

DR. ELIZABETH A. SILBER

silber.research@gmail.com ▪ www.EASilber.com

Education

- 2014 PhD. in Physics and Planetary Science, Western University, London, ON, Canada
Thesis Title: *Observational and theoretical investigation of cylindrical line source blast theory using meteors*, <http://ir.lib.uwo.ca/etd/2112/>, [[pdf](#)], graduated with cumulative GPA 4.0
- 2008 MSc. in Physics and Planetary Science (transferred to PhD.), Western University
- 2007 Honors BSc., Specialization in Astrophysics and Major in Planetary Science, graduated with Distinction, Western University, London, ON, Canada

Certifications

- 2013 CTBTO Diplomacy and Public Policy Course
- 2010 Canadian Association of Physicists, Professional Physicist Certification, License # 236
- 2010 The Certificate in University Teaching and Learning, Western University
- 2007 The Teaching Assistant Training Program Certificate, Western University

Positions

- 2018 – Present Defence Scientist, Defence R&D Canada (DRDC), Dartmouth, NS, Canada
- 2016 – 2018 NSERC Postdoctoral Fellow, Brown University, Providence, RI, USA
- 2014 – 2016 Postdoctoral and NSERC CREATE Fellow, Western University, London, ON, Canada
- 2012 – 2018 Limited Duties Faculty (University Instructor/Lecturer, Preferred Status Member), Western University, London, ON, Canada
- 2007 – 2012 Graduate Teaching Assistant, Western University, London, ON, Canada
- 2007 – 2014 Graduate Research Assistant, Western University, London, ON, Canada
- 2006 – 2007 Research Assistant, Western University, London, ON, Canada
- 2004 Research Lab Assistant, Western University, London, ON, Canada
- 2001 – 2003 Project Coordinator, MSX International, Dearborn, MI, USA

Fellowships & Scholarships

- 2016 Natural Sciences and Engineering Research Council of Canada (NSERC) Postdoctoral Fellowship (top ranked female candidate in the Physics and Astronomy category on the national level)
- 2012 GTA Outstanding Research Contributions Scholarship
- 2009 Natural Sciences and Engineering Research Council of Canada, Alexander Graham Bell Canada Graduate Scholarship (CGS D3), NSERC
- 2009 Ontario Graduate Scholarship, Western University (declined)
- 2008 Ontario Graduate Scholarship, Western University
- 2007 Western Graduate Scholarship, Western University
- 2007 Physics Graduate Entrance Scholarship
- 2006 Alumni Western London Branch Scholarship
- 2006 Ray Leroi Allen Scholarship
- 2006 Laurene Paterson Scholarship
- 2005 Robert and Ruth Lumsden Scholarship

Awards

- 2016 Nominated for the prestigious NSERC-L'Oréal fellowship supplement as the top ranking female candidate in the Astronomy and Physics category on a national level
- 2015 Bridging the Gap III: Travel Award by the German Research Foundation
- 2014 Accepted as an NSERC CREATE Trainee within Centre for Planetary Science & Exploration at Western (CPSX); Technologies and Techniques for Earth and Space Exploration
- 2014 ITW2014 Conference Funding (CTBTO, Vienna)
- 2013 S&T 2013 Conference Funding (CTBTO, Vienna)
- 2013 CTBTO Award for Young Scientists and Engineers
- 2013 Meteoroids 2013 Conference Funding (NASA)
- 2013 The Graduate Research Award for Disarmament, Arms Control and Non-Proliferation, offered by The Simons Foundation and the International Security Research and Outreach Programme (ISROP) of the Department of Foreign Affairs and International Trade Canada (DFAIT)
- 2013 Western Graduate Thesis Research Award
- 2011 The Graduate Research Award for Disarmament, Arms Control and Non-Proliferation, offered by The Simons Foundation and the International Security Research and Outreach Programme (ISROP) of the Department of Foreign Affairs and International Trade Canada (DFAIT)
- 2011 Western Graduate Thesis Research Award
- 2010 CAP Best Student Presentation - Honourable Mention Award, Finalist
- 2010 Meteoroids 2010 Conference Funding
- 2009 Nominated for the SOGS Teaching Assistant Award
- 2009 Western Graduate Thesis Research Award
- 2008 Faculty of Science Teaching Assistant Award of Excellence for the academic year 2007-08

Academic and Professional Accomplishments

- Guest Editor for MDPI Atmospheres Special Issue "*Shock Wave Propagation and Dynamics and Its Effect on Planetary Atmosphere*"
- Received the Certificate of Outstanding Contribution in Reviewing for 2018 by Icarus
- Nominated for and featured in *150 Days of Canadian Women in STEM* at *hEr VOLUTION*
- Authored Test bank and Power Point lectures for ASTRO 2nd Canadian Edition, Nelson Publishing
- Featured on Daily Planet – Windsor Hum investigation
- Featured in scholarships publicity materials for the Western University
- Participated in the debates on non-proliferation and disarmament issues (the Department of Foreign Affairs and International Trade Canada)
- Guest Physics Lecture (Western University)
- Nominated for the prestigious Vanier NSERC Scholarship as a student with the highest standing in the Department of Physics and Astronomy
- Dean's Honors List for the academic years 2004-05, 2005-06 and 2006-07
- Selected by the Department and featured in a brochure entitled Mathematical, Computational and Physical Sciences at Western

Professional Activities and Service

- Lunar and Planetary Science Conference (LPSC) Program Committee Member (2019)
- NASA Grants review panellist (2016, 2017, 2018)

- Reviewer for: Geophysical Journal International, Icarus, JGR – Planets, JGR – Space Science, Meteoritics & Planetary Science (MAPS), Assessment and Mitigation of Asteroid Impact Hazards (Springer book), Proceedings of the National Academy of Sciences of the United States of America (PNAS)
- Conference session organizing committee for the European Planetary Science Congress 2018 (EPSC2018), Session: Observing and modelling meteors in planetary atmospheres (2018)
- MetSoc Conference 2017 (Santa Fe, 22-28 Jul, 2017) Session Chair
- Conference session organizing committee for the European Planetary Science Congress 2017 (EPSC2017), Session: Observing and modelling meteors in planetary atmospheres (2017)
- Planetary Crater Consortium Executive (elected position) (2016-Present) and Nomenclature Subcommittee member
- Dornik Judge for student presentations at LPSC (2016)
- Supervised and mentored student volunteers through the Western Volunteer Program (2014-2016)
- Canadian Science Policy Conference Committee (social media, PR and outreach) (2014)
- Physics & Astronomy Graduate Council, Chair (elected position) (2011 – 2014)
- Science Award for Excellence in Graduate Student Mentoring Committee (2012)
- National Scholarship Selection Committee (2011)
- Physics & Astronomy Graduate Council Representative (elected position), Webmaster and Co-founder (2009 – 2011)
- Graduate Representative on the Departmental Graduate Affairs Committee (2011 – 2012)
- Volunteer Photographer for the Department (2010 – 2013)
- GTA Political Action and Social Justice Committee, Chair (2011)
- Student Organizer for the Physics and Astronomy Alumni Reception (2011)
- Radio Interview, 106.9 The X (2011)
- Student Representative for the External Undergraduate Academic Review Committee (2011)
- Volunteer for the CASCA 2011 Conference
- Undergraduate Academic Review Student Representative Committee (2010)
- Participated in filming of National Geographic Channel show on meteors (Naked Science: Alien Fireballs) as an infrasound expert (2010)
- “Ask the Expert” Scholarship Help Session Advisor (2010)
- Conducted Course Evaluations for the Department of Physics & Astronomy (2008 – 2011)
- GTA Union Scholarships Committee (2010)
- GTA Union Departmental Steward (2008 – 2010)
- Session Chair, Meteoroids 2010 Conference, Breckenridge, CO (2010)
- Graduate Representative on a Decanal Selection Committee (2010)
- Co-founder and President, Space Society of London (2008 – 2009)
- SOGS Department Councillor (2008 – 2009)
- SOGS Elections Appeals Board Committee (2009)
- Judge - Regional Science Fair (2009)
- Represented Physics & Astronomy Department on the Faculty of Science interviewing committee for candidates in the final competition for the position of Assistant Dean, Diversity and Outreach (2008)
- Volunteered for Faculty of Science Telephone Campaign on behalf of the Departments of Earth Science, and Physics and Astronomy (2008)
- Coordinated Departmental photoshoot for graduating students (2007)
- Session Chair, Undergraduate Physics Conference, Western University (2007)

- Department Representative – Fall Preview Open House at Western (2004 – 2005)

Research Experience

Defence Scientist, Defence Research and Development Canada (2018 – Present)

Conducting research in the area of underwater and airborne acoustics (sensing, propagation and source characterization), shock waves, hypersonic impact hydrodynamics, shock wave propagation in solids, liquids and gasses, shock induced modification and transformation of materials, and shock wave interaction with planetary surfaces and atmospheres. Impact modeling with hydrocode *iSALE*; programming using Python, *MATLAB*, *FORTRAN*.

NSERC Postdoctoral Fellow, Brown University (2016 – 2018)

Conducted research in the area of numerical modelling, shock waves, hypersonic impact hydrodynamics, shock wave propagation in solids, liquids and gasses, shock induced modification and transformation of materials, and shock wave interaction with planetary surfaces and atmospheres. Impact modeling with hydrocode *iSALE*; programming using Python, *MATLAB*, *FORTRAN*.

Postdoctoral and NSERC CREATE Fellow, Western University (2014 – 2016)

Conducted research in the area of numerical modelling, shock waves, hypersonic impact hydrodynamics and shock wave interaction with planetary surfaces and atmospheres. Impact modeling with hydrocode *iSALE*; programming using Python, *MATLAB*, *FORTRAN*.

Graduate Research Assistant, Western University (2007 – 2014)

Conducted interdisciplinary research in the area of shock wave dynamics, hypersonic propagation, infrasound propagation and modelling, and meteor physics. Performed both theoretical and experimental scientific investigation. Programming using *MATLAB*, *FORTRAN*, *IDL*.

Experimental work: Observational investigation and instrumental techniques in the area of bolide shock physics, astrometric and photometric observations and measurements of meteors, as well as detection and measurement of very low frequency acoustic (infrasound) waves produced by airblasts on a regional and global scale.

Theoretical work: Investigation and modelling of cylindrical line source produced by hypersonic projectiles, shock wave propagation in the atmosphere and acoustics with the focus on infrasound.

Research Assistant, Western University (2006 – 2007)

Research in the area of infrasound (rocket and bolide infrasound); conducted literature reviews and surveys; prepared literature reviews; participated in proposal and report writing; gave scientific presentations; analyzed research results; developed a novel method for digitizing historical (1960-1972) infrasound records.

Research Lab Assistant, Western University (2004)

Assisted with day-to-day operations in the Geology lab; prepared new rock specimens for upcoming courses; organized and filed scientific literature; used EndNote citation manager; compiled research results.

Teaching, Mentoring, and Leadership Experience

Limited Duties Faculty (University Instructor/Lecturer, Preferred Status Member), Western University (2012 – 2018)

The course instructor; responsible for all aspects of the course design, management and administration; developing course curriculum; responsible for teaching assistants; grade book maintenance; course design through OWL; designing and delivering lectures and course materials; designing on-line learning tools and materials; implementation of new teaching tools; planning, preparing and administering quizzes, test and exams.

Developed and taught a new on-line astronomy course.

Courses taught: Astronomy 1021, Astronomy 1021 (on-line), Astronomy 1011A (on-line), Physics 2070A/B, Earth Science 2232G (on-line), Astronomy 2232G (on-line)

Graduate Teaching Assistant, Western University (2007 – 2012)

Private Tutor (math and astronomy), Western University (2004 – 2011)

Webmaster, Western University (2009 – 2013)

Created, designed and maintained websites for:

- Physics & Astronomy Graduate Council
- First Year Physics Labs
- Planetary Science and Meteor Physics Research Group

Fleet Manager and Project Coordinator, MSX International, Dearborn, USA (2001 – 2003)

Was directly involved in the day-to-day project management operations in a fast-paced environment; managed a team of 20+ people; was in charge of the complete fleet of pre-production vehicles and fleet operations; dealt with highly confidential information and trade secrets; used various computer applications; prepared reports and memos.

Professional Development and Workshops

Computation and Business

- Mitacs Step: Writing Strategic Business Reports, Western University (March 1, 2016)
- An Introduction to R Workshop, Western University, London, Ontario (Oct 29, 2015)
- Crash Course - Intro Inferential Statistics, Western University, London, Ontario (Oct 29, 2015)
- Ontario Summer School on High Performance Computing, Western University, London, Ontario (May 25 – 29, 2015)
- Software Carpentry Workshop, Western University, London, Ontario (May 11 – 13, 2015)
- Wind Profiler Radar Workshop, Environment Canada, Toronto (2011)
- Public Speaking for Impact (July 10, 2007)

Teaching and Mentoring

- eLearning Lunch and Learn: Teaching With Social Media, Western University (February 12, 2015)
- Where Do I Start When Teaching Online? On-Line Learning: Best Practices, Opportunities and Challenges, Teaching Support Centre, Western University (February 8, 2013)
- Completed the Teaching Mentor Program for Graduate Students through the Teaching Support Centre (November 2009)
- Teaching Mentor Program for Graduate Students (October 9, 2008)
- Providing Effective Feedback on Student Writing (July 24, 2008)

- Integrating Service-Learning into the University Experience (March 28, 2008)
- Teaching Critical Thinking, Part 1 (March 6, 2008)
- The Teaching Assistant / TA Supervisor Relationship (February 8, 2008)
- Fostering Active Learning in the Classroom (February 1, 2008)
- Public Speaking in the Classroom (July 24, 2007)

Social Issues and Policy

- Student Transitional Executive Program (STEP)
 - The Ethics of Health Care
 - Prostitution and Narcotic Addiction: A Stark Reality
 - Prison Conditions and Reform in Ontario
 - The State of Human Rights in Ontario

Space Mission Experience

- 2015 CanMars MSR Analogue Mission (Nov 16 – 27, 2015) – served as Tactical Lead for the mission. This was a Mars Sample Return Analogue Mission carried out in partnership between the Canadian Space Agency, MacDonald, Dettwiler and Associates Ltd. (MDA), and the Centre for Planetary Science and Exploration (CPSX) at the University of Western Ontario, as part of the NSERC CREATE project ‘Technologies and Techniques for Earth and Space Exploration’
- HiRISE (MRO) – assisted to CIPP (Co-Investigator Pay Period) in mission planning, target selection, scientific rationale, image validation, caption writing, participation in HiRISE Operations telecons; (June – July, 2015)
- CREATE-Canadian Space Agency Analogue Mars Rover Mission – served on the Science Team (Aug 11 – 25, 2014)

Peer Reviewed Journal Articles

(807 citations [Google Scholar] as of Feb 2019), **h-index: 11, i10-index: 11**

PDFs available as hyperlinks in text and at www.easilber.com

In Revision and/or Submitted Works

- Wiggins, S. E., Johnson, B. C., Bowling, T. J., Melosh, H. J., Silber, E. A. (2018) Impact Fragmentation and Development of the Lunar Regolith, to be submitted to JGR – Planets, in revision

Published Works

- Osinski, G. R., **Silber, E. A.**, Clayton, J, Grieve, R. A. F., Hansen, K., Johnson, C. L., Kalynn, J., Tornabene, L. L. (2018) *Transitional impact craters on the Moon: Insight into the effect of target lithology on the impact cratering process*, MAPS, 1-19, doi: 10.1111/maps.13226
- Osinski, G. R. ... **Silber, E. A.** ... (62nd of 72 authors) (2018) *The CanMars Mars Sample Return Analogue Mission*, Planetary & Space Science special issue, doi: 10.1016/j.pss.2018.07.011
- Pilles, E. A., ... **Silber, E. A.** ... (13th of 14 authors) (2018) *Exploring new models for improving planetary rover operations efficiency through the 2016 CanMars Mars Sample Return (MSR) Analogue Deployment*, Planetary & Space Science special issue, doi: 10.1016/j.pss.2018.10.001
- Galiazzo, M., **Silber, E. A.**, Dvorak, R. (2018) *The threat of Centaurs for terrestrial planets and their orbital evolution as impactors*, MNRAS, doi: 10.1093/mnras/sty2614 [[pdf](#)]

- Moreno-Ibáñez, M., **Silber, E. A.**, Gritsevich, M., Trigo-Rodríguez, J. M. (2018) *Verification of the flow regimes based on high fidelity observations of bright meteors*, *Astrophysical Journal*, 863(2), 174, doi: 10.3847/1538-4357/aad334 [[pdf](#)]
- **Silber, E. A.** (2018) *Deployment of a Short-Term Geophysical Field Survey to Monitor Acoustic Signals Associated with the Windsor Hum*, *Earth and Planetary Physics*, 2(4), 351-358, doi: 10.26464/epp2018032
- **Silber, E. A.**, Boslough, M., Hocking, W. K., Gritsevich, M., Whitaker, R. (2018) *Physics of Meteor Generated Shock Waves in the Earth's Atmosphere - A review*, *ASR*, **Invited Review**, doi: 10.1016/j.asr.2018.05.010 [[pdf](#)]
- **Silber, E. A.**, Niculescu, M., Butka, P., Silber, E. A. (2018) *Nitric oxide production by centimetre sized meteoroids and the role of linear and nonlinear processes in the shock bound flow fields*, *Atmosphere, Linear to Non-Linear Flows in Atmospheric Processes Special Issue*, 9(202), 1-21, doi: 10.3390/atmos9050202 [[pdf](#)]
- **Silber, E. A.**, Johnson, B. C. (2017) *Impact crater morphology and the structure of Europa's ice shell*, *JGR – Planets*, 122, 2685-2701, doi: 10.1002/2017JE005456 [[pdf](#)]
- **Silber, E. A.**, Osinski, G. R., Johnson, B. C., Grieve, R. A. F. (2017) *Effect of impact velocity and acoustic fluidization on the simple-to-complex transition of lunar craters*, *JGR-Planets*, 122, doi: 10.1002/2016JE005236, **paper featured in JGR - Planets** [[pdf](#)]
- **Silber, E. A.**, Hocking, W. K., Niculescu, M. L., Gritsevich, M., Silber, R. E. (2017) *On Shock Waves and the Role of Hyperthermal Chemistry in the Early Diffusion of Overdense Meteor Trains*, *MNRAS*, 469(2), 1869-1882, doi: 10.1093/mnras/stx923 [[pdf](#)]
- Galiazzo, M. A., **Silber, E. A.** and Bancelin, D. (2017) *V-type Near-Earth asteroids: dynamics, close encounters and impacts with terrestrial planets*, *Astronomical Notes*, 1-10, doi: 10.1002/asna.201613273 [[pdf](#)]
- Caudron, C., Taisne, B., Perttu, A., Garcés, M., **Silber, E. A.**, and Mialle, P. (2016) *Infrasound and seismic detections associated with the 7 September 2015 Bangkok fireball*, *Geoscience Letters*, 3(1), 26. [[pdf](#)]
- **Silber, E. A.** Brown, P. G. and Krzeminski, Z. (2015) *Optical Observations of Meteors Generating Infrasound: Weak Shock Theory and Validation*, *JGR – Planets*, 120(3), pp. 413-428, doi: 10.1002/2014JE004680 [[pdf](#)]
- **Silber, E. A.** and Brown, P. G. (2014) *Optical Observations of Meteors Generating Infrasound – I: Acoustic Signal Identification and Phenomenology*, *JASTP*, Vol. 119, pp. 116-128, doi: 10.1016/j.jastp.2014.07.005 [[pdf](#)]
- Jenniskens, P., ... **Silber, E. A.** ... (24th of 48 authors) (2013) *Fall, Recovery and Characterization of the Novato L6 Chondrite Breccia*, *MAPS*, 49(8), pp. 1388-1425 [[pdf](#)]
- Rybnov, Y. U. S., Popova, O. P., Kharlamov, V. A., Solov'yev, A. V., Rusakov, Y. U. S., Glukhov, A. G., **Silber, E.**, Podobnaya, E. D., Surkova, D. V. (2013) *Estimation of the energy of the Chelyabinsk bolide based on infrasound measurements*, *Dynamic processes in geospheres. Issue 4: Collection of scientific papers (in Russian)*
- Brown, P.G. and 32 authors (25th author) (2013) *A 500-kiloton airburst over Chelyabinsk and an enhanced hazard from small impactors*, *Nature*, 503, 238-241 [[pdf](#)]
- Borovicka, J., Toth, J., Igaz, A., Spurny, P., Kalenda, P., Haloda, J., Svoren, J., Kornos, L., **Silber, E.** Brown, P., Husarik, M. (2013) *The Košice meteorite fall: Atmospheric trajectory, fragmentation, and orbit*, *Meteoritics & Planetary Science*, 1-23 [[pdf](#)]

- Jenniskens, P. and 68 authors, (52nd author) (2012) *Radar enabled recovery of Sutter's Mill, a unique carbonaceous chondrite regolith breccia*, Science, 338, 1583-1587 [pdf]
- Ens, T., Brown, P. Edwards, W., **Silber, E. A.** (2012) *Infrasound production by bolides: A global statistical study*, Journal of Atmospheric and Solar-Terrestrial Physics, Vol. 80, p. 208-229 [pdf]
- **Silber, E.A.**, Le Pichon, A. Brown, P. (2011) *Infrasonic Detection of a Near-Earth Object Impact over Indonesia on 8 October, 2009*, Geophysical Research Letters, Vol. 38, L12201 [pdf]
 - The above paper was featured in Nature Research Highlights: Nuclear network detects fireball (2011), Nature, Vol. 475, pp. 9
- Brown, P., McCausland, P.J.A., Fries, M., **E. Silber**, Edwards, W.N., Wong, D.K., Weryk, R.J., Fries J., Krzeminski, Z. (2011) *The Fall of the Grimsby Meteorite - I: Fireball dynamics and 6 orbit from radar, video and infrasound records*, Meteoritics and Planetary Science, Vol. 46, Issue 3, pp. 1-25 [pdf]
- **Silber, E.A.**, ReVelle, D.O., Brown, P.G., Edwards, W.N. (2009) *An estimate of the terrestrial influx of large meteoroids from infrasonic measurements*, JGR-Planets, 114, E08006 [pdf]
- Brown, P.G., ReVelle, D.O., **Silber, E.A.**, Edwards, W.N., Arrowsmith, S., Jackson Jr., L.E., Tancredi, G., Eaton, D. (2008) *Analysis of a Crater Forming Meteorite Impact in Peru*, Journal of Geophysical Research – Planets, Vol. 113, E09007 [pdf]
- ReVelle, D.O., **Silber, E.A.**, Edwards, W.N., Brown, P.G. (2008), *Reanalysis of the Historic AFTAC Bolide Infrasound database*, The Earth, Moon and Planets, Vol. 102, issue 1-4, pp. 337-344

Book Chapters

- **Silber, E.A.** and Brown, P. G. (2019) *Infrasound monitoring as a tool to characterize impacting Near-Earth Objects (NEOs)*, Chapter 31, in: *Infrasound Monitoring (Challenges and New Perspective)* Le Pichon et al. (eds.), Springer, ISBN: 9783319751382

Manuscripts in preparation

- **Silber, E. A.**, Zanetti, M., Osinski, G. R., Johnson, B. C. (2019) *Effect of impact velocity on melt production in simple-to-complex lunar craters*, to be submitted to Icarus
- **Silber, E. A.**, Singer, K., Johnson, B. C., McKinnon, W., Schenk, P. (2019) *Formation of multiring basins on Europa*, to be submitted to a high impact journal
- Hildebrand, A. R., Hanton, L. T. J., Ciceri, F., Nowell, R., Lyytinen, E., **Silber, E. A.**, Brown, P. G., Gi, N., Jenniskens, P. M. M., Albers, J., Hladiuk, D. (2019) *Characteristics of a well recorded, bright, meteorite-dropping fireball, British Columbia, Canada, September 4, 2017*, to be submitted to MAPS

Non-Refereed Articles

- **Silber, E. A.** (2019) *The highlights of the AMS 2018 workshop*, Defence Research and Development Canada
- **Silber, E. A.** (2018) *Infrasound Observations of Bright Meteors: The Fundamentals*, WGN, International Meteor Organization, April 2018 Issue, 46(2), 52-61

- **Silber, E. A.**, Hocking, W. K. and Silber, R. E. (2018) *Shock waves generated by overdense meteors in the mesosphere lower thermosphere*, The Proceedings of the International Meteor Conference (IMC), Petnica, Serbia, 21-24 September, 2017
- **Silber, E. A.** (2014) *Observational and Theoretical Investigation of Cylindrical Line Source Blast Theory Using Meteors*, Electronic Thesis and Dissertation Repository, Paper 2112, <http://ir.lib.uwo.ca/etd/2112>
- **Silber, E. A.** (2014) *Infrasound as a scientific tool to study meteors*, IMC Conference Proceedings, 22–25 August 2013, Poznan, Poland
- **Silber, E. A.** and Brown, P. G. (2013) *Scientific Research to Characterize and Localize the Windsor Hum: Final Report*, Final Report for Department of Foreign Affairs and International Trade, Contract #7294374
- **Silber, E. A.** and Brown, P. G. (2013) *Scientific Research to Characterize and Localize the Windsor Hum: Preliminary Report*, Preliminary Report for Department of Foreign Affairs and International Trade, Contract #7294374
- **Silber, E. A.** (2013) *Transparency and Freedom of Information for Dual-use Research*, published in 2012-2013 Graduate Research Awards Debates on Disarmament, Arms Control and Non-Proliferation, The Simons Foundation, pp. 52-57
- **Silber, E. A.**, LePichon, A., Brown, P. (2011) *Infrasonic Detection of a Large Bolide Over South Sulawesi, Indonesia on October 8, 2009: Preliminary Results*, Meteoroids: The Smallest Solar System Bodies, NASA Technical report, Proceedings of the Meteoroids 2010 Conference held in Breckenridge, Colorado, USA, May 24–28, 2010
- **Silber, E. A.** (2011) *Contemplating solutions to annihilation*, Invited Article, Western News, The Western University
- **Silber, E. A.** (2011) *Should the Biological Weapons Convention Review Conference in 2011 revive the verification debate or focus instead on compliance?*, published in 2010-2011 Graduate Research Awards Debates on Disarmament, Arms Control and Non-Proliferation, The Simons Foundation, pp. 28-32
- Brown, P. G., Edwards, W. N., **Silber, E. A.** (2006) *The Potential of the International Monitoring System Infrasound Network for the Detection of Rocket Launches*, Department of Foreign Affairs and International Trade (DFAIT), Canada Report, 43 Pages + Appendix, Contract #IDC 0061
- **Silber, E. A.** (2007) *A theoretical and experimental investigation of hypersonically generated cylindrical line source blastwaves using meteors*, Undergraduate Honors Thesis, Western University

Talks and Presentations

- Crósta, A. P., **Silber, E. A.**, Lopes, R. M. C., Johnson, B. C., Malaska M. J. (2019) *Modeling the formation of Menrva impact crater in Titan: Implications for a potentially habitable hydrocarbon world*, LPSC 50, held March 18–22, 201, The Woodlands, TX, USA
- Tornabene, L. L. ... **Silber, E. A.** ... (21st of 24 authors) (2019) *Mission science/operations support and training for spacecraft payloads: Building the next generation of planetary mission professionals*, LPSC 50, held March 18–22, 201, The Woodlands, TX, USA
- **Silber, E. A.**, Mialle, P. (2018) *Infrasound Monitoring of Explosive Sources in the Atmosphere: Rockets and Bolides*, AGU Fall Meeting, Washington, DC, 10 – 14 December, 2018

- Johnson, B. C., **Silber, E. A.**, Bjonnes, E., Kjaer, K. H., Wiggins, S. MacGregor, J. A., Larsen, N. K. (2018) *Formation of terrestrial craters on thick ice sheets*, AGU Fall Meeting, Washington, DC, 10 – 14 December, 2018
- **Silber, E. A.**, Gritsevich, M., Boslough, M., Hocking, W. K., Whitaker, R. (2018) *Shock waves generated by meteoroids impacting the Earth's atmosphere: An up-to-date state of knowledge in the field*, European Planetary Science Congress 2018, Berlin, Germany, September 16 – 21, 2018, abstract #585.
- Gritsevich, M., **Silber, E. A.** (2018) *Insights into impact-classification scheme based on the fireball analysis*, European Planetary Science Congress 2018, Berlin, Germany, September 16 – 21, 2018.
- **Silber, E. A.**, Gritsevich, M., Silber, R. E., Butka, P. (2018) *The production of nitric oxide by centimetre-sized meteoroids in the upper atmosphere*, European Planetary Science Congress 2018, Berlin, Germany, September 16 – 21, 2018, abstract #582.
- Kuznetsova, D., Gritsevich, M., **Silber, E. A.**, Christou, A. (2018) *Analytical model for determining the outcome of meteoroid entry into the Martian atmosphere*, 81st Annual Meeting of The Meteoritical Society, Moscow, Russia, July 22-27, 2018, abstract #6198.
- Gritsevich, M., **Silber, E. A.** (2018) *Insights into impact-classification scheme based on the fireball analysis*, 81st Annual Meeting of The Meteoritical Society, Moscow, Russia, July 22-27, 2018, abstract #6121.
- **Silber, E. A.**, Gritsevich, M., Silber, R. E. (2018) *Nitric oxide production by centimeter-sized meteoroids impacting the Earth's atmosphere*, 81st Annual Meeting of The Meteoritical Society, Moscow, Russia, July 22-27, 2018, abstract #6183.
- **Silber, E. A.**, Gritsevich, M., Boslough, M., Hocking, W. K., Whitaker, R. (2018) *Shock waves generated by meteoroids impacting the Earth's atmosphere: A comprehensive review*, 81st Annual Meeting of The Meteoritical Society, Moscow, Russia, July 22-27, 2018, abstract #6186.
- **Silber, E. A.** (2018) *Impact craters and meteor generated shock waves: A journey from Europa to Earth*, CalTech (invited seminar)
- **Silber, E. A.**, Johnson, B. C. (2018) *Formation of multiring basins on Europa*, LPSC 49, held March 19–23, 2018, The Woodlands, TX, USA, LPI Contrib. No. 2083, abstract #1349
- Hildebrand, A. R., Hanton, L. T. J., Ciceri, F., Nowell, R., Lyytinen, E., **Silber, E. A.**, Brown, P. G., Gi, N., Jenniskens, P. M. M., Albers, J., Hladiuk, D. (2018) *Characteristics of a well recorded, bright, meteorite-dropping fireball, British Columbia, Canada, September 4, 2017*, LPSC 49, held March 19–23, 2018, The Woodlands, TX, USA, LPI Contrib. No. 2083, abstract #3006
- **Silber, E. A.**, Zanetti, M, Osinski, G. R., Johnson, B. C., Grieve, R. A. F. (2018) *A combined modeling and observational study of the effect of impact velocity on production of melt in simple-to-complex lunar craters*, LPSC 49, held March 19–23, 2018, The Woodlands, TX, USA, LPI Contrib. No. 2083, abstract #1401
- Osinski, G. R., **Silber, E. A.**, Clayton, J, Grieve, R. A. F., Hansen, K., Johnson, C. L., Kalynn, J., Tornabene, L. L. (2018) *Lunar transitional impact craters: Insight into the effect of target lithology on the impact cratering process*, LPSC 49, held March 19–23, 2018, The Woodlands, TX, USA, LPI Contrib. No. 2083, abstract #1734
- Bjonnes, E. E., Johnson, B. C., **Silber, E. A.** (2018) *Formation of impact craters on Ganymede and Callisto as a constraint on ice shell structure*, LPSC 49, held March 19–23, 2018, The Woodlands, TX, USA, LPI Contrib. No. 2083, abstract #1548

- Wiggins, S., Johnson, B. C., **Silber, E. A.** (2018) *Impact generated porosity at depth within the lunar crust*, LPSC 49, held March 19–23, 2018, The Woodlands, TX, USA, LPI Contrib. No. 2083, abstract #2157
- Moreno-Ibáñez, M., **Silber, E. A.**, Gritsevich, M., Trigo-Rodriguez, J. M. (2018) *Flight flow regimes of meteoroids determined from infrasound detection*, LPSC 49, held March 19–23, 2018, The Woodlands, TX, USA, LPI Contrib. No. 2083, abstract #2327
- **Silber, E. A.**, Johnson, B. C. (2017) *Numerical modeling the formation of impact craters: Implications for the structure of Europa's ice shell*, AGU Fall Meeting, 11-15 December, 2017, New Orleans, USA, abstract #225885
- **Silber, E. A.** (2017) *History and development of infrasound monitoring: The intertwined world of civilian and military applications*, Defence Research and Development Canada, Dartmouth, NS (invited talk)
- **Silber, E. A.** (2017) *Deciphering the structure of Europa's ice shell through numerical modeling of the formation of impact craters*, Brown University (invited talk)
- **Silber, E. A.**, Silber, R. E. and Hocking, W. K. (2017) *Shock waves generated by overdense meteors in the mesosphere lower thermosphere*, International Meteor Conference, Petnica, Serbia, 21-24 September, 2017
- Gritsevich, M., Kero, J., **Silber, E. A.**, Silber, R.E., Penttilä, A., Nakamura, T., Muinonen, K. (2017) *Challenges in interpreting meteor detections based on middle and upper atmosphere radar measurements*, Finnish URSI Convention on Radio Science, 7-8 September, 2017, Helsinki, Finland
- Silber, R. E., Hocking, W. K., **Silber, E. A.**, Gritsevich, M., Niculescu, M. L. (2017) *Detection and Characterization of Meteor Shockwaves Using Radar Observed Meteor Head Echo/Height Correlation*, 32nd URSI GASS, 19-26 August 2017, Montreal, Quebec, Canada
- **Silber, E. A.**, Johnson, B. C. (2017) *The structure of Europa's ice shell: Insights from numerical modeling*, The 80th Annual Meeting of the Meteoritical Society, 23-28 July, 2017, Santa Fe, New Mexico, USA, abstract #6148, LPI Contrib. No. 1987
- Silber, R. E., **Silber, E. A.**, Gritsevich, M. (2017), *On detection of shockwaves generated by overdense meteors*, The 80th Annual Meeting of the Meteoritical Society, 23-28 July, 2017, Santa Fe, New Mexico, USA, abstract #6256
- Silber, R. E., **Silber, E. A.**, Gritsevich, M., Niculescu, M. L., Hocking, W. K. (2017), *On the mechanism of early rapid removal of electrons from postadiabatically expanding overdense meteor trains*, The 80th Annual Meeting of the Meteoritical Society, 23-28 July, 2017, Santa Fe, New Mexico, USA, abstract # 6317
- Moreno-Ibáñez, M., Gritsevich, M., Lyytinen, E., **Silber, E. A.**, Silber, R. E., Trigo-Rodríguez, J. M. (2017) *Revised masses for the Canadian meteor network fireballs*, The 80th Annual Meeting of the Meteoritical Society, 23-28 July, 2017, Santa Fe, New Mexico, USA, abstract # 6318
- Wiggins, S. E., Johnson, B. C., **Silber, E. A.**, Bowling, T. J., Melosh, H. J., Collins, G. (2017) *Impact fragmentation: Development of megaregolith and porosity*, Origins of Solar Systems, Gordon Research Conference, 18 – 23 June, 2017, South Hadley, MA, US
- Hocking, W.K., Silber, R. E., **Silber, E. A.** (2017) *Impact of Ozone and Oxygen on Early Stage Decay of Transitionally- and Overdense Meteor Trails*, The 15th International Workshop on Technical and Scientific Aspects of MST Radar and the 18th EISCAT International Symposium


(MST15/iMST2/EISCAT18), held in The National Institute of Polar Research (NIPR), May 26-31, 2017, Tachikawa, Tokyo, Japan, paper #M7-8

- Galiazzo, M. A., **Silber, E. A.**, Dvorak, R., Aljbaae, S. (2017) *Possible impacts with Centaurs!*, Impacts in planetary systems, Lund Observatory, Sweden, 15 – 17 May, 2017
- Silber, R. E., Hocking, W. K., **Silber, E. A.**, Gritsevich, M. (2017) *On the Possibility of Constraining Bright Meteor Shock Wave Forming Altitudes – Theoretical Consideration of Relationship to Radar Observed Meteor Head Echo Termination Heights in MLT*, CAP Congress, May 28 - June 2, 2017, Kingston, ON, Canada, abstract #1578
- **Silber, E. A.**, Johnson, B. C. (2017) *Impact craters and the structure of Europa's ice shell*, LPSC 48, held March 20–24, 2017, The Woodlands, TX, USA, abstract 1277
- **Silber, E. A.**, Osinski, G. R., Johnson, B. C., Grieve, R. A. F. (2017) *Numerical Modelling of the Effect of Impactor Size and Velocity on Morphological Diversity of Simple-to-Complex Lunar Craters*, LPSC 48, held March 20–24, 2017, The Woodlands, TX, USA, abstract 1027
- Gritsevich, M., **Silber, E. A.**, Lyytinen, E., Moreno-Ibáñez, M., Trigo-Rodríguez, J. M., Muinonen, K., Penttila, A., Silber, R. E. (2017) *A New Approach to Estimate Meteoroid Impact Hazard Based on Atmospheric Trajectory Analysis*, LPSC 48, held March 20–24, 2017, The Woodlands, TX, USA, abstract 2471
- Wiggins, S. E., Johnson, B. C., **Silber, E. A.**, Bowling, T. J., Melosh, H. J. (2017) *Impact Fragmentation and Development of the Lunar Regolith*, LPSC 48, held March 20–24, 2017, The Woodlands, TX, USA, abstract 1295
- Silber, R. E., Hocking, W. K., **Silber, E. A.**, Gritsevich, M. (2017) *On the Possibility of Constraining Bright Meteor Shock Wave Forming Altitudes – Theoretical Consideration of Relationship to Radar Observed Meteor Head Echo/Height Termination Heights in MLT*, CAP Congress, Kingston, ON, May 28 - June 2, 2017, abstract #1578
- Silber, R. E., Hocking, W. K., **Silber, E. A.**, Gritsevich, M., Niculescu, M. L. (2017) *Detection and Characterization of Meteor Shockwaves Using Radar Observed Meteor Head Echo/Height Correlation*, 32nd URSI GASS, Montreal, 19-26 August 2017
- Silber, E. A., Osinski, G. R., Johnson, B. C., Grieve, R. A. F. (2017) *The Effect of Projectile Properties on Transitional Impact Crater Morphologies and Melt*, Fallona Interdisciplinary Showcase, Western University, held January 16, 2017
- Gritsevich, M., **Silber, E. A.**, Lyytinen, E., Moreno-Ibanez, M., Trigo-Rodriguez, J. M., Muinonen, K. (2016) *Meteoroid Impact Hazard based on Atmospheric Trajectory Analysis*, AGU Fall Meeting, 12-16 December, 2016, San Francisco, CA, USA, abstract P43B-2104
- **Silber, E. A.** (2016) *Fire in the sky: Lessons learned from recent bolide impacts*, Brown University (invited talk)
- **Silber, E. A.**, Osinski, G. R., Grieve, R. A. F. (2016) *The Effect of Impactor Properties on Lunar Transitional Crater Morphologies and Melt*, 79th Annual Meeting of the Meteoritical Society, held August 7 - 12, 2016 in Berlin, Germany, abstract # 6490
- Osinski, G. R., Francis, R., Haltigin, T., Kerrigan, M. C., Pontefract, A., **Silber, E. A.**, Tornebene, L. L. (2016) *Overview of the 2015 CanMars Mars Sample Return Analogue Mission*, 47th Lunar and Planetary Science Conference, held March 21-25, 2016 at The Woodlands, Texas. LPI Contribution No. 1903, p.2616

- Galiazzo, M. A., **Silber, E. A.**, Bancelin, D., Wiegert, P., Osinski, G. R. (2016) *V-Type NEAs: Orbital Dynamics and Collisional Interactions with Terrestrial Planets*, 47th Lunar and Planetary Science Conference, held March 21-25, 2016 at The Woodlands, Texas. LPI Contribution No. 1903, p.1393
- **Silber, E. A.**, Osinski, G. R., Grieve, R. A. F. (2016) *Differences in Transitional Crater Morphologies as a Function of Impactor Properties*, 47th Lunar and Planetary Science Conference, held March 21-25, 2016 at The Woodlands, Texas. LPI Contribution No. 1903, p.1086
- **Silber, E. A.**, Osinski, G. R., Francis, R., Cross, M. D. G., Pritchard, I. M. (2016) *2015 CanMars MSR Analogue Mission: An Overview of the Mission Control Tactical Team*, 47th Lunar and Planetary Science Conference, held March 21-25, 2016 at The Woodlands, Texas. LPI Contribution No. 1903, p.1083
- Hopkins, R. T., Collins, G. S., Osinski, G. R., **Silber, E. A.** (2015) Modelling the Effect of Material Anisotropy on Impacts into Layered Targets, *Fallona Family Interdisciplinary Showcase*, Western University, Dec 8, 2015
- **Silber, E. A.**, Osinski, G. R. (2015) Hydrocode Modelling of Impact Processes, *Fallona Family Interdisciplinary Showcase*, Western University, Dec 8, 2015
- Galiazzo, M. A., **Silber, E. A.**, Bancelin, D., Wiegert, D., Osinski, G. R. (2015) V-Type NEAs: Orbital Dynamics and Collisional Interactions with Terrestrial Planets, *Fallona Family Interdisciplinary Showcase*, Western University, Dec 8, 2015
- Galiazzo, M. A., **Silber, E. A.**, Bancelin, D., Wiegert, D., Osinski, G. R. (2015) V-Type NEAs: Impacts and Close Encounters with Terrestrial Planets, *COSPAR Symposium*, Foz do Iguacu, Brazil, Nov 9 - 13, 2015
- **Silber, E. A.**, Osinski, G. R. (2015) The Role of Damage and Porosity on Crater Size: Insights from Modeling Lunar Impacts *Bridging the Gap III: Impact Cratering in Nature, Experiments, and Modeling*, Freiburg, Germany, Sep 21-23, 2015, LPI contribution # 1861, p. 1023
- Galiazzo, M. A., **Silber, E. A.**, Bancelin, D., Wiegert, D., Osinski, G. R. (2015) V-Type NEAs: Impacts and Close Encounters with Terrestrial Planets, *Bridging the Gap III: Impact Cratering in Nature, Experiments, and Modeling*, Freiburg, Germany, Sep 21-23, 2015, LPI contribution # 1861, p. 1024
- Hopkins, R. T., Collins, G. S., Osinski, G. R., **Silber, E. A.** (2015) Modelling the Effect of Material Anisotropy on Impacts into Layered Targets, *Bridging the Gap III: Impact Cratering in Nature, Experiments, and Modeling*, Freiburg, Germany, Sep 21-23, 2015, LPI contribution # 1861, p. 1092
- **Silber, E. A.** (2015) Modelling Lunar Impact Craters, *CREATE Annual Meeting*, Queens University, Kingston, Ontario, June 7, 2015
- Brown, P.G., Dube, K., **Silber, E.** (2014) *Detecting NEO Impacts using the International Monitoring System*, 46th DPS Meeting, Tuscon, Arizona, November 9-14, 2014
- **Silber, E. A.** (2014) *Meteors as analogues to high altitude explosive sources in the atmosphere: signal identification and phenomenology*, Infrasound Technology Workshop 2014, Vienna, Austria, October 13-16, 2014
- **Silber, E. A.** (2014) *Weak shock theory and validation using experimental observations of meteor generated infrasound*, Infrasound Technology Workshop 2014, Vienna, Austria, October 13-16, 2014

- **Silber, E. A.** and Brown, P. G. (2013) *Simultaneous Infrasonic and Optical observations of bright meteors: analysis of acoustic source heights and signal classification*, Meteoroids 2013 Conference, Poznan, Poland, Aug 26 – 30, 2013
- **Silber, E. A.** (2013) *Infrasound as a scientific tool to study meteors*, International Meteor Conference (IMC 2013), Poznan, Poland, Aug 22 – 25, 2013, Keynote Lecture
- **Silber, E. A.** and Brown, P. G. (2013) *Model validation of explosive atmospheric sources*, S&T 2013, Vienna, Austria, Jun 17 – 24, 2013
- **Silber, E. A.** (2013) *Infrasound as a scientific tool: from geopolitics to meteors*, Dalhousie University, Halifax, Invited Lecture
- Brown, P. and **Silber, E. A.** (2013) *The Sutter's Mill Meteorite: Fall and Recovery*, CPSX Research Forum, Western University, January, 2013
- Brown, P., Ens, T., Edwards, W., **Silber, E. A.** (2012) *Global Detection of Airbursts: A Combined Satellite-Infrasound Study*, 43rd Lunar and Planetary Science Conference, held March 19–23, 2012 at The Woodlands, Texas. LPI Contribution No. 1659, id.1581
- **Silber, E. A.** (2012) *Silent Sound: Infrasound Demystified*, Society of Graduate Students 25th Annual Western Research Forum, Western University, London, ON, March 26-27, 2012
- Popova, O., **Silber, E. A.**, Rybnov, Y. (2011) *The detection of a superbolide over Tajikistan (July 23, 2008)*, Physics of Surrounding Environments Conference, held in Tomsk, Russia, June 27 – July 1, 2011
- **Silber, E. A.**, Le Pichon, A., Brown, P. (2011) *Infrasonic detection and analysis of the Oct 8, 2009 Bolide over Indonesia*, CASCA Conference, held in London, Ontario, May 30 – June 2, 2011
- **Silber, E. A.**, Le Pichon, A., Brown, P. (2010) *Infrasonic detection and analysis of the Oct 8, 2009 Bolide over Indonesia*, Infrasonic Technology Workshop (ITW) 2010, Tunis, Tunisia
- **Silber, E. A.**, Brown, P. G., McCausland, P. J., Fries, M., Edwards, W.N., Wong, D. K., Weryk, R. J., Fries J. and Krzeminski, Z. (2010) *Infrasonic Observations of the Grimsby Meteorite Fall*, Infrasonic Technology Workshop (ITW) 2010, Tunis, Tunisia
- **Silber, E. A.**, Le Pichon, A., Brown, P. (2010) *Infrasonic detection and analysis of the Oct 8, 2009 superbolide near Indonesia*, Conference Proceedings, CAP Congress 2010, Toronto, ON, Canada, June 6-11, 2010
- **Silber, E. A.**, Le Pichon, A., Brown, P. (2010) *Infrasonic detection and analysis of the Oct 8, 2009 superbolide near Indonesia*, Conference Proceedings, Meteoroids 2010, Breckenridge, CO, May 24-28, 2010
- **Silber, E.A.**, ReVelle, D. O., Brown, P. (2010) *Development and testing of a weak shock model of infrasonic propagation using regional observations of meteors*, Meteoroids 2010, Breckenridge, CO, May 24-28, 2010
- **Silber, E. A.** (2010) *Cratering Processes in the Solar System*, Invited Talk, AB Lucas Secondary School, London, Ontario
- **Silber, E. A.** (2009) *Infrasonic Observations of Meteors and Weak Shock Theory*, Graduate Research Symposium, Western University
- Revelle, D. O., **Silber, E.A.**, Brown, P.G., Edwards, W.N. (2008) *An Estimate of the Terrestrial Influx of Large Meteoroids from Infrasonic Measurements*, Infrasound Technical Workshop Proceedings, Bermuda, USA

- **Silber, E.A.**, ReVelle, D.O., Brown, P.G., Edwards, W.N. (2008) *An Estimate of the Terrestrial Influx of Large Meteoroids from Infrasonic Measurements*, Meteor Group Seminar, Western University
- **Silber, E.A.** (2007) *The Hayabusa Mission*, The Undergraduate Physics Conference, Western University, Oral Presentation
- ReVelle, D.O., **Silber, E.A.**, Edwards, W.N., Brown, P.G. (2007), *Reanalysis of the historic AFTAC bolide infrasound database*, Meteoroids 2007 Conference Proceedings, Barcelona, Spain
- **Silber, E.A.**, Brown, P., ReVelle, D. (2006), *Re-analysis of archival AFTAC bolide signals: Refinement of the flux of NEO's impacting the Earth*, Natural Resources Canada
- **Silber, E.A.**, Brown, P.G., Edwards, W.N. (2006), *The history of rocket infrasound*, Department of Foreign Affairs and International Trade
- **Silber, E.A.** (2005), *Nikola Tesla: The genius who lit the world*, The Undergraduate Physics Conference, Western University

 orcid.org/0000-0003-4778-1409

 <http://ca.linkedin.com/in/esilber>