

# Ekta Patel, PhD

Miller Research Fellow | University of California, Berkeley

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**Research Interests:** Near-field cosmology, satellite galaxies, dwarf galaxies, computational astrophysics

## Education

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### University of Arizona

Tucson, AZ

○ M.S., Ph.D. in Astronomy & Astrophysics

2017, 2019

Thesis: "Dynamics of Local Group Satellite Galaxies in the Era of Precision Astrometry"

Advisor: Dr. Gurtina Besla

### New York University

New York, NY

○ B.A. in Physics (with Honors)

2014

Senior Honors Thesis: "The Sloan Digital Sky Survey Large Galaxy Atlas"

Advisor: Dr. David Hogg

## Honors, Awards, and Professional Affiliations

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- 2019-2022 Miller Research Fellowship, Miller Institute for Basic Research in Science
- 2019 Division of Dynamical Astronomy Raynor L. Duncombe Student Research Prize
- 2019 National Science Foundation Astronomy & Astrophysics Postdoc Fellowship Recipient (Declined)
- 2016-2019 National Science Foundation Graduate Research Fellowship Recipient
- 2016 University of Arizona College of Science Service Award Recipient
- 2015 Ford Foundation Pre-Doctoral Fellowship Honorable Mention and Alternate Candidate
- 2014 Sigma Pi Sigma National Physics Honors Society Initiate

## Publications

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- 10 refereed journal articles (5 as first/corresponding author, 3 as second/third author).....
- Sohn, S.T., **Patel, E.**, et al., 2020, ApJ, 901, 43, *HST Proper Motions of NGC 147 and NGC 185: Orbital Histories and Tests of a Dynamically Coherent Andromeda Satellite Plane*
- Patel, E.** et al., 2020, ApJ, 893, 121, *The Orbital Histories of Magellanic Satellites Using Gaia DR2 Proper Motions*
- Quirk, A. & **Patel, E.**, 2020, MNRAS, 497, 2870-2882, *Asymmetric Drift of Andromeda Analogs in the Illustris Simulations*
- Patel, E.**, Carlin, J., Tollerud, E., Collins, M., Dooley, G, 2018, MNRAS, 480, 1883-1897, *ΛCDM Predictions for the Satellite Population of M33*
- van der Marel, R. P., Fardal, M., Sohn, S.T., **Patel, E.**, et al., 2019, ApJ, 872, 24, *First Gaia Dynamics of the Andromeda System: DR2 Proper Motions, Orbits, and Rotation of M31 and M33*
- Besla, G., Patton, D., Stierwalt, S., Rodriguez-Gomez, V., **Patel, E.**, et al., 2018, MNRAS, 480, 3376-3396, *The Frequency of Dwarf Galaxy Multiples at Low Redshift in SDSS vs. Cosmological Expectations*
- Patel, E.**, Besla, G., Mandel, K., Sohn, S.T., 2018, ApJ, 857, 78-94, *Estimating the Mass of the Milky Way Using the Ensemble of Classical Satellite Galaxies*
- Sohn, S.T., **Patel, E.**, et al., 2017, ApJ, 849, 93-107, *Space Motions of the Dwarf Spheroidal Galaxies Draco*

and Sculptor Based on HST Proper Motions with  $\sim 10$  Year Base-Line

**Patel, E.**, Besla, G., Mandel, K., 2017, MNRAS, 468, 3428-3449, *The Orbits of Massive Satellite Galaxies - II. Bayesian Estimates of the Milky Way and Andromeda masses using high precision astrometry and cosmological simulations*

**Patel, E.**, Besla, G., Sohn, S.T., 2017, MNRAS, 464, 3825-3849, *The Orbits of Massive Satellite Galaxies - I. A Close Look at the Large Magellanic Cloud and a New Orbital History for M33*

#### Other.....

*Construction of an  $L_*$ — Galaxy: the Transformative Power of Wide Fields for Revealing the Past, Present and Future of the Great Andromeda System*

Gilbert, K., ..., **Patel, E.**, et al., 2019, Astro2020: Decadal Survey on Astronomy and Astrophysics, Bulletin of the American Astronomical Society, Vol. 51, Issue 3, id. 540

#### Selected Press & Media Features.....

2020 STEAM Squad Curriculum Book - Blasts Off!, [Meet Ekta Patel, Ph.D.](#)

2019 European Space Agency, [Gaia clocks new speeds for Milky Way-Andromeda collision](#)

2019 The New York Times, [Andromeda Is Coming for Our Milky Way Galaxy, Eventually](#)

2019 Astronomy Magazine Ask Astro Column Response, [Will the Pinwheel Galaxy \(M33\) merge with the Andromeda Galaxy \(M31\) prior to Andromeda merging with the Milky Way?](#)

2019 National Geographic, [Our galaxy is due to crash into its neighbor—but when?](#)

2019 Space.com, [We Finally Know When Our Milky Way Will Crash Into the Andromeda Galaxy](#)

2019 Active Galactic Women of Discovery Series, [Galaxy Evolution with Ekta Patel](#)

2019 LiveScience.com, [How Massive is the Milky Way?](#)

2018 University of Arizona Press Release, [How do you Weigh a Galaxy? Especially the One You're In?](#)

2018 Air & Space Magazine, [How to Weigh a Galaxy](#)

2018 International Business Times, [Milky Way's Mass Estimated More Reliably Using Satellite Galaxies Angular Momentum](#)

2018 Nature Research Highlights, [Measuring the Milky Way's mind-boggling mass](#)

2018 American Astronomical Society Nova, [Using Satellite Galaxies to Weigh the Milky Way](#)

2018 Space.com, [Milky Weigh: New Method Pins Down Our Galaxy's Mass](#)

2018 Astronomy Magazine, [A whole new way to weigh the Milky Way](#)

#### Selected Talks & Presentations

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##### Invited: 16.....

Apr 2021 New York University Center for Cosmology and Particle Physics Astro Seminar

Apr 2021 University of Michigan Astronomy Colloquium

Feb 2021 University of California, Santa Cruz Astronomy Colloquium

Feb 2021 University of Oklahoma Astronomy Colloquium

Nov 2020 University of California, Berkeley Astrophysics Roundtable on Near-field Cosmology

Nov 2020 Yale University Astronomy Colloquium

Oct 2020 Princeton University Institute for Advanced Study Seminar

Sep 2020 Rutgers University Astrophysics Seminar

Sep 2020 University of California, Berkeley Astronomy Colloquium

Mar 2020 Las Cumbres Observatory Seminar

Jun 2019 Division of Dynamical Astronomy Raynor L. Duncombe Student Research Prize Talk

Nov 2018 Ohio State University Center for Cosmology and Astroparticle Physics Seminar

Oct 2018 University of California, Berkeley Astronomy Department Lunch Talk

Oct 2018 American Museum of Natural History Astrophysics Seminar, New York, NY

Jul 2018 PHAT Collaboration Team Meeting, Ringberg Castle  
Jun 2018 [232nd American Astronomical Society Meeting Press Conference](#), Denver, CO

#### Contributed Conference Presentations: 9.....

Dec 2020 [Linking the Galactic and Extragalactic\\*](#), Australia (\**runner-up for best contributed talk*)  
Sep 2020 The Local Group: Assembly and Evolution, Space Telescope Science Institute  
Nov 2019 Bay Area Local Group Meeting, Kavli Institute/SLAC National Accelerator Laboratory  
Jul 2019 Small Galaxies, Cosmic Questions, Durham University, United Kingdom  
Jun 2018 [232nd American Astronomical Society Meeting](#), Milky Way Session 402, Denver, CO  
Jul 2017 Large Surveys of the Great Andromeda Galaxy, Lorentz Center, Netherlands  
Apr 2017 Marc Aaronson Symposium, University of (poster)  
Jun 2015 Local Group Astrostatistics Conference, University of Michigan (poster)  
Jan 2014 Midwest Conference for Undergraduate Women in Physics, University of Chicago (poster)

#### Other Talks: 6.....

Dec 2019 University of California, Berkeley Astronomy Department Lunch Talk  
Apr 2018 University of Texas at Austin ExGal Seminar  
Dec 2017 University of Colorado JILA Seminar  
Oct 2017 Columbia University Galaxies Lunch Seminar  
Dec 2016 Space Telescope Science Institute Galaxy Club  
Nov 2016 National Optical Astronomy Observatory FLASH Talk

## Science Communication

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#### Invited Public Presentations.....

2020 [Satellite Galaxies in the Local Group](#), UC Berkeley Astronomy Night  
2020 [Satellite Galaxies in the Local Group](#), Mount Diablo Astronomical Society  
2020 [Satellite Galaxies in the Local Group](#), San Francisco Amateur Astronomers  
2020 [Satellite Galaxies in the Local Group](#), San Mateo County Astronomical Society  
2019 [Satellite Galaxies in the Local Group](#), Huachuca Astronomical Society  
2018 [Satellite Galaxies and Dwarfs in the Local Group](#), Sonora Astronomical Society  
2018 [Estimating the Mass of the Milky Way Using Satellite Galaxies](#), 232nd American Astronomical Society Meeting Press Conference  
2017 [Satellite Galaxies and Dwarfs in the Local Group](#), Tucson Amateur Astronomy Association

#### Community Engagement.....

##### o **Meet a Miller Fellow × El Cerrito High School**

*Speaker | 2020–2021*

- Participate in virtual visits to high school physics and environmental science classes aimed at humanizing science by highlighting scientific career paths and modern areas of research

##### o **University of California, Santa Cruz Lamat Program**

*Speaker | 2020*

- Discussed my career path and area of research in the *Meeting of the Minds* series with California community college students participating in the Lamat summer research program

##### o **National Optical Astronomy Observatory (now NOIRLab)**

*Teen Astronomy Cafe*

*Speaker & Instructor | 2018–2019*

- Designed and presented an original 40 minute research talk entitled *Galactic Archaeology: From Little to Big* accessible to high school students in Tucson, AZ

- Designed and facilitated a 40 minute activity applying skills in basic computer programming, data visualization, and graph interpretation to determine the collision timescale of the Milky Way and Andromeda galaxies

*Project ASTRO*

*Classroom Astronomer | 2015–2017*

- Paired with a local elementary (2015-2016) and high school (2016-2017) teachers to bring astronomy themed hands-on activities to students in the classroom

- o **Academy of Tucson High School**

*Keynote Speaker | 2018*

- Gave a keynote speech at the Academy of Tucson High School's Class of 2018 graduation

- o **Colors of Nature Summer Academy Tucson**

*Instructor | 2017–2018*

- Arizona-Sonora Desert Museum (2017, 2018): Co-instructed a one week summer academy for middle school students to explore the science of color in nature through both scientific and artistic lenses
- Kitt Peak, AZ (2018): Co-instructed a one week summer academy specifically for middle school girls of the Tohono O'odham Nation, the Indigenous people of the Sonoran Desert

## Telescope Time Awarded

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**As Co-Investigator:**

**HST Cycle 28, *Near Field Cosmology with Ultra-faint Dwarfs: Patchy Reionization and Sub-Solar Initial Mass Function*, GO 16293, PI: Y. Choi, 5 orbits**

**HST Cycle 28, *Resolved Proper Motions of M33*, GO 16274, PIs: S.T. Sohn & M. Fardal, 25 orbits**

**HST Cycle 28, *Andromeda and the Seven Dwarfs: M31 Mass, Satellite Orbits, and the Nature of the Satellite Plane*, GO 16273, PI: S.T. Sohn, 48 orbits**

**HST Cycle 27, *Tracing the 6-D Orbital and Formation History of the Complete M31 Satellite System*, GO 15902, PI: D. Weisz, 244 orbits**

**HST Cycle 27, *Orbits of Isolated Dwarfs: Local Group Mass and Environmental Quenching*, GO 15911, PI: A. del Pino, 20 orbits**

**HST Cycle 26, *Resolved Proper Motions of M31 and the M31-M32 Interaction*, GO 15658, PI: S. T. Sohn, 35 orbits**

## Leadership & Service Experience

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Leadership Experience.....

- o **UC Berkeley Astronomy Department**

*Postdoc Representative | 2020–Present*

- Serve as a liaison between postdoctoral scholars and department leadership
- Attend bi-weekly meetings to communicate requests from the postdoc community and receive department updates
- Organize once per semester town halls to collect feedback from the postdoc community

*Diversity, Equity, Inclusion, & Climate Committee*

*Postdoc Representative | 2020–Present*

- Work with faculty, students, postdocs, and staff to outline recommendations addressing representation and support networks for individuals belonging to marginalized groups in astronomy
- Contribute to the development of a climate advisors program to promote positive department culture

○ **Miller Institute for Basic Research in Science**

*Diversity, Equity, and Inclusion Working Group Member | 2020–Present*

- Work with Miller Research Fellows and faculty to provide recommendations for improving the overall climate and hiring practices at the Miller Institute
- Contribute to the development of the Meet a Miller Fellow × El Cerrito High School community outreach program

○ **University of Arizona Department of Astronomy and Steward Observatory**

*Graduate Council Member | 2015–2017*

- Acted as a liaison between astronomy graduate students and faculty, including department leadership
- Launched a seminar series highlighting non-academic career trajectories

Mentoring & Academic Support.....

○ **Physical science Opportunities for Womxn in Education and Research (POWER) Bay Area**

*Mentor | 2020–Present*

- Provide in-depth mentoring in academic and life skills to a Bay Area community college student majoring in STEM

○ **University of Arizona Graduate College Application Support Program**

*Editor | Summer 2017*

- Worked with graduate students in individual and group settings to revise application materials for pre-doctoral, graduate, and dissertation fellowship grant applications

○ **University of Arizona Department of Astronomy and Steward Observatory**

Tucson Initiative for Minority Engagement in Science and TEchnology Program (TIMESTEP)

*Mentor | 2015–2019*

- Mentored undergraduate STEM majors in a group setting on topics centered around professional development

Tucson Women in Astronomy Mentoring Program

*Mentor | 2014–2016*

- Mentored undergraduate women majoring in physics and/or astronomy one-on-one and provided general guidance in navigating academic life

Graduate Student-Postdoc Mentoring Program

*Mentor | 2017*

- Provided in-depth mentoring to first and second year women in the astronomy graduate program on best research practices, teaching skills, and managing coursework responsibilities

Academic Service.....

- Journal Referee for *The Astrophysical Journal*, *Monthly Notices of the Royal Astronomical Society*, *Astronomy & Astrophysics*
- Reviewer for NASA Astrophysics Data Analysis Grants Program
- Reviewer for NASA FINNEST Graduate Fellowship Program
- Executive Secretary for NASA Astrophysics Theory Grants Program

## Teaching Experience

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- 2017-2018 | University of Arizona
  - ASTR400B: Galactic & Extragalactic Astronomy and Cosmology (Teaching Assistant)
  - Astronomy Tutoring for Majors & Minors Program (Tutor)
- 2015-2017 | Ph.G. Tutoring, Tucson, AZ
  - Tutor for elementary through high school students in mathematics
- 2013-2014 | New York University
  - Einstein's Universe (Laboratory Teaching Assistant)
  - Physics II: Intro to Electromagnetism (Teaching Assistant)
  - General Physics I (Adjunct)

## Technical Skills

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- Programming: Python (primary), C, C++, GitHub
- Software: Microsoft Office Suite, Google Suite, LaTeX, Zoom, Box, Dropbox, Slack
- Systems: Linux, Macintosh OS-X, Windows

*Revised on April 26, 2021*