

RACHEL B. PATERNO-MAHLER
Curriculum Vitae

Office Address

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Current Position WEST LOS ANGELES COLLEGE Aug. 2018 – Present
Culver City, CA, USA
Visiting Professor

Highlights Postdoctoral Researcher, 3+ years
Teaching Experience, Lead Instructor, Three terms
Teaching Experience, TA Discussion/Lab Instructor, Seven terms
Publications: 17 (4 first author)
Invited Seminars: 2 — Contributed Conference Talks: 3
Observing Time Awarded: 190 ks on *Swift*

Education BOSTON UNIVERSITY Sep. 2010 – Jul. 2015
Boston MA, USA
Ph.D. in Astrophysics
Dissertation: “Radio AGN in Galaxy Clusters: Feedback, Merger Signatures, and Cluster Tracers”
Thesis Advisor: Elizabeth Blanton

UNIVERSITY OF CALIFORNIA, IRVINE Sep. 2007 – Dec. 2009
Irvine CA, USA
M.S. in Physics
Thesis: “Using Time Delays to Constrain Lens Masses”
Thesis Advisor: Manoj Kaplinghat

POMONA COLLEGE Sep. 2003 – May 2007
Claremont CA, USA
B.A. in Physics (Astronomy Concentration)
Thesis: “Determining the AGN Fraction of Galaxy Groups”
Thesis Advisors: John Mulchaey, Philip Choi

Honors AAS Travel Grant, 2018, \$2371.91
GAANN Fellowship, 2007-2009
Travel Grant to Hawaii for the Summer AAS Meeting, 2007
The Frank P. Brackett and Davida W. Brackett Prize in Astronomy, 2006
Travel Grant to Washington D.C. for the Winter AAS Meeting, 2006
Summer Undergraduate Research Program Grant, 2005
National Society of Collegiate Scholars, 2003

Research Interests My research focuses on bent, double-lobed radio sources and the role they play in galaxy clusters, as well as the physics of the intracluster medium. Specifically, I am interested in how the intracluster medium interacts with the active galactic nucleus at the center of the cluster, and vice versa, as well as using these sources as tracers for high-redshift ($z > 0.7$) galaxy clusters. I use data from multiple wavelength regimes, including radio, optical, infrared, and X-ray. I am also interested in modeling the mass distribution of these clusters using strong lensing.

Postdoctoral Experience	UNIVERSITY OF CALIFORNIA, IRVINE - POSTDOCTORAL RESEARCHER Irvine, CA, USA Supervisor: David Buote	Sep. 2017 – Aug. 2018
	UNIVERSITY OF MICHIGAN - POSTDOCTORAL RESEARCHER Ann Arbor, MI, USA Supervisor: Keren Sharon	Sep. 2015 – Aug. 2017
Research Experience	GRADUATE RESEARCH ASSISTANT, BOSTON UNIVERSITY Supervisor: Elizabeth Blanton	Oct. 2010 – Aug. 2015
	GRADUATE RESEARCH ASSISTANT, HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS Supervisor: Scott Randall	May 2013-Aug. 2013
	GRADUATE RESEARCH ASSISTANT, UC IRVINE Supervisor: Manoj Kaplinghat	Jun. 2008 – Dec. 2009
	SUMMER RESEARCH ASSISTANT, CARNEGIE OBSERVATORIES Supervisor: John Mulchaey	May 2006 – Jul. 2006
	SUMMER RESEARCH ASSISTANT, POMONA COLLEGE Supervisor: Alma Zook	May 2005 – Aug. 2005
Teaching and Outreach	VISITING PROFESSOR, WEST LOS ANGELES COLLEGE - CULVER CITY, CA Instructor of record for the class “Elementary Astronomy”	Fall 2018
	UC IRVINE COSMOS One of two instructors of record for the UC Irvine COSMOS program, Cluster 7: The Big Bang and the Subatomic world. Led the lectures pertaining to the Big Bang and cosmology.	Summer 2018
	MARLBOROUGH SCHOOL Spoke to the Stars, Time, Astrophysics, Relativity (STAR) Club and the Honors Research class about what it means to be a woman in science and what my day to day life is like.	2018
	GUEST LECTURER, UNIVERSITY OF MICHIGAN Gave guest lectures to the introductory astronomy classes on topics ranging from my own research to covering the normal lectures on exoplanets and spectra.	2017
	ADMISSIONS COMMITTEE, THE SUMMER SCIENCE PROGRAM Evaluate student applications for admission to The Summer Science Program.	2016 - present
	TEACHING FELLOW, BOSTON UNIVERSITY Led discussion for introductory course titled “Cosmology”	Spring 2013
	TRANSIT OF VENUS PUBLIC EVENT Spoke at Venus transit public viewing organized by Boston University Astronomy Department	June 2012
	TEACHING FELLOW, BOSTON UNIVERSITY Led lab exercises for introductory course titled “Stars and Galaxies” Led lab exercises for the summer session courses “Introduction to the Solar System” and “Stars and Galaxies” Led discussion for introductory course titled “Cosmology” Led lab exercises for introductory course titled “Introduction to the Solar System”	Fall 2010 - Fall 2011
	VISITING PROFESSOR, SANTA ANA COLLEGE - SANTA ANA, CA Instructor of record for the class “Introduction to the Solar System”	Spring 2010

TEACHING ASSISTANT, SUMMER SCIENCE PROGRAM Summer 2009, Summer 2007
Teaching assistant at an astronomy summer program for gifted high school students

TEACHING ASSISTANT, UC IRVINE Winter 2008 - Spring 2008
Led lab and discussion for introductory physics class for physicists and engineers
Led discussion for introductory class titled "Physics of Athletics"

MENTOR, POMONA COLLEGE Fall 2006
Held weekly office hours during which the students in the introductory astronomy class could come ask questions

LAB ASSISTANT, POMONA COLLEGE Spring 2005 - Winter 2006
Led observational astronomy lab for the introductory astronomy course
Lab assistant for the class "Atomic and Nuclear Physics"

GRADER, POMONA COLLEGE Fall 2004 - Spring 2005
Graded homework for the introductory physics course

Broader Impacts SUMMER SCIENCE PROGRAM 60TH CELEBRATION July 2018
Led the panel entitled: Women in STEM: Challenges Overcome, a roundtable discussion about day-to-day challenges, how those challenges have changed over time, and ideas for making STEM more inclusive and equitable.

PARTICIPANT, NEXTPROF SCIENCE, UNIVERSITY OF MICHIGAN May 2017
Workshop designed for scientists with a demonstrated commitment to diversity. By application.

UNIVERSITY OF MICHIGAN ASTRONOMY LADIES LUNCH ORGANIZER September 2015 - June 2017
Monthly meeting of the female postdocs to check in with each other and discuss issues such as job applications and work-life balance.

BU WOMEN IN ASTRONOMY LUNCH ASSOCIATION May 2015 - August 2015
Co-founder. Informal monthly lunch meetings open to all women in the department. Each meeting is loosely centered around a topic of relevance to women in STEM.

Professional Service JOURNAL REFEREE (*MNRAS*, *ApJ*)
NASA/*Chandra* PROPOSAL REVIEW PANEL 2018
UNIVERSITY OF MICHIGAN COLLOQUIUM SERIES CO-CHAIR 2016 - 2017
NASA/*Swift* PROPOSAL REVIEW PANEL 2015

Professional Memberships American Astronomical Society
High Energy Astrophysics Division, American Astronomical Society

Observing Experience Optical Imaging: DCT 4.3 m, Pomona College TMO 1 m
Optical Spectroscopy: Magellan 6.5 m (MagE)

Telescope Time Awarded *Swift* Winter 2017
Awarded 190.1 ks of time as PI to observe a subset of cluster candidates in the COBRA Survey to confirm that they are clusters and to measure their properties using scaling relationships.

References PROFESSOR KEREN SHARON
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(734) 936-2079, kerens@umich.edu

PROFESSOR ELIZABETH BLANTON
Boston University Department of Astronomy
725 Commonwealth Avenue
Boston, MA 02215
(617) 353-2633, eblanton@bu.edu

PROFESSOR MANOJ KAPLINGHAT
2180 Frederick Reines Hall
Irvine, CA 92697
(949) 824-8541, mkapling@uci.edu

DR. SCOTT RANDALL
Harvard-Smithsonian Center for Astrophysics
MS-70
60 Garden Street
Cambridge, MA 02138
(617) 496-7738, srandall@cfa.harvard.edu

**Refereed
Publications**

- A17 RELICS: HIGH-RESOLUTION CONSTRAINTS ON THE INNER MASS DISTRIBUTION OF THE $z=0.83$ MERGING CLUSTER RXJ0152.7-1357 FROM STRONG LENSING
Acebron, A., Alon, M., Zitrin, C., Mahler, G., [**Paterno-Mahler, R.**, as part of the RELICS collaboration]. *ApJ*, Submitted. [arXiv:1810.08122](https://arxiv.org/abs/1810.08122)
- A16 A CANDIDATE $z \sim 10$ GALAXY STRONGLY LENSED INTO A SPATIALLY RESOLVED ARC
Salmon, B., Coe, D., Bradley, L., Bradač, M., Strait, V., **Paterno-Mahler, R.**, Huang, K-H., Oesch, P., Zitrin, A., and the RELICS Collaboration. 2018, *ApJ*, 864L, 22
- A15 RELICS: A STRONG LENS MODEL FOR SPT-CLJ0615–5746, A $z = 0.972$ CLUSTER
Paterno-Mahler, R., Sharon, K., Coe, D., Cerny, C., Johnson, T. L., Schrabback, T., and the RELICS Collaboration. 2018, *ApJ*, 863, 154
- A14 RELICS: STRONG LENSING ANALYSIS OF THE GALAXY CLUSTERS ABELL S295, ABELL 697, MACS J0025.4-1222, AND MACS J0159.8-0849
Cibirka, N., Acebron, A., Zitrin, C., Coe, D., [**Paterno-Mahler, R.**, as part of the RELICS collaboration]. 2018, *ApJ*, 863, 145
- A13 THE HIGH-REDSHIFT CLUSTERS OCCUPIED BY BENT RADIO AGN (COBRA) SURVEY: FOLLOW-UP OPTICAL IMAGING
Golden-Marx, E., Blanton, E. L., **Paterno-Mahler, R.**, Brodwin, M., & Ashby, M. L. N. *ApJ*, Submitted.
- A12 RELICS: STRONG LENS MODELS FOR FIVE GALAXY CLUSTERS FROM THE REIONIZATION LENSING CLUSTER SURVEY
Cerny, C., Sharon, K., [**Paterno-Mahler, R.**, as part of the RELICS collaboration]. 2018, *ApJ*, 859, 159
- A11 RELICS: STRONG-LENSING ANALYSIS OF THE MASSIVE CLUSTERS MACS J0308.9+2645 AND PLCK G171.9-40.7
Acebron, A., Cibirka, N., Zitrin, C., Coe, D., [**Paterno-Mahler, R.**, as part of the RELICS collaboration]. 2018, *ApJ*, 858, 42
- A10 THE MAGELLAN EVOLUTION OF GALAXIES SPECTROSCOPIC AND ULTRAVIOLET REFERENCE ATLAS (MEGASAURA) II: STACKED SPECTRA
Rigby, J. R., Bayliss, M. B., Chisholm, J., Bordoloi, R., Sharon, K., Gladders, M. D., Johnson, T., **Paterno-Mahler, R.**, Wuyts, E., Dahle, H., & Acharya, A. 2018, *ApJ*, 853, 87
- A9 THE MAGELLAN EVOLUTION OF GALAXIES SPECTROSCOPIC AND ULTRAVIOLET REFERENCE ATLAS (MEGASAURA) I: THE SAMPLE AND THE SPECTRA
Rigby, J. R., Bayliss, M. B., Sharon, K., Gladders, M. D., Chisholm, J., Dahle, H., Johnson, T., **Paterno-Mahler, R.**, Wuyts, E., & Kelson, D. D. 2018, *AJ*, 155, 104
- A8 THE REIONIZATION LENSING CLUSTER SURVEY (RELICS) AND THE BRIGHTEST HIGH- z GALAXIES
Salmon, B., Coe, D., [**Paterno-Mahler, R.**, as part of the RELICS collaboration], *ApJ*, Submitted, [arXiv:1710.08930](https://arxiv.org/abs/1710.08930)
- A7 SPATIALLY RESOLVED PATCHY LYMAN- α EMISSION WITHIN THE CENTRAL KILOPARSEC OF A STRONGLY LENSED QUASAR HOST GALAXY AT $z = 2.8$
Bayliss, M. B., Sharon, K., Acharya, A., Gladders, M. D., Rigby, J. R., Bian, F., Bordoloi, R., Runnoe, J. Dahle, H., Kewley, L., Florian, M., Johnson, T., & **Paterno-Mahler, R.** 2017 *ApJL*, 845L, 14
- A6 INITIAL RESULTS OF THE HIGH-REDSHIFT CLUSTERS OCCUPIED BY BENT RADIO AGN (COBRA) SURVEY
Paterno-Mahler, R., Blanton, E. L., Brodwin, M., Ashby, M. L. N., Golden-Marx, E., Decker, B., Wing, J. D., & Anand, G. 2017 *ApJ*, 844, 78
- A5 LENS MODEL AND TIME DELAY PREDICTIONS FOR THE SEXTUPLY LENSED QUASAR SDSS J2222+2745
Sharon, K., Bayliss, M. B., Dahle, H., Florian, M. K., Gladders, M. D., Johnson, T. L., **Paterno-Mahler, R.**, Rigby, J. R., Whitaker, K. E., & Wuyts, E. 2017 *ApJ*, 835, 5

- A4 PROBING THE OUTSKIRTS OF THE EARLY STAGE GALAXY CLUSTER MERGER A1750
Bulbul, E., Randall, S. W., Bayliss, M., Miller, E., Andrade-Santos, F., Johnson, R. E., Bautz, M., Blanton, E. L., Forman, W. R., Jones, C., **Paterno-Mahler, R.**, Murray, S. S., Sarazin, C. L., Smith, R. K., & Ezer, C. 2016 *ApJ*, 818, 131
- A3 MERGER SIGNATURES IN THE TRIPLE MERGING SYSTEM ABELL 98
Paterno-Mahler, R., Randall, S. W., Bulbul, E., Andrade-Santos, F., Blanton, E. L., Jones, C., Murray, S., & Johnson, R. E. 2014 *ApJ*, 791, 104
- A2 DEEP *Chandra* OBSERVATIONS OF THE EXTENDED GAS SLOSHING SPIRAL IN A2029
Paterno-Mahler, R., Blanton, E. L., Randall, S. W., & Clarke, T. E. 2013 *ApJ*, 590, 207
- A1 DEEP IMPACT: OBSERVATIONS FROM A WORLDWIDE EARTH-BASED CAMPAIGN
Meech, K. J., [124 authors], **Paterno-Mahler, R.**, [82 authors] 2005 *Science* 310, 265.

Seminars

- B9 THE SEARCH FOR HIGH-REDSHIFT GALAXY CLUSTERS AND WHAT'S BEHIND THEM
Cal Poly Pomona (Invited Seminar), September 2018
- B8 THE SEARCH FOR HIGH-REDSHIFT GALAXY CLUSTERS AND WHAT'S BEHIND THEM
Boston University (Lunch Talk), February 2018
- B7 THE SEARCH FOR HIGH-REDSHIFT GALAXY CLUSTERS AND WHAT'S BEHIND THEM
Occidental College (Invited Seminar), February 2018
- B6 THE SEARCH FOR HIGH-REDSHIFT GALAXY CLUSTERS AND WHAT'S BEHIND THEM
UCLA (Noaz Group Meeting), August 2017
- B5 PROPERTIES OF GALAXY CLUSTERS SELECTED VIA UNIQUE TRACERS
Carnegie Observatories (Lunch Talk), April 2017
- B4 RADIO AGN IN GALAXY CLUSTERS: FEEDBACK, MERGER SIGNATURES, AND CLUSTER TRACERS
University of Michigan, Ann Arbor (Extreme Astrophysics Seminar), September 2015
- B3 RADIO AGN IN GALAXY CLUSTERS: FEEDBACK, MERGER SIGNATURES, AND CLUSTER TRACERS
University of Michigan, Ann Arbor (Extreme Astrophysics Seminar, Invited), February 2015
- B2 MERGER AND FEEDBACK SIGNATURES IN THE INTRACLUSTER MEDIUM
University of Colorado, Boulder (CASA/JILA Astrophysics Lunch Seminar), April 2014
- B1 MERGER AND FEEDBACK SIGNATURES IN THE INTRACLUSTER MEDIUM
Harvard-Smithsonian Center for Astrophysics (GCG Seminar), August 2013

Selected
Conference
Presentations
and
Proceedings
Articles

- C19 POSTER: X-RAY PROPERTIES OF LENSING-SELECTED CLUSTERS
Paterno-Mahler, R., Sharon, K., Bayliss, M., McDonald, M., Gladders, M., Johnson, T. L., Dahle, H., Rigby, J. R., Whitaker, K. E., Florian, M., & Wuyts, E. *Snow Cluster 2018*
- C18 POSTER: X-RAY PROPERTIES OF LENSING-SELECTED CLUSTERS
Paterno-Mahler, R., Sharon, K., Bayliss, M., McDonald, M., Gladders, M., Johnson, T. L., Dahle, H., Rigby, J. R., Whitaker, K. E., Florian, M., & Wuyts, E. *American Astronomical Society, HEAD Meeting #16*, id.105.05
- C17 THE REIONIZATION LENSING CLUSTERS SURVEY: STRONG LENSING ANALYSIS
Paterno-Mahler, R., Sharon, K., RELICS Collaboration *Clusters 2017*
- C16 POSTER: *Swift* INITIAL CHARACTERIZATION OF A STRONG LENS CLUSTER SAMPLE
Paterno-Mahler, R., Sharon, K., Gladders, M., Bayliss, M., Johnson, T. L., Dahle, H., Rigby, J. R., Whitaker, K. E., & Florian, M. *Chandra Science for the Next Decade 2016*

- C15 *Swift* INITIAL CHARACTERIZATION OF A STRONG LENS CLUSTER SAMPLE
Paterno-Mahler, R., Sharon, K., Bayliss, M., Gladders, M., Johnson, T. L., Dahle, H., Rigby, J. R., Whitaker, K. E., & Florian, M. *Great Lakes Cosmology and Galaxies Workshop 2016*
- C14 THE HIGH-REDSHIFT CLUSTERS OCCUPIED BY BENT RADIO AGN (COBRA) SURVEY
Paterno-Mahler, R., Blanton, E. L., Wing, J. D., Ashby, M. L. N., Brodwin, M., & Golden-Marx, E. *International Astronomical Union General Assembly Meeting 29, Galaxies at High Redshift and Their Evolution Over Cosmic Time*, #2257788, Proceedings of the IAU, Volume 11, Issue S319
- C13 SLOSHING, SHOCKS, AND BUBBLES IN CLUSTERS OF GALAXIES
 Blanton, E. L., **Paterno-Mahler, R.**, Randall, S. W., Clarke, T. E., Sarazin, C., McNamara, B., Golden-Marx, E., Ashby, M. L. N., Wing, J. D., Douglass, E., McDonald, M., & Brodwin, M. *International Astronomical Union General Assembly Meeting 29*, #2257563
- C12 PROBING THE OUTSKIRTS OF STRONGLY MERGING DOUBLE-CLUSTERS WITH X-RAY OBSERVATIONS
 Randall, S. W., Bulbul, E., **Paterno-Mahler, R.**, Jones, C., Forman, W., Miller, E. D., Murray, S. S., Sarazin, C., & Blanton, E. L. *International Astronomical Union General Assembly Meeting 29*, #2255653
- C11 EXTRAGALACTIC JETS AS PROBES OF DISTANT CLUSTERS OF GALAXIES AND THE CLUSTERS OCCUPIED BY BENT RADIO AGN (COBRA) SURVEY
 Blanton, E. L., **Paterno-Mahler, R.**, Wing, J. D., Ashby, M. L. N., Golden-Marx, E., Brodwin, M., Douglass, E. M., Randall, S. W., & Clarke, T. E. 2014, *Extragalactic Jets From Every Angle*, Proceedings of the IAU Symposium No. 313 held 15-19 September 2014 on the Galápagos Islands, Ecuador, [arXiv:1411.6025](https://arxiv.org/abs/1411.6025)
- C10 RADIO GALAXIES IN GALAXY CLUSTERS: FEEDBACK, MERGER SIGNATURES, AND SIGNPOSTS
Paterno-Mahler, R., Blanton, E. L., Randall, S. W., Andrade-Santos, F., Ashby, M., Brodwin, M., Bulbul, E., Clarke, T. E., Golden-Marx, E., Johnson, R., Jones, C., Murray, S. S., & Wing, J. D. *American Astronomical Society Meeting 225*, #418.02
- C9 POSTER: OPTICAL FOLLOW-UP OBSERVATIONS FOR THE HIGH-Z COBRA (CLUSTERS OCCUPIED BY BENT RADIO AGN) SURVEY
 Golden-Marx, E., Blanton, E. L., **Paterno-Mahler, R.**, Wing, J. D., Ashby, M., & Brodwin, M. *American Astronomical Society Meeting 225*, #252.21
- C8 POSTER: MERGER SIGNATURES IN THE GALAXY CLUSTER ABELL 98
Paterno-Mahler, R., Randall, S. W., Bulbul, E., Andrade-Santos, F., Jones, C., Murray, S., Blanton, E. L. & Johnson, R. E. 2014, *15 Years of Science with Chandra*, held 18-21 November 2014, Boston, MA, id.P53
- C7 A TARGETED, DISTANT CLUSTER SURVEY USING BENT, DOUBLE-LOBED RADIO SOURCES
 Blanton, E. L., Wing, J. D., Ashby, M., Brodwin, M., **Paterno-Mahler, R.**, & Golden-Marx, E. 2014, *Future Directions in Galaxy Cluster Surveys*, Paris, France
- C6 POSTER: MERGER SIGNATURES IN THE GALAXY CLUSTER ABELL 98
Paterno-Mahler, R., Randall, S. W., Bulbul, E., Andrade-Santos, F., Jones, C., Murray, S., Blanton, E. L. & Johnson, R. E. 2014, *American Astronomical Society Meeting 224*, #222.02
- C5 A TARGETED, DISTANT GALAXY CLUSTER SURVEY USING BENT, DOUBLE-LOBED RADIO SOURCES
 Blanton, E. L., **Paterno-Mahler, R.**, Wing, J., Ashby, M., & Brodwin, M. 2014, *American Astronomical Society Meeting 224*, #206.05
- C4 POSTER: SLOSHING IN CLUSTERS OF GALAXIES
Paterno-Mahler, R., Blanton, E. L., Randall, S. W., Clarke, T. E., Wing, J. D., Ashby, M. N., & Brodwin, M. 2013, *American Astronomical Society Meeting 221*, #243.13

- C3 AGN IN CLUSTERS OF GALAXIES: FEEDBACK, SLOSHING, AND LOBE BENDING
Blanton, E. L., Randall, S., Clarke, T., Sarazin, C., McNamara, B., Douglass, E. M.,
Wing, J., **Paterno-Mahler, R.**, Brodwin, M., & Ashby, M. 2012, *Half a Century of
X-Ray Astronomy*, Proceedings of the conference held 17-21 September 2012 on Mykonos
Island, Greece, id.63
- C2 POSTER: AGN POPULATION IN GROUPS OF GALAXIES
Paterno-Mahler, R., Mulchaey, J. & Choi, P. I. 2007, *American Astronomical Society
Meeting 210*, #06.03
- C1 POSTER: VRI BLAZAR MONITORING AT THE TABLE MOUNTAIN OBSERVATORY
Zook, A. C., **Paterno-Mahler, R. B.**, & Stecklein, G. R. 2005, *American Astronomical
Society Meeting 207*, #141.06