

Jensen Lawrence

Planetary Science Ph.D. Student

Contact

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I am an incoming planetary science doctoral student with a background in astrophysics, fluid dynamics, and scientific computing. My main research interests are planet formation and evolution, planetary climate systems, exoplanet characterization, and applications of modern computational techniques to planetary science.

Education

Starting 2023/09	Massachusetts Institute of Technology Ph.D. in Planetary Science Advisor: Prof. Richard Teague
2018/09 – 2023/04	University of Waterloo B.Sc. in Honours Co-operative Mathematical Physics Minor in Astrophysics Advisor: Prof. Marek Stastna

Research Experience

2022/05 – 2022/08	Department of Applied Mathematics University of Waterloo Undergraduate Research Assistant Advisor: Prof. Michael Waite
2022/01 – 2022/04	Herzberg Astronomy and Astrophysics Research Centre Undergraduate Research Assistant Advisors: William Thompson and Prof. Christian Marois
2021/09 – 2022/12	Perimeter Institute for Theoretical Physics Undergraduate Research Assistant Advisors: Prof. Niayesh Afshordi and Prof. David Garfinkle
2021/05 – 2021/08	Perimeter Institute for Theoretical Physics Mike Lazaridis Fellow Advisor: Prof. Niayesh Afshordi
2020/09 – Present	Waterloo Centre for Astrophysics Undergraduate Research Assistant Advisors: Dr. Alex Krolewski and Prof. Will Percival
2020/01 – 2020/04	TRIUMF Undergraduate Research Assistant Advisors: Dr. Suresh Saminathan and Dr. Marco Marchetto

Awards

2023/06	Dean's Honours University of Waterloo
2023/02	Eckhardt Graduate Scholarship (\$45,000) University of Chicago; Declined
2022/05 – 2022/08	Undergraduate Student Research Award (\$6,000) Natural Sciences and Engineering Research Council of Canada
2021/05 – 2021/08	Mike Lazaridis Scholarship in Theoretical Physics (\$20,000) University of Waterloo
2020/09 – 2020/12	Undergraduate Student Research Award (\$4,500) Natural Sciences and Engineering Research Council of Canada
2018/09	President's Scholarship (\$2,000) University of Waterloo

Publications

1. Thompson, W., **Lawrence, J.**, Blakely, D., et al. (2023). "Octofitter: fast, flexible, and accurate orbit modelling to detect exoplanets". *In review*.

Talks

10. **Lawrence, J.** (2023). "Investigating the Structure and Dynamics of Europa's Ocean". *Department of Physics and Astronomy, University of Waterloo*.
9. **Lawrence, J.** (2023). "Breaking the Ice: A Framework for Ocean Dynamics on Europa". *Department of Physics and Astronomy, University of Waterloo*.
8. **Lawrence, J.** (2022). "Stochastic Backscatter in Large Eddy Simulations". *Department of Applied Mathematics, University of Waterloo*.
7. **Lawrence, J.** (2022). "Rotating Reference Frames: Physics and Implications for the Earth". *Physics Club Seminar Series, University of Waterloo*.
6. **Lawrence, J.** (2022). "A Julia Framework for Exoplanet Detection". *Herzberg Astronomy and Astrophysics Research Centre*.
5. **Lawrence, J.** (2021). "That's No Moon: Why Exomoons Remain Elusive". *PHYS 10, University of Waterloo*.
4. Astwood, M., Buitenhuis, M., **Lawrence, J.**, Terrey, C. (2021). "A Convolutional Neural Network Approach to Gravitational Wave Data Analysis". *Department of Physics and Astronomy, University of Waterloo*.
3. **Lawrence, J.** (2021). "Astronomy's Hidden Stars: Henrietta Swan Leavitt and Cecilia Payne-Gaposchkin". *PHYS 10, University of Waterloo*.
2. **Lawrence, J.** (2020). "Numerical Methods for Newtonian Gravity". *Physics Club Seminar Series, University of Waterloo*.

1. **Lawrence, J.** (2019). "K-Type Stars and Planetary Habitability". *Physics Club Seminar Series, University of Waterloo*.

Service

2022/09 – 2022/12	Tutor University of Waterloo Tutor Connect
2020/09 – 2021/07	Tutor Ontario Secondary School Curriculum
2019/03 – 2020/04	Senior News Writer in Physics and Astronomy newsoftheuniverse.com

Skills

- **Computer skills:** Python • NumPy • SciPy • Pandas • Matplotlib • Seaborn • Astropy • TensorFlow • PyTorch • Rebound • Julia • Octofitter • Oceananigans • Fortran • Bash scripting • Linux • MPI • Git • Slurm • Latex • Microsoft Office Suite
- **Theoretical skills:** finite difference, element, and volume methods • N-body simulation • Monte Carlo methods • signal processing • neural networks and deep learning • numerical optimization
- **Languages:** English (native) • French (professional proficiency) • Spanish (elementary proficiency)