Ava E. Polzin

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Education

Yale University — New Haven, CT
Ph.D. in Astronomy, Advisors: Professors Laura Newburgh and Pieter van Dokkum — 2019–Current

- Dean's Emerging Scholars Fellowship

M.S. and M.Phil. (en route) — exp. 2022

Northwestern University — Evanston, IL
B.A. in Physics & Astronomy (honors), Earth & Planetary Sciences (minor) — 2016–2018

- Thesis: *Exploring the Eclipsing Binary Yield of the Large Synoptic Survey Telescope* with Professor Aaron Geller

University of Southern California — Los Angeles, CA
B.S. track in Music Industry (Thornton School of Music), Geological Sciences — 2014–2016

- Resident Honors Program
- Thematic Option humanities honors program

Research Experience

Yale University — New Haven, CT

Graduate Research Assistant, Newburgh and van Dokkum groups — November 2021–Present
- Departments of Astronomy and Physics, advisors: Profs. Laura Newburgh and Pieter van Dokkum
- Observational, extragalactic and cosmology research using data from the Canadian Hydrogen Intensity Mapping Experiment (CHIME) and the Dragonfly Telephoto Array.

Graduate Research Assistant, van Dokkum Group, Department of Astronomy — August 2019–November 2021
- Observational extragalactic research; advisor: Prof. Pieter van Dokkum
- Focusing on star formation in low luminosity/dwarf galaxies and the Dragonfly Ultrawide Survey

Graduate Research Assistant, Newburgh Lab, Department of Physics — June 2020–December 2020
- Cosmology research, radio astronomy; advisor: Prof. Laura Newburgh
- Worked on the CHIME pipeline and daily data validation via ringmap statistics.

Visiting Undergraduate Researcher, Newburgh Lab, Department of Physics — Summer 2018
- Experimental cosmology research, instrumentation; advisor: Prof. Laura Newburgh
- Examined the feasibility of using drones for calibration and beam-mapping of static Hydrogen Intensity and Real-time Analysis eXperiment (HIRAX) – and CHIME – dishes.

Northwestern University — Evanston, IL

Research Assistant, Margutti Group — January 2019–July 2019
- X-ray duration-luminosity phase space; advisor: Prof. Raffaella Margutti
- Worked on comprehensive review of soft X-ray transients and variables to define discovery space for upcoming missions and generate a resource to allow for initial, qualitative classification of transient signals.

Vera Rubin Observatory Intern — June 2017–July 2019
- Time-domain astronomy, simulations; advisor: Prof. Aaron Geller
- Created a full-scale Galactic simulation to determine a new minimum prediction for Rubin Observatory's eclisping binary yield over its ten-year run.

Undergraduate Research Assistant, Micro-X Lab December 2016–June 2017
- High-energy astroparticle physics, instrumentation; advisors: Prof. Enectali Figueroa-Feliciano, Dr. David Goldfinger, and Dr. Antonia Hubbard
- Primarily worked on Transition Edge Sensors and simulated the helium consumption of the lab's dewars in advance of sounding rocket launch.

University of Southern California Los Angeles, CA
Undergraduate Research Volunteer, Nealson Lab Spring 2016
- Environmental microbiology, geological sciences; advisors: Prof. Ken Nealson, Dr. Casey Barr
- Intended as training for planned research in environmental microbiology scheduled to be carried out at the Jet Propulsion Lab, Pasadena, CA, Summer 2016. In addition to setting up electrochemical tests, general biology lab experience – making plates, mixing media, isolating samples for re-plating, organizing and cataloging chemical shelves, etc.

Teaching & Mentorship Experience

Graduate Mentor, Yale University May 2021–Present
Mentor students in research projects related to the work of the van Dokkum Group and Dragonfly Telephoto Array collaboration.
- Rohan S. — Integrated light photometry, galaxy morphology, Dragonfly Wide-Field Survey

Lead Instructor, Yale Young Global Scholars Summers 2020 and 2021
- Designed and implemented seminars about astrophysics and the history of astrophysics targeted at advanced high school students (e.g., "Introduction to Extragalactic Astrophysics" and "Astronomy Sans the White Dudes".)
- Evaluations are linked: 2020 and 2021

Mentor and Writing Fellow, Polygence April 2020–Present
Mentor high schoolers in manageable research projects designed to give them a sense of astrophysical research. Emphasis placed on developing familiarity/comfort with coding, data analysis, and critical thinking. Each student has ended up with the product they'd initially desired – a paper in a high school journal, an animation showing dynamical evolution, etc. Additionally, have worked with full-time Polygence staff to encourage the establishment of scholarships for underprivileged learners.
- Anagha R. — "Finding the constant of an accelerating universe: the Hubble constant"
- Cora C. — "Fourth order integration of the solar system"
- Anirudh K. — "A review of black hole X-ray transients"
- Jacqueline H. — "A surface brightness profile of M31 from archival SDSS data"
- Jeshwanth M. — "Multi-messenger observability of neutron star binary systems"

Graduate Teaching Fellow, Yale University August 2019–Present
- ASTR 110 (Planets & Stars) with Dr. Michael Faison, Fall 2019 (4.6/5.0)
- ASTR 170 (Introduction to Cosmology) with Prof. Priya Natarajan, Spring 2020 (N/A due to COVID-19)
- ASTR 110 (Planets & Stars) with Dr. Michael Faison, Fall 2020 (4.7/5.0)
- ASTR 255/PHYS 295 (Research Methods in Astrophysics) with Prof. Héctor Arce, Fall 2021

Teaching Assistant, Yale Summer Program in Astrophysics Summers 2019 and 2020
Mentor students in their research projects, aid with assignments (both in a tutoring capacity and a grading one), and serve as telescope Time Allocation Committee (TAC). During Summer 2019, oversaw/ran nightly observing sessions at the Leitner Family Observatory and Planetarium.

Grader, Northwestern Universith Department of Physics & Astronomy January–March 2019
Graded assignments for Physics 330-2 (Classical Mechanics) with Prof. Nathaniel Stern, Winter 2019.

Peer-Guided Study Group Facilitator, Northwestern University September 2017–March 2019
Through Academic Support and Learning Advancement (Searle Center for Advancing Learning & Teaching, Weinberg College).
- Led small group sessions supplemental to general physics courses. Worked with Prof. David Taylor's and Prof. Art Schmidt's classes for Fall 2017 and Prof. Deborah Brown's classes Winter 2018 to Spring 2019.
- Selected to serve on student panel at annual ASLA New Faculty Workshop (September 21, 2018) and returning student leader panel at annual Peer Leader Training (September 26, 2018).

N'Cat Tutor, Northwestern Athletics, Northwestern University September 2017–March 2019
Tutored student athletes in physics, astronomy, math, music, and earth science courses. Worked both one-on-one and with groups.

Learning Assistant, Searle Center for Advancing Learning & Teaching, Northwestern University April–June 2018
Attended all lectures and discussions to provide TA-like support to students during introductory physics class. Participated in Prof. Zosia Krusberg's Physics 135-3 pilot of the Learning Assistant program.

Outreach, DEI, & Other Pertinent Experience

Skype-a-Scientist Fall 2021–Present

Letters to a Pre-Scientist Fall 2021–Present

Yale Astronomy Data Science Journal Club Organizing Committee Member Spring 2021–Present

Outreach Subcommittee Chair, Yale Astronomy Climate and Diversity Committee Spring 2020–Present

IDEA Journal Club Organizing Committee Member Spring 2020–Present
"Inclusion, Diversity, and Equity in Astronomy" (IDEA) Journal Club, Yale Astronomy

Advocacy Chair, Yale Women in Physics+ Fall 2019–Present

Organizer, Astronomy on Tap New Haven Fall 2019–Present

Peer Orientation Mentor, Yale Graduate School of Arts & Sciences Fall 2020
Piloted through the GSAS and Graduate Student Development & Diversity. Welcomed and oriented a group of first year graduate students (from various departments) to Yale and New Haven. Charged with building community despite the pandemic and offering ongoing mentorship and support to ensure new student success in the graduate school.

Volunteer, Yale Pathways to Science Telescope Workshop July 2019

Dearborn Observatory Telescope Operator May 2017–July 2019
Northwestern University Department of Physics & Astronomy; supervisor: Prof. Michael Smutko. Ran telescope, hosted events, and answered questions pertaining to the field and observatory.

NU CUWiP Local Organizing Committee Member February 2018–January 2019
2019 Conference for Undergraduate Women in Physics hosted at Northwestern University through the Society of Women in Physics & Astronomy and the Department of Physics & Astronomy.

Heavy Hitters Music Group Intern, Glendale, CA Summer 2016
Supervisors: Cindy Badell-Slaughter (company president) and Nikole Luebbe.
- Broad internship in film/TV and publishing industry combining creative (A&R, music reviewing, working with artists) with pitching music and licensing/clearance from the publishing side (for interest in sync), as well as metadata, promotion and marketing, and royalty collection.
- Listened to and helped select new artists to sign to the Emmy Award-winning catalog. Also curated music to be pitched to film and TV "creatives", put together professional playlists and descriptions, organized and edited audio files and cue sheet information, helped run social media and website (set Heavy Hitters up on LinkedIn and maintained existing professional sites), actively contributed in creative meetings and to lists for music supervisors, and did general industry research on existing/upcoming projects, contact and marketing info, and new music supervisors to keep the company up to date.

Lakota Cultural Exchange Program (LCEP) 2009–Present
Additional details at thelakotaculturalexchangeprogram.org and our Facebook page.
Founded the program in 2009 and have run programming through it consistently since then. Ongoing effort to bring empowerment through enrichment to girls on Pine Ridge Reservation in South Dakota. What began as a girls-helping-girls self-defense initiative has grown into permanent music programs on the reservation and a continuing STEM outreach effort at Northwestern University. As everything else, a bit derailed by the COVID-19 pandemic, but in connection-building stage in Connecticut and exploring the possibility of extended, virtual opportunities for students on the reservation.

Publications

9. **A. Polzin**, R. Margutti, K. Auchettl, K. L. Page, G. Vasilopoulos, D. Coppejans, J. S. Bright, P. Esposito, P. K. G. William, L. Chomiuk, and E. Berger, "The phase space of Galactic and extragalactic X-ray transients", *In preparation for submission to The Astrophysical Journal*, 2021.

8. D. Wulf, The CHIME Collaboration (incl. **A. Polzin**), "Using the Sun to measure the primary beam response of the Canadian Hydrogen Intensity Mapping Experiment telescope", *In preparation for submission to Monthly Notices of the Royal Astronomical Society*, 2021.

7. The CHIME Collaboration (incl. **A. Polzin**), "An overview of CHIME, the Canadian Hydrogen Intensity Mapping Experiment", *In preparation for submission to The Astrophysical Journal*, 2021.

6. The CHIME Collaboration (incl. **A. Polzin**), "Detection of large-scale structure with the Canadian Hydrogen Intensity Mapping Experiment", *In preparation for submission to The Astrophysical Journal*, 2021.

5. M. A. Keim, P. van Dokkum, S. Danieli, D. Lokhorst, J. Li, Z. Shen, R. Abraham, S. Chen, C. Gilhuly, Q. Liu, A. Merritt, T. B. Miller, I. Pasha, and **A. Polzin**, "Tidal distortions in NGC 1052-DF2 and NGC 1052-DF4: Independent evidence for a lack of dark matter", *Submitted to the Astrophysical Journal*, 2021. (arXiv/ADS)

4. Q. Liu, R. Abraham, C. Gilhuly, P. van Dokkum, P. G. Martin, J. Li, J. P. Greco, D. Lokhorst, S. Chen, S. Danieli, M. A. Keim, A. Merritt, T. B. Miller, I. Pasha, **A. Polzin**, Z. Shen, and J. Zhang, "A method to characterize the wide-angle point spread function of astronomical images", *The Astrophysical Journal, in press*, 2021. (arXiv/ADS)

3. I. Pasha, D. Lokhorst, P. G. van Dokkum, S. Chen, R. Abraham, J. Greco, S. Danieli, T. Miller, E. Lippitt, **A. Polzin**, Z. Shen, M. A. Keim, Q. Liu, A. Merritt, and J. Zhang, "A nascent tidal dwarf galaxy forming within the northern HI streamer of M82", *The Astrophysical Journal Letters*, vol. 923, no. 2, p. L21, Dec. 2021. (arXiv/ADS)

2. A. M. Geller, **A. Polzin**, A. Bowen, and A. A. Miller, "Simulating eclipsing binary yields of the Rubin Observatory in the Galactic field and star clusters", *The Astrophysical Journal*, vol. 919, no. 2, p. 83, Sep. 2021. (arXiv/ADS)

1. **A. Polzin**, P. van Dokkum, S. Danieli, J. P. Greco, and A. J. Romanowsky, "A recently quenched isolated dwarf galaxy outside of the Local Group environment", *The Astrophysical Journal Letters*, vol. 914, no. 1, p. L23, Jun. 2021. (arXiv/ADS)
   This work received some popular interest and was covered by astrobites (shared by AAS Nova) and the Yale Scientific Magazine.

Presentations

7. "A recently quenched isolated dwarf galaxy outside of the Local Group environment", invited presentation at the OSU Astro Coffee (given virtually); May 20, 2021.

6. "The Phase Space of Galactic and Extragalactic X-ray Transients", MIT Kavli Institute Brown Bag Lunch Talk (given virtually); Oct. 26, 2020.

5. "Stellar STEM Weekends", Northwestern University Center for Native American & Indigenous Research Symposium; May 17, 2019.
   Video available on the LCEP webpage (under "STEM Outreach" tab).

4. **A. Polzin**, A. Geller, A. Miller, K. Breivik, "Exploring the Eclipsing Binary Yield of the Large Synoptic Survey Telescope". Poster presented at the 233rd American Astronomical Society Meeting; Jan. 9, 2019; Seattle, WA. (ADS)

3. **A. Polzin**, A. Geller, A. Miller, K. Breivik, "Exploring the Eclipsing Binary Yield of the Large Synoptic Survey Telescope". Poster presented at the Greater Chicago Undergraduate Women in Physics Workshop (University of Chicago); Sept. 30, 2018; Chicago, IL.
   Received poster award.

2. "Examining drone calibrations for HIRAX", Wright Laboratory Undergraduate Research Symposium, Yale University, July 30, 2018

1. **A. Polzin**, A. Geller, A. Miller, K. Breivik, "Exploring an Improved Method for Determining LSST's Eclipsing Binary Yield". Poster presented at the Adler Planetarium and Northwestern Department of Physics & Astronomy for the 2017 CIERA REU; Aug. 17 - 18, 2017; Evanston, IL and Chicago, IL.

Telescope Proposals

- **(Co-I)** "A galaxy apparently formed by star formation in massive, extremely dense clumps of gas", Keck/LRIS + KCWI 2022A
- **(Co-I)** "Radial velocities of low mass galaxies from broad slit spectroscopy with LRIS", Keck/LRIS 2021B
- **(Co-I)** "A nearby globular cluster-rich ultra diffuse galaxy", Keck/LRIS + KCWI 2020A

Honors & Awards

- **Dean's Emerging Scholars Fellowship**, Yale University 2019–2022
- **Honorable Mention, National Science Foundation Graduate Research Fellowship Program** 2019 & 2021
- **Center for Native American & Indigenous Research Event Co-Sponsorhip Grant** Spring and Summer 2019
  Northwestern University; award in the amount of $1000, which facilitated the Lakota Stellar STEM Weekend for middle school-age girls from Pine Ridge Reservation.
- **Office of Institutional Diversity & Inclusion Event Sponsorship Grant** Spring and Summer 2018 & 2019
  Northwestern University; two awards, each in the amount of $2500, which was sufficient to cover all expenses (travel, food, housing, program costs, incidentals) for Stellar STEM Weekend for middle school girls from the Bad River Ojibwe band and partially funded another Stellar STEM Weekend for half a dozen Lakota girls from Pine Ridge Reservation.
- **Northwestern University Dean's List** Spring and Fall 2018
- **Weinberg College of Arts & Sciences Research Grant** Summer 2018
  Award in the amount of $3500 to facilitate summer research completed in the Yale University Department of Physics: "Optimizations on the HIRAX radio array"
- **Northwestern Summer Internship Grant Program** awarded for Summer 2018
  Award in the amount of $3000 to facilitate summer research, turned down in favor of WCAS Research Grant.
- **NASA Illinois Space Grant** 2017–2018
  Award in the amount of $3000 to facilitate academic year research in the space sciences.
- **DAAD Research Internship in Science and Engineering** awarded for Summer 2017
  Declined in order to participate in 2017 Northwestern CIERA REU cohort.
- **Bruce Fishkin Scholarship Fund** 2014–2018
  Full scholarship (including tuition, housing, books, food, and incidental costs) for four years of university education. Applied funding at both the University of Southern California and Northwestern University.
- **USC Deans and University Scholarships** 2014–2016
  Quarter tuition (and additional several thousand dollar supplement) merit-based scholarship attendant to admission to the University of Southern Californa and its Resident Honors Program.
- **USC Academic Achievement Award** Spring and Fall 2015
- **USC Dean's List** Fall 2014 and Spring 2015
- **Fulbright Summer Institute** 2015
  - Via the US-UK Fulbright Commission. Opportunity to spend a portion of the summer at Queen's University Belfast learning about conflict resolution and cultural history in a region famous for its profound turmoil and, subsequently, remarkable initiatives to mitigate sectarianism and heal a population traumatized by the Troubles.
  - Served as reader for 2019 Summer Institute applications.

- **USC Dornsife Summer Undergraduate Research Fund** 2015
  Award in the amount of $3000 to fund summer research. Project in conjunction with the Thematic Option Interdisciplinary Humanities Honors Program and Fulbright Summer Institute: "9/11 and the Troubles – Representations, Ramifications, Responses, and Realities".
- **HERLead (formerly ANNpower)/Vital Voices Grant** 2014 & 2015
  Received for independently established Lakota Cultural Exchange Program. Two awards in the amount of $2500 each to support exchange and enrichment efforts for girls on Pine Ridge Reservation, South Dakota.
- **HERLead Leadership Forum Fellow** 2014
- **USC Thematic Option Honors Program** admitted 2014
  Interdisciplinary humanities honors program, undertaken in lieu of usual general education requirements.
- **USC Resident Honors Program** admitted 2014
  Invited to apply for, and admitted to, the RHP at USC, which enabled exceptional students to begin their freshman year of college at USC in Los Angeles in lieu of their senior year of high school.

Memberships & Activities

- **Dragonfly Telephoto Array Collaboration** 2020–Present
- **Canadian Hydrogen Intensity Mapping Experiment (CHIME) Collaboration** 2020–Present
- **Astronomy Climate and Diversity Committee**, Yale University 2020–Present
  Outreach subcommittee lead and Equity & Diversity Journal Club planning committee member.
- **Women in Physics+**, Yale University 2019–Present
  Serving as advocacy chair from October 2019.
- **American Physical Society** 2018–Present
- **American Astronomical Society**, Graduate Student Member 2017–Present
- **Sigma Xi** ($\Sigma\Xi$), Associate Member inducted 2019
  National scientific research honors society.
- **Sigma Pi Sigma** ($\Sigma\Pi\Sigma$), Northwestern University inducted 2018
  National physics honors society.
- **Weinberg College Student Advisory Board**, Northwestern University Fall 2018
  Selected by department as Physics & Astronomy representative.
- **Society of Physics Students**, Northwestern University 2016–2019
  - Elected President for 2017-2018 year; assumed duties April 2017
  - Initiatives include establishing fundraising effort in conjunction with Dearborn Observatory (selling observatory-branded gear to fund outreach), renovating office and repurposing the space to help it serve as an undergraduate major lounge, planning monthly undergraduate events for prospective and current majors and minors, and working to enhance involvement with department.
- **Society of Women in Physics and Astronomy**, Northwestern University 2016–2019
- **Sigma Gamma Epsilon** ($\Sigma\Gamma\mathrm{E}$), University of Southern California inducted 2015
  National earth sciences honors society.
- **USC Men's Crew (coxswain)** 2014–2016
- **Trojan Marching Band (mellophone)**, University of Southern California 2014–2016

Observing & Computing Experience

- **Dragonfly Telephoto Array** (regularly, 37 nights)
- **Keck/LRIS** (2 nights)
- **Keck/NIRES** (2 nights)
- **Palomar/TripleSpec** (2 nights)
- **Cedar High Performance Computing Cluster**, Compute Canada 2020–Present
- **Quest High Performance Computing Cluster**, Northwestern University 2017–2019

Summer Schools & Workshops

- **Large-Volume Spectroscopic Analyses of AGN and Star Forming Galaxies in the Era of JWST** will attend, April 4 - 7, 2022
  STScI, hosted virtually.
- **La Serena School for Data Science 2021: Applied Tools for Data-driven Sciences** August 2 - 13, 2021
  AURA and Universidad de La Serena, hosted virtually. Received full scholarship.
  Project entailed training a convolutional neural network to automatically identify transients' host galaxies. Paper in the works (first publication to come out of an LSSDS summer school in program history).
- **Cosmology Summer School** June 1 - 5, 2020
  University of Michigan, hosted virtually.
- **Midwest Workshop on Supernovae and Transients** February 25 - 26, 2019
  University of Chicago, Chicago, IL.