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Education

2022	**Curtin University, Perth, Western Australia, Australia** **Doctor of Philosophy** Supervisors: Professor P. A. Bland, Professor G. Benedix, Dr. E.K. Sansom Thesis Title: Meteoroid Orbital Analysis: Connecting Meteorites and Asteroids
2017	**Case Western Reserve University, Cleveland, Ohio USA** **B.S. Geological Sciences** Senior Thesis – Characterization of Cohesion/Adhesion in Asteroidal Regolith Simulants
Summer 2013	**University of Pittsburgh, Pittsburgh, Pennsylvania USA** The Slavic, Eastern European, and Near Eastern Summer Language Institute: Intensive Russian Program

Publications in prep.

3 manuscripts total in preparation

Silber EA et al. (incl. **Shober, P. M.**) (In Prep) Multimodal analysis of a large daytime bolide near Cleveland, Ohio on March 17, 2026 *Meteoritics & Planetary Science, TBD*

Shober PM, Fries MD, Abell PA (In Prep) MetDetect: An automatic detection software for meteorite signatures in NEXRAD weather radar *Meteoritics & Planetary Science*

Shober PM (In Prep) A dynamic analysis of 2,200 asteroids on cometary orbits *The Astronomical Journal*

Publications in review

2 manuscripts total in review

Anderson S, Anghel S, **Shober PM** et al. (In Review) Fresh from space: the Ménétréol meteorite, an exceptional case of rapid recovery and pristine meteorite analysis *Meteoritics & Planetary Science*

Devillepoix HAR, et al. (In Review) Minimoon Still on the Loose *Meteoritics & Planetary Science*

Refereed Publications

28 peer-reviewed publications, including 14 as first author

2026

Shober PM (2026) Confirmed new "rock-comet" stream and search for a tidal disruption signature *The Astrophysical Journal*, 1000(2), 254.

Lebreton M. et al. (incl. **Shober, P. M.**) (2026). *FRIPONMeter : high resolution radiometer for fireballs. WGN*, in press.

Deam S, Devillepoix HAR, Nesvorny D, **Shober PM**, et al. (2026) A Near-Earth Object Model Calibrated to Earth Impactors *The Astronomical Journal*, 171(3), 126

Courtot A, **Shober PM**, Vaubaillon J (2026) Orbit dissimilarity criteria in meteor showers: a comparative review *Planetary & Space Science* p.106231.

Shober PM, Vaubaillon J, Anghel S, Devillepoix HAR, Sansom EK, Vida D, Colas F, Malgoyre A, Deam S (2026) Comparing the data-reduction pipelines of FRIPON, DFN, WMPL, and AMOS: Case study of the Geminids *Astronomy & Astrophysics*, 705, A65

2025

Shober PM, Devillepoix HAR, Vaubaillon J, Anghel S, Deam SE, Sansom EK, Colas F, Zanda B, Vernazza P, Bland P (2025) What falls versus what we recover: Quantifying search and recovery bias for orbital meteorites. *Meteoritics & Planetary Science*, 60(10), 2488-2503.

Egal A et al. (2025) Catastrophic disruption of asteroid 2023 CX1 and implications for planetary defense *Nature Astronomy*, 1-14.

Shober PM (2025) Statistical significance of meteorite-asteroid pairs using geocentric parameters *Astronomy & Astrophysics*, 702, A36.

Shober PM, Devillepoix HAR, Vaubaillon J, Anghel S, Deam SE, Sansom EK, Colas F, Zanda B, Vernazza P, Bland P (2025) Perihelion history and atmospheric survival as primary drivers of the Earth's meteorite record *Nature Astronomy*, 1-14

Shober PM, Courtot A, Vaubaillon J (2025) Near-Earth stream decoherence revisited: the limits of orbital similarity *Astronomy & Astrophysics* 693, A23

2024

Shober PM, Vaubaillon J, Tancredi G, Devillepoix HAR, Sansom EK, Martino S, Anghel S, Colas F, Deam S (2024) Comparing the Dynamics of Jupiter-Family Comets and Comet-like Fireballs *Astronomy & Astrophysics* 687, A181

Shober PM, Vaubaillon J (2024) A generalizable method for estimating meteor shower false positives *Astronomy & Astrophysics* 686, A130

Shober PM, Caffee MW, Bland PA (2024) Cosmic-ray exposure age accumulated in near-Earth space: a carbonaceous chondrite case study *Meteoritics & Planetary Science* 59 (10), 2695-2717

Lagain, A, Devillepoix, HA, Vernazza, P, Robertson, D, Granvik, M, Pokorny, P, Ozerov, A, **Shober, PM**, Jorda, L, Servis, K and Fairweather, JH, (2024) Recalibration of the lunar chronology due to spatial cratering-rate variability. *Icarus*, p.115956.

McMullan S et al. (2024) The Winchcombe fireball—That lucky survivor *Meteoritics & Planetary Science*, 59(5), 927-947.

2022

King AJ et al. (2022) The Winchcombe meteorite, a unique and pristine witness from the outer solar system *Science Advances*, 8(46), p.eabq3925.

Anderson SL, Towner MC, Fairweather J, Bland P, Devillepoix HAR, Sansom EK, Cupak M, **Shober PM**, Benedix G (2022) Successful Recovery of a Observed Meteorite Fall Using Drones and Machine Learning *Astrophys. J. Letters*, 930(2), p.L25.

Devillepoix H.A.R., Sansom E.K., **Shober PM**, Anderson S.L., Towner M.C., Lagain A., Cupak M., Bland P.A., Howie R.M., Jansen-Sturgeon T., Hartig B.A.D., Benedix G., Forman L., (2022) Trajectory, recovery, and orbital history of the Madura Cave meteorite *Meteorit. Planet. Sci.*, 57(7), pp.1328-1338.

Shober PM, Devillepoix H.A.R., Sansom E.K., Towner M.C., Cupak M., Anderson S.L., Benedix G., Laubenstein M., Forman L., Bland P.A., Howie R.M., Hartig B.A.D., Cary F., Langendam A. (2022) Arpu Kuilpu: An H5 from the Outer Main Belt *Meteorit. Planet. Sci.*, 57(6), pp.1146-1157.

2021

Devillepoix H.A.R., Jenniskens P., Bland P.A., Sansom E.K., Towner M.C., **Shober PM**, Cupak M., Howie R.M., Hartig B.A.D., Jansen-Sturgeon T., Cox M.A. (2021) Taurid meteoroid stream #628: a reservoir of large impactors *The Planetary Science Journal*, 2(6), p.223.

Anderson SL, Sansom EK, **Shober PM**, Hartig BAD, Devillepoix HAR (2021) The Silicate-Sulfuric Acid Process: Mineral Processing for In Situ Resource Utilization (ISRU) *Acta Astronautica*, 188, pp.57-63.

Shober PM, Sansom EK, Bland PA, Devillepoix HAR, Towner MC, Cupak M, Howie RM, Hartig BAD, Anderson SL (2021) The main asteroid belt: the primary source of debris on comet-like orbits. *The Planetary Science Journal*, 2(3), p.98.

2020

Anderson SL, Towner MC, Bland PA, Haikings C, Volante W, Sansom EK, Devillepoix HAR, **Shober PM**, Hartig BAD, Cupak M, Jansen-Sturgeon T, Howie RM, Benedix G (2020) Machine Learning for Semi-Automated Meteorite Recovery. *Meteorit. Planet. Sci.*, 55(11), pp.2461-2471.

Shober PM, Jansen-Sturgeon T, Bland PA, Devillepoix HAR, Sansom EK, Towner MC, Cupak M, Howie RM, Hartig BAD (2020) Using Atmospheric Impact Data to Model Meteoroid Close Encounters. *Mon. Not. R. Astron. Soc*, 498(4), pp.5240-5250.

Devillepoix HAR, Cupak M, Bland PA, Sansom EK, Towner MC, Howie RM, Hartig BAD, Jansen-Sturgeon T, **Shober PM**, ... (2020) A Global Fireball Observatory. *Planet. Space Sci.*, 191, p.105036.

Shober PM, Jansen-Sturgeon T, Devillepoix HAR, Towner MC, Sansom EK, Bland PA, Cupak M, Howie RM, Hartig BAD (2020) Where Did They Come From. Where Did They Go. Grazing Fireballs. *Astron. J.*, 159(5), p.191.

2019

Shober PM, Jansen-Sturgeon T, Sansom EK, Devillepoix HAR, Bland PA, Towner MC, Cupak M, Howie RM, Hartig BAD (2019) Identification of a Minimoon Fireball. *Astron. J.*, 158(5), p.183.

Sansom EK, Gritsevich M, Devillepoix HAR, Jansen-Sturgeon T, **Shober PM**, Bland PA, Towner MC, Cupak M, Howie RM, Hartig BAD (2019) Determining Fireball Fates Using the α–β Criterion. *Astrophys. J*, 885(2), p.115.

Leadership Roles

2024 – 2026 **Principal Investigator** – Next-Generation Meteorite Tracking: Leveraging Weather Radar for Global Detection and Recovery
- Project funded through the NASA Postdoctoral Fellowship Program
- Leading the use of machine-learning methods to automate the detection and characterization of meteorite falls in the continental US using the NEXRAD Doppler weather radar network.

2022 – Present **Core Team Member** – Fireball Recovery and InterPlanetary Observation Network
- Leading the advancement of data reduction techniques and pipeline development, significantly enhancing the efficiency and accuracy of FRIPON's observational data analysis.
- Improved data integration and collaboration among international research teams.

2022 – 2024 **Principal Investigator** – MASSED: Mapping Arrival Times in the Solar System for Extraterrestrial Debris
- Project funded through Marie Skłodowska-Curie Actions along with support from the Ile de France
- Lead project to compare meteorite cosmic-ray irradiation ages to dynamic N-body models to predict meteorite source regions.

2019 – Present **Team Member** – Global Fireball Observatory
- Continuing collaboration of a diverse team of international experts, with experience in meteoritics, orbital dynamics, impact modeling, crater modeling, astronomy, and machine learning, covering a diverse cross-section of planetary scientists.
- Responsible for the scientific utilization of the orbital dataset collected.
- Assist with installation and upkeep of fireball observatories.

Employment

2024 – 2026/27 **NASA Postdoctoral Program Fellow** – NASA Johnson Space Center
- Leading a project within the Astromaterials Research and Exploration Science Division at the JSC to automate the reduction of Doppler weather radar in the U.S. and internationally to detect meteoritic and satellite debris falling to the Earth.

2022 – 2024 **Marie Curie Postdoctoral Fellow** – Paris, France
∘ Conducting research at the Institute of Celestial Mechanics and Calculation of Ephemerides (LTE), located within the Paris Observatory, to better understand the relationship between the orbital and irradiation histories of meteoritic samples.

2021 – 2022 **Astrodynamics Specialist** – InTrack Solutions (private company), Adelaide, SA Australia
∘ Lead modeling efforts of geosynchronous satellites and other related topics for the purposes of space domain awareness. Also, working on maneuver planning and detection algorithms.

2017 – 2022 **Doctoral Candidate** – Space Science & Technology Centre, Curtin University, Perth, Western Australia
∘ Led orbital modeling and statistical analysis related to the data collected by the Desert Fireball Network.

2016 – 2017 **NASA Intern** – NASA Glenn Research Center Cleveland, OH USA
∘ Collected adhesion/cohesion measurements of meteoritic materials using an ultra-high vacuum torsion balance rig.
∘ Sample characterization using SEM, XRD, UV-nIR, IR, & Raman spectroscopy.

2015 – 2016 **Laboratory Assistant** – Case Western Reserve University Cleveland, OH USA
∘ Worked within the Planetary Interiors Research Group.
∘ Helped create several Fe-Si and Fe-C alloys and characterized the eutectic temperature in these systems.

Teaching/Mentoring

2023 **Masters Intern Co-supervisor** (20 hours) – Paris Observatory, Paris, France
∘ Assisted in the supervision of a masters student working on searching for evidence of clusters of meteors resulting from recent thermal fragmentation in space.

2020 – 2021 **Assistant Lecturer** (40 hours) – Curtin University, Perth, Western Australia
∘ Demonstrated for the introductory planetary science lab section.

2019 **Summer Internship Supervisor** (20 hours) – Curtin University, Perth, Western Australia
∘ Supervised a 2nd year physics undergraduate during his internship at the Curtin University Hub for Immersive Visualisation and eResearch (HIVE). His project focused on creating interactive visualizations of the orbital data collected by the Desert Fireball Network.

Grants/Awards

Total merit-based academic scholarship: 224 000 €.
Total funding as P.I. since 2022: 285 000 €.

2024 **PI – NASA Postdoctoral Fellowship**
Amount: $180,000
Awarded NASA Postdoctoral Program (NPP) fellowship to carry out the project *Next-Generation Meteorite Tracking: Leveraging Weather Radar for Global Detection and Recovery* in collaboration with the Astromaterials Research and Exploration Science Division at NASA Johnson Space Center.

2023 **Asteroid (33964) Patrickshober Name Designation**
The International Astronomical Union named asteroid (33964) Patrickshober following the 2023 Asteroids, Comets, and Meteors conference (Flagstaff, AZ), in recognition of contributions to planetary science and small-body research.

2022 **PI – Paris Région fellowship Programme**
Amount: 128880 €
Selected for Paris Région fellowship supporting the *MASSED* postdoctoral project at LTE, Paris Observatory, within the "Domaines d'Intérêt Majeur" framework.

2019 **The Institute for Geoscience Research Small Grant**
Amount: $2,000
Grant was obtained for post-conference collaborative visit to the University of Western Ontario. I spent one week working with Prof. Peter Brown and other colleagues at the university.

2017 **Curtin Research Stipend Scholarship**
Amount: $93,387
Stipend scholarship to cover living expenses while completing research for Ph.D..

2017 **Curtin International Postgraduate Research Scholarship**
Amount: $158,600
Scholarship to cover tuition fees associated with Ph.D..

2017 **Charles S. Bacon Award**
Award given to finishing undergraduate student for outstanding contributions to the department of Earth, Environmental, and Planetary Sciences at Case Western Reserve University.

2013 **Case Western Reserve University Academic Scholarship**
Amount: $92,000
Scholarship to cover tuition fees associated with B.S.

Presentations (conferences, workshops, and seminars)

Since 2017: 7 invited talks and more than 34 total presentations.

2026 **Talk & Poster** COSPAR (Florence, Italy)
2026 **Talk & Poster** Asteroids, Comets, Meteors (ACM) Conference (Poznań, Poland)
2026 **Talk** Annual meeting of the Global Meteor Network (Virtual)
2025 **Invited Talk** EPSC-DPS Joint Meeting (Helsinki, Finland)
2025 **Invited Talk** 87th Annual Meeting of the Meteoritical Society (Perth, Australia)
2025 **Talk** Meteoroids Conference (Perth, Australia)
2025 **Invited Plenary Talk** Meteoroids Conference (Perth, Australia)
2025 **Invited Talk** Astronomical Institute of the Romanian Academy (Bucharest, Romania)
2025 **Invited Talk** Brown University (Providence, USA)
2025 **Talk** Itokawa and the Dawn of Asteroidal Sample Return Workshop (Houston, USA)
2025 **Talk** Lunar & Planetary Science Conference (Houston, USA)
2024 **Invited Talk** LTE Seminar 2024 (Paris, France)
2024 **Talk** International Meteor Conference 2024 (Kutna Hora, Czech Republic)
2024 **Talk & Poster** Europlanet Science Congress 2024 (Berlin, Germany)
2024 **Invited Talk** Astronomical Institute of the Romanian Academy (Bucharest, Romania)
2024 **Talk** EGU Annual Meeting 2024. (Vienna, Austria)
2024 **Talk** Lunar & Planetary Science Conference 2024 (Houston, USA)
2024 **Talk** PEGASE Team Annual Meeting. (Paris, France)
2023 **Talk & Poster** Asteroids, Comets, Meteors 2023. (Arizona, USA)
2023 **Talk** PEGASE Team Annual Joint Meeting. (Brussels, Belgium)
2023 **Convener** EGU Annual Meeting 2023. (Vienna, Austria)
2023 **Talk** Paris Observatory, LTE Seminar (Paris, France)
2023 **Talk** PEGASE Team Seminar (Paris, France)
2021 **Talk** Europlanet Science Congress 2021. (Virtual)

2020	**Talk** Europlanet Science Congress 2020. (Virtual)
2020	**Talk & Poster** Lunar & Planetary Science Conference 2020 (Houston, USA)
2019	**Talk** Australian Space Research Conference 2019 (Adelaide, Australia)
2019	**Talk** SSERVI Australia 2019 (Melbourne, Australia)
2019	**Invited Talk** Western University Meteor Physics Group Meeting (London, Canada)
2019	**Talk** Meteoroids 2019 (Bratislava, Slovakia)
2019	**Talk & Poster** Lunar & Planetary Science Conference 2019 (Houston, USA)
2018	**Talk** SSERVI Australia 2018 (Perth, Australia)
2017	**Poster** Case Western Reserve University ShowCASE (Cleveland, USA)

Volunteering and collective responsibilities

2018 – 2022 **EdConnect learning support volunteer** (500 hours total)
∘ Weekly science and mathematics teaching in a local primary school in Western Australia (ages 6–11).

2018 – 2020 **Secretary, Earth and Planetary Sciences PhD Student Committee**
∘ Welcomed and oriented new postgraduate students within the School of Earth and Planetary Sciences and helped organise student activities.

2018 – 2020 **Postgraduate Student Committee Science and Engineering representative**
∘ Represented the Curtin University postgraduate (Ph.D. and Master's) community in faculty and university-level committees, relaying student concerns and participating in discussions with senior staff.

Science Communication, Outreach, and Media Presence

Authored: (>120 000 reads)	The Conversation; American Scientist; Astronomy Magazine; Phys.org; Nature Astronomy Research Briefing; EarthSky; ScienceAlert; Stuff.co.nz; Cosmos Education; Gizmodo;
Press releases:	Observatoire de Paris (2); Curtin University (3)
Media coverage	New York Times; The New Scientist; Astronomy.com; BBC Science Focus; ScienceDaily; The Independent; Popular Mechanics; Gizmodo; SpaceDaily; Phys.org; Interesting Engineering; USA Today; The New Castle News
Interviews:	The Academic Minute (US Radio); Scitech "Particle" Podcast (Australia).

Other

Languages – Professional French, Beginner Russian, Beginner Spanish

Programming languages – Python, Matlab, Java, Bash, R, C++, LaTeX

Other Skills/Experience – orbital N-body modeling, orbit determination, algorithm development, version control (Git & Mercurial), multiprocessing, data visualization (3D orbital animation, etc.), unsupervised machine learning, impact fragmentation modeling, meteor shower identification, Docker containers, supercomputing, chaotic systems, Bayesian statistics, Numpy, Scipy, Astropy, GUI development, Scikit-learn, SEM analysis, XRD analysis, Raman spectroscopy, UV-nIR analysis

Professional Memberships – American Astronomical Society - Division of Planetary Science, European Geophysical Union

Peer Reviewer – Monthly Notices of the Royal Astronomical Society, Astrophysics and Space Science, Planetary and Space Science, Meteoritics & Planetary Science, Astronomy & Astrophysics, The Astronomical Journal, Icarus, NASA ROSES Yearly Opportunities for Research in Planetary Defense (YORPD), NASA ROSES Future Investigators in NASA Earth and Space Science and Technology (FINESST)

References

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