Caleb Lammers

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Research Interests

Dynamics and orbital architectures of exoplanet systems; celestial mechanics; exoplanet detection and characterization; N-body simulations; machine learning; galaxy evolution.

Education

PhD, Princeton University 2023 – 2028
Astrophysical Sciences

Honours BSc, University of Toronto 2019 – 2023
Physics Specialist & Mathematics Minor Cumulative GPA: 3.95/4.00

Publications

7. **Caleb Lammers**, Joshua N. Winn. "Slow Rotation for the Super-Puff Planet Kepler-51d." Submitted to ApJL. arXiv: 2409.06697
6. **Caleb Lammers**, Miles Cranmer, Sam Hadden, Shirley Ho, Norman Murray, Daniel Tamayo. "Accelerating Giant Impact Simulations with Machine Learning." ApJ, in press. arXiv: 2408.08873
5. **Caleb Lammers**, Sam Hadden, Norman Murray. "The Instability Mechanism of Compact Multiplanet Systems." ApJ, 972, 53. arXiv: 2403.17928
4. **Caleb Lammers**, Joshua N. Winn. "The Six-Planet Resonant Chain of HD 110067." ApJL, 968, L12. arXiv: 2405.04527
3. **Caleb Lammers**, Sam Hadden, Norman Murray. "Intra-system uniformity: a natural outcome of dynamical sculpting." MNRAS, 525, L66. arXiv: 2304.02634.
2. **Caleb Lammers**, Kartheik Iyer, Hector Ibarra-Medel, Camilla Pacifici, Sebastián Sánchez, Sandro Tacchella, Joanna Woo. "AGN Feedback in SDSS-IV MaNGA: AGNs Have Suppressed Central Star Formation Rates." 2023, ApJ, 953, 26. arXiv: 2212.00762.
1. **Caleb Lammers**, Ryley Hill, Seunghwan Lim, Douglas Scott, Raoul Cañameras, Hervé Dole. "Candidate high-redshift protoclusters and lensed galaxies in the *Planck* List of High-z Sources overlapping with *Herschel*-SPIRE imaging." 2022, MNRAS, 514, 5004. arXiv: 2204.06752.

Presentations

Emerging Researchers in Exoplanet Science Symposium IX July 2024
Contributed talk: "Accelerating Giant Impact Simulations with Machine Learning"

AAS Division on Dynamical Astronomy Meeting 55 May 2024
Contributed talk: "The Instability Mechanism of Compact Multiplanet Systems"

AI-Driven Discovery in Physics and Astrophysics, Kavli IPMU January 2024
Lighting talk: "Accelerating Planet Formation Simulations with Machine Learning"

AAS Division on Dynamical Astronomy Meeting 54 May 2023

Contributed talk: "Intra-system uniformity: a natural outcome of dynamical sculpting"

American Astronomical Society Meeting 241 Jan 2023

Contributed talk: "Instabilities in Compact Multis: Dynamical Insights from Numerical Experiments"

Undergraduate Physics Research Fair, University of Toronto Oct 2022

Poster: "What causes multiplanet systems to destabilize?"

Observational Cosmology Seminar, California Institute of Technology Aug 2022

Student talk: "AGN Galaxy-Halo Connection From Galaxy-Galaxy Lensing With DES"

Planet Day 2022, Canadian Institute for Theoretical Astrophysics Aug 2022

Contributed talk: "Dynamical Causes of Instability in Compact Multiplanet Systems"

Canadian Undergraduate Physics Conference 2021 Nov 2021

Contributed talk: "New Protoclusters and Lensed Galaxies in the *Planck* Catalogues"

Astronomy Colloquium, University of British Columbia Aug 2021

Student talk: "High-z Protoclusters and Lensed Galaxies in the *Planck* Catalogues"

Canadian Astronomical Society Annual General Meeting 2021 May 2021

Poster: "AGN-Driven Quenching in Spatially Resolved SFHs"

Canadian Undergraduate Physics Conference 2020 Nov 2020

Contributed talk: "Reconstructing the Properties of Galaxies With Machine Learning"

University of Toronto, Summer Undergraduate Research Poster Session Aug 2020

Poster: "Active Galactic Nuclei Quenching Star-Formation"

Teaching

Teaching Assistant, Department of Astronomy Spring 2024 – present
Princeton University

Acting as a Teaching Assistant for AST205: Planets in the Universe. Responsibilities include grading assignments and exams, holding office hours, and running precepts throughout the semester.

Teaching Assistant, Department of Mathematics Fall 2021
University of Toronto

Acted as a Teaching Assistant for MAT135: Calculus 1, which involved organizing and teaching two tutorials a week. Also graded assignments/exams, held office hours, and ran exam review sessions.

Outreach

Organizer, Peyton Hall Public Observing Fall 2024 – present
Princeton University

Help organize and host monthly public observing nights. This involves presenting to the public about astronomy, answering questions, and occasionally setting up the telescope and choosing targets.

Founder, Undergraduate Astronomy Journal Club Fall 2022 – Spring 2023
University of Toronto

Started a weekly journal club for undergraduate students to discuss astronomy research. Organized the meetings, helped younger students select and present research papers, and often led the discussions.

Honors & Awards

Raynor L. Duncombe Student Research Prize ($600) May 2024
AAS Division of Dynamical Astronomy (DDA)

Awarded to a small number of students, on a competitive basis, to recognize excellent student research to be presented at the annual DDA meeting.

Bryan Wayne Statt-George Luste Prize in Experimental Physics ($700) Nov 2022
Department of Physics, University of Toronto

Awarded to the top second, third, or fourth year students enrolled in a program in the Department of Physics based on performance in physics laboratory courses.

Chancellor's Scholarship ($500) Nov 2022
Trinity College, University of Toronto

Awarded for academic achievement.

Undergraduate Research Fair Poster Award ($30) Oct 2022
Department of Physics, University of Toronto

Awarded by a panel of judges to the three best poster presentations.

Summer Undergraduate Research Fellowship ($8,820) June 2022 – Aug 2022
Department of Physics, California Institute of Technology

Awarded based on the quality of the research proposal and potential to conduct research.

NSERC Undergraduate Student Research Award ($6,000) May 2021 – Aug 2021
Department of Physics & Astronomy, University of British Columbia

Awarded on the basis of academic record and research aptitude.

Drew Thompson Scholarship ($400) Nov 2020
Trinity College, University of Toronto

Awarded for academic achievement.

Summer Undergraduate Research Program Poster Award ($50) Aug 2020
Department of Astronomy & Astrophysics, University of Toronto

Awarded by a panel of judges to the three best poster presentations.

Summer Undergraduate Research Program Fellowship ($9,500) May 2020 – Aug 2020
Department of Astronomy & Astrophysics, University of Toronto

Awarded based on academic record and potential to conduct research (student spotlight).

Schulich Leader Scholarship ($80,000) Sep 2019 – June 2023
University of Toronto

"Canada's largest science scholarship" awarded to the top four science/engineering students entering the University of Toronto on the basis of academic excellence, leadership, and potential in STEM.