

## Dr. Anna Mercedes Nierenberg

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<b>Contact Information</b>	Physics & Astronomy Department University of California Irvine Irvine, CA 92697-2575	<i>e-mail:</i> <a href="mailto:anierenb@uci.edu">anierenb@uci.edu</a> <i>web:</i> <a href="http://annanierenberg.com">http://annanierenberg.com</a>
<b>Appointments</b>	<b>NASA Postdoctoral Program Fellow</b> Jet Propulsion Laboratory	Sept. 2018-Sept 2021
	<b>University of California Chancellor's Fellow</b> Department of Physics and Astronomy, University of California Irvine	Sept. 2017- Sept. 2018
	<b>CCAPP Postdoctoral Fellow</b> Center for Cosmology and AstroParticle Physics, The Ohio State University	Sept. 2014 to Sept. 2017
<b>Education</b>	<b>Ph. D. Physics</b> , University of California Santa Barbara Dissertation: <i>Testing galaxy formation and the nature of dark matter with satellite galaxies</i> , Advisor: Tommaso Treu	Sept. 2014
	<b>B. S. Physics</b> , University of California Los Angeles <i>summa cum laude</i>	June 2008
<b>Observing proposals and grants</b>	<b>Principal-Investigator</b> <i>Hubble Space Telescope</i> GO-15177, 'Testing CDM with the WFC3 Grism', Cycle 25, 18 orbits, WFC3 IR imaging and grism, \$158,568 (PI)  <i>Hubble Space Telescope</i> GO-13732, 'Detecting dark matter substructure with narrow-line lensing', Cycle 21, 10 orbits, WFC3 IR imaging and grism, \$70,759 (PI)  <i>Hubble Space Telescope</i> AR-13271, 'The cosmic evolution of faint satellites as a test of galaxy formation and the nature of dark matter', archival proposal, \$59,784 (Co-PI)  <b>Co-Investigator</b> VLT Observatory, 0102.A-0335(A), 'Lens redshifts and the inner structure of high redshift AGN for new gravitationally lensed quads', 12 hours.  <i>Hubble Space Telescope</i> GO-15320, 'Probing the dark universe with quadruply imaged quasars', Cycle 25, 26 orbits, WFC3 IR, UVIS	

Keck Observatory, Keck I and II telescopes, 15 nights (OSIRIS, NIRC2, NIRES, ESI)  
Lick Observatory, 3 m telescope, 17 nights (Kast, IRCAL)

## **Fellowships and Awards**

*NASA Postdoctoral Program Fellowship*- Three years postdoctoral funding.

*UC Irvine Chancellor's Postdoctoral Fellowship* - One year postdoctoral funding and lifetime UC-wide faculty hiring incentive

*CCAPP Postdoctoral Fellowship* - Three years postdoctoral funding

*UCSB Dean's Fellowship* -2012-2013 Academic year graduate student researcher salary and tuition

*Worster Undergraduate Research Mentor Fellowship* - Summer 2013 Undergraduate Research Salary

*Physics Chair's Fellowship*- Spring 2012 Graduate student researcher salary and tuition

## **Publications**

19. Graus, Andrew S.; Bullock, James S.; Boylan-Kolchin, Michael; **Nierenberg, Anna M.** 'Through a Smoother Lens: An expected absence of LCDM substructure detections from hydrodynamic and dark matter only simulations', MNRAS 480, 1322 (2018).

18. Gilman, Daniel; Birrer, Simon; Treu, Tommaso; Keeton, Charles R.; **Nierenberg, Anna M.** 'Probing the nature of dark matter by forward modeling flux ratios in strong gravitational lenses', MNRAS, tmp, 2153 G

17. Pancoast, A. et al. **inc. AMN**, 'Stability of the Broad-line Region Geometry and Dynamics in Arp 151 Over Seven Years', ApJ 856, 108 (2018).

16. Keel, William C.; Bennert, Vardha N.; Pancoast, Anna; Harris, Chelsea E.; **Nierenberg, Anna**; Chojnowski, S. Drew; Lintott, Chris J.; Schawinski, Kevin; Mitchell, Graham; Cornen, Claude 'Cross-ionization of gas in AGN companion galaxies as a probe of AGN radiation in time and angle', arXiv:1711.09936 (2017).

15. **Nierenberg, A. M.** ; Treu, T.; Brammer, G.; Peter, A. H. G.; Fassnacht, C. D.; Keeton, C. R.; Kochanek, C. S.; Schmidt, K. B.; Sluse, D. ; Wright, S. A., 'Probing dark matter substructure in the gravitational lens HE0435-1223 with the WFC3 grism', MNRAS 471, 2224 (2017).

14. Gilman, Daniel; Agnello, Adriano; Treu, Tommaso; Keeton, Charles R.; **Nierenberg, Anna M.**, 'Strong lensing signatures of luminous structure and substructure in early-type galaxies', MNRAS 467, 3970 (2017)

13. Ding, Xuheng; Liao, Kai; Treu, Tommaso; Suyu, Sherry H.; Chen, Geoff C.-F.; Auger, Matthew W.; Marshall, Philip J.; Agnello, Adriano; Courbin, Frederic; **Nierenberg, Anna M.** ; Rusu, Cristian E.; Sluse, Dominique; Sonnenfeld, Alessandro; Wong,

Kenneth C., ‘H0LiCOW. VI. Testing the fidelity of lensed quasar host galaxy reconstruction’, MNRAS 465, 4634 (2017)

12. **Nierenberg, A. M.**; Treu, T.; Menci, N.; Lu, Y.; Torrey, Paul; Vogelsberger, M., ‘The Missing Satellite Problem in 3D’, MNRAS 462, 4473 (2016).

11. Barth, Aaron J. et al., **including AMN**, ‘The Lick AGN Monitoring Project 2011: Spectroscopic Campaign and Emission-line Light Curves’ ApJS 217, 26 (2015)

10. **Nierenberg, A. M.**; Treu, T.; Wright, S. A.; Fassnacht, C. D.; Auger, M. W., ‘Detection of substructure with integral field spectroscopy of the gravitational lens B1422+231’, MNRAS 422, 2434 (2014).

9. **Nierenberg, A. M.**; Oldenburg, Dylan; Treu, T., ‘Do lens galaxies have an excess of luminous substructure?’, MNRAS 436, 2120 (2013)

8. **Nierenberg, A. M.**; Treu, T.; Menci, N.; Wang, W., ‘The Cosmic Evolution of Faint Satellite Galaxies as a Test of Galaxy Formation and the Nature of Dark Matter’, ApJ 772, 146 (2013)

7. Barth, Aaron et al. **including AMN**, ‘The The Lick AGN Monitoring Project 2011: Fe II Reverberation from the Outer Broad-line Region’, ApJ 769, 128 (2013)

6. Pancoast, Anna et al. **including AMN**, ‘The Lick AGN Monitoring Project: Dynamical Modeling of the Broad Line Region in Mrk 50’, ApJ 754, 49 (2012)

5. **Nierenberg, A. M.**; Auger M. W.; Treu, T.; Marshall, P.J.; Fassnacht, C. D.; Busha, Michael T., ‘Luminous Satellites of Early-Type Galaxies II: Spatial Distribution, Luminosity Function and Cosmic Evolution’, ApJ 752, 99 (2012)

4. Keel, William C. et al. **including AMN**, ‘The Galaxy Zoo survey for giant AGN-ionized clouds: past and present black hole accretion events’, MNRAS 420, 878 (2012)

3. Barth, Aaron J. et al., **including AMN**, ‘The Lick AGN Monitoring Project 2011: Reverberation Mapping of Markarian 50’, ApJ 743, 4 (2011)

2. Barth, Aaron J. et al., **including AMN**, ‘Broad-line Reverberation in the Kepler-field Seyfert Galaxy Zw 229-015’, ApJ 732, 121 (2011)

1. **Nierenberg, A. M.**; Auger, M.W.; Treu, T.; Marshall, P.J.; Fassnacht, C. D. ‘Luminous Satellites of Early-Type Galaxies I: Spatial Distribution’, ApJ 731, 44 (2011)

**Teaching and Service**

**Mauna Kea Spectroscopic Explorer Dark Matter Science Working Group**

**Deflector Redshift Task Force Team Leader**

Organize spectroscopic measurements of lens deflectors between international strong

lensing teams using telescopes in the northern and southern hemispheres.

**LSST Strong Lensing Working Group, LSST Dark Matter Group**

**TMT IRIS Science Team**

**Calbridge Python Workshop**

Co-running an introductory python workshop for California State Bridge program participants, UCI, January and March 2018.

**HST TAC**

**NASA Keck TAC**

**CCAPP seminar co-organizer**, OSU, Spring 2016.

**CCAPP summer seminar co-organizer**, OSU, Summer 2015.

**Physics graduate student life committee**, UCSB, 2008-2009

**Referee** MNRAS, Nature Astronomy, ApJ

**Physics 4L** Electromagnetism lab teaching assistant, UCSB Winter 2009

**Physics 3L**, Mechanics lab, teaching assistant, UCSB Fall 2008

**Public Outreach** **Live Eclipse Broadcast from Columbus Center of Science and Industry**

Science host on four hour Facebook Live broadcast from COSI on the day of the August 21 solar eclipse, shown to in Columbus libraries and public spaces and publicly available on Facebook. Explained basic eclipse phenomena, and answered live questions from the community.

**Eclipse outreach on Columbus News Stations**

Guest on Columbus Channel 10 News broadcast answering eclipse questions from Facebook Live. Guest on Columbus NBC4 morning news discussing eclipse science.

**Space in Your Face YouTube Channel**

Co-host, Youtube outreach channel with astronomy news, 20 episodes

**Columbus Fair Physics Volunteer**

August 2016

**Columbus Science Pub Speaker**

Public lecture on dark matter, June 2016

**Science day at Innis Elementary**

Created and presented an educational slideshow about astronauts for K-2 students, Winter 2015

**Adopt-A-Physicist**

Communicate with several high school classes about being a physicist over the course of several weeks, Fall 2015, Fall 2009- 2013, Spring 2011

**Astronomy on Tap**

Speaker and co-organizer, Spring 2015.

**JW Science Extravaganza**

Elementary School crater exhibit presenter, April 2015.

**La Colina Middle School Career Day**

Discuss science career with middle school students October 2011, 2012

**Student Advising Alexandra Davis**

Graduate student in Physics, The Ohio State University. Detecting new dwarf galaxies in the local volume. Supervised with Professor Annika Peter. May 2016 to present.

**Daniella Roberts**

Bridge graduate student in Physics, The Ohio State University. Measuring the luminosity function of satellites around sub-Milky Way mass host galaxies. Supervised with Professor Annika Peter. May 2016 to present.

**Kaitlin McTague**

Undergraduate in Astronomy and Astrophysics, The Ohio State University. Searching for new ultra-faint satellite galaxies in the local volume. Supervised with Professor Annika Peter.

**Dylan Oldenburg**

Undergraduate in Physics, UCSB. Measured the luminosity function of satellites around gravitational lenses. June 2012-November 2013.

**Invited Talks**

Milan Italy, 'The Universe as a telescope: probing the cosmos at all scales with strong lensing', September 2018

Vulcano Italy, 'Frontier Objects in Astrophysics and Particle Physics', May 2018

Kavli Institute for Particle Astrophysics and Cosmology, Cosmology seminar, May 2018

UCI, Astrophysics Seminar, April 2018

UCLA, 'Shedding Light on the Dark Universe with Extremely Large Telescopes', April 2018

University of Kentucky Physics, Colloquium, February 2018

University of California Davis, Astrophysics Seminar, February 2018

University of California San Diego Center for Astrophysics and Space Science, seminar, October 2017

University of Minnesota, Astrophysics Colloquium, October 2017

Cogne Italy, ‘Strong gravitational lensing by galaxies and clusters’, June 2017

CfA, ITC Galaxies and Cosmology Seminar, January 2017

Kavli IPMU, ‘The Astrophysics of Dark Matter’ conference, October 2016

Leiden University, April 2016, Galaxy lunch talk

University of Texas at Dallas, ‘Symposium on relativistic astrophysics’, December 2013

The Ohio State University, CCAPP Seminar, October 2013

INPAC, panel member ‘ $\Lambda$ CDM and astronomical probes of dark matter physics’, April 2013.

Pepperdine University, Science Seminar, October 2012

**Contributed  
Conference Talks**

UCLA, ‘UCLA Dark Matter 2018’, February 2018.

Cogne Italy, ‘Strong gravitational lensing by galaxies and clusters’ workshop, June 2017.

Leiden University, ‘Astrophysics of Dark Matter’ workshop, April 2016.

Kavli IPMU, ‘Galaxies and cosmology in light of strong lensing’ conference, October 2014.

223 AAS meeting, January 2015

Courmayeur Italy, ‘Galaxy formation under the magnifying glass of gravitational lensing’ workshop, June 2013.

University of California, San Diego, ‘Keck Science Meeting’, September 2012.

University of Bologna, ‘Dark Matter from Globular Clusters to Clusters of Galaxies’, September 2012.

Courmayeur, Italy, ‘Strong lensing from stars to dark matter halos’, workshop, June 2012.