Sarah Greenstreet

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EDUCATION

Ph.D., Astronomy, University of British Columbia, 2015
M.S., Astronomy, University of British Columbia, 2011
B.S., Physics, Western Washington University, 2007

PROFESSIONAL APPOINTMENTS

University of Washington, Astronomy Department, Research Scientist, 2020 – present

B612 Asteroid Institute, Senior Researcher, 2017 – 2021
University of Washington, Astronomy Department, Postdoctoral Scholar, 2017 - 2020
Las Cumbres Observatory, Postdoctoral Fellow, 2015 - 2017
University of California, Santa Barbara, Physics Department, Postdoctoral Scholar, 2015 – 2017

REFEREED PUBLICATIONS

Published Journal Papers:

2022 Berres, A., **Greenstreet, S.**, et al., Orb_It: A Validation Packages for Orbit Integrators, *RNAAS*, 6, 174.

2022 Lister, T., et al. (including **Greenstreet, S.**), The LCO Outbursting Objects Key Project: Overview and Year 1 Status, 2022, *The Planetary Science Journal*, 3, 173.

2022 Kelley, M. S. P., et al. (including **Greenstreet, S.**), A LOOK at outbursts of comet C/2014 UN_{271} (Bernardinelli-Bernstein) near 20 au, 2022, *The Astrophysical Journal Letters*, 933, L44.

2022 Lee, H.-J., et al. (including **Greenstreet, S.**), Refinement of the convex shape model and tumbling spin state of (99942) Apophis using the 2020-2021 apparition data, 2022, *Astrononmy & Astrophysics*, 661, L3.

2021 Mao, X., McKinnon, W. B., Singer, K. N., Keane, J. T., Beyer, R. A., **Greenstreet, S.**, et al., Collisions of Small Kuiper Belt Objects with (486958) Arrokoth: Implications for Its Spin Evolution and Bulk Density, 2021, *Journal of Geophysical Research: Planets*, 126, 12, e06961.

2021 Hsieh, H. H., et al. (including **Greenstreet, S.**), Physical Characterization of Main-belt Comet (248370) 2005 QN173, 2021, *The Astrophysical Journal Letters*, 922, L9-L18.

2021 Alexandersen, M., **Greenstreet, S.**, et al., OSSOS. XXIII. 2013 VZ70 and the Temporary Co-orbitals of the Giant Planets, 2021, *The Planetary Science Journal*, 2, 5, 212-222.

2021 Lister, T., Gomez, E., Chatelain, J., **Greenstreet, S.**, et al., NEOExchange – an online portal for NEO and Solar System Science, 2021, *Icarus*, 364, 114387.

2021 Abedin, A., Kavelaars, J. J., **Greenstreet, S.**, et al., OSSOS. XXI. Collision Probabilities in the Edgeworth-Kuiper Belt, 2021, *The Astronomical Journal*, 161, 195.

2020 **Greenstreet, S.**, Gladman, B., Ngo, H., Transient Jupiter Co-orbitals from Solar System Sources, 2020, *The Astronomical Journal*, 160:144.

2020 **Greenstreet, S.**, Lu, E., Loucks, M., Carrico, J., Kichkaylo, T., Juric, M., Required deflection impulses as a function of time before impact for Earth-impacting asteroids, 2020, *Icarus*, 347, 113792.

2020 **Greenstreet, S.**, Orbital Dynamics of 2020 AV2: the First Vatira Asteroid, 2020, *Monthly Notices of the Royal Astronomical Society*, 493, L129-L131.

2019 Chen, Y.-T., et al. (including **Greenstreet, S.**), OSSOS. XVIII. Constraining Migration Models with the 2:1 Resonance using the Outer Solar System Origins Survey, 2019, *The Astronomical Journal*, 158, 214-230.

2019 Singer, K. N., McKinnon, W. B., Gladman, B., **Greenstreet, S.**, et al., Impact Craters on Pluto and Charon Indicate A Deficit of Small Kuiper Belt Objects, 2019, *Science*, 363, 6430, 955-959.

2019 **Greenstreet, S.**, Farnocchia, D., Lister, T., Measuring the Yarkovsky Effect with Las Cumbres Observatory, 2019, *Icarus*, 321, 564-571.

2019 **Greenstreet, S.**, Gladman, B., McKinnon, W. B., Kavelaars, J. J., Singer, K. N., Crater Density Predictions for New Horizons flyby target 2014 MU69, 2019, *The Astrophysical Journal Letters*, 872, L5-L10.

2018 Frantseva, K., et al. (including **Greenstreet, S.**), Delivery of Organics to Mars through Asteroid and Comet Impacts, 2018, *Icarus*, 309, 125-133.

2018 Volk, K., et al. (including **Greenstreet, S.**), OSSOS. IX. Two Objects in Neptune's 9:1 Resonance – Implications for resonance sticking in the scattering population, 2018, *The Astronomical Journal*, 155, 260.

2018 Bannister, M., et al. (including **Greenstreet, S.**), OSSOS. VII. 800+ Trans-Neptunian Objects – The Complete Data Release, 2018, *The Astrophysical Journal Supplement Series*, 236, 18-36.

2016 **Greenstreet, S.**, Gladman, B., McKinnon, W. B., Corrigendum to: Impact and Cratering Rates onto Pluto, 2015, *Icarus*, 274, 366-367.

2015 **Greenstreet, S.**, Gladman, B., McKinnon, W. B., Impact and Cratering Rates onto Pluto, 2015, *Icarus*, 258, 267-288.

2015 Lawler, S., **Greenstreet, S.**, Gladman, B., Fomalhaut B as a Dust Cloud: Frequent Collisions within the Fomalhaut Disk, 2015, *The Astrophysical Journal Letters*, 802, L20-L24.

2013 Alexandersen, M., Gladman, B., **Greenstreet, S.**, et al., A Uranian Trojan and the Frequency of Temporary Giant-Planet Co-Orbitals, 2013, *Science*, 341, 6149, 994-997.

2013 **Greenstreet, S.**, Gladman, B., High-inclination Atens are indeed rare, 2013, *The Astrophysical Journal Letters*, 767, L18-L22.

2012 **Greenstreet, S.**, Gladman, B., Ngo, H., Granvik, M., Larson, S., Production of near-Earth asteroids on retrograde orbits, 2012, *The Astrophysical Journal Letters*, 749, L39-L43.

2012 **Greenstreet, S.**, Ngo, H., Gladman, B., The orbital distribution of near-Earth objects inside Earth's orbit, 2012, *Icarus*, 217, 355-366.

Book Chapters:

2021 Singer, K., **Greenstreet, S.**, Schenk, P. M., Robbins, S. J., and Bray, V. J. (2021). Pluto and Charon craters and terrain age estimates, in *The Pluto system*. edited by S. A. Stern, L. A. Young, J. M. Moore, W. M. Grundy, and R. P. Binzel, University of Arizona Press, Tucson.

Magazine Articles:

2021 **Greenstreet, S.**, Asteroids in the Inner Solar System, 2021, *Physics Today*, 74, 7, 42.

Papers in Progress:

2022 Schwamb, M., et al. (including **Greenstreet, S.**), Tuning the Legacy Survey of Space and Time (LSST) Observing Strategy for Solar System Science, *ApJS*

NON-REFEREED PUBLICATIONS

2021 Schwamb, M., Juric, M., Bolin, B. T., Dones, L., **Greenstreet, S.**, et al., Year 1 of the Legacy Survey of Space and Time (LSST): Recommendations for Template Production to Enable Solar System Small Body Transient and Time Domain Science, 2021, *Research Notes of the AAS*, 5, 6, 143.

2021 Mainzer, A., et al. (including **Greenstreet, S.**), The Future of Planetary Defense in the Era of Advanced Surveys, 2021, *Planetary Science and Astrobiology Decadal Survey 2023-2032*, 53, 4, 259.

2021 Vera C. Rubin Observatory LSST Solar System Science Collaboration, et al. (including **Greenstreet, S.**), The Scientific Impact of the Vera C. Rubin Observatory's Legacy Survey of Space and Time (LSST) for Solar System Science, 2021, *Planetary Science and Astrobiology Decadal Survey 2023-2032*, 53, 4, 236.

2021 Schenk, Paul, et al. (including **Greenstreet, S.**), The Chronology Problem in the Outer Solar System: Constraining the "WHEN" of Major Dynamical and Geological Events, 2021, *Planetary Science and Astrobiology Decadal Survey 2023-2032*, 53, 4, 147.

Conference Participation:

2021 **Greenstreet, S.**, Lu, E., Juric, M., Moeyens, J., "The Asteroid Discovery, Analysis, and Mapping (ADAM) platform iPoster presented at the Division of Planetary Sciences Conference (virtual)

2020 **Greenstreet, S.**, Gladman, B., "Centaurs and Jovian Co-orbitals with High Inclinations" poster presented at the Division of Planetary Sciences Conference (virtual)

2019 **Greenstreet, S.,** Loucks, M., Carrico, J., Lu, E., Kichkaylo, T., "Required deflection impulses as a function of time before impact for Earth-impacting asteroids" poster presented at the Planetary Defense Conference in College Park, MD

2019 **Greenstreet, S.,** Loucks, M., Carrico, J., Lu, E., Kichkaylo, T., "Required deflection impulses as a function of time before impact for Earth-impacting asteroids" iPoster presented at the American Astronomical Society Meeting in Seattle, WA

2018 **Greenstreet, S.,** Ngo, H., Gladman, B., "Near-Earth Asteroids on Retrograde Orbits" talk presented at the NWxSW Astronomy Meeting in Vancouver, B. C., Canada

2018 **Greenstreet, S.,** Ngo, H., Gladman, B., "A main-belt source for retrograde jovian co-orbital asteroids" talk presented at the Division of Planetary Sciences Conference in Knoxville, TN

2017 **Greenstreet, S.**, Seale, S., Rivera, J., Skinner, R., "Las Cumbres Observatory Partners with Local Museums in "Experience the Eclipse" Community Program", poster presented at the Division of Planetary Sciences Conference in Provo, UT

2017 **Greenstreet, S.**, Farnocchia, D., Lister, T., "Measuring the Yarkovsky effect with Las Cumbres Observatory" poster presented at the Division of Planetary Sciences Conference in Provo, UT

2016 **Greenstreet, S.**, Lister, T., Gomez, “Preparing for LSST with the LCO NEO Follow-up Network” talk presented at the Division of Planetary Sciences Conference in Pasadena, CA

2016 **Greenstreet, S.**, Lister, T., Gomez, “Preparing for LSST with the LCO NEO Follow-up Network” talk presented at the Hotwiring the Transient Universe V Conference in Philadelphia, PA

2015 **Greenstreet, S.**, Lister, T., Gomez, E., Christensen, E., Larson, S., “Results from the LCOGT Near-Earth Object Follow-up Network” poster presented at the Division of Planetary Sciences Conference in National Harbor, MD

2014 **Greenstreet, S.**, Gladman, B., McKinnon, W. B., “Impact and Cratering History of the Pluto System” talk presented at the Division of Planetary Sciences Conference in Tucson, AZ

2013 **Greenstreet, S.,** Alexandersen, M., Gladman, B., Kavelaars, J.J., Petit, J.-M., Gwyn, S., “The First Known Uranian Trojan and the Frequency of Temporary Giant-Planet Co-Orbitals” presented at the Division of Planetary Sciences Conference, Denver, CO

2012 **Greenstreet, S.**, Gladman, B., “High-Inclination Atens ARE Rare” talk presented at the Division of Planetary Sciences Conference in Reno, NV

2012 **Greenstreet, S.**, Gladman, B., Ngo, H., Granvik, M., Larson, S., “Production of Near-Earth Asteroids & High-Strength Meteoroids on Cometary (?) Retrograde Orbits” talk presented at the Asteroids, Comets, and Meteors Conference in Niigata, Japan

2011 **Greenstreet, S.**, Ngo, H., Gladman, B., Granvik, M., Larson, S., “Production of Retrograde NEAs” talk presented at the Division of Planetary Sciences Conference in Nantes, France

2010 **Greenstreet, S.**, Ngo, H., Gladman, B., “The toasty Solar System: Inside Earth's orbit” poster presented at the Division of Planetary Sciences Conference in Pasadena, CA

Conference Proceedings (non-first-author):

30 presentations at 25 conferences (Oct 2011 - Jun 2022)

Minor Planet Electronic Circulars:

548 publications (May 2011 - Jul 2021)

GRANT AWARDS & HONORS

2022 **Greenstreet, S.** & Moeyens, J. (UW graduate student), “Lowering the Barrier to Entry: Making Key Solar System Packages Easy to Install”, Preparing for Astrophysics with LSST, Heising-Simons Foundation / Las Cumbres Observatory, Grant Period: Jan 2022 – Aug 2022, Amount: $19,876, Student, Aditi Chauhan (UW postbaccalaureate student)

2022 **Greenstreet, S.** & Moeyens, J. (UW graduate student), “Lowering the Barrier for Making Discoveries with LSST: Verification and Validation for Key Solar System Orbit-fitting Software”, Preparing for Astrophysics with LSST, Heising-Simons Foundation / Las Cumbres Observatory, Grant Period: Jan 2022 – Aug 2022, Amount Requested/Received: $19,876/$23,876, Student: Aidan Berres (UW postbaccalaureate student; UIUC graduate student)

2022 **Greenstreet, S.**, Jurić, M., Gladman, B., “Searching for Transient Jovian Co-orbitals”, NASA Solar System Workings, Grant Period: 2022 – 2025, Amount: $622,866

2021 Hungaria asteroid (30535) 2001 OR_5 named “Sarahgreenstreet”

INVITED TALKS & SEMINARS

Upcoming:

2022 Washington State University, Nov 2022

2022 Johns Hopkins University Applied Physics Laboratory, Sep 2022

Recent:

2022 "Transient Solar System Objects of Interest Expected From LSST", National Optical-Infrared Astronomy Research Laboratory

2021 "Discovering Two New Asteroid Populations", University of British Columbia

2019 "Retrograde Asteroids: Going the Wrong Way Around the Sun", Portland State University

2018 "Near-Earth Asteroids on Retrograde Orbits", opening speaker NWxSW Astronomy Meeting

2016 "Small body population celestial mechanics, impacts, and observations", California Institute of Technology

2015 "Small body population celestial mechanics, impacts, and observations", Jet Propulsion Laboratory

2015 "From NEOs to Craters on Pluto: A Look at Small Body Populations in the Solar System", SWRI

2013 "Impact Hazard of Near-Earth Asteroids", Time and Life in the Universe – A Roundtable Initiative, Peter Wall Institute for Advanced Studies, University of British Columbia

2012 "Near-Earth Asteroid Population Model: Surprises in the Inner Solar System", Western Washington U.

SELECTED MEDIA COVERAGE

2022 Drake, Nadia. "Inside the hunt for mysterious 'twilight' asteroids." *National Geographic*, 28 Jul 2022; https://www.nationalgeographic.co.uk/space/2022/07/inside-the-hunt-for-mysterious-twilight-asteroids

2022 Japelj, Jure. "Galaxy Mapper Tracks Asteroids Closer to Home." *Eos (Science News by AGU)*, 14 Jul 2022; https://eos.org/articles/galaxy-mapper-tracks-asteroids-closer-to-home

2020 Day, Charles. "An asteroid whose orbit is wholly within Venus's." *Physics Today*, 16 Apr 2020; https://physicstoday.scitation.org/do/10.1063/PT.6.1.20200416a/full/

2019 Miller, Johanna L. "Craters on Pluto and Charon show that Kuiper belt collisions are rare." *Physics Today*, 72, 5, 14 (2019); doi: 10.1063/PT.3.4196; https://physicstoday.scitation.org/doi/10.1063/PT.3.4196

2019 Kohler, Susanna. "Insights from MU69's (Lack of) Craters." *AAS Nova*, 18 Feb 2019; https://aasnova.org/2019/02/18/insights-from-mu69s-lack-of-craters/

2017 Greene, Debra. "Scientists Share Astronomy with Public in Unusual Way on South Coast", KCLU, 10 Mar 2017; https://www.kclu.org/term/astronomy-tap#stream/0

2016 Byrd, Deborah. "Join Astronomers in Tracking Asteroids", *EarthSky*, 30 June 2016; https://earthsky.org/space/join-astronomers-in-tracking-asteroids/

2016 Lewis, Danny. “Track These Space Rocks From Your Couch on Asteroid Day.” *Smithsonian Magazine*, 30 June 2016; https://www.smithsonianmag.com/smart-news/help-scientists-track-space-rocks-asteroid-day

2013 U. of British Columbia. “Astronomers Discover ‘Trojan’ Asteroid Sharing the Orbit of Uranus.” *SciTech Daily*, 30 Aug 2013; https://scitechdaily.com/astronomers-discover-trojan-asteroid-sharing-orbit-uranus/

LEADERSHIP

LSST Solar System Science Collaboration (SSSC) Near-Earth Objects and Interstellar Objects Working Group Lead (October 2019 – present)

Referee for *Planetary and Space Science*, *Monthly Notices of the Royal Astronomical Society*, *New Astronomy*, *Journal of Geophysical Research-Planets*, *Geophysical Research Letters*, *Icarus*, *Planetary Science Journal*, *Celestial Mechanics and Dynamical Astronomy*, and *Universe*

LSSTC Catalyst Fellowship mentor program participant

Panelist for NASA Planetary Mission Senior Review of OSIRIS-REx (APEX) extended mission to Apophis (2022)

External referee for The Canada-France-Hawaii Telescope Large Program proposal call (2022)

Division of Planetary Sciences Meeting Session Chair

Panel reviewer, external reviewer, and executive secretary for NASA proposal review panels (2013 – 2020)

Scientific organizing committee, NWxSW Astronomy Meeting (2018)

Astronomy public talk series organizer, Las Cumbres Observatory (May 2016 – Nov 2017)

Science Seminar Chair/Organizer, Las Cumbres Observatory (Jan 2016 – Nov 2017)

Organizer for Planetary Journal Club, University of British Columbia (Fall 2012 – Summer 2015)

STUDENT PROJECTS & FUNDING

2021-2022

Student: Aidan Berres (UW postbaccalaureate student; UIUC graduate student)
Project: “Lowering the Barrier for Making Discoveries with LSST: Verification and Validation for Key Solar System Orbit-fitting Software”
Software: “Orb_It” orbit integrator end-to-end testing framework
Github: https://github.com/B612-Asteroid-Institute/orb_it
Funding: Preparing for Astrophysics with LSST program sponsored by Heising-Simons Foundation & Las Cumbres Observatory, PI: Sarah Greenstreet, Amount: $23,876
Paper: Berres, A., **Greenstreet, S.**, et al., Orb_It: A Validation Packages for Orbit Integrators, 2022, *RNAAS*, 6, 174
Conference presentation: Berres, A., Greenstreet, S., et al., “Orb_It: A Validation Packages for Orbit Integrators poster presented at the Astronomical Data Analysis Software and Systems conference (virtual), 2022.

Student: Aditi Chauhan (UW postbaccalaureate student)
Project: “Lowering the Barrier to Entry: Making Key Solar System Packages Easy to Install”
Software: sbpy, Find_Orb, and OpenOrb orbit integrators conda-forge feedstock updates
Funding: Preparing for Astrophysics with LSST program sponsored by Heising-Simons Foundation & Las Cumbres Observatory, PI: Sarah Greenstreet, Amount: $19,876

2020-2021

Student: Aidan Berres (UW postbaccalaureate student)
Software: “validate_findorb” end-to-end testing framework for orbit integrator Find_Orb
Github: https://github.com/B612-Asteroid-Institute/validate_findorb
Funding: B612 Asteroid Institute

TELESCOPE EXPERIENCE

Postdoctoral Fellow at LCO performing follow-up and characterization photometric and astrometric observations of NEO candidates and NASA ARM / NHATS / radar targets as well as astrometric measurements of candidate Yarkovsky drifters using LCO's global network of 1.0-m optical telescopes (2015 – 2017).

Greenstreet, S. et al., “Detection of the Yarkovsky effect for a selection of near-Earth asteroids.” Las Cumbres Observatory, 1.0-m telescope network, 2016B, 2017AB, 2018A, Target(s): selected NEAs for which the Yarkovsky effect may be detectable, Time requested/awarded: 120 hours (2016B), 100 hours (2017AB), 80 hours (2018A)

Greenstreet, S. et al., “Rotational properties of spacecraft target asteroid (162173) 1999 JU3.” Las Cumbres Observatory, 2.0-m Faulkes North & South, 2016A, Target(s): Hayabusa 2 sample return mission target asteroid Ryugu, Time requested/awarded: 48 hours

Co-Investigator with the Near-Earth Space Surveillance (NESS) project science team for Canada's microsatellite NEOSSat (Near-Earth Object Surveillance Satellite) (2013 – 2015).

Greenstreet, S. et al., “Tracking of NEA Discoveries from Canada’s NEOSSat Space Telescope.”, Canada-France-Hawaii Telescope, Megacam instrument, 2013B, Target(s): Follow-up of NEOSSat discoveries of Aten and Atira NEOs, Time requested/awarded: 2 hours, Ranking 1/33

Completed independent studies course taken on operating the University of British Columbia Southern Observatory (UBCSO) remote telescope on Cerro Tololo, Chile and performing photometric and astrometric observations of main-belt asteroids (2012).

Palomar Mountain Observing Run #2503, 2010 Mar 18 – 2010 Mar 20, Telescope: P200, P.I.: Bob Jacobson, Lead Observer: Brett Gladman, Primary Instrument: LFC, Target: Saturnian irregular satellite discovery and tracking.

INVITED OUTREACH TALKS

2022 “Pluto, the Kuiper belt, and a possible new planet”, New Jersey Astronomical Society, Aug 2022
YouTube video: https://www.youtube.com/watch?v=IxrMBtJFqR0

2019 “Asteroids, Orbital Dynamics, and Craters on Pluto", Woodland High School, Woodland, WA

2018 “Asteroids, Telescopes, and Craters on Pluto", Woodland High School, Woodland, WA

2017 “The Outer Solar System: Pluto and Friends”, Cosmopolitan Club, Santa Barbara, CA

2017 “We are the First Generation to Explore the Solar System”, Astronomy on Tap Santa Barbara,
YouTube video: https://www.youtube.com/watch?v=UKDK527LwzY&t=321s (5:07 – 14:18)

2016 “The Outer Solar System: Pluto and Friends”, Astronomy on Tap Santa Barbara,
YouTube video: https://www.youtube.com/watch?v=jOYCGw5HTUc (5:35 – 42:35)

2016 “The Solar System's Spare Parts: Observing Asteroids & Comets” and “The Solar System's Spare Parts: Space Rocks”, Camp Cosmos, Las Cumbres Observatory

2016 "Pluto, the Kuiper Belt, and a Possible (new) 9th Planet", Santa Barbara Astronomical Unit amateur astronomer monthly meeting

2014 "My Journey Toward Becoming an Astrophysicist", AAUW-Bellingham High School Scholars Recognition Event, SPARK Museum of Electrical Invention

2014 "Asteroids, Dinosaurs, and Telescopes...Oh My!", Henrietta Lacks Health and Bioscience HS

OUTREACH ACTIVITIES

2019	Participant in DiRAC Institute video for Asteroid Day
2016-2017	Speaker for Astronomy on Tap events
2016-2017	Organizer for astronomy public talks series, Las Cumbres Observatory
2016-2017	Volunteer for open houses, Las Cumbres Observatory
2016-2017	Volunteer for public observing events, Las Cumbres Observatory
2016-2017	Volunteer for student science nights & science fairs, Santa Barbara, CA
2016	Camp leader, speaker (2 talks), activity organizer/developer, & coding/robotics instructor at Camp Cosmos, Las Cumbres Observatory
2016	Organized/executed public asteroid tracking observing program at Las Cumbres Observatory for Asteroid Day
2014	Speaker at American Association of University Women (AAUW) event, Bellingham, WA
2014	Speaker at Henrietta Lacks High School career symposium
2006-2007	Volunteer for public observing nights at Western Washington University

SELECTED SCIENCE COMMUNICATION

2021 **Greenstreet, S.** "Asteroid named for Asteroid Institute Senior Researcher." 10 Aug 2021; https://b612foundation.org/asteroid-named-for-asteroid-institute-senior-researcher/

2019 DiRAC Institute, University of Washington (featuring, **Greenstreet, S.**). "New Era of Cosmic Discovery.", June 2019; https://vimeo.com/346915212

2018 **Greensteet, S.** "Asteroid Institute at LSST Solar System Science Collaboration." 9 Aug 2018; https://b612foundation.org/asteroid-institute-at-lsst-solar-system-science-collaboration/

2015 **Greenstreet, S.** " 'Spooky' NEO passes close to the Earth on Halloween." 30 Oct 2015; https://lco.global/news/spooky-neo-passes-close-to-the-earth-on-halloween/

2015 **Greenstreet, S.** "LCOGT monitors a close-approaching NEO." 5 Oct 2015; https://lco.global/news/lcogt-**monitors-a-close-approaching-neo/**

TEACHING EXPERIENCE

University of British Columbia

ASTR 102 – Introduction to Stars and Galaxies	(Winter 2010)
ASTR 101 – Introduction to the Solar System	(Fall 2009)

Western Washington University

PHYS 101 – Principles of Light	(Fall 2005 – Spring 2007)
PHYS 233 – Waves and Optics	(Fall 2005)
PHYS 116 – Principles of Physics II	(Spring 2005)
PHYS 115 – Principles of Physics I	(Winter 2005)
PHYS 133 – Electricity & Magnetism	(Fall 2004)

SOFTWARE DEVELOPMENT & TECHNICAL SKILLS

Programming abilities in Python, Fortran, C, Jupyter Notebooks, Google Compute Engine, MySQL, Django, & Selenium, including test-driven development

Beowulf cluster use for numerical integration (with SWIFT-RMVS4)

IRAF, Astrometrica, and Find_Orb for photometry and astrometry

GitHub version control system

OpenOrb asteroid orbit computation software

Find_Orb orbit determination software

Development of LCO's NEOExchange online observing portal manager, scheduler, and analyzer

Software Engineer for Scalable Cyberinfrastructure to support Multi-Messenger Astrophysics (SciMMA)

Development of ADAM (Asteroid Decision Analysis & Mapping) impact mitigation and analysis platform

Development of NEOSSat (Near-Earth Object Surveillance Satellite) survey simulator (in Fortran)

Development of simulator (in Python) for NEO candidate follow-up with LCO's telescope network

MEMBERSHIP IN SCHOLARLY SOCIETIES & MISSION SCIENCE TEAMS

Rubin Observatory's Legacy Survey of Space and Time (LSST) Solar System Science Collaboration (2019 – present)

Division of Planetary Sciences Full Member, American Astronomical Society (2016 – present)

Member of the Outer Solar System Origins Survey (OSSOS) science team (2016 – present)

Collaborator with the New Horizons science team (2015 – present)

Co-Investigator with the Near-Earth Space Surveillance project science team for Canada's microsatellite NEOSSat (Near-Earth Object Surveillance Satellite) (2013 – 2015)

American Astronomical Society (2010 – present)

Division of Planetary Sciences Junior Member, American Astronomical Society (2010 – 2015)