Cole Riley Gregg, PhD

Post Graduate Researcher
Department of Physics and Astronomy
University of Western Ontario
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Research Interests

- Near-Earth objects (NEOs), asteroid and comet discovery
- Planetary defense and impact hazards
- Dynamical evolution and orbital modeling of small Solar System bodies
- Observational surveys and moving-object detection pipelines for small-body populations, including Lunar Trojan asteroids
- Astrometric analysis and orbit determination of asteroids and comets
- Interstellar material transfer and interactions with the Solar System

Education

2021/09 – 2025/12 Doctorate, Doctor of Philosophy, Astronomy (Collaborative Specialization in Planetary Science and Exploration)
University of Western Ontario
Degree Status: Completed (2026/02)
Supervisor(s): Dr. Paul Wiegert

2020/09 – 2021/08 Master's, Master of Science, Astronomy (Collaborative Specialization in Planetary Science and Exploration)
University of Western Ontario
Degree Status: Completed (2021/10)
Supervisor(s): Dr. Paul Wiegert

2016/09 – 2020/04 Bachelor's, Bachelor of Science, Honours Specialization in Astrophysics with distinction
Bachelor's, Minor, Advanced Physics
University of Western Ontario
Degree Status: Completed (2020/06)

Research Positions

2026/01 – Present Post Graduate Researcher
Department of Physics and Astronomy, University of Western Ontario
Supervisor: Dr. Paul Wiegert
Conducting research on interstellar transfer and Solar System dynamics.

2020/05 – 2020/08 Undergraduate Summer Research Position NSERC USRA
Department of Physics and Astronomy, University of Western Ontario
Supervisor: Dr. Paul Wiegert
Was awarded a NSERC USRA. Worked on an asteroid survey project. This research led into my Master's project, searching for Lunar co-orbiting asteroids using small ground-based telescopes.

2019/05 – 2019/08 Undergraduate Summer Research Position NSERC USRA
Department of Physics and Astronomy, University of Western Ontario
Supervisor: Dr. Paul Wiegert
Was awarded a NSERC USRA. Worked on a combination of a meteor related project and a comet related project. Discovered an unknown comet and reported data to the Minor Planet Center (MPC). Assisted in the completion of a near-Sun meteor environment paper discussing supercatastrophic disruption.

2018/05 – 2018/08 Undergraduate Student-Research
Department of Physics and Astronomy, University of Western Ontario
Supervisor: Dr. Paul Wiegert
Conducted research on Solar System dynamics using meteor data collected by the Canadian Meteor Orbit Radar (CMOR).

Teaching Experience

2026/01 – 2026/04 Part-Time Associate Faculty Member
Lambton College
STE-1153 – Introduction to Astronomy
Designed and delivered an undergraduate introductory astronomy course, including preparation of lectures, assignments, and examinations, management of the online learning environment, and assessment and reporting of student performance.

2024/09 – 2024/12 Temporary Part-Time Instructor
Department of Physics and Astronomy, University of Western Ontario
ASTRONOMY 1021 – General Astronomy
Independently instructed a university-level introductory astronomy course, including development of course materials, delivery of lectures, design and grading of assignments and examinations, and evaluation and reporting of student achievement.

2020 – 2025 Graduate Teaching Assistant
Department of Physics and Astronomy, University of Western Ontario

ASTRONOMY 2201B – Planetary Systems
2025, 2024, 2023, 2022 / 01 – 04
Supervisor: Dr. Peter Brown

Assisted instruction on Solar System and exoplanetary systems, including celestial mechanics, planetary atmospheres and interiors, small Solar System bodies, and the formation and evolution of planetary systems.

ASTRONOMY 2801A – Observing the Stars
2023, 2022 / 09 – 12
Supervisor: Dr. Paul Wiegert
Guided students in robotic telescope operation, astronomical imaging, and image processing techniques used to obtain and analyze observational astronomical data.

PHYSICS 1501A – Enriched Introduction to Physics I
2023, 2021 / 09 – 12
Supervisor: Dr. Paul Wiegert
Supported laboratory instruction in classical mechanics including Newtonian dynamics, energy, momentum, rotation, gravitation, and planetary motion.

PHYSICS 1202B – Physics for the Sciences II
2023 / 01 – 04
Supervisor: Dr. Alexei Ouriadov
Assisted laboratory instruction in oscillations, waves, fluids, electricity, magnetism, and experimental data analysis techniques.

NUMERICAL MATHEMATICAL METHODS 2270A – Applied Mathematics for Engineering II
2022, 2020 / 09 – 12
Supervisor: Dr. Allan MacIsaac
Assisted instruction in differential equations and mathematical methods widely used in scientific computing and modeling of physical systems.

PHYSICS 2102B – Introduction to Modern Physics
2022, 2021 / 01 – 04
Supervisor: Dr. Els Peeters
Supported instruction in quantum mechanics, atomic and nuclear physics, particle physics, and cosmology.

NUMERICAL MATHEMATICAL METHODS 1411A – Linear Algebra with Numerical Analysis for Engineering
2021 / 09 – 12
Supervisor: Dr. Alex Buchel
Assisted teaching of linear algebra, numerical methods, and MATLAB-based computational techniques used in engineering and scientific applications.

PHYSICS 3900G – Senior Physics Laboratory
2021 / 01 – 04
Supervisor: Dr. Lyudmila Goncharova
Mentored students in advanced experimental methods, scientific data analysis, and computer programming for laboratory research.

Publications

Refereed Journal Articles

1. **Cole R. Gregg** & Paul A. Wiegert. (2025). A Catalogue of Interstellar Material Delivery From Nearby Debris Disks. The Planetary Science Journal, 6(12), 309. https://iopscience.iop.org/article/10.3847/PSJ/ae284f

2. Paul Wiegert, Vanessa Tran, **Cole Gregg**, Denis Vida, & Peter Brown. (2025). An upper limit on the interstellar meteoroid flux at video sizes from the Global Meteor Network. The Astrophysical Journal, 984(2), 151. https://iopscience.iop.org/article/10.3847/1538-4357/adc44f

3. **Cole R. Gregg** & Paul A. Wiegert. (2025). A Case Study of Interstellar Material Delivery: α Centauri. The Planetary Science Journal, *6*(3), 56. https://doi.org/10.3847/PSJ/adb1e9

4. **Cole R. Gregg** & Paul A. Wiegert. (2022). A dedicated Lunar Trojan Asteroid Survey with small ground-based telescopes. Monthly Notices of the Royal Astronomical Society. 511(4): 5396-5404. http://dx.doi.org/10.1093/mnras/stac165

5. Paul Wiegert, Peter Brown, Petr Pokorny, Quanzhi Ye, **Cole Gregg**, Karina Lenartowicz, Zbigniew Krzeminski, and David Clark. (2020). Supercatastrophic Disruption of Asteroids in the Context of SOHO Comet, Fireball and Meteor Observations. The Astronomical Journal. 159(4). https://doi.org/10.3847/1538-3881/ab700d

Conference Proceedings/Abstracts

1. **Cole R. Gregg** & Paul A. Wiegert. (2025). A Catalogue of Interstellar Material Delivery From Nearby Debris Disks. EPSC-DPS Joint Meeting 2025 (EPSC-DPS2025), held 7-12 September, 2025 in Helsinki, Finland. Online at https://www.epsc-dps2025.eu, id. EPSC-DPS2025-41

2. **Cole R. Gregg** & Paul A. Wiegert. (2024). A Case Study of Interstellar Material Delivery: Alpha Centauri. AAS Division for Planetary Sciences meeting #56, id. 106.08. Bulletin of the American Astronomical Society, Vol. 56, No. 8 e-id 2024n8i106p08

3. **Cole R. Gregg** & Paul A. Wiegert. (2024). The Development of Interstellar Meteoroid Streams. AAS Division on Dynamical Astronomy meeting #55, id. 101.06. Bulletin of the American Astronomical Society, Vol. 56, No. 6 e-id 2024n6i101p06

4. **Cole R. Gregg** & Paul A. Wiegert. (2023). The Development of Interstellar Meteoroid Streams. Asteroids, Comets, Meteors Conference, held 18-23 June, 2023 in Flagstaff, Arizona/Virtual. LPI Contribution No. 2851, 2023, id. 2164

5. **Cole R. Gregg** & Paul A. Wiegert. (2022). A Dedicated Lunar Trojan Asteroid Survey with Small Ground-Based Telescopes. AAS Division of Planetary Science meeting #54, id. 520.04. Bulletin of the American Astronomical Society, Vol. 54, No. 8 e-id 2022n8i520p04

Conference Presentations and Participation

2025/09	Invited Speaker/Participant, 2025 NOIRLab Science Conference: The Solar System in Context, Conference Oral Presentation
2025/09	Participant, EPSC-DPS 2025 Joint Meeting, Conference Oral Presentation
2025/07	Participant, Meteoroids 2025, Conference Oral Presentation, Discussion Panel Member, Session Chair
2025/05	Participant, Space Day at Western 2025, Conference Poster Presentation
2024/10	Participant, AAS Division for Planetary Science 56, Conference Oral presentation
2024/05	Participant, AAS Division on Dynamical Astronomy 55, Conference Oral presentation
2024/04	Participant, Space Day at Western 2024, Conference Poster Presentation
2023/06	Participant, Asteroids, Comets, Meteors Conference, Conference Oral presentation
2023/05	Participant, Space Day at Western 2023, Conference Poster Presentation
2022/10	Participant, AAS DPS 54, Conference Poster presentation

2022/05	Participant, Space Day at Western 2022, Conference Poster Presentation
2022/06	Attendee, Meteoroids 2022, Conference Virtual Attendee
2022/04	Attendee, AAS DDA 53, Conference Virtual Attendee
2021/04	Participant, Space Day at Western 2021, Conference Held a virtual poster session for my MSc research.
2020/03	Volunteer, Physics Undergraduate Conference (PhUnC), Conference Organized workshops and scheduled talks. Gave feedback to help improve successive years.
2019/03, 2018/03	Participant, Physics Undergraduate Conference (PhUnC), Conference Engaged in workshops and presented research poster.

Research Funding

2023/05 – 2024/04	Ontario Graduate Scholarship, Scholarship - $15,000 Competitive – Yes Principal Investigator Merit-based scholarship for the work of my PhD research, researching the development of interstellar meteoroid showers with n-body simulations.
2020/05 – 2020/08	NSERC Undergraduate Summer Research Award, Fellowship - $4,500 Competitive – Yes Principal Applicant Undergraduate Summer Research Award
2019/05 – 2019/08	NSERC Undergraduate Summer Research Award, Fellowship - $4,500 Competitive – Yes Principal Applicant Undergraduate Summer Research Award

Honors and Awards

2025/07	DPS Travel Grant Recipient Awarded travel grant to attend the EPSC-DPS joint meeting in Helsinki, Finland (September 2025).

2025/04	Meteoroids Travel Grant Recipient Awarded travel grant to attend the Meteoroids 2025 meeting in Perth, Australia (July 2025).
2024/05	Amelia and William Wehlau Award in Astronomy University of Western Ontario Prize / Award Awarded annually to a student in a Master's or Doctoral program in Astronomy, based on academic achievement and research merit.
2023/06	Faculty of Science Graduate Student Teaching Award University of Western Ontario Prize / Award Excellent teaching is vital to the success of the Faculty of Science. Recipients are selected for their valued and effective contribution to the undergraduate programs.
2020/04	Legacies for Tomorrow Awards University of Western Ontario Prize / Award Awarded annually to full-time undergraduate students in any program based on academic achievement and financial need.
2019/11	Laurene Paterson Estate Scholarship University of Western Ontario Distinction Awarded annually to full-time undergraduate students in any year in the Faculty of Science who have demonstrated financial need and has maintained a minimum 80% average.
2019/11	Garnet Alexander Woonton Scholarship University of Western Ontario Distinction Awarded annually to a full-time undergraduate student registered in the Faculty of Science in any year beyond year one, who is enrolled in an Honours Specialization, Major, or Specialization in Applied Mathematics, Mathematics, Physics and Astronomy or Chemistry. Candidates must have a minimum 85% average and demonstrated financial need.
2017/04 – 2020/04	Dean's Honor Roll University of Western Ontario Distinction To be on the Dean’s Honour List for that academic year, a student must have earned an A average, with no failures.

2016/06 Ursuline Sisters Award
Ursuline College Chatham
Prize / Award
Awarded to a graduating high school student who has shown academic excellence and compassion.

Research Highlights and Discoveries

2025/06, 2024/05, 2018/07 NASA Funding Review Research Presentation
University of Western Ontario
Delivered well-received update on research done by and on behalf of the Western Meteor Physics Group. Successfully justified funding received by NASA.

2022/08 Research showcased in the *Inspiring Minds 2021* Campaign
University of Western Ontario
Research was chosen to be highlighted across Western University's social media platforms.
Link: https://ir.lib.uwo.ca/exhibit/inspiring-minds-showcase/using-robotic-telescopes-to-observe-lunar-co-orbital-asteroids/

2020/11 Provisional discovery of Near-Earth Object ALA2xH
University of Western Ontario

2019/07 Provisional discovery of Comet ALA2xG
University of Western Ontario

2019/09 – 2020/04 Undergraduate Research Thesis
University of Western Ontario
Conducted comet related research under the supervision of Dr. Paul Wiegert. Used online telescope network, iTelescope, to conduct a far-southern sky comet survey. Experience completing a full scientific report of research, submitted an observation of a previously unknown comet to the Minor Planet Center.

Professional Memberships

2023 – Present Member
Canadian Astronomical Society (CASCA)

2022 – Present Member
American Astronomical Society (AAS)

Peer Review Activity

2026 Referee, Astronomy & Astrophysics

Committee Involvement

2021 – 2023 — Department of Physics and Astronomy Representative
Western Space Graduate Council
Advocated for Department of Physics and Astronomy students, communicating their interests and concerns to *The Institute for Earth and Space Exploration* ("*Western Space*").

Media Relations

2026/02 — AAS NOVA Research Highlight
Feature article summarizing my *Planetary Science Journal* publication on the transfer of interstellar material from nearby debris disks.
Link: https://aasnova.org/2026/02/06/we-have-visitors-interstellar-material-from-nearby-debris-disks/

2025/04 — International Media Coverage
Research on the transfer of interstellar material from Alpha Centauri featured in Tähdet ja Avaruus (Finnish astronomy magazine).

2025/03 — AAS Journal Author Series
Invited participant discussing my *Planetary Science Journal* publication on the transfer of interstellar material from Alpha Centauri.
Link: https://youtu.be/Dr1fSWtfAP4?si=5nHHpWim1sI7BVH9

2025/03 — Western News Media Coverage
Institutional press release regarding my *Planetary Science Journal* publication on the transfer of interstellar material from Alpha Centauri.
Link: https://news.westernu.ca/2025/03/interstellar-material/

2025/02 — Interviews: Forbes, ScienceNews, Spaceweather
Interviewed following publication of my research on the transfer of interstellar material from Alpha Centauri.
Links:
https://www.forbes.com/sites/brucedorminey/2025/02/16/interstellar-asteroids-could-originate-from-alpha-centauri-says-paper/
https://www.sciencenews.org/article/comet-alpha-centauri-solar-meteor
https://spaceweather.com/archive.php?view=1&day=27&month=02&year=2025

2024/10 — Sky & Telescope Interview
Featured in the article "Are Objects From Alpha Centauri Streaming by Earth" discussing research on interstellar material transfer.
Link: https://skyandtelescope.org/astronomy-news/are-objects-from-alpha-centauri-streaming-by-earth/

2020/12 Discovery Canada – #ScientistFridays
Invited to create a research video explaining my telescopic survey for Earth-Moon co-orbiting asteroids.
Published on Twitter (now "*X*") and Facebook.

2020/11 Media Coverage: Western News, CBC News, London Free Press, Radio
Interviews and press coverage (TV, Newspaper, and 4 separate radio stations) following a minor planet provisional discovery during my Master's research.
Link: https://news.westernu.ca/2020/11/student-finds-asteroid/

Knowledge Transfer and Public Outreach

2025/11 Roanoke Valley Astronomical Society – Invited Speaker
Presented research talk: "An Examination of Interstellar Transport"

2025/11 Department of Physics and Astronomy Open House – Featured Student
Participated in undergraduate recruitment and outreach activities.

2025/10 Department of Physics and Astronomy Undergraduate Seminar – Invited Speaker
Presented research talk: "An Examination of Interstellar Transport"

2025/06 TV Series Cast Member/Fact Checker
Milestones of the Solar System (GB SPACE1 Production Inc.)
Interviewed as a Solar System science expert for a six-part documentary series. Following the editing stage, screened episodes to ensure factual accuracy.

2025/05 London North Rotary Club – Invited Speaker
Presented research talk: "Asteroids & Comets: Searching the skies"

2025/05 Pittsburgh Astronomy Club – Invited Speaker
Presented research talk: "A Case Study of Interstellar Meteoroid Streams: Alpha Centauri"

2024/11 West Hawaii Astronomy Club (Associated with Keck Observatories) – Invited Speaker
Presented research talk: "A Case Study of Interstellar Meteoroid Streams: Alpha Centauri"

2024/05 – 2024/08	Hume Cronyn Memorial Observatory – Public Night Volunteer/Presenter Public lecture: "Asteroids & Comets: Searching the skies" Demonstrated detecting exoplanets with the transit method and using spectroscopy to determine stellar composition to the public. Aided with telescope operations.
2024	Scientific Advisor to Science Fiction Writer Provided expert guidance on the mathematical aspects of Solar System themed novella.
2020, 2023, 2024 2025	Telescope Purchase Advisor Provided detailed recommendations and guidance for selecting a suitable telescope, considering user requirements and budget constraints.

Technical Skills

Programming:	Python, MATLAB, Bash Working familiarity: C, Java, HTML
Scientific Computing:	N-body simulations, adaptive numerical integrators, orbital dynamics modeling, galactic dynamics simulations, astronomical coordinate transformations
Data Analysis:	NumPy, SciPy, Astropy, Matplotlib, large dataset analysis, scientific data visualization, FITS data handling
Observational Astronomy:	Telescope observation planning, astronomical image acquisition and reduction, survey design and execution, astronomical survey data processing, moving object detection pipelines for asteroid/comet surveys, astrometric data reduction and analysis, Minor Planet Center (MPC) observation reporting
Research Software Development:	Python package development, simulation pipeline design, command-line tools for scientific workflows
Tools:	LaTeX, Git version control, Linux / Unix environments

Equity, Diversity, and Inclusion Training

2025/06 Anti-Oppression Certificate
University of Western Ontario
Completed the Certificate Program which provides the opportunity to learn and reflect on systems of oppression towards Indigenous Peoples, Black, Asian, Muslim, and Jewish communities, as well as people with disabilities and 2SLGBTQIA+ and Trans communities.
Credential:
https://learner.mycreds.ca/badges/public/assertion/Vy6bjoCySoaqoOoMQNCJ-w

Certificate Requirements Completed:
- 2025/06 *Unpacking and Addressing Anti-Indigenous* Racism e-Learning Module
- 2025/05 *Unpacking Anti-2SLGBTQIA+ Oppression* e-Learning Module
- 2025/04 *Prevention of Ableism* e-Learning Module
- 2025/03 *Bridging Divides: Fostering Courageous and Respectful Conversations* Workshop
- 2025/02 Completion of the *Award of Achievement in Anti-Oppression*
- 2024/12 *Unpacking and Addressing Ageism* e-Learning Module
- 2024/10 *Unpacking and Addressing Misogyny and Sexism* e-Learning Module

2025/03 Award of Achievement in Anti-Oppression
Completed the Award of Achievement in Anti-Oppression which allows participants to reflect on systems of oppression towards Black, Asian, Muslim, and Jewish communities.

Certificate Requirements Completed:
- 2024/11 *Unpacking and Addressing Microaggressions* Workshop
- 2024/06 *Unpacking and Addressing Anti-Black Racism* e-Learning Module
- 2024/05 *Unpacking and Addressing Antisemitism* e-Learning Module
- 2024/04 *Unpacking and Addressing Anti-Asian Racism* e-Learning Module
- 2024/03 *Unpacking and Addressing Anti-Islamophobia* e-Learning Module

2024/03 Anti-Racism Foundations Certificate
Completed the Certificate Program which provides the opportunity to learn about the current impact of the history of racism in the Canadian context.
Credential:
https://learner.mycreds.ca/r/badges/public/assertion/ysO09WTQTFmD6FzQBxqFEw

Certificate Requirements Completed:
- 2024/02 *Historical Review of Racism in Canada* e-Learning Module
- 2024/01 *Bias and Microaggressions: Impact, Prevention* e-Learning Module
- 2024/01 *Building Inclusivity / Anti-Racism* e-Learning Module
- 2023/11 *Power and Privilege as Agents of Change* Workshop
- 2023/10 *Transforming Power and White Privilege* e-Learning Module