

Andrea Derdzinski

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Positions

EMIT Postdoctoral Fellow	Oct 2023 - present
<i>as part of the Establishing Multi-messenger Astronomy Inclusive Training program</i>	
Department of Life and Physical Sciences, Fisk University, Nashville, TN, U.S.A.	
Department of Physics and Astronomy, Vanderbilt University, Nashville, TN, U.S.A.	
Postdoctoral Fellow	Feb 2020 - Aug 2023
Center for Theoretical Astrophysics and Cosmology	
Institute for Computational Science, University of Zurich, Switzerland	
National Science Foundation Graduate Research Fellow	Aug 2015 - Dec 2020
Astronomy Department, Columbia University, New York, U.S.A.	

Education

Columbia University in the City of New York	
Ph.D, Astronomy	May 2020
Dissertation: <i>Signatures of accretion disks around coalescing BH binaries</i>	
Advisor: Prof. Zoltán Haiman	
Master of Arts, Master of Philosophy	Oct 2016, May 2017
University of California, Santa Cruz	
Bachelor of Science, Astrophysics	June 2014

Awards and Honors

Tomalla Foundation for Gravity Research Fellowship	Feb 2020 - Dec 2021
National Science Foundation Graduate Research Fellowship	Aug 2015 - Dec 2019
Columbia University Lead Teaching Fellowship	2016 - 2017
Dean's Fellowship, Columbia University	2014 - 2019
Outstanding Poster Presentation, Undergraduate Women in Physics, UC Berkeley	Jan 2014
LAMAT REU Fellowship, University of California, Santa Cruz	2013
NASA California Space Grant Consortium Fellowship	2013

Professional Contributions, Collaborative Work, and Mentorship

Referee , MNRAS, ApJ, Nature Astronomy	2020,2021,2022,2023
Organizer , Gravitational Waves Seminars, University of Zurich (UZH)	2021 - present
Organizer , Student Seminars, ICS Ph.D. Program, UZH	2021 - present
· I organize talks by students on topics beyond their research, providing guidance and feedback as part of their professional development.	
Organizer , Theoretical Astrophysics and Cosmology Seminars, UZH	2020 - present
Visiting Scientist , International Space Science Institute	May 2023
· Team 551 : <i>Future Missions to Uranus and Neptune: Prospects for Non-Planetary Science</i> (PIs: Dan D'Orazio & Prasenjit Saha).	

Co-Supervisor , Masters student thesis research projects	2021
<ul style="list-style-type: none"> · M. Pijnenburg, <i>Tidal disruption events in dwarf galaxies</i>, now a PhD student at University of Geneva · N. Kubli, <i>Instabilities in self-gravitating, magnetized accretion disks</i>, now a PhD student at ICS 	
Member of LISA Science Group and Astrophysics Working Group	2020 - present
<ul style="list-style-type: none"> · I am a coordinator of one of the first (ongoing) collaborative Astro Working Group projects and a contributor to the Red Book which outlines the mission requirements. · I coordinated and contributed sections to the Astrophysics White Paper in Living Reviews in Relativity (arXiv:2203.06016). This work summarizes the capabilities of the future mission and recommends critical next steps to achieve the proposed goals. 	
Organizer and Mentor , Columbia Astronomy Mentorship Program	2015 - 2019
<ul style="list-style-type: none"> · I coordinated one-on-one mentorship pairing, organized presentations on useful skills for undergraduate and graduate mentors/mentees, and advocated for department funding to facilitate monthly lunch meetings (press: "Astronomy grads support undergrad students in new program"). 	
Co-Organizer , Conference for Undergraduate Women in Physics in NYC	Jan 2019
Panel Organizer and Moderator , <i>Women in Physics-Driven Careers</i> , NYC	Jan 2019
Organizer , weekly astro-ph discussions, Columbia Astronomy	2018
Co-Organizer , LSST Detection of Optical Counterparts to GWs, Columbia	May 2017
Co-Organizer , Astrofest Conference, Columbia University	Sep 2016

Professional Development and Teaching

Lead Teaching Fellow , Columbia University Center for Teaching & Learning	2016 - 2017
<ul style="list-style-type: none"> · As a Fellow, I attended several pedagogical seminars and received financial support to organize pedagogical workshops in the Astronomy department. 	
Computational Plasma Astrophysics Summer Program, IAS, Princeton	July 2016
Participant & Team Leader , Institute for Science & Engineering Educators	2014 - 2016
<ul style="list-style-type: none"> · ISEE is a Professional Development Program that trains scientists in Inquiry-based teaching methods. As a participant, I attended 2 pedagogical meetings each year and organized workshops at Columbia for undergraduates that incorporate scientific research methods. The second year I returned as a Design Team Leader to guide a team with the implementation of a workshop on data analysis and coding practices. 	
Teaching Assistant , Columbia University, <i>Earth, Moon, and Planets</i>	Spring 2015
Teaching Assistant , Columbia University, <i>Life in the Universe</i>	Fall 2014
Tutor , UC Santa Cruz, Introduction to Scientific Computing & IDL	Fall 2014

Community Involvement

in addition to public talks (see below)

Volunteer , 3 years of 'Meet the Scientist' Sessions, Intrepid Museum in NYC	2015 - 2018
<ul style="list-style-type: none"> · I ran a public information booth on 'Meet the Astrophysicists' as part of Kid's Week. 	
Volunteer , Columbia Astronomy Outreach Program	2014 - 2018
<ul style="list-style-type: none"> · I helped organize free public lectures and rooftop stargazing. 	

Scientific Presentations and Science Communication

I have given **30+** talks at various institutions, international conferences, workshops, and public events.

Invited Talk , European Astronomical Society meeting, Krakov, Poland Gravitational wave sources in gas-rich environments	July 2023
Invited Seminar (remote), Lunar Gravitational Wave Antenna (LGWA) meeting Science potential of gas-rich galactic nuclei for future GW experiments	May 2023
Colloquium , GRAPPA, University of Amsterdam GRavitation Astroparticle Physics Amsterdam	Nov 2022
Invited Seminar , Center for Relativistic Astrophysics, Georgia Tech CRA Seminar	Oct 2022
Invited Talk , Cahill Center for Astronomy & Astrophysics, Caltech Theoretical AstroPhysics Including Relativity and Cosmology Seminar	Sep 2022
Talk (remote), Sun Yat-sen University, Guangzhou, China TianQin Astronomy Workshop	Aug 2022
Invited Talk , Max Planck Institute for Gravitational Physics, Potsdam Seminar at the Albert Einstein Institute	July 2022
Talk , Institute for Gravitational Wave Astronomy, University of Birmingham, U.K. LISA Astrophysics Working Group meeting	June 2022
Invited Review Talk , Sapienza University of Rome, Italy EuCAPT Workshop on GW Probes of BH Environments	June 2022
Talk , Neils Bohr Institutet, Denmark Young Astronomers on Galactic Nuclei Conference	Sep 2021
Talk (remote), hosted by University of Zurich, Switzerland LISA Astrophysics Working Group Meeting	June 2021
Talk (remote), hosted by Neils Bohr Institutet, Denmark Young Astronomers on Galactic Nuclei Conference	Oct 2020
Invited Talk (remote), Center for Computational Astrophysics, Flatiron Institute AGN disks: Where the Wild Things Are Workshop	Oct 2020
Invited Talk (remote), Center for Computational Astrophysics, Flatiron Institute Compact Objects Group Meeting	May 2020
Talk , Radboud University, Netherlands LISA Astrophysics Working Group Meeting	Mar 2020
Invited Talk , Institute for Computational Science, University of Zurich Theoretical Astrophysics & Computational Science Seminar	Jan 2020
Competition Talk , Columbia University Finalist for the Three-minute Thesis Competition	Dec 2019
Talk , Astronomy Department, Columbia University Yearly Astrofest Conference	2015 - 2019
Invited Talk , Private residence, New York City Astronomy Council Fundraising Meeting	April 2019
Talk , Institute d'Astrophysique de Paris LISA Astrophysics Working Group Meeting	Dec 2018
Invited Review Talk , NSCA, University of Illinois Urbana-Champaign Deep Learning for Multi-messenger Astrophysics conference	Oct 2018

Invited Review Talk , UAB Barcelona, Spain Astro-GR / Tal Alexander Meeting	Sep 2018
Talk , Chicago, Illinois U.S.A. AAS 12th International LISA Symposium	July 2018
Public Talk , Columbia Astronomy Outreach Program <i>Waves from Space</i>	April 2018
Public Talk , Astronomy on Tap NYC <i>Imaging the Milky Way's supermassive black hole</i>	April 2018
Invited Talk , UC Berkeley Theoretical Astrophysics Center Seminar	Mar 2018
Invited Talk , Caltech The Dynamic Infrared Sky Conference	Sep 2017
Talk , University of Cambridge, U.K. The Disc Migration Issue Meeting	May 2017
Invited Talk , Columbia University Common Envelope Workshop	Jan 2017
Public Talk , 100% Outer Space Party at Littlefield, Brooklyn, NY <i>Black holes don't suck</i>	Aug 2016
Poster , Columbia University Conference on Shocks in Novae and Supernovae	June 2016
Poster , Harvard University Sackler Conference on Transient Astronomy	May 2016
Public Talk , Astronomy on Tap NYC <i>The Rosetta Mission (We landed on a %\$&*ing comet!)</i>	May 2015
Public Talk , Columbia University Outreach Program <i>Observing Comet Lovejoy</i>	Jan 2015
Poster , Conference for Undergraduate Women in Physics, UC Berkeley <i>Modeling the External Environments of White Dwarf Binary Systems</i>	Jan 2014

Publication List

Alternatively, see the [NASA ADS search](#).

4 first-author, 2 second-author and 3 *n*th-author (refereed)

total citations: 450+

Papers accepted or submitted to peer-reviewed scientific journals: *denotes advised students

10. S. Morton, S. Rinaldi, A. Torres-Orjuela, **A. Derdzinski**, M. Vaccaro, W. Del Pozzo, *GW190521: a binary black hole merger inside an active galactic nucleus?*, submitted to PrD, [arXiv:2310.16025](#) (2023)
9. M. Garg*, S. Tiwari, **A. Derdzinski**, J. Baker, S. Marsat, L. Mayer, *The minimum measurable eccentricity from gravitational waves of LISA massive black hole binaries*, submitted to MNRAS, [arXiv:2307.13367](#) (2023)
8. **A. Derdzinski** & Lucio Mayer, *In-situ extreme mass ratio inspirals via sub-parsec formation and migration of stars in thin, gravitationally unstable AGN discs*, MNRAS, 521, Issue 3, pp.4522-4543 (2023), [arXiv:2205.10382](#)
7. M. Garg*, **A. Derdzinski**, L. Zwick*, P. R. Capelo, L. Mayer, *The imprint of gas on gravitational waves from LISA intermediate-mass black hole binaries*, MNRAS, 517, Issue 1, pp.1339-1354 (2022), [arXiv:2206.05292](#)
6. L. Zwick*, **A. Derdzinski**, M. Garg*, P. R. Capelo, L. Mayer, *Dirty waveforms: Multiband harmonic content of gas-embedded gravitational wave sources*, MNRAS, 511, 4, 6143-6159 (2022), [arXiv:2110.09097](#)
5. P. Amaro-Seoane, [33 authors], **A. Derdzinski**, [120 authors], *Astrophysics with the Laser Interferometer Space Antenna*, Living Reviews in Relativity, Volume 26, Issue 1, article id.2 (2023), [arxiv:2203.06016](#)
4. **A. Derdzinski**, D. D’Orazio, P. Duffell, Z. Haiman, A. Macfadyen, *Evolution of gas disc embedded intermediate mass ratio inspirals in the LISA band*, MNRAS, 501, Issue 3, pp.3540-3557 (2021), [arXiv:2005.11333](#)
3. P. Duffell, D. D’Orazio, **A. Derdzinski**, Z. Haiman, A. Macfadyen, *Circumbinary Disks: Accretion and Torque as a Function of Mass Ratio and Disk Viscosity*, ApJ, 901, Issue 1, id.25 (2020), [arXiv:1911.05506](#)
2. **A. Derdzinski**, D. D’Orazio, P. Duffell, Z. Haiman, A. Macfadyen, *Probing gas disc physics with LISA: simulations of an intermediate mass ratio inspiral in an accretion disc*, MNRAS 486, pp.2754-2765 (2019), [arXiv:1810.03623](#)
1. **A. Derdzinski**, B. Metzger, D. Lazzati, *Radiative Shocks Create Environments for Dust Formation in Classical Novae*, MNRAS 469, pp.1314-1329 (2017), [arXiv:1610.02401](#)

Book Contributions:

1. Invited author of ‘Extreme Mass Ratio Inspirals’, **A. Derdzinski** & Lorenz Zwick, as part of Chapter 5 of the book *Black Holes in the Era of Gravitational-Wave Astronomy*, in production with Elsevier (2023)

White Papers:

2. J. Baker, [7 authors], **A. Derdzinski**, [26 authors] *Multimessenger science opportunities with mHz gravitational waves*, Astro2020: Decadal Survey on Astronomy and Astrophysics, 51, Issue 3, id. 123 (2019)

1. L. Chomiuk, E. Aydi, A. Babul, **A. Derdzinski**, [9 authors], *A Shocking Shift in Paradigm for Classical Novae*, Astro2020 Science White Paper, (2019)