

# REBECCA DIESING

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## EDUCATION

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

## RESEARCH INTERESTS

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- 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

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<b>THEA Fellow   Columbia University, New York City, NY</b>	2025 – 2027
<b>Member (Postdoctoral Scholar)   Institute for Advanced Study, Princeton, NJ</b>	2023 – 2025
<b>Graduate Research Assistant   University of Chicago, Chicago, IL</b> <i>The Maximum Energy of Shock-Accelerated Cosmic Rays</i> Advisors: Damiano Caprioli & Angela V. Olinto	2017 – 2023
<b>Undergraduate Research Assistant   Northwestern University, Evanston, IL</b> <i>Radio Observations of the Supermassive Black Hole at the Galactic Center and its Orbiting Magnetar</i> Advisor: Farhad Yusef-Zadeh	2014 – 2017
<b>Intern   CERN (University of Michigan REU), Meyrin, Switzerland</b> <i>Using Machine Learning to Search for Minimally Supersymmetric Standard Model Higgs Bosons</i> Advisor: Jan Steggemann	2016
<b>Intern   Fermilab (SULI Program), Batavia, IL</b> <i>A Simple Event Display for the DarkSide-50 Time Projection Chamber</i> Advisor: Stephen Pordes	2015

## AWARDS & GRANTS

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<b>Co-I: NASA Fermi GI Program</b> <i>Grant NNH22ZDA001N-FERMI; Interpreting the Gamma-Ray Emission from Novae</i>	2023
<b>William Rainey Harper Dissertation Fellowship</b> <i>\$4,000 awarded to outstanding PhD candidates; one of the University of Chicago's highest honors</i>	2022

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

## TEACHING EXPERIENCE

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

## RESEARCH MENTORSHIP

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### Graduate Students

Emily Simon

### Undergraduates (theory projects)

Shoshana Chipman; Khadijat Durojaiye; Nick Corso; Rohan Venkat

### 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

## DIVERSITY, EQUITY, AND INCLUSION

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**Co-Leader of IDEA (Inclusion, Diversity, and Equity in Astronomy) | University of Chicago, Chicago, IL**  
*IDEA is a journal club and advocacy group for junior members of U Chicago's Astronomy & Astrophysics Department.*

**Mentor | Society of Women in Physics at the University of Chicago, Chicago, IL**

The SWiP mentorship program is a collaboration between graduate and undergraduate students that connects women in physics at all different stages of their educational journeys.

**PROFESSIONAL SERVICE****Reviewer**

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

**Seminar & Workshop Organization**

Organizer, IAS Astrophysics Seminar Series

**Committees**

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

**Collaborations**

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

**ADDITIONAL SKILLS****Computer Languages & Programs**

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

**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**

- 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
- 38<sup>th</sup> International Cosmic Ray Conference | Nagoya, Japan July, 2023
- 241<sup>st</sup> American Astronomical Society Meeting | Seattle, WA January, 2023
- 32<sup>nd</sup> JEM-EUSO Collaboration Meeting | Saitama, Japan November, 2022
- Supernova Remnants and Their Progenitors | Cambridge, MA August, 2022
- 31<sup>st</sup> JEM-EUSO Collaboration Meeting | Golden, CO June, 2022
- 30<sup>th</sup> JEM-EUSO Collaboration Meeting | Paris, France December, 2021
- Plenary at the 37<sup>th</sup> International Cosmic Ray Conference | Berlin, Germany\* July, 2021
- 29<sup>th</sup> JEM-EUSO Collaboration Meeting | Golden, CO June, 2021
- American Physical Society Meeting | Online April, 2021
- 27<sup>th</sup> JEM-EUSO Collaboration Meeting | Moscow, Russia June, 2020
- 235<sup>th</sup> American Astronomical Society Meeting | Honolulu, HI January, 2020
- 36<sup>th</sup> International Cosmic Ray Conference | Madison, WI August, 2019
- Supernova Remnants II | Chania, Crete, Greece June, 2019
- Cosmic Explosions 2019 | Cargèse, Corsica, France June, 2019
- 23<sup>rd</sup> JEM-EUSO Collaboration Meeting | Mürren, Switzerland June, 2018

## PUBLICATIONS

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\*denotes research mentee

### First author & significant contribution

- [1] R. Diesing, M. Guo, C.-G. Kim, et al. 2024 | Accepted to ApJ | arXiv:2404.15396  
*Nonthermal Signatures of Radiative Supernova Remnants*
- [2] R. Diesing 2023 | ApJ 958, 1 | arXiv:2305.07697  
*The Maximum Energy of Shock-Accelerated Cosmic Rays*
- [3] 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*
- [4] 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*
- [5] R. Diesing and D. Caprioli 2021 | ApJ 922, 1 | arXiv:2107.08520  
*Steep Cosmic Ray Spectra with Revised Diffusive Shock Acceleration*
- [6] Fermi-LAT Collaboration, R. Diesing, and D. Caprioli 2021 | ApJ 921, 144 | arXiv:2105.11469  
*Gamma Rays from Fast Black-hole Winds*
- [7] R. Diesing and D. Caprioli 2020 | PRD 101, 103030 | arXiv:2001.02240  
*Nonsecondary Origin of Cosmic Ray Positrons*
- [8] S. Chipman\*, R. Diesing, M. H. Reno et al. 2019 | PRD 100, 063011 | arXiv:1906.11736  
*Anomalous ANITA air shower events and tau decays*
- [9] R. Diesing and D. Caprioli 2019 | PRL 123, 071101 | arXiv:1905.07414  
*On the Spectrum of Electrons Accelerated in Supernova Remnants*

[10] 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*

[11] 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

[12] The JEM-EUSO Collaboration 2024 | submitted to Astroparticle Physics | arXiv:2406.13673

*The EUSO-SPB2 Fluorescence telescope for the Detection of Ultra-High Energy Cosmic Rays*

[13] The JEM-EUSO Collaboration 2024 | Journal of Instrumentation 19, P01007 | arXiv:2309.02577

*EUSO-Offline: A comprehensive simulation and analysis framework*

[14] The JEM-EUSO Collaboration 2024 | Astroparticle Physics 154, 102891 | arXiv:2401.06525

*EUSO-SPB1 mission and science*

[15] 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*

[16] 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*

[17] 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*

[18] The POEMMA Collaboration 2021 | JCAP 2021, 007 | arXiv:2012.07945

*The POEMMA (Probe of Extreme Multi-Messenger Astrophysics) Observatory*

#### Non-refereed

[19] R. Diesing and S. Gupta 2024 | in preparation

*Nonthermal Signatures of Radiative Supernova Remnants II: The Impact of Cosmic Rays and Magnetic Fields*

[20] R. Diesing, S. Meyer, J. Eser et al. 2023 | PoS ICRC2023, 450 | arXiv:2310.08607

*Infrared Cloud Monitoring with UCIRC2*

[21] R. Diesing, B. Metzger, E. Aydi et al. 2023 | PoS ICRC2023, 865

*Using Gamma-Rays to Reveal the Evolution of Novae*

[22] R. Diesing, S. Meyer, A. V. Olinto et al. 2022 | PoS 395, 214 | arXiv:2112.09618

*UCIRC2: EUSO-SPB2's Infrared Cloud Monitor*

[23] R. Diesing and D. Caprioli 2022 | PoS 395, 29 | arXiv:2109.11022

*Galactic Cosmic Ray Acceleration with Steep Spectra*

[24] R. Diesing, S. Meyer, A. V. Olinto et al. 2019 | PoS 358, 241 | arXiv:1909.02663

*UCIRC2: An Infrared Cloud Monitor for EUSO-SPB2*

[25] The POEMMA Collaboration 2019 | PoS 358, 378 | arXiv:1909.09466

*The POEMMA (Probe of Extreme Multi-Messenger Astrophysics) mission*