RANDY RUCH

Doctoral Candidate, Georgia Institute of Technology
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EDUCATION

Georgia Institute of Technology *August 2023 - Present*
Doctor of Philosophy (Ph.D.), Planetary and Space Physics Expected Graduation: May 2028
Advisor: Dr. Sven Simon GPA: 4.0

Georgia Institute of Technology *August 2019 - May 2023*
B.S., Physics, Concentration: Astrophysics GPA: 3.94

POSITIONS HELD

Georgia Institute of Technology, School of Earth and Atmospheric Sciences Atlanta, GA
Graduate Research Assistant, Center for Relativistic Astrophysics *August 2023 - Present*

- Developed a parallelized computational model (Python) for studying energetic heliospheric ion dynamics through regions of non-uniform electromagnetic fields
- Implemented this model at Pluto to investigate the influence of its nearby electromagnetic environment on the distribution of energetic heliospheric ions
- Applied a hybrid plasma simulation tool to model Pluto's induced magnetosphere, resulting from the interaction of the impinging solar wind with Pluto's neutral atmosphere

Georgia Institute of Technology, School of Earth and Atmospheric Sciences Atlanta, GA
Undergraduate Research Assistant, Center for Relativistic Astrophysics *Spring 2023*

- Studied computational methods in space plasma physics with Dr. Sven Simon
- Applied studies to the Jovian magnetosphere to simulate ion dynamics in different magnetic field configurations

PUBLICATIONS

Modeling the Detectability of Energetic Heliospheric Ions at Pluto During the New Horizons Flyby
R. T. Ruch, S. Simon, P. Kollmann, and C. M. Haynes, *J. Geophys. Res. (Space Physics)*, 131, e2026JA035261, doi: 10.1029/2026JA035261, 2026.

Dynamics of Energetic Heliospheric Ions in Pluto's Induced Magnetosphere
R. T. Ruch, S. Simon, and C. M. Haynes, *J. Geophys. Res. (Space Physics)*, 130, e2024JA033548, doi: 10.1029/2024JA033548, 2025.

PRESENTATIONS

R. T. Ruch, S. Simon, P. Kollmann, and C. M. Haynes. **Modeling the Detectability of Energetic Heliospheric Ions at Pluto During the New Horizons Flyby**. *AGU Fall Meeting*, New Orleans, LA, USA, 15-19 December, 2025.

*__R. T. Ruch__, C. M. Haynes, and S. Simon. **Energetic Ion Dynamics in Pluto's Induced Magnetosphere**. *AGU Fall Meeting*, Washington, D.C., USA, 9-13 December, 2024.

*R. T. Ruch, S. Simon, and C. M. Haynes. **Energetic Ion Dynamics in Pluto's Induced Magnetosphere**. *EuroPlanet Science Congress*, Berlin, Germany, 8-13 September, 2024.

R. T. Ruch, P. Addison, T. Tippens, C. M. Haynes, P. Kollmann, S. Simon, and A. Stahl. **Model of Pluto's Induced Magnetosphere and its Interaction with Energetic Heliospheric Ions**. *AGU Fall Meeting*, San Francisco, USA, 11-15 December, 2023.

(*): Oral presentation

HONORS AND AWARDS

Best Paper Award: School of Earth and Atmospheric Sciences *March 2025*
Awarded to a student for the best refereed paper or series of refereed papers, published or accepted for publication by the time of selection, for which the student is the first author. Includes a $1000 award

President's Undergraduate Research Award (PURA) *January 2023*
Awarded to competitive research prospects within their first two years as undergraduates at Georgia Tech. Includes a $1500 salary award to fund a semester of original research

Dean's List *Fall 2019 - May 2023*
Awarded to any undergraduate student with a GPA greater than 3.0

Highest Honors *Fall 2019 - May 2023*
Awarded to undergraduate students with a GPA greater than 3.55

TEACHING

Earth System Modeling Atlanta, GA
Graduate Teaching Assistant *Fall 2025*

- Graduate-level course on the development and application of numerical methods for modeling
- Topics include developing numerical methods for solving ordinary and partial differential equations, coupled systems of ordinary differential equations, numerical integration, and root finding methods

Advanced Space Plasma Physics Atlanta, GA
Graduate Teaching Assistant *Spring 2024*

- Graduate-level course on the theoretical framework of advanced plasma physics
- Topics include kinetic plasma theory, multi-fluid and magnetohydrodynamic treatments, cold plasma waves, shocks and discontinuities, planetary plasma interactions, and magnetospheric topology

PROFESSIONAL REFERENCES

Sven Simon, Professor Ph.D. Advisor
School of Earth and Atmospheric Sciences, Georgia Institute of Technology
Email: sven.simon@eas.gatech.edu
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Website: https://svensimon.gatech.edu/