

REBECCA DIESING

Postdoctoral Scholar at the Institute for Advanced Study & Columbia University
rrdiesing@ias.edu | +1 (414) 861-3546 | rebeccadiesing.com

EDUCATION

University of Chicago <i>PhD in Astronomy and Astrophysics</i>	2017– 2023
Northwestern University <i>Bachelor of Arts in Physics (Summa Cum Laude)</i>	2013 – 2017

RESEARCH INTERESTS

- Acceleration and propagation of Galactic cosmic rays
- Evolution of astrophysical shocks, including supernova remnants, novae, and black hole winds
- Multi-messenger emission from extreme astrophysical phenomena
- Astroparticle instrumentation

RESEARCH EXPERIENCE

THEA Fellow Columbia University, New York City, NY	2025 –
Member (Postdoctoral Scholar) Institute for Advanced Study, Princeton, NJ	2023 – 2025
Graduate Research Assistant University of Chicago, Chicago, IL <i>The Maximum Energy of Shock-Accelerated Cosmic Rays</i> Advisors: Damiano Caprioli & Angela V. Olinto	2017 – 2023
Undergraduate Research Assistant Northwestern University, Evanston, IL <i>Radio Observations of the Supermassive Black Hole at the Galactic Center and its Orbiting Magnetar</i> Advisor: Farhad Yusef-Zadeh	2014 – 2017
Intern CERN (University of Michigan REU), Meyrin, Switzerland <i>Using Machine Learning to Search for Minimally Supersymmetric Standard Model Higgs Bosons</i> Advisor: Jan Steggemann	2016
Intern Fermilab (SULI Program), Batavia, IL <i>A Simple Event Display for the DarkSide-50 Time Projection Chamber</i> Advisor: Stephen Pordes	2015

AWARDS & GRANTS

International Union of Pure and Applied Physics Early Career Scientist Prize <i>€1,000 in recognition of outstanding contribution of a young scientist to astroparticle physics</i>	2025
Co-I: NASA Fermi GI Program <i>Grant NNH22ZDA001N-FERMI; Interpreting the Gamma-Ray Emission from Novae</i>	2023
William Rainey Harper Dissertation Fellowship <i>\$4,000 awarded to outstanding PhD candidates; one of the University of Chicago's highest honors</i>	2022

Eugene and Niesje Parker Graduate Student Fellowship	2019
<i>One year of full funding awarded to an outstanding graduate student in high energy astrophysics</i>	
International School of Cosmic Ray Astrophysics Best Poster	2018
University of Chicago Eckhardt Scholarship	2017
<i>\$40,000 awarded to select graduate students in the physical sciences</i>	
Northwestern University Oliver Marcy Scholar	2017
<i>\$400 awarded to top students in the physical sciences</i>	
Northwestern University Best Honors Thesis in Physics	2017
Northwestern University Undergraduate Research Grant	2016
<i>\$1,000 to study the Galactic Center at the NRAO facility in Socorro, NM</i>	
Northwestern University Best Junior in Physics	2016

TEACHING EXPERIENCE

Instructor The Physics of Stars, University of Chicago, Chicago, IL	2019
<i>The Physics of Stars is a three-week immersion course for advanced high school students.</i>	
Tutor Strive Tutoring, Chicago, IL	2018 – 2019
<i>Strive offers free after-school programming to underserved students in Chicago.</i>	
Curriculum Designer Space Explorers, Chicago, IL	2018
<i>Space Explorers is a free program that immerses underserved Chicago students in science.</i>	
Teaching Assistant University of Chicago, Chicago, IL	2017 – 2018
<i>PHSC12600, "Matter, Energy, Space, and Time"; PHSC12610, "Black Holes"; PHSC12620, "The Big Bang"</i>	
GSW Senior Mentor Northwestern University, Evanston, IL	2014 – 2017
<i>GSW provides weekly review sessions to students in introductory STEM courses.</i>	
Tutor Northwestern University Dept. of Physics & Astronomy, Evanston, IL	2014 – 2017

RESEARCH MENTORSHIP

Graduate Students

Anirudh Patel; Emma McGinness; Emily Simon

Undergraduates (theory projects)

Shoshana Chipman; Nick Corso; Khadijat Durojaiye; Jake Grodner; Rohan Venkat

Undergraduates (design, construction, and calibration of the University of Chicago Infrared Camera)

Alexa Bukowski; Zoë de Beurs; Emily Donovan; Khadijat Durojaiye; Seamus Flannery; Noah Friedlander; Kameron Mehling; Alex Miller

PROFESSIONAL SERVICE

Organization

Organizer, IAS Astrophysics Seminar Series; Co-Leader, U Chicago IDEA Journal Club

Reviewer

Physical Review; The Astrophysical Journal; Astronomy & Astrophysics; Monthly Notices of the Royal Astronomical Society; Advances in Space Research

Committees

Member, U Chicago Curriculum Committee; Member, U Chicago Website Committee

Collaborations

Member, JEM-EUSO Collaboration; Member, HEX-P Collaboration; Member, HEROIX Collaboration

Other Service

Mentor, Society of Women in Physics, U Chicago

ADDITIONAL SKILLS**Computer Languages & Programs**

Python, C++, Fortran, ROOT, CASA, AIPS, Wolfram Mathematica, Adobe Creative Suite

PUBLICATIONS

*denotes research mentee

First author & significant contribution

- [1] A. Patel*, R. Diesing, and B. Metzger 2026 | submitted | arXiv:2601.00953
Ultra Heavy Cosmic Rays from Magnetars
- [2] E. Simon*, R. Diesing, D. Caprioli, et al. 2025 | submitted | arXiv:2512.07940
Detecting Neutrino Emission from Supernova Remnants: A Theoretically Motivated Target Catalog
- [3] R. Diesing, L. Böss, and D. Caprioli 2025 | submitted | arXiv:2510.23700
Particle Acceleration in the Intracluster Medium: Implications of Micromirror Confinement
- [4] B. Metzger, L. Lancaster, and R. Diesing 2025 | ApJ 988, 2 | arXiv:2505.08907
Suppression of Shock X-Ray Emission in Novae from Turbulent Mixing with Cool Gas
- [5] R. Diesing and S. Gupta 2025 | ApJ 980, 2 | arXiv:2411.18679
Nonthermal Signatures of Radiative Supernova Remnants II: The Impact of Cosmic Rays and Magnetic Fields
- [6] R. Diesing, M. Guo, C.-G. Kim, et al. 2024 | ApJ 974, 2 | arXiv:2404.15396
Nonthermal Signatures of Radiative Supernova Remnants
- [7] R. Diesing 2023 | ApJ 958, 1 | arXiv:2305.07697
The Maximum Energy of Shock-Accelerated Cosmic Rays
- [8] R. Diesing, B. Metzger, E. Aydi et al. 2023 | ApJ 947, 2 | arXiv:2211.02059
Evidence for multiple shocks from the gamma-ray emission of RS Ophiuchi
- [9] N. Corso*, R. Diesing, and D. Caprioli 2023 | ApJ 954, 1 | arXiv:2301.10257
Hadronic versus leptonic origin of gamma-ray emission from supernova remnants

[10] R. Diesing and D. Caprioli 2021 | ApJ 922, 1 | arXiv:2107.08520
Steep Cosmic Ray Spectra with Revised Diffusive Shock Acceleration

[11] Fermi-LAT Collaboration, R. Diesing, and D. Caprioli 2021 | ApJ 921, 144 | arXiv:2105.11469
Gamma Rays from Fast Black-hole Winds

[12] R. Diesing and D. Caprioli 2020 | PRD 101, 103030 | arXiv:2001.02240
Nonsecondary Origin of Cosmic Ray Positrons

[13] S. Chipman*, R. Diesing, M. H. Reno et al. 2019 | PRD 100, 063011 | arXiv:1906.11736
Anomalous ANITA air shower events and tau decays

[14] R. Diesing and D. Caprioli 2019 | PRL 123, 071101 | arXiv:1905.07414
On the Spectrum of Electrons Accelerated in Supernova Remnants

[15] R. Diesing and D. Caprioli 2018 | PRL 121, 091101 | arXiv:1804.09731
Effect of Cosmic Rays on the Evolution and Momentum Deposition of Supernova Remnants

[16] F. Yusef-Zadeh, R. Diesing, M. Wardle et al. 2015 | ApJL 811, L35 | arXiv:1509.03337
*Radio Continuum Emission from the Magnetar SGR J1745-2900: Interaction with Gas Orbiting Sgr A**

Contributing author

[17] The JEM-EUSO Collaboration 2025 | submitted | arXiv:2505.20762
The Extreme Universe Observatory on a Super-Pressure Balloon II: Mission, Payload, and Flight

[18] A. J. Nayana, R. Margutti, E. Wiston, et al. 2025 | ApJ 985, 1 | arXiv:2411.02647
Dinosaur in a Haystack : X-ray View of the Entrails of SN 2023ixf and the Radio Afterglow of Its Interaction with the Medium Spawned by the Progenitor Star (Paper 1)

[19] The JEM-EUSO Collaboration 2024 | Astroparticle Physics 165, 103046 | arXiv:2406.13673
The EUSO-SPB2 Fluorescence telescope for the Detection of Ultra-High Energy Cosmic Rays

[20] The JEM-EUSO Collaboration 2024 | Journal of Instrumentation 19, P01007 | arXiv:2309.02577
EUSO-Offline: A comprehensive simulation and analysis framework

[21] The JEM-EUSO Collaboration 2024 | Astroparticle Physics 154, 102891 | arXiv:2401.06525
EUSO-SPB1 mission and science

[22] The JEM-EUSO Collaboration 2023 | EPJ C 83, 1028 | arXiv:2311.12656
Developments and results in the context of the JEM-EUSO program obtained with the ESAF simulation and analysis framework

[23] S. Reynolds, H. An, M. Abdelmaguid et al. 2023 | FrASS 10, 1321278 | arXiv:2311.04952
The High Energy X-Ray Probe (HEX-P): Supernova remnants, pulsar wind nebulae, and nuclear astrophysics

[24] K. Mori, S. Reynolds, H. An et al. 2023 | FrASS 10, 1303197 | arXiv:2311.04851
The High Energy X-Ray Probe (HEX-P): Galactic PeVatrons, star clusters, superbubbles, microquasar jets, and gamma-ray binaries

[25] The POEMMA Collaboration 2021 | JCAP 2021, 007 | arXiv:2012.07945
The POEMMA (Probe of Extreme Multi-Messenger Astrophysics) Observatory

Non-refereed

- [26] R. Diesing, S. Meyer, J. Eser et al. 2023 | PoS ICRC2023, 450 | arXiv:2310.08607
Infrared Cloud Monitoring with UCIRC2
- [27] R. Diesing, B. Metzger, E. Aydi et al. 2023 | PoS ICRC2023, 865
Using Gamma-Rays to Reveal the Evolution of Novae
- [28] R. Diesing, S. Meyer, A. V. Olinto et al. 2022 | PoS 395, 214 | arXiv:2112.09618
UCIRC2: EUSO-SPB2's Infrared Cloud Monitor
- [29] R. Diesing and D. Caprioli 2022 | PoS 395, 29 | arXiv:2109.11022
Galactic Cosmic Ray Acceleration with Steep Spectra
- [30] R. Diesing, S. Meyer, A. V. Olinto et al. 2019 | PoS 358, 241 | arXiv:1909.02663
UCIRC2: An Infrared Cloud Monitor for EUSO-SPB2
- [31] The POEMMA Collaboration 2019 | PoS 358, 378 | arXiv:1909.09466
The POEMMA (Probe of Extreme Multi-Messenger Astrophysics) mission

INVITED PRESENTATIONS

- HEAD 22 Meeting | St. Louis, MO October, 2025
- Galactic PeVatron Workshop | Nevis Laboratories, Irvington, NY October, 2025
- Plasma Astrophysics Chalk Talk | CCA, New York, NY September, 2025
- Particle Acceleration and Transport | Calabria, Italy February, 2025
- COSPAR 2025 | Busan, South Korea July, 2024
- Astrophysics Seminar | Institute for Advanced Study, Princeton, NJ October, 2023
- Chalk Talk | University of Chicago, Chicago, IL May, 2023
- HEAD 20 Meeting | Waikoloa, HI March, 2023
- CCAPP Seminar | The Ohio State University, Columbus, OH November, 2022
- KIPAC Tea Talk | Stanford University, Palo Alto, CA November, 2022
- THEA Seminar | Columbia University, New York City, NY October, 2022
- Seminar | Princeton University, Princeton, NJ October, 2022
- Monday Science Seminar | University of Wisconsin, Madison, WI September, 2022
- Explosive Astro Seminar | University of California, Berkeley, CA September, 2022
- Seminar at Group Meeting | University of California, Santa Barbara, CA January, 2022
- Seminar | RWTH Aachen University, Aachen, Germany October, 2021
- Tuesday Seminar | University of Chicago, Chicago, IL October, 2021
- Plenary at the 37th International Cosmic Ray Conference | Berlin, Germany July, 2021
- HELIX Journal Club | University of Michigan, Ann Arbor, MI June, 2020
- Milky Way Discussion Group | University of Chicago, Chicago, IL January, 2020
- Special Seminar | Arcetri Astrophysical Observatory, Florence, Italy June, 2019