REBECCA DIESING

Postdoctoral Scholar at the Institute for Advanced Study & Columbia University
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EDUCATION

University of Chicago — 2017– 2023
PhD in Astronomy and Astrophysics

Northwestern University — 2013 – 2017
Bachelor of Arts in Physics (Summa Cum Laude)

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 — 2017 – 2023
The Maximum Energy of Shock-Accelerated Cosmic Rays
Advisors: Damiano Caprioli & Angela V. Olinto

Undergraduate Research Assistant | Northwestern University, Evanston, IL — 2014 – 2017
Radio Observations of the Supermassive Black Hole at the Galactic Center and its Orbiting Magnetar
Advisor: Farhad Yusef-Zadeh

Intern | CERN (University of Michigan REU), Meyrin, Switzerland — 2016
Using Machine Learning to Search for Minimally Supersymmetric Standard Model Higgs Bosons
Advisor: Jan Steggemann

Intern | Fermilab (SULI Program), Batavia, IL — 2015
A Simple Event Display for the DarkSide-50 Time Projection Chamber
Advisor: Stephen Pordes

AWARDS & GRANTS

International Union of Pure and Applied Physics Early Career Scientist Prize — 2025
In recognition of outstanding contribution of a young scientist to astroparticle physics

Co-I: NASA Fermi GI Program — 2023
Grant NNH22ZDA001N-FERMI; Interpreting the Gamma-Ray Emission from Novae

William Rainey Harper Dissertation Fellowship 2022
$4,000 awarded to outstanding PhD candidates; one of the University of Chicago's highest honors

Eugene and Niesje Parker Graduate Student Fellowship 2019
One year of full funding awarded to an outstanding graduate student in high energy astrophysics

International School of Cosmic Ray Astrophysics Best Poster 2018

University of Chicago Eckhardt Scholarship 2017
$40,000 awarded to select graduate students in the physical sciences

Northwestern University Oliver Marcy Scholar 2017
$400 awarded to top students in the physical sciences

Northwestern University Best Honors Thesis in Physics 2017

Northwestern University Undergraduate Research Grant 2016
$1,000 to study the Galactic Center at the NRAO facility in Socorro, NM

Northwestern University Best Junior in Physics 2016

TEACHING EXPERIENCE

Instructor | *The Physics of Stars*, University of Chicago, Chicago, IL 2019
The Physics of Stars is a three-week immersion course for advanced high school students.

Tutor | Strive Tutoring, Chicago, IL 2018 – 2019
Strive offers free after-school programming to underserved students in Chicago.

Curriculum Designer | Space Explorers, Chicago, IL 2018
Space Explorers is a free program that immerses underserved Chicago students in science.

Teaching Assistant | University of Chicago, Chicago, IL 2017 – 2018
PHSC12600, "Matter, Energy, Space, and Time"; PHSC12610, "Black Holes"; PHSC12620, "The Big Bang"

GSW Senior Mentor | Northwestern University, Evanston, IL 2014 – 2017
GSW provides weekly review sessions to students in introductory STEM courses.

Tutor | Northwestern University Dept. of Physics & Astronomy, Evanston, IL 2014 – 2017

RESEARCH MENTORSHIP

Graduate Students
Emily Simon; Emma McGinness

Undergraduates (theory projects)
Shoshana Chipman; Khadijat Durojaiye; Nick Corso; Rohan Venkat; Jake Grodner

Undergraduates (design, construction, and calibration of the University of Chicago Infrared Camera)
Khadijat Durojaiye; Zoë de Beurs; Seamus Flannery; Kameron Mehling; Emily Donovan; Alexa Bukowski; Noah Friedlander; Alex Miller

PROFESSIONAL SERVICE

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

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

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

Collaborations
Member, JEM-EUSO Collaboration; Member, HEX-P 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] 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

[2] **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

[3] **R. Diesing**, M. Guo, C.-G. Kim, et al. 2024 | ApJ 974, 2 | arXiv:2404.15396
Nonthermal Signatures of Radiative Supernova Remnants

[4] **R. Diesing** 2023 | ApJ 958, 1 | arXiv:2305.07697
The Maximum Energy of Shock-Accelerated Cosmic Rays

[5] **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

[6] 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

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

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

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

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

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

[12] **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

[13] 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

[14] A. J. Nayana, R. Margutti, E. Wiston, et al. 2024 | submitted | 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)

[15] 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

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

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

[18] 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

[19] 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

[20] 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

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

Non-refereed

[22] **R. Diesing**, S. Meyer, J. Eser et al. 2023 | PoS ICRC2023, 450 | arXiv:2310.08607
Infrared Cloud Monitoring with UCIRC2

[23] **R. Diesing**, B. Metzger, E. Aydi et al. 2023 | PoS ICRC2023, 865
Using Gamma-Rays to Reveal the Evolution of Novae

[24] **R. Diesing**, S. Meyer, A. V. Olinto et al. 2022 | PoS 395, 214 | arXiv:2112.09618
UCIRC2: EUSO-SPB2's Infrared Cloud Monitor

[25] **R. Diesing** and D. Caprioli 2022 | PoS 395, 29 | arXiv:2109.11022
Galactic Cosmic Ray Acceleration with Steep Spectra

[26] **R. Diesing**, S. Meyer, A. V. Olinto et al. 2019 | PoS 358, 241 | arXiv:1909.02663
UCIRC2: An Infrared Cloud Monitor for EUSO-SPB2

[27] The POEMMA Collaboration 2019 | PoS 358, 378 | arXiv:1909.09466
The POEMMA (Probe of Extreme Multi-Messenger Astrophysics) mission

PRESENTATIONS

**denotes invited talk*

Seminars

- Astrophysics Seminar | Institute for Advanced Study, Princeton, NJ* — October, **2023**
- Chalk Talk | University of Chicago, Chicago, IL — May, **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**
- 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**
- Chalk Talk | University of Chicago, Chicago, IL — October, **2018**

Conference Talks

- 39th International Cosmic Ray Conference | Geneva, Switzerland — July, **2025**
- Particle Acceleration and Transport | Calabria, Italy* — February, **2025**
- TeV Particle Astrophysics | Chicago, IL — August, **2024**
- COSPAR 2024 | Busan, South Korea* — July, **2024**
- Supernova Remnants III | Chania, Crete, Greece — June, **2024**
- Aspen Workshop on Cosmic Ray Feedback | Aspen, CO — May, **2024**
- PCTS Workshop on Synergistic Approaches to Particle Transport | Princeton, NJ — April, **2024**
- 38th International Cosmic Ray Conference | Nagoya, Japan — July, **2023**
- 241st American Astronomical Society Meeting | Seattle, WA — January, **2023**
- 32nd JEM-EUSO Collaboration Meeting | Saitama, Japan — November, **2022**
- Supernova Remnants and Their Progenitors | Cambridge, MA — August, **2022**
- 31st JEM-EUSO Collaboration Meeting | Golden, CO — June, **2022**
- 30th JEM-EUSO Collaboration Meeting | Paris, France — December, **2021**
- Plenary at the 37th International Cosmic Ray Conference | Berlin, Germany* — July, **2021**
- 29th JEM-EUSO Collaboration Meeting | Golden, CO — June, **2021**
- American Physical Society Meeting | Online — April, **2021**
- 27th JEM-EUSO Collaboration Meeting | Moscow, Russia — June, **2020**

- 235th American Astronomical Society Meeting | Honolulu, HI — January, 2020
- 36th International Cosmic Ray Conference | Madison, WI — August, 2019
- Supernova Remnants II | Chania, Crete, Greece — June, 2019
- Cosmic Explosions 2019 | Cargèse, Corsica, France — June, 2019
- 23rd JEM-EUSO Collaboration Meeting | Mürren, Switzerland — June, 2018