky and under real-world conditions.
- Collaborated with group members both in person, and through collaborative tools (e.g., GitHub, SVN).
- Presented scientific results in high-impact, peer reviewed journals and at international conferences.

The University of Tennessee, Knoxville, Tennessee USA
Master's Candidate **August, 2007 - 2009**
- Implemented a C-based pipeline to process hundreds of GBs of simulation results. Including a computer vision algorithm to automatically analyze and compare results to expected targets.
- Optimized simulation parameters using a genetic algorithm based search utilizing HPC (100k+ core) systems at the National Center for Computational Science, part of Oak Ridge National Laboratory

Observing Experience Proposals

- *On the Trail of the Most Massive Galaxy Clusters in the Universe*
  Co-I (PI: J. Hughes), KPNO, 3 nights awarded, 2016
- *X-ray Confirmation of Candidate Planck Clusters with Swift*
  Co-I (PI: J. Hughes), Swift X-ray Observatory, 2016
- *Measuring the Masses of X-ray-Selected, Low-Mass Galaxy Clusters and Groups with Integral Field Spectroscopy*
  Co-I (PI: N. Mehrtens), McDonald Observatory, 4 nights awarded, 2013
- *Measuring the Masses of Galaxy Clusters with Integral Field Spectroscopy*
  Co-I (PI: C. Papovich), McDonald Observatory, 9 nights awarded, 2012
- *Measuring the Masses of Galaxy Clusters with Integral Field Spectroscopy*
  Co-I (PI: C. Papovich), McDonald Observatory, 5 nights awarded, 2012

Telescopes

- Harlan J. Smith 2.7m Telescope, Mitchell Spectrograph (formerly VIRUS-P), 20+ nights
- KPNO, Mayall 4m Telescope, MOSAIC3, NEWFIRM, 10+ nights

Data Experience

- Optical and Near-IR Imagine
- Integral Field Spectroscopy
- Hubble Space Telescope Imaging
- *Swift* X-ray Telescope Imaging and Spectroscopy
- Sloan Digital Sky Survey Imaging and Spectroscopy

Computing Experience

Extensive experience in the processing and application of large astronomical data sets, including: the acquisition and reduction of optical integral field unit spectroscopy, querying large astronomical databases such as the Sloan Digital Sky Survey and the Millennium Simulation, analysis of multi-wavelength imaging from the Hubble Space Telescope. Key computing skills include: mastery of the Python language, and the interface with other languages and tools, considerable experience with large multiprocessor applications (e.g. Gadget-2) and high performance computing systems, supervised and unsupervised machine learning and optimization, GPGPU computing, and participation in open source and collaborative development environments, including version control. Contributor to AstroPy. Co-author of astLib Python library.

Teaching and Outreach

Rutgers University, New Brunswick, New Jersey USA

Guest Lecturer **2016-2020**
Guest lectured in various astronomy 101 level courses.

Texas A&M University, College Station, Texas USA

Teaching Assistant **2010 - Spring, 2015**
Supervised undergraduate students for weekly lab sessions, tutoring sessions, grading of homework and quizzes for Basic Astronomy, Overview of Modern Astronomy, and Survey of Astronomy.

Physics Festival **2010 - 2016**
Demonstrated physics and astronomy principles for students from elementary through high school and the general public.

Star Parties **2010 - 2016**
Discussed astronomical topics and operated telescopes for college students and the general public.

Nashville State Community College, Nashville, Tennessee USA

Adjunct Faculty **Spring, 2010**
Primary instructor for introductory physics course, Conceptual Physics.

The University of Tennessee, Knoxville, Tennessee USA

Teaching Assistant **August, 2007 - 2009**
Supervised laboratory experiences for undergraduate students in Introduction to Modern Physics, and Electricity and Magnetism for Engineering. Designed and taught laboratories for undergraduate Honors Astronomy.

Academic Honors and Awards

The University of Tennessee: graduated Magna Cum Laude, Phi Beta Kappa, Sigma Pi Sigma, President, Society of Physics Students 2006 thru 2007

Grants and Awards

- *The Road to the Virgo Cluster: The DECam/IRAC Galaxy Environment Survey*
  Co-I (PI: C. Papovich), NSF Alliances for Graduate Education and the Professoriate, 2015
- *Graduate Student Presentation Grant*
  PI, Texas A&M University Office of Graduate and Professional Studies, 2015
- *Graduate Student Travel Grant*
  PI, Texas A&M University Department of Physics and Astronomy, 2015

Posters and Presentations

Talk: Galaxy Cluster Workshop, Center for Computational Astrophysics, NYC June 2018
Talk: Tri-State Postdoc Retreat, Center for Computational Astrophysics, NYC May 2018
Talk: Tri-State Postdoc Retreat, Columbia University, NYC March 2017
Talk: Astronomy Seminar Series, Rutgers University, New Brunswick, NJ October 2016
Talk: 227th AAS Meeting, Kissimmee, FL January, 2016
Talk: CANDELS Team Meeting, University of Santa Cruz, Santa Cruz, CA July, 2015
Talk: CANDELS Team Meeting, STScI, Baltimore, MD July, 2014
Poster: Bashfest Symposium, University of Texas, Austin, TX October, 2013
Talk: CANDELS Team Meeting, University of Kentucky, Lexington, KY August, 2013
Poster: GMT Science Meeting, University of Chicago, Chicago, IL June, 2013
Talk: CANDELS Team Meeting, University of Santa Cruz, Santa Cruz, CA September, 2012
Poster: 219th AAS Meeting, Austin, TX January, 2012
Poster: Bashfest Symposium, University of Texas, Austin, TX October, 2011
Talk: Texas A&M Astronomy Symposium, Texas A&M University, College Station, TX August, 2011–15

Publications

- John F. Wu and **Steven Boada** *Using convolutional neural networks to predict galaxy metallicity from three-color images* 2019, MNRAS, 484, 4683
- **Steven Boada**, John P. Hughes, Felipe Menanteau, Peter Doze, L. Felipe Barrientos, L. Infante *High Confidence Optical Confirmation of High Signal-to-Noise Planck Cluster Candidates* 2019, ApJ, 871, 188
- Li, T. S., DePoy, D. L., Marshall, J. L., Tucker, D., Kessler, R., Annis, J., Bernstein, G. M., **Boada, S.**, Burke, D. L., Finley, D. A., James, D. J., Kent, S., Lin, H., Marriner, J., Mondrik, N., Nagasawa, D., Rykoff, E. S., Scolnic, D., Walker, A. R., Wester, W., Abbott, T. M. C., Allam, S., Benoit-Lévy, A., Bertin, E., Brooks, D., Capozzi, D., Carnero Rosell, A., Carrasco Kind, M., Carretero, J., Crocce, M., Cunha, C. E., D'Andrea, C. B., da Costa, L. N., Desai, S., Diehl, H. T., Doel, P., Flaugher, B., Fosalba, P., Frieman, J., Gaztanaga, E., Goldstein, D. A., Gruen, D., Gruendl, R. A., Gutierrez, G., Honscheid, K., Kuehn, K., Kuropatkin, N., Maia, M. A. G., Melchior, P., Miller, C. J., Miquel, R., Mohr, J. J., Neilsen, E., Nichol, R. C., Nord, B., Ogando, R., Plazas, A. A., Romer, A. K., Roodman, A., Sako, M., Sanchez, E., Scarpine, V., Schubnell, M., Sevilla-Noarbe, I., Smith, R. C., Soares-Santos, M., Sobreira, F., Suchyta, E., Tarle, G., Thomas, D., Vikram, V., and The DES Collaboration *Assessment of Systematic Chromatic Errors that Impact Sub-1% Photometric Precision in Large-Area Sky Surveys* 2016, ApJ, 151, 157
- **Steven Boada**, Tilvi, V., Papovich, C., Quadri, R. F., Hilton, M., Finkelstein, S., Guo, Y., Bond, N., Conselice, C., Dekel, A., Ferguson, H., Giavalisco, M., Grogin, N. A., Kocevski, D. D., Koekemoer, A. M. and Koo, D. C. *The Role of Bulge Formation in the Homogenization of Stellar Populations at $z \sim 2$ as revealed by Internal Color Dispersion in CANDELS* 2015, ApJ, 803, 104

White Papers

- Ntampaka, Michelle; Avestruz, Camille; **Boada, Steven**; Caldeira, Joao; Cisewski-Kehe, Jessi; Di Stefano, Rosanne; Dvorkin, Cora; Evrard, August E.; Farahi, Arya; Finkbeiner, Doug; Genel, Shy; Goodman, Alyssa; Goulding, Andy; Ho, Shirley; Kosowsky, Arthur; La Plante, Paul; Lanusse, Francois; Lochner, Michelle; Mandelbaum, Rachel; Nagai, Daisuke Newman, Jeffrey A.; Nord, Brian; Peek, J. E. G.; Peel, Austin; Poczos, Barnabas; Rau, Markus Michael; Siemiginowska, Aneta; Sutherland, Dougal J.; Trac, Hy; Wandelt, Benjamin *The Role of Machine Learning in the Next Decade of Cosmology* 2019, Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, no. 14; Bulletin of the American Astronomical Society

Conference Proceedings

- Ting Li, DePoy, D. L., Marshall, Jennifer L., Nagasawa, D. Q., Carona, D. W., **Boada, S.** *Monitoring the atmospheric throughput at Cerro Tololo Inter-American Observatory with aTmCam* 2014, Proceedings of the SPIE, 9147, 91476Z

Collaboration Publications

- *The Simons Observatory: Science Goals and Forecasts* 2019 Journal of Cosmology and Astroparticle Physics, Issue 02, article id. 056