CHRISTOPHER E. PARRISH, PhD, CP, CMS

Professor
Oregon State University
School of Civil and Construction Engineering

Education

2007	Ph.D., Civil and Environmental Engineering/Geospatial Information Engineering University of Wisconsin, Madison, Wisconsin Advisor: Frank Scarpace
2003	M.S., Civil and Coastal Engineering/Geomatics University of Florida, Gainesville, Florida
1993	B.S., Physics, *cum laude* Bates College, Lewiston, Maine

Professional Experience

Sept 2022 - present	Professor School of Civil and Construction Engineering Oregon State University
Sept 2023 – present	Director Geospatial Center for the Arctic and Pacific (GCAP)
Sept 2022 - present	Jim and Billie Plasker Faculty Scholar in Geomatics
Sept 2014 – Sept 2022	Associate Professor School of Civil and Construction Engineering Oregon State University
Sept 2017 - Sept 2019	Eric H.I. and Janice Hoffman Faculty Scholar School of Civil and Construction Engineering Oregon State University
Sept 2011 - present	Affiliate Professor Earth Sciences and Ocean Engineering University of New Hampshire, Center for Coastal and Ocean Mapping/Joint Hydrographic Center
Oct. 2009 - Sept. 2014	Lead Physical Scientist

	NGS Project Manager for Integrated Ocean and Coastal Mapping (IOCM); Lead Remote Sensing Scientist in NGS/RSD National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce, National Geodetic Survey, Remote Sensing Division, Silver Spring, Maryland
Oct. 2000 - Sept. 2009	Physical Scientist PI in remote sensing research team; NOS Remote Sensing Workgroup National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce, National Geodetic Survey, Remote Sensing Division, Silver Spring, Maryland
Oct. 1997 - Sept. 2000	Geodetic Operations & Liaison Officer, Lieutenant (junior grade) - Lieutenant, NOAA Commissioned Corps Field Party Chief of NGS geodetic control and airport obstruction surveys Norfolk, Virginia
April, 1994 - Oct. 1997	Junior Officer, Ensign - Lieutenant (junior grade), NOAA Ship *WHITING* Officer in Charge of hydrographic surveys, Vertical Control Officer, Senior Watch Officer

Teaching, Advising, and Other Assignments

Instructional Summary

Credit Courses

Number	Course Title	Term/Year	Credits	Enrollment
ESCI 7/896, OE 7/895 (UNH)	Coastal Remote Sensing	Spring 2012	3	7
ESCI 7/896, OE 7/895 (UNH)	Coastal Remote Sensing	Spring 2014	3	15
CE505 (now CE661)	Kinematic Positioning & Navigation	Winter 2015	3	9
CEM263	Plane Surveying	Spring 2015	3	64
CE505 (now CE661)	Kinematic Positioning & Navigation	Fall 2015	3	9

CE505 (now CE567	Coastal Remote Sensing	Winter 2016	3	8
CEM263	Plane Surveying	Spring 2016	3	45
CE361	Surveying Theory	Fall 2016	4	49
CE560 (now CE567)	Coastal Remote Sensing	Winter 2017	3	22
CE507	Geomatics Seminar	Spring 2017	1	7
CEM263	Plane Surveying	Spring 2017	3	99
CE361	Surveying Theory	Fall 2017	4	54
CE661	Kinematic Positioning & Navigation	Winter 2018	3	13
CEM263	Plane Surveying	Spring 2018	3	101
CE361	Surveying Theory	Fall 2018	4	52
CE567	Coastal Remote Sensing	Winter 2019	4	13
CE560	Hydrographic Surveying	Spring 2019	3	12
CE361	Surveying Theory	Fall 2019	4	72
CE 461/561	Photogrammetry	Winter 2020	3	13
CE 461/561	Photogrammetry	Winter 2021	3	11
CE 507	Geomatics Seminar	Spring 2021	1	12
CE 361	Surveying Theory	Fall 2021	4	79
CE 561	Photogrammetry	Winter 2022	3	13
CE 567	Coastal Remote Sensing	Spring 2022	4	12
CE 507	Geomatics Seminar	Spring 2022	1	11
CE 361	Surveying Theory	Fall 2022	4	57
CE 561	Photogrammetry	Winter 2023	3	13
CE 361	Surveying Theory	Fall 2023	3	60
CE 561	Photogrammetry (co-taught with Matt Sharr)	Winter 2024	3	9
CCE561	Hydrographic Surveying (co-taught with Matt Sharr)	Spring 2024	3	16

Non-Credit Courses and Workshops

"Topobathymetric Lidar Workshop," Feb 11, 2024. C. Parrish and A. Nayeghandi. Two-hour workshop at GeoWeek/ASPRS Annual Conference.

"Topobathymetric Lidar Workshop," Feb 13, 2023. Nayeghandi, A., and C. Parrish. Three-hour workshop at GeoWeek/ASPRS Annual Conference.

"Airborne Topobathy Lidar - Principles and Applications," Feb 6, 2022. Nayeghandi, A., N. Kules, and C. Parrish. Three-hour workshop at ASPRS Annual Conference.

"Advanced Bathymetric Lidar Workshop," December 10-11, 2019. Two-day workshop for NOAA personnel focused on bathymetric lidar theory, operations, data processing and analysis, QA/QC, total propagated uncertainty (TPU), and applications.

"Lidar technology for surveying and mapping," March 2015. OSU Geomatics Workshop Series. 7 hrs. Co-taught with Michael Olsen.

"Lidar 101," ASPRS GeoTech 2012 Workshop. One-day workshop, including the following topics: topographic and bathymetric lidar principles, fundamentals of operation, terminology, workflows, and applications.

"A Do-It-Yourself Approach to Lidar and Imagery Processing and Analysis Using Open-Source Tools," ASPRS Annual Conference Workshop, March 9, 2009, and April 27, 2010. One-day workshop providing lectures and hands-on instruction in using open-source, customizable tools to process and analyze publicly-available lidar data and imagery.

"Lidar Theory and Concepts – Short Course," NOAA/NGS, June 2004. Five-day training course, including lectures and homework exercises; originally provided to visiting international scientists and later incorporated into NOAA lidar training modules.

Course and Curriculum Development

Developed Hydrographic Surveying Course: This 3-credit, graduate-level course covers the fundamentals of hydrographic surveys performed to measure the depth and bottom configuration of water bodies in support of nautical charting and other areas of marine geomatics. Topics covered in the course include underwater acoustics, the sonar equation, sound velocity, transducers and arrays, sonar systems (e.g., single-beam, multibeam, side scan sonar), water levels and tidal datums, positioning and motion sensing for hydrographic surveying, and bathymetric lidar, as well as applications of hydrographic surveying. The class includes a final project, in which students plan and conduct a survey with a single-beam echosounder, process the data, and generate a bathymetric DTM and other deliverables.

Developed Kinematic Positioning & Navigation Course: This 3-credit, graduate-level course is designed to prepare students to use direct georeferencing with GNSS-aided inertial navigation systems (INS) in operational surveying projects conducted from mobile, airborne, and/or spaceborne platforms. Topics covered include: inertial frames, 3D coordinate transformations, inertial navigation, GNSS, Kalman filtering and integration, sensor modeling and direct-georeferencing of remotely-sensed data. The course includes a final project using un-crewed aircraft systems (UAS).

Developed Coastal Remote Sensing Course: This 4-credit (originally 3-credit), graduate-level course covers remote sensing tools, technologies and techniques and their application to coastal engineering, coastal science and coastal zone management. Topobathymetric lidar, aerial imagery, UAS imagery, multi- and hyperspectral imagery are all covered from a coastal applications perspective. Initially developed this course at University of New Hampshire and subsequently revised and enhanced it substantially at OSU.

Updated CE461/561 - Photogrammetry: Substantially revised this 3-credit course by adding new modules and material on softcopy (digital) photogrammetry, digital aerial cameras, GNSS-aided inertial navigation systems (INS), automatic tie point measurement, UAS, and structure from motion (SfM) photogrammetry.

Team or Collaborative Efforts

Co-taught ESCI 875, OE 875.01: Fundamentals of Ocean Mapping II, Spring 2012, Spring 2013, and Spring 2014 (University of New Hampshire). Developed and taught two course modules: "Introduction to Remote Sensing" and "Shoreline Mapping." This year-long Fundamentals course was co-taught by the faculty of the Center for Coastal and Ocean Mapping – Joint Hydrographic Center.

Student (eSET) and Participant/Client Evaluations

Course No. (credits)	Term	Enroll-ment	# Re-sponding	Student Evaluation (#1/#2)	Required /Elective
ESCI 7/896, OE 7/895 (UNH) (3)	Spring 2012	7	5	4.88 out of possible 5.00 (UNH OE scale)	Elective
ESCI 7/896, OE 7/895 (UNH) (3)	Spring 2014	15	7	4.86 out of possible 5.00 (UNH OE scale)	Elective
CE505: KINEMATIC SRVYNG & NAVGTN (3)	Winter 2015	9	8	5.9/6.0	Elective
CEM 263: PLANE SURVEYING (3)	Spring 2015	64	48	5.0/5.1 (Lecture) 5.0/5.2 (Lab)	Required
CE 505: KINEMATIC SRVYNG & NAVGTN (3)	Fall 2015	9	7	5.9/6.0	Elective
CE505: COASTAL REMOTE SENSING (3)	Winter 2016	8	6	5.9/6.0	Elective
CEM 263: PLANE SURVEYING (3)	Spring 2016	45	30	5.8/5.8 (Lecture) 5.6/5.6 (Lab)	Required
CE 361: SURVEYING THEORY (4)	Fall 2016	49	39	5.6/5.8 (Lecture) 5.5/5.7 (Lab)	Required
CE 560: COASTAL REMOTE SENSING (3)	Winter 2017	22	9	5.8/6.0	Elective

CE 507: GEOMATICS SEMINAR (1)	Spring 2017	7	4	5.5/5.5	Elective
CEM 263: PLANE SURVEYING (3)	Spring 2017	99	65	5.4/5.6 (Lecture) 5.6/5.7 (Lab)	Required
CE 361: SURVEYING THEORY (4)	Fall 2017	54	40	5.5/5.6 (Lecture) 5.4/5.8 (Lab)	Required
CE 661: KINEMATIC POSITION & NAV (3)	Winter 2018	13	4	6.0/6.0	Elective
CEM 263: PLANE SURVEYING (3)	Spring 2018	101	18	5.8/5.9 (Lecture) 5.8/5.9 (Lab)	Required
CE 361: SURVEYING THEORY (4)	Fall 2018	52	21	5.6/5.7 (Lecture) 5.6/5.6 (Lab)	Required
CE 567: COASTAL REMOTE SENSING (4)	Winter 2019	13	4	5.8/6.0 (Lecture) 5.9/6.0 (Lab)	Elective
CE 560: HYDROGRAPHIC SURVEYING (3)	Spring 2019	12	2	6.0/6.0	Elective
CE 361: SURVEYING THEORY (4)	Fall 2019	72	32	5.7/5.8 (Lecture) 5.8/5.8 (Lab)	Required
CE 461/561: PHOTOGRAMMETRY (3)	Winter 2020	13	6	461: 5.8/5.9 (Lecture) 5.8/5.9 (Lab) 561: 5.8/5.9 (Lecture) 5.8/5.9 (Lab)	Elective
CE 461/561: PHOTOGRAMMETRY (3)	Winter 2021	11	6	461: 5.9/5.9 (Lecture) 6.0/6.0 (Lab) 561: Not available	Elective
CE 507: GEOMATICS SEMINAR (1)	Spring 2021	12	4	6.0/6.0	Elective

CE 361: SURVEYING THEOR (4)	Fall 2021	79	13	5.6/5.8 (Lecture) 6.0/6.0 (Lab Sec 11) 6.0/6.0 (Lab Sec 12) 5.5/5.5 (Lab Sec 13) 5.0/5.7 (Lab Sec 14)	Required
CE 561: PHOTOGRAMMETRY (3)	Winter 2022	13	6	6.0/6.0 (Lecture) 6.0/6.0 (Lab)	Elective
CE 567: COASTAL REMOTE SENSING (4)	Spring 2022	12	5	6.0/5.6 (Lecture) 6.0/6.0 (Lab)	Elective
CE 507: GEOMATICS SEMINAR	Spring 2022	11	7	5.9/6.0	Elective
CE 361: SURVEYING THEORY (4)	Fall 2022	57	15	5.9/5.8	Required
CE 561: PHOTOGRAMMETRY (3)	Winter 2023	13	9	6.0/6.0	Elective
CE 361: SURVEYING THEORY (4)	Fall 2023	60	16	5.9/5.9	Required
CE 561: PHOTOGRAMMETRY (3)	Winter 2024 (co-taught with Matt Sharr)	16	5	5.9/5.9	Elective
CCE 561: HYDROGRAPHIC SURVEYING	Spring 2024 (co-taught with Matt Sharr)	9	3	5.8/5.8	Elective

Advising

Graduate Advisees – Completed

Student	Degree	Thesis	Graduated
1. Forrest Corcoran	PhD	*Applications of Artificial Intelligence to Bathymetric Mapping with ICESat-2*	Spring 2024 (now Quantitative Analytics Associate at J.P. Morgan Asset Management)
2. Richard Slocum	PhD	*New Simulation and Fusion Techniques for Assessing and Enhancing UAS Topographic and Bathymetric Point cloud Accuracy*	Spring 2020 (now Sensor Engineer at Argo AI)

3. Nicholas Forfinski-Sarkozi	PhD	*Mapping Nearshore Bathymetry with Spaceborne Data Fusion and State Space Modeling*	Fall 2019 (now Geodesist at NOAA NGS)
4. Michael Dennis	PhD	*Of Planes and Plumblines: Map Projections and Differential Leveling in a GNSS-based 3D Geodetic Framework*	Winter 2019 (now Geodesist and SPCS2022 Project Manager at NOAA NGS)
5. Brian Madore	MS	*Investigating Nearshore Bathymetric Change Over Time Using Satellite Derived Bathymetry and NOAA's SatBathy Tool*	Spring 2024 (Now at NOAA's National Geodetic Survey)
6. Matthew Sharr	MS	*Bathymetric Truthiness: Classifying Valid and Erroneous Depths in Satellite Derived Bathymetry with Random Forest*	Spring 2023 (now at NOAA)
7. Selina Lambert	MS	*Efficient Topobathymetric Mapping and 3D Spatial Analysis of Estuaries Using Multi-Platform, Multi-Temporal Data*	Spring 2022 (now a PhD student)
8. Kyle Herrera (co-advised with Pedro Lomónaco)	MS	*Enhancing Detection of Marine Debris with Polarimetric Imagery*	Winter 2022 (now at Measutronics)
9. Joan Herrmann (co-advised with Ben Leshchinsky	MS	*Remote Sensing Tools for Evaluating Climate Change in Coastal Environments*	Winter 2022 (Now at NOAA)
10. Meshal Alshammari	MS	*Investigation of Commercial and Open-Source Web-Based Structure from Motion Processing Options for UAS Imagery (project report)*	Fall 2021 (Now teaching surveying eng. courses at univ.)
11. Benjamin Babbel (co-advised with Michael Olsen)	MS	*An Efficient Workflow and Accuracy Assessment for ICESat-2 and Multispectral Imagery Fusion for Bathymetric Mapping*	Spring 2020 (now Head of Bathymetric Lidar Editing Team at Dewberry)
12. Chase Simpson	MS	*A Multivariate Comparison of Drone-Based Structure from Motion and Drone-Based Lidar for Dense Topographic Mapping Applications*	Fall 2018 (now Instructor in OSU CCE)
13. Nicholas Wilson	MS	*Radiometric Calibration of EAARL-B Bathymetric Lidar Data*	Spring 2017 (now Remote Sensing Tech II at Woolpert)

14. Kory Kellum	MS	*Seamless Topobathymetric River Mapping Through Multi-Sensor Data Integration: Lidar, Sonar, RTK GNSS and Structure from Motion*	Spring 2017 (now Lead Geomatics Engineer at Phoenix LiDAR Systems)
15. Matthew Gillins	MS	*Unmanned Aircraft Systems for Bridge Inspection: Testing and Developing an End-to-End Operational Workflow*	Fall 2016 (now UAS Program Lead and PLS at JUB Engineers Inc.)
16. Fang Yao	MS (UNH)	*Uncertainty Analysis on Photogrammetry-Derived National Shoreline*	Spring 2014 (now at Esri)
17. Rachot Osiri	MS (UNH)	*Radiometric Calibration and Evaluation of Lidar Data for Coastal Science Applications* (Directed Project Report)	Summer 2011 (now at Thai Hydrographic Survey Office)

Graduate Advisees – Current

Student	Degree	Expected Graduation	Advanced to Candidacy (Y/N)
1. Selina Lambert	PhD	Spring 2025	Y
2. Owusuah Osei-Kwakye	PhD	Spring 2026	N
3. Ellery Ohlwiler	MS	Summer 2024	--
4. Ruth McCullough	MS	Spring 2026	--

Graduate Thesis or Project Committees

Minor Professor or Committee Member:

Graduated

1. Matthew Barker, PhD, Forest Engineering, Resources, and Management, 2024
2. Weston Hustace, MS, Civil Engineering, 2023
3. Gulay Sayim, MS, Civil Engineering, 2023
4. Khalid Alqurashi, MS, Civil Engineering, 2022
5. Juliane Affonso, MS (UNH), Summer 2022
6. Joshua Weaver, MS, Civil Engineering, 2022
7. Marja Haagsma, PhD, Water Resources Engineering, 2021
8. Sue Kim, PhD, Civil Engineering, 2021
9. Casey O'Heran, MS, Ocean Engineering/Ocean Mapping (UNH), 2020
10. Cory Garms, PhD, Sustainable Forest Management, 2020
11. Kery Prettyman, MS, Civil Engineering, 2019
12. Ashley Norton, PhD, Natural Resource and Earth System Science (UNH), 2019
13. Marian Jamieson, MS, Civil Engineering, 2019
14. Scott Heffernan, MS, Forest Engineering, Resources, and Management, 2018

15. Kathryn Nuss, MS (Department of Anthropology), 2018
16. Matthew O'Banion, PhD, Civil Engineering, 2017
17. Richard Gabriel, MS, Forest Engineering, Resources and Management, 2017
18. Jonathan Burnett, PhD, Forest Engineering, Resources and Management, 2017
19. Ricardo Friere, PhD, Ocean Engineering (UNH), 2017
20. Brian Weaver, MS, Civil Engineering, 2017
21. Preston Hartzell, PhD (Univ. of Houston), 2016
22. Zhigang Pan, PhD (Univ. of Houston), 2016
23. Jeffrey Rogers, PhD (Univ. of New Hampshire), 2014
24. Chukwuma Azuike, MS (Univ. of New Hampshire), 2012
25. Olumide Fadahunsi, MS (Univ. of New Hampshire), 2012
26. Michael Gonsalves, PhD (Univ. of Southern Mississippi), 2010
27. Anuchit Sukcharoenpong (Ohio State Univ.), 2010

Current

1. Kutalmis Saylam, PhD, Geography, Environment and Geomatics, University of Ottawa, 2024 (external evaluator)
2. Fiona Luhrmann, PhD, Civil Engineering, 2025
3. Matt Tyler, PhD (UNH), 2025

Graduate Council Representative:

1. Neha Pusalkar, 2024 (expected) (Robotics)
2. Grace Diehl, 2023 (Robotics and Computer Science)
3. Lila Ardor Bellucci, 2022 (Ocean, Earth and Atmospheric Sciences)
4. Dylan Jones, PhD, 2020 (Robotics)
5. Anna Ballasiotes, MS, 2020 (Geography)
6. Matthew Rueben, PhD, 2018 (Robotics)
7. Robert Shriver, MS, 2018 (Forest Engineering)
8. Sean Penney, MS, 2017 (Computer Science)
9. Carter Lassetter, MS, 2017 (Electrical Engineering and Computer Science)
10. Ridwan Azam, MS, 2016 (Electrical Engineering)

<u>Undergraduate Research Assistants</u>

1. Zachary Grubb (Fall 2017 – Spring 2018)
2. Shane O'Hara (Fall 2016 – Spring 2018)
3. Michael Craig (Fall 2015 – Spring 2016)

<u>Postdoctoral Trainees</u>

1. Jaehoon Jung (co-advised with Michael Olsen) (Winter 2017 – 2020) (Dr. Jung advanced to the position of Research Assistant Professor at OSU from 2021-2023 and is currently an Assistant Professor in the Department of Urban Engineering at Gyeongsang University, South Korea).

Scholarship and Creative Activity

Publications

Bold font indicates students for whom I served as a major advisor. A dagger (†) indicates a student on whose committee I served. A double dagger (††) indicates a postdoc I supervised.

Books & Book Chapters

1. Pe'eri, S., C. Parrish, N. Johnson, C. Macon, and S. White, 2019. Performance Evaluation. In *Airborne Laser Hydrography II*, W. D. Philpot (Ed.), (pp. 207–230). Ithaca, NY: eCommons. https://doi.org/10.7298/tbxj-3067.

2. Parrish, C.E., 2012. Chapter 6: Shoreline Mapping in *Advances in Mapping from Remote Sensor Imagery: Techniques and Applications* (X. Yang and J. Li, Eds.), CRC Press, Taylor and Francis Group, Boca Raton, Florida, pp. 145-168.

3. Pack, R.T., V. Brooks, J. Young, N. Vilaça, S. Vatslid, P. Rindle, S. Kurz, C.E. Parrish, R. Craig, and P.W. Smith, 2012. Chapter 2: An Overview of ALS Technology in *Airborne Topographic Lidar Manual* (M. Renslow, Ed.), American Society for Photogrammetry and Remote Sensing (ASPRS), Bethesda, Maryland, pp. 7-97.

4. Heidemann, H.K., J. Stoker, D. Brown, M.J. Olsen, R. Singh, K. Williams, A. Chin, A. Karlin, G. McClung, J. Janke, J. Shan, K.-H. Kim, A. Sampath, S. Ural, C.E. Parrish, K. Waters, J. Wozencraft, C.L. Macon, J. Brock, C.W. Wright, C. Hopkinson, A. Pietroniro, I. Madin, and J. Conner, 2012. Chapter 10: Applications in *Airborne Topographic Lidar Manual* (M. Renslow, Ed.), American Society for Photogrammetry and Remote Sensing (ASPRS), Bethesda, Maryland, pp. 283-423.

Refereed Journal Publications

1. Jung, J., C.E. Parrish, B. Costa, and S. Yoo, 2024. Simultaneous invariant normalization of waveform features from bathymetric lidar, SINWav: A Saipan case study. *ISPRS Journal of Photogrammetry and Remote Sensing*, Vol. 214, pp. 1-20.

2. **Sharr, M.B.**, C.E. Parrish, and J. Jung, 2024. Automated Classification of Valid and Invalid Satellite Derived Bathymetry with Random Forest. *International Journal of Applied Earth Observation and Geoinformation*, Vol. 129, 103796.

3. Jung, J., E. Che, M. Olsen, C. Parrish, Y. Turkan, S. Yoo, 2024. Instance-based clustering of road markings with wear and occlusion from mobile lidar data. *Journal of Computing in Civil Engineering*, Vol. 38, No. 4.

4. Dietrich, J.T., A. Rackley Reese, A. Gibbons, L.A. Magruder, and C.E. Parrish, 2024. Analysis of ICESat-2 data acquisition algorithm parameter enhancements to improve worldwide bathymetric coverage. *Earth and Space Science*, 11, e2023EA003270.

5. Krivova, M., M. Olsen, J. Allan, C. Parrish, B. Leshchinsky, A. Senogles, and J. Herrmann, 2023. Vulnerability Assessment of Risk for a Coastal Highway in Oregon, USA. *Journal of Coastal Research*, Vol. 40, No. 4, pp. 714-739.

6. **Corcoran, F.,** and C.E. Parrish, 2023. DORSL-FIN: A Self-Supervised Neural Network for Recovering Missing Bathymetry from ICESat-2. *Photogrammetric Engineering & Remote Sensing.* Vol. 89, No. 9, pp. 561–575.

7. **Lambert, S.E**., and C.E. Parrish. 2023. Refraction Correction for Spectrally Derived Bathymetry Using UAS Imagery. *Remote Sensing.* 15, no. 14: 3635.

8. **Herrmann, J.**, L.A. Magruder, J. Markel, and C.E. Parrish, 2022. Assessing the Ability to Quantify Bathymetric Change over Time Using Solely Satellite-Based Measurements. *Remote Sensing*. Vol. 14, No. 1232.

9. Jung, J.[††], C.E. Parrish, B. Callahan, and **M.L. Dennis**, 2022. Recovery and Readjustment of Historical Ocean Coast Control Stations in Oregon. *Journal of Surveying Engineering*, Vol. 148, No. 2.

10. Jung, J.[††], J. Lee, and C.E. Parrish, 2021. Inverse Histogram-Based Clustering Approach to Seafloor Segmentation from Bathymetric Lidar Data. *Remote Sensing*, Vol. 13, No. 3665.

11. **Corcoran, F.**, and C.E. Parrish, 2021. Diffuse Attenuation Coefficient (Kd) from ICESat-2 ATLAS Spaceborne Lidar Using Random Forest Regression. *Photogrammetric Engineering & Remote Sensing*, Vol. 87, No. 11, pp. 831-840.

12. **Babbel, B.J.**, C.E. Parrish, and L.A. Magruder, 2021. ICESat-2 elevation retrievals in support of satellite derived bathymetry for global science applications. *Geophysical Research Letters*, Vol. 48, No. 5.

13. Javadnejad, F., **R.K. Slocum**, D.T. Gillins, M.J. Olsen, and C.E. Parrish, 2021. Dense Point Cloud Quality Factor (DPQF) as A Proxy for Accuracy Assessment of Image-based 3D Reconstruction. *Journal of Surveying Engineering*, Vol. 147, No. 1.

14. Prettyman, K.[†], M. Babbar-Sebens, C.E. Parrish, J.M. Babbar-Sebens, 2020. A Feasibility Study of Uninhabited Aircraft Systems for Rapid and Cost-Effective Plant Stress Monitoring at Green Stormwater Infrastructure Facilities. *Journal of Hydroinformatics,* doi: 10.2166/hydro.2020.195.

15. **Slocum, R.K.**, C.E. Parrish, and **C.H. Simpson**, 2020. Combined Geometric-Radiometric and Neural Network Approach to Shallow Bathymetric Mapping with UAS Imagery. *ISPRS Journal of Photogrammetry and Remote Sensing*, Vol. 169, pp. 351-363.

16. Garms, C.[†], **C. Simpson**, C. Parrish, M. Wing, and B. Strimbu, 2020. Assessing Lean and Positional Error of Individual Mature Douglas-Firs with Active and Passive Sensors. *Canadian Journal of Forest Research*, Vol. 50, No. 11, pp.1228-124.

17. Javadnejad, F., D.T. Gillins, C.E. Parrish, and **R.K. Slocum**, 2020. A photogrammetric approach to fusing natural colour and thermal infrared UAS imagery in 3D point cloud generation. *International Journal of Remote Sensing*, Vol. 41, No. 1, pp. 211-237.

18. **Wilson, N.**, C.E. Parrish, T. Battista, C.W. Wright, B. Costa, **R. Slocum**, J.A. Dijkstra, and M.T. Tyler, 2019. Mapping Seafloor Relative Reflectance and Assessing Coral Reef Morphology with EAARL-B Topobathymetric Lidar Waveforms, *Estuaries and Coasts*, Special Issue: Shallow Water Mapping, pp. 1-15.

19. Parrish, C.E., L.A. Magruder, A.L. Neuenschwander, **N. Forfinski-Sarkozi**, M. Alonzo, and M. Jasinski, 2019. Validation of ICESat-2 ATLAS Bathymetry and Analysis of ATLAS's Bathymetric Mapping Performance. *Remote Sensing*, Vol. 11, No. 4: 1634.

20. Che, E., M.J. Olsen, C.E. Parrish, and J. Jung[††], 2019. Pavement Marking Retroreflectivity Estimation and Evaluation using Mobile Lidar Data. *Photogrammetric Engineering & Remote Sensing*, Vol. 85, No. 8, pp. 573-583.

21. Eren, F., J. Jung[††], C.E. Parrish, **N. Forfinski-Sarkozi**, and B. Calder, 2019. Total Vertical Uncertainty (TVU) modeling for topo-bathymetric lidar systems. *Photogrammetric Engineering and Remote Sensing*, Vol. 85, No. 8, pp. 585-596.

22. **Forfinski-Sarkozi, N.A.**, and C.E. Parrish, 2019. Active-Passive Spaceborne Data Fusion for Mapping Nearshore Bathymetry. *Photogrammetric Engineering and Remote Sensing*, Vol. 85, No. 4, pp. 281-295.

23. Jung, J.[††], E. Che, M.J. Olsen, and C. Parrish, 2019. Efficient and Robust Lane Marking Extraction from Mobile Lidar Point Clouds, *ISPRS Journal of Photogrammetry and Remote Sensing*, Vol. 147, pp. 1-18.

24. Kalathas, P., D. Hurwitz, C. Parrish, and Y. Zhang, 2018. A Survey on Road Noise Prediction for Milled Shoulder Rumble Strips. *International Journal of Vehicle Noise and Vibration*, Vol. 14, No. 3, pp. 251- 269.

25. **Slocum, R.K.**, R.K. Adams, K. Buker, D.S. Hurwitz, H.B. Mason, C.E. Parrish, and M.H. Scott, 2018. Response spectrum devices for active learning in earthquake engineering education. *HardwareX*, Vol. 4, e00032.

26. O'Banion[†], M.S., M.J. Olsen, C.E. Parrish, and M. Bailey, 2018. Interactive Visualization of 3D Coordinate Uncertainties in Terrestrial Laser Scanning Point Clouds Using OpenGL Shader Language. *Journal of Surveying Engineering*, Vol. 145, No. 1.

27. Rogers, J.N. [†], C.E. Parrish, L.G. Ward, and D.M. Burdick, 2018. Improving Salt Marsh Digital Elevation Model Accuracy with Full-Waveform Lidar and Nonparametric Predictive Modeling. *Estuarine, Coastal and Shelf Science*, Vol. 202, pp. 193-211.

28. **Slocum, R.K.**, and C.E., Parrish, 2017. Simulated Imagery Rendering Workflow for UAS-Based Photogrammetric 3D Reconstruction Accuracy Assessments. *Remote Sensing*, Vol. 9, No. 4:396.

29. **Forfinski-Sarkozi, N.A.**, and C.E. Parrish, 2016. Analysis of MABEL Bathymetry in Keweenaw Bay and Implications for ICESat-2 ATLAS. *Remote Sensing*, Vol. 8, No. 9, doi: 10.3390/rs8090772.

30. Wright, C.W., C. Kranenburg, T.A. Battista, and C. Parrish, 2016. Depth Calibration and Validation of the Experimental Advanced Airborne Research LiDAR, EAARL-B. *Journal of Coastal Research*, SI 76, pp. 4-17.

31. Parrish, C.E., J.A. Dijkstra, J.P.M. O'Neil-Dunne, L. McKenna, and S. Pe'eri, 2016. Post-Sandy Benthic Habitat Mapping Using New Topobathymetric Lidar Technology and Object-Based Image Classification. *Journal of Coastal Research*, SI 76, pp. 200-208.

32. Rogers, J.N. †, C.E. Parrish, L.G. Ward, and D.M. Burdick, 2016. Uncertainty Assessment of Salt Marsh Environments Using Discrete-Return and Full-Waveform Lidar. *Journal of Coastal Research*, SI 76, pp. 107-122.

33. Pe'eri, S., B. Madore, J. Nyberg, L. Snyder, C. Parrish, and S. Smith, 2016. Evaluation of Chart Adequacy over the Arctic North Slope using a Satellite-Derived Bathymetry Multi-Temporal Approach, *Journal of Coastal Research*, SI 76, pp. 56-63.

34. Kashani, A.G., M.J. Olsen, C.E. Parrish, and **N. Wilson**, 2015. A Review of Lidar Radiometric Processing: from ad hoc Intensity Correction to Rigorous Radiometric Calibration. *Sensors*, Vol. 15, pp. 28099-28128; doi:10.3390/s151128099.

35. **Yao, F.**, C.E. Parrish, S. Pe'eri, B.R. Calder, and Y. Rzhanov, 2015. Modeling Uncertainty in Photogrammetry-Derived National Shoreline. *Marine Geodesy*, Vol. 28, pp. 128-145.

36. Rogers, J.N.†, C.E. Parrish, L.G. Ward, and D.M. Burdick, 2015. Evaluation of Field-Measured Vertical Obscuration and Full Waveform Lidar to Assess Salt Marsh Vegetation Biophysical Parameters. *Remote Sensing of Environment*, Vol. 156, pp. 264-275.

37. Pe'eri, S., C.E. Parrish, C. Azuike, L. Alexander, and A. Armstrong, 2014. Satellite Remote Sensing as Reconnaissance Tool for Assessing Chart Adequacy and Completeness Information. *Marine Geodesy*, Vol. 37, No. 3, pp. 293-314.

38. Parrish, C.E., J.N. Rogers†, and B.R. Calder, 2014. Assessment of Waveform Shape Features for Lidar Uncertainty Modeling in a Coastal Salt Marsh Environment. *Geoscience and Remote Sensing Letters*, Vol. 11, No. 2, pp. 569-573.

39. Pe'eri, S., A. McLeod, P. Lavoie, S. Ackerman, J. Gardner, and C. Parrish, 2013. Field Calibration and Validation of Remote Sensing Surveys, *International Journal of Remote Sensing*, Vol. 34, No. 18, pp. 6423-6436.

40. Bachmann, C.M., M.J. Montes, C.E. Parrish, R.A. Fusina, C.R. Nichols, R.-R. Li, E. Hallenborg, C.A. Jones, K. Lee, J. Sellars, S.A. White, and J.C. Fry, 2012. A dual-spectrometer approach to reflectance measurements under sub-optimal sky conditions. *Optics Express*, Vol. 20, No. 8.

41. Adams, T., P. Beets, and C. Parrish, 2012. Extracting More Data from LiDAR in Forested Areas by Analyzing Waveform Shape. *Remote Sensing*, Vol. 4, No. 3, pp. 682-702.

42. Parrish, C.E., I. Jeong, R.D. Nowak, and R.B. Smith, 2011. Empirical Comparison of Full-Waveform Lidar Algorithms: Range Extraction and Discrimination Performance. *Photogrammetric Engineering & Remote Sensing*, Vol. 77, No. 8, pp. 825-838.

43. Uddin, W., B. Gutelius, and C. Parrish, 2011. Airborne Laser Survey Specifications and Quality Management Protocols for Airport Obstruction Surveys. *Transportation Research Record: Journal of the Transportation Research Board*, No. 2214, pp. 117-125.

44. White, S.A., C.E. Parrish, B.R. Calder, S. Pe'eri, and Y. Rzhanov, 2011. Lidar-Derived National Shoreline: Empirical and Stochastic Uncertainty Analyses. *Journal of Coastal Research*, Special Issue 62, pp. 62-74.

45. Bachmann, C.M., C.R. Nichols, M.J. Montes, R.-R. Li, P. Woodward, R.A. Fusina, W. Chen, V. Mishra, W. Kim, J. Monty, K. McIlhany, K. Kessler, D. Korwan, W.D. Millar, E. Bennert, G. Smith, D. Gillis, J. Sellars, C. Parrish, A. Schwarzschild, and B. Truitt, 2010. Retrieval of Substrate Bearing Strength from Hyperspectral Imagery during the Virginia Coast Reserve (VCR'07) Multi-Sensor Campaign, *Marine Geodesy*, Vol. 33, No. 2, pp. 101-116.

46. Bachmann, C.M., M.J. Montes, R.A. Fusina, C. Parrish, J. Sellars, A. Weidemann, W. Goode, C.R. Nichols, P. Woodward, K. McIlhany, V. Hill, R. Zimmerman, D. Korwan, B. Truitt, and A. Schwarzschild, 2010. Bathymetry Retrieval from Hyperspectral Imagery in the Very Shallow Water Limit: a Case Study from the 2007 Virginia Coast Reserve (VCR'07) Multi-Sensor Campaign. *Marine Geodesy*, Vol. 33, No. 1, pp. 53 - 75.

47. Parrish, C.E., and R.D., Nowak, 2009. Improved Approach to LIDAR Airport Obstruction Surveying Using Full-Waveform Data. *Journal of Surveying Engineering*, Vol. 135, No. 2, pp. 72-82.

48. Parrish, C.E., G.H. Tuell, W.E. Carter, and R.L. Shrestha, 2005. Configuring an Airborne Laser Scanner for Detecting Airport Obstructions. *Photogrammetric Engineering & Remote Sensing*, Vol. 71, No. 1, pp. 37-46.

Peer-Reviewed Archival Conference Publications

The following papers appeared in archival proceedings that were distributed to libraries (the next section covers other types of proceedings).

1. Che, E., M.J. Olsen, C. Parrish, and J. Jung††, 2019. Pavement Marking Reflectivity Evaluation through Radiometric Calibration of The Leica P40 Terrestrial Laser Scanner. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume IV-2/W5*, ISPRS Geospatial Week 2019, 10–14 June 2019, Enschede, The Netherlands, pp. 333-339.

2. Fusina, R., J. Fry, R. Nichols, C. Bachmann, R.-R. Li, J. Sellars, C. Parrish, M. Montes, C. Gross, S. White, K. Lee, C. Jones, 2010. Geodatabase Development to Support Hyperspectral Imagery Exploitation, *Proceedings of the IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 25-30 July, Honolulu, Hawaii, doi: 10.1109/IGARSS.2010.5654182, pp. 4224-4227.

3. Bachmann, C. M., M. J. Montes, R. A. Fusina, C. Parrish, J. Sellars, A. Weidemann, W. Goode, V. Hill, R. Zimmerman, C. R. Nichols, P. Woodward, K. McIlhany, D. Korwan, M. Crawford, J. Monty, B. Truitt, A. Schwarzschild, 2008. Very Shallow Water Bathymetry Retrieval from Hyperspectral Imagery at the Virginia Coast Reserve (VCR'07) Multi-Sensor Campaign. *Proceedings of the IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 7-11 July, Boston, Massachusetts, doi: 10.1109/IGARSS.2008.4778943, Vol. 2, pp. II-125.

4. Parrish, C.E., 2007. Exploiting Full-Waveform Lidar Data and Multiresolution Wavelet Analysis for Vertical Object Detection and Recognition, 2007. *Proceedings of the IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 23-27 July, Barcelona, Spain, doi: 10.1109/IGARSS.2007.4423351, pp. 2499-2502.

Other Peer-Reviewed Publications

The following papers appeared in proceedings that were distributed primarily to attendees (as CDs, printed volumes, availability through a public website, etc.).

1. **Forfinski, N.**, and C.E. Parrish, 2016. ICESat-2 bathymetry: an empirical feasibility assessment using MABEL. *Proceedings of SPIE Remote Sensing: Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions* 2016, 26-29 Sept, Edinburgh, Scotland, Vol. 9999; doi:10.1117/12.2241210, pp. 999904-1-999904-08.

2. Bachmann, C.M., D. Gray, A. Abelev, W. Philpot, M.J. Montes, R. Fusina, J. Musser, R.-R. Li, M. Vermillion, G. Smith, D. Korwan, C. Snow, W.D. Miller, J. Gardner, M. Sletten, G. Georgiev, B. Truitt, M. Kilmon, J. Sellars, J. Woolard, C. Parrish, and A. Schwarzchild, 2012. Linking goniometer measurements to hyperspectral and multi-sensor imagery for retrieval of beach properties and coastal characterization. Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XVIII (S.S. Shen, and P.E. Lewis, Eds.), *Proceedings of SPIE Vol. 8390, SPIE Defense, Security, and Sensing*, 23-27 April, Baltimore, Maryland, doi:10.1117/12.918464, pp. 83901D-83901D.

3. Bachmann, C.M., A. Abelev, W. Philpot, C.R. Nichols, G. Smith, D. Korwan, J.Gardner, M. Sletten, J.A. Musser, R.A. Fusina, M. Vermillion, C.E. Parrish, R.-R. Li, J. Sellars, S. White, E. van Roggen, and K. Doctor, 2012. A Multi-Sensor Approach to Coastal Characterization, *Proceedings of Optical Remote Sensing of the Environment (ORS) 2012*. 24-28 June,

Monterey, California, ISBN: 1-55752-947-7, doi:10.1364/ORSE.2012.RTu1E.1, pp. RTu1E-1.

4. Adams, T., P. Beets, and C. Parrish, 2011. Another dimension from LiDAR – Obtaining foliage density from full waveform data. *Proceedings of SilviLaser*, 16-19 October, Hobart, Australia, 12 pp.

5. Parrish, C.E., S.A. White, B.R. Calder, S. Pe'eri, and Y. Rzhanov, 2010. New Approaches for Evaluating Lidar-Derived Shoreline. OSA Technical Digest: *Proceedings of OSA Optical Remote Sensing of the Environment (ORS) 2010*, 7-8 June, Tucson, Arizona, ISBN: 978-1-55752-892-6, doi:10.1364/ORSE.2010.OMC5, p. OMC5, 3 pp.

6. Lee, K., C.M. Bachmann, R.A. Fusina, M.J. Montes, R.-R. Li, J.C. Fry, C.R. Nichols, C. Parrish, J. Sellars, 2010. Coastal Vegetation Mapping from Hyperspectral Imagery. *Proceedings of OSA Optical Remote Sensing of the Environment (ORS) 2010*, 7-8 June, Tucson, Arizona. ISBN: 978-1-55752-892-6, doi:10.1364/ORSE.2010.JTuA28, p. JTuA28.

7. Bachmann, C.M., C.R. Nichols, M.J. Montes, R.A. Fusina, J.C. Fry, R.-R. Li, D. Gray, D. Korwan, C. Parrish, J. Sellars, S.A. White, J. Woolard, K. Lee, C. McConnon, and J. Wende, 2010. Coastal Characterization from Hyperspectral Imagery. *Proceedings of OSA Optical Remote Sensing of the Environment (ORS) 2010*, 7-8 June, Tucson, Arizona. ISBN: 978-1-55752-892-6, doi:10.1364/ORSE.2010.OMD2, p. OMD2.

Other Publications

Includes abstracts, posters, and non-peer-reviewed publications.

1. Weaver, B., C. Parrish, L. Tang, G. Seroka, L. Shi, J. Riley, and M. Michalski, 2024. Improving Coastal Vertical Datums in the Pacific Ocean through Enhanced Satellite Altimetry-Derived Mean Sea Surface Estimation. ASCE UESI Surveying and Geomatics Conference, June 2-4, 2024, Corvallis, Oregon.

2. Parrish, C., 2024. Solving the Global Nearshore Data Void. Center for Coastal and Ocean Mapping Joint Hydrographic Center Seminar Series. 19 April, Durham, New Hampshire. Online: https://ccom.unh.edu/seminars/chris-parrish-2024.

3. Parrish, C.E., L.A. Magruder, J.T. Dietrich, J. Markel, and J. Jung, 2023. ICESat-2 Bathymetry: New Global Data Product for Coastal and Nearshore Science. AGU Fall Meeting, 11-15 Dec, San Francisco, CA.

4. Parrish, C.E., L.A. Magruder, J.T. Dietrich, J. Markel, A.R. Reese, A. Gibbons, 2023. Advances in ICESat-2 Bathymetry. 22nd JALBTCX Airborne Coastal Mapping and Charting Technical Workshop, 28-30 Nov, Kiln, Mississippi.

5. Parrish, C., S. Lambert, K. Kief, F. Corcoran, S. White, J. Kum, G. Imahori, and B. Calder, 2023. New Developments in Bathymetric Lidar TPU Modeling and cBLUE

Software. 22nd JALBTCX Airborne Coastal Mapping and Charting Technical Workshop, 28-30 Nov, Kiln, Mississippi.

6. Zoltek, M., C.E. Parrish, Q. Abdullah, M. Flood, and L.Z. Liu, 2023. ASPRS Positional Accuracy Standards for Digital Geospatial Data, 2nd Ed., Addendum I: General Best Practices and Guidelines. American Society for Photogrammetry and Remote Sensing, Baton Rouge, Louisiana.

7. Parrish, C.E., Winans, W.R., Battista, T., Uhrin, A.V., **Herrera, K.**, Murphy, P., Simpson, C., and Slocum, R., 2023. Uncrewed Aircraft Systems, Machine Learning, and Polarimetric Imaging for Enhanced Marine Debris Shoreline Surveys. Final Report. NOAA Technical Memorandum NOS NCCOS 312. Silver Spring, MD. 31 pp. doi: 10.25923/337h-k518

8. Parrish, C.E., 2023. Remote Sensing Methods for Nearshore Bathymetry and Topography. Bathymetry and Topography at the Land-Ocean Interface: National Academies Board on Earth Sciences and Resources, Committee on Solid Earth Geophysics (COSEG) Spring 2023 Meeting.

9. Parrish, C.E., L. Magruder, U. Herzfeld, N. Thomas, J. Markel, M. Jasinski, G. Imahori, **J. Herrmann**, T. Trantow, A. Borsa, R. Stumpf, B. Eder, and I. Caballero, 2022. ICESat-2 Bathymetry: Advances in Methods and Science. *In IEEE OCEANS 2022, Hampton Roads,* DOI: 10.1109/OCEANS47191.2022.9977206.

10. Parrish, C., **J. Herrmann**, J. Markel, and L. Magruder, 2022. Assessment of Satellite-Based Observations of Bathymetric Change, Pecora 2022, 26 Oct., Denver Colorado.

11. **K. Herrera**, T. Battista, A.V. Uhrin, P. Murphy, and C. Parrish, 2022. Enhanced Detection and Characterization of Shoreline Marine Debris using Polarimetric Imagery. 7th International Marine Debris Conference (7IMDC), 18 - 23 Sept, Busan, Korea.

12. Affonso, J., C. Kastrisios, C. Parrish, and B.R. Calder, 2022. A Geographically Adaptive Model for Satellite Derived Bathymetry. In *Proceedings of the 2022 Canadian Hydrographic Conference*, 6-9 June, Ottawa, Canada.

13. Starek, M., and C. Parrish, 2022. Simulation and Field Validation of UAS-SfM solutions based on different GNSS augmentation methods for Coastal Zone Mapping. 21st JALBTCX Airborne Coastal Mapping and Charting Technical Workshop, 28 June – 1 July, Kiln, Mississippi.

14. Parrish, C. and G. Imahori, 2022. NOAA SatBathy. 21st JALBTCX Airborne Coastal Mapping and Charting Technical Workshop, 28 June – 1 July, Kiln, Mississippi.

15. Babbar-Sebens, M., K. Prettyman, C. Parrish, and J. Babbar-Sebens, 2022. On the use of Uncrewed Aircraft Systems for Monitoring of Plants at Green Stormwater Infrastructure

Facilities. World Environmental & Water Resources Congress 2022. 5-8 June, Atlanta, Georgia.

16. Winans, R., C. Parrish, T. Battista, A.V. Uhrin, **K. Herrera**, and P. Murphy 2022. Mapping Marine Debris with UAS, Polarimetric Imaging and Machine Learning," OneNOAA Science Seminar. Online: https://noaabroadcast.adobeconnect.com/p3nhyd5m7nto/

17. Weaver, B., C. Parrish, M. Wengrove, J. Herrmann, L. Shi, L. Tang, G. Seroka, J. Riley, E. Myers, and S. Pe'eri, 2022. Satellite Altimetry-Derived Mean Sea Surface and Mean Dynamic Topography for Vertical Datum Transformations and Modeling. Ocean Sciences Meeting 2022, 28 Feb-4 Mar, Virtual.

18. M. Jasinski, J. Stoll, D. Hancock, J. Robbins, J. Nattala, T. Pavelsky, J. Morrison, B. Jones, M. Ondrusek, C. Parrish, and the ICESat-2 Science Team, August 2021: Algorithm Theoretical Basis Document (ATBD) for Along Track Inland Surface Water Data, ATL13, Release 5, Release Date August, 2021, NASA Goddard Space Flight Center, Greenbelt, MD, 124 pp. DOI: 10.5067/RI5QTGTSVHRZ.

19. Manda, D., J. Congo, R. Slocum, C. Simpson, M.J. Starek, and C. Parrish, 2021. Positioning Accuracy Assessment of UAS Captured Structure from Motion DTMs for Feature Characterization. U.S. Hydro Conference, 13-16 September, Virtual.

20. **Herrmann, J.**, C.E. Parrish, L.A. Magruder, C. Simurda, J. Markel, and **F. Corcoran**, 2021. Leveraging ICESat-2 and Multispectral Imagery to Detect Bathymetric Change due to Hurricanes in the Northern Gulf of Mexico. AGU Fall Meeting, 13-17 December, New Orleans, Louisiana.

21. Parrish, C.E., 2021. Advancing Measurement of Shallow Bathymetry from Space in Support of Coastal and Nearshore Science Objectives (Invited). AGU Fall Meeting, 13-17 December, New Orleans, Louisiana.

22. **Herrmann, J.**, B.A. Leshchinsky, M.J. Olsen, C.E. Parrish, J.C. Allan, A. Senogles, and M. Krivova, 2021. Integrating a Seacliff Erosion Forecast Model into the State of Oregon's Climate Change Strategy. AGU Fall Meeting, 13-17 December, New Orleans, Louisiana.

23. Donnellan, A., D. Harding, P. Lundgren, K. Wessels, A. Gardner, M. Simard, C. Parrish, C. Jones, Y. Lou, J. Stoker, K.J. Ranson, B. Osmanoglu, M. Lavalle, S. Luthcke, S. Saatchi, R. Treuhaft, 2021. *Observing Earth's Changing Surface Topography and Vegetation Structure: A Framework for the Decade, NASA Surface Topography and Vegetation Incubation Study*, 210 pp.

24. C. Higgins and Parrish, C., 2021. Blue Skies – Bring in the Drones. NASCC: The Virtual Steel Conference, World Steel Bridge Symposium, 16 April.

25. Parrish, C.E., 2021. Summary of 2018 NSF Seafloor Sensing Workshop & Recommendations. BLUE UCI 2021, Virtual Workshop: https://blue-uci2021.org/

26. Parrish, C.E., B. Peterson, R. Allard, and M. Wethington, 2020. NASA ICESat-2 Applications Town Hall. AGU Fall Meeting, 1 Dec (Virtual).

27. Parrish, C.E., and **C. Simpson**, 2020. Fundamentals of Direct Georeferencing (GNSS-aided INS), Oregon UAS Summit, Virtual Workshop, 27-28 October.

28. Parrish, C., **C. Simpson**, and **R. Slocum**, 2020. UAS-Based Lidar and Structure from Motion (SfM) Photogrammetry and Operational Implementation. Caltrans UAS Workshop, 4 Feb, Sacramento, California.

29. Parrish, C., B. Callahan, J. Jung††, and **M. Dennis**, 2020. Surveying the Oregon Coast: Past, Present and Future. PLSO Annual Conference, 23 January, Portland, Oregon.

30. **Slocum, R.K.**, W. Wright, C. Parrish, B. Costa, M. Sharr, and T.A. Battista. 2019. Guidelines for Bathymetric Mapping and Orthoimage Generation using sUAS and SfM, An Approach for Conducting Nearshore Coastal Mapping. NOAA Technical Memorandum NOS NCCOS 265. Silver Spring, MD. 83 pp. doi:10.25923/07mx-1f93

31. Parrish, C., D. Hurwitz, **C. Simpson**, S. Sorour, A. Abdel-Rahim, 2019. Lidar, Unmanned Aircraft Systems, and Machine Learning for Traffic Network Monitoring (Poster presentation). 2019 PacTrans, CSET Regional Transportation Conference, 11 Oct, Seattle, Washington.

32. Parrish, C., L. Magruder, A. Neuenschwander, and **N. Forfinski-Sarkozi**, 2019. Empirical Analysis of ICESat-2 ATLAS's Bathymetric Mapping Capability. The 20th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 4-6 June, South Bend, Indiana.

33. O'Banion†, M.S., Olsen, M.J., Parrish, C.E., Bailey, M., Wright, W.C. Interactive Visualization of 3D Coordinate Uncertainties in Terrestrial Laser Scanning Point Clouds. Abstract 446891, 2018 Fall Meeting, AGU, Washington, D.C., 10-14 December.

34. O'Banion†, M.S., Olsen, M.J., Parrish, C.E., Bailey, M., Wright, W.C. Improve Your Terrestrial Laser Scanning Planning and Execution: Visualize Uncertainty. Trimble Dimensions User Conference 2018, Las Vegas, NV, 5-7 November.

35. Parrish, C.E., 2018. Emerging Surveying and Mapping Technologies. OSBEELS Symposium, 14 September, Salem, Oregon.

36. Olsen, M.J., R.J. Schultz, C. Parrish, J. Park, J. Kiser, and Y. Turkan, 2018. SaGES 2017: The XIV Surveying and Geomatics Educators Society Conference at Oregon State University. *Surveying and Land Information Science*, Vol. 77, No. 2, 2018, pp. 67-70.

37. Parrish, C., 2018. UAS Basics for Transportation. UAS in Transportation Expo, July 30-31, Corvallis, Oregon.

38. **Simpson, C.**, C. Parrish, D. Gillins, and **M. Gillins**, 2018. Lessons Learned from OSU PacTrans and ODOT UAS Projects. UAS in Transportation Expo, July 30-31, Corvallis, Oregon.

39. Parrish, C., J. Jung††, **N. Forfinski-Sarkozi**, F. Eren, B. Calder, S. White, G. Imahori, J. Kum, and M. Aslaksen, 2018. Operational TPU Software for Topobathymetric Lidar. The 19th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 26-28 June, Providence, Rhode Island.

40. **Forfinski-Sarkozi, N.**, and C. Parrish, 2018. Filling the Nearshore Data Void through Satellite-based Data Fusion. The 19th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 26-28 June, Providence, Rhode Island.

41. **Simpson, C.**, C. Parrish, D. Gillins, **M. Gillins**, E. Cain, and C. Glantz, 2018. Unmanned Aircraft Systems (UAS) for Bridge Inspection. Oregon GNSS Users Group Meeting, 19 June, Bend, Oregon.

42. Parrish, C.E., G. Imahori, S. White, F. Eren, J. Jung††, **N. Forfinski-Sarkozi**, T. Kammerer, R. Troche, and J., Kum, 2018. Topographic-Bathymetric Lidar Total Propagated Uncertainty Modeling. Joint Canadian Hydrographic and National Surveyors' Conference, 26-29 March, Victoria, B.C., Canada.

43. Parrish, C.E., and J. Park, 2018. ODOT/OSU Research Projects. ODOT Surveyors Training Seminar. 13 March, 2018, Salem, Oregon.

44. Parrish, C.E., 2018. Enhancing Coastal Resilience with UAS, Lidar and Advanced Mapping Technologies. Oregon State University, Civil and Construction Engineering (CCE) Resilience seminar series, 20 Feb, Corvallis, Oregon.

45. Parrish, C.E., G. Imahori, S. White, F. Eren, J. Jung††, **N. Forfinski-Sarkozi**, and T. Kammerer, 2018. Total Propagated Uncertainty Modeling for Topobathymetric LiDAR. International LiDAR Mapping Forum (ILMF), 5-7 Feb, Denver, Colorado.

46. Park, J. and C. Parrish, 2018. Post Disaster Surveying. Professional Land Surveyors of Oregon (PLSO) 2018 Annual Conference. 17-19 January, Salem, Oregon.

47. **Simpson, C.**, C. Parrish, S. Sorour, A. Abdel-Rahim, and D. Hurwitz, 2017. Airborne Lidar Scanning and Deep Learning System for Real-time Event Extraction and Control Policies in Urban Transportation Networks. Pacific Transportation Consortium (PACTRANS) Region 10 Conference (Poster Session), 6 October, Seattle, Washington.

48. Parrish, C., F. Eren, J. Jung[††], G. Imahori, and S. White, 2017. Total Propagated Uncertainty Analysis for Topobathymetric Lidar. The 18th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 6-8 June, Savannah, Georgia.

49. Parrish, C., 2017. Unmanned Aerial Systems. GIS in Action, 17-18 April, Portland, Oregon.

50. Gillins, D.T., **C. Simpson**, and C. Parrish, 2017. Emerging Technology: Unmanned Aircraft Systems (UAS) for Bridge Inspection, 2017 Bridge & Tunnel Inspectors Conference, 4-6 April, Vancouver, Washington.

51. Kessler, M., J. Mallela, M. Olsen, and C. Parrish, 2017. Effective Use of Geospatial Tools in Highway Construction, Federal Highway Administration (FHWA) Seminar, 29 March, Online.

52. Parrish, C., 2017. Drones in Education: Research Perspective, 21 March, Oregon State University.

53. Olsen, M., and C. Parrish, 2017. Surveying with Drones, Lasers, and Explosions. Professional Land Surveyors of Oregon (PLSO) 2017 Conference, 18-20 January, Portland, Oregon.

54. Gillins, D.T., **M.L. Dennis**, B. Weaver, M. Olsen, and C. Parrish, 2016. Hybrid Static plus Real-Time GNSS Survey Networks: An efficient Approach for Height Modernization Surveys. ION GNSS+ 2016, 12-16 Sept, Portland, Oregon.

55. Parrish, C.E., **M. Gillins**, and D. Gillins, 2016. UAS for Structural Inspections and OregonView STEM Education Initiatives. ORURISA UAS Symposium by the Sea, 16 Sept, Lincoln City, Oregon.

56. **Gillins, M.N.**, D.T. Gillins, and C. Parrish, 2016. Bridge and Communication Tower Inspections with Small Unmanned Aircraft Systems (sUAS). UAS Mapping Conference, American Society of Photogrammetry and Remote Sensing (ASPRS), 12-14 Sept, Palm Springs, California.

57. Parrish, C.E., **N. Forfinski**, and **N. Wilson**, 2016. Advances in Seafloor Mapping with New Spaceborne and Airborne Lidar Systems. The 17th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 19-21 July, Silver Spring, Maryland.

58. Costa, B., T. Battista, C. Parrish, and **N. Wilson**, 2016. Evaluating the Utility of EAARL-B Lidar Waveforms for Mapping Coral Reef Habitats. The 17th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 19-21 July, Silver Spring, Maryland.

59. Kinney, J., M. Bogonko, M. White, A. Armstrong, E. Nagel, J. Dijkstra, C. Parrish and **N. Wilson**, 2016. Intensity and Reflectance for Habitat Mapping and Seafloor Characterization using the Superstorm Sandy Lidar Data. The 17th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 19-21 July, Silver Spring, Maryland.

60. Parrish, C.E., 2016. New Techniques in Bathymetric Mapping and Coastal Change Analysis: from UAVs to Satellites. OneNOAA Science Seminars, NOAA National Ocean Service. 18 July, Silver Spring, Maryland.

61. Freire, R., S. Pe'eri, L. Alexander, Y. Rzhanov, C.E. Parrish, and T.C. Lippmann, 2016, Use of Satellite Imagery for Monitoring the Mouths of Dynamic Rivers, 2016 Canadian Hydrographic Conference. 16-19 May, Halifax, Nova Scotia, Canada.

62. **Gillins, M.N.**, D.T. Gillins, and C. Parrish, 2016. Cost-Effective Bridge Safety Inspection using Unmanned Aircraft Systems (UAS). GEO Structures Congress 2016 14-17 Feb, Phoenix, Arizona.

63. **Gillins, M.N.**, D.T. Gillins, and C. Parrish, 2015. Bridge Inspection Using Unmanned Aircraft Systems (UAS), 2015 PacTrans Regional Transportation Conference, 15 Oct, Seattle, Washington.

64. Parrish, C. and **N. Wilson**, 2015. Topobathymetric Lidar Waveform Features for Habitat Mapping and Hurricane Sandy Response. The 16th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 16-18 June, Corvallis, Oregon.

65. Kinney, J., S. Wolfskehl, S. Bruce, M. Bongiovanni, C. Bongiovanni, A. Armstrong, E. Nagel, S. Pe'eri, and C. Parrish, 2015. Update on NOAA's IOCM Sandy Project for Charting & Habitat Mapping using Topobathymetric Lidar surveys. The 16th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 16-18 June, Corvallis, Oregon.

66. Price, V., J.A. Dijkstra, E. Nagel, J.P.M. O'Neil-Dunne, C.E. Parrish, and S. Pe'eri, 2015. Developing methodology for efficient eelgrass mapping across lidar systems. GEOHAB, 8-12 May, Salvador, Brazil.

67. Freire, R. [†], S. Pe'eri, B. Madore, Y. Rzhanov, L. Alexander, C. Parrish, and T. Lippmann, 2015. Monitoring Near-Shore Bathymetry using a Multi-Image Satellite-Derived Bathymetry Approach. *Proceedings of U.S. Hydro*, 16-19 March, National Harbor, Maryland.

68. Olsen, M.J, and C. Parrish, 2015. Picking through the points: considerations for lidar-based surveying. Professional Land Surveyors of Oregon (PLSO) Annual Meeting, 22 January, Salem, Oregon.

69. Parrish, C.E., and J. Dijkstra, 2014. Benthic Habitat Mapping in Barnegat Bay with Topographic-Bathymetric Lidar Waveform Features. European Lidar Mapping Forum (ELMF), 8-10 December, Amsterdam, The Netherlands.

70. Parrish, C.E., 2014. Keynote Address: Lidar: Trends, Opportunities and Challenges in a Rapidly-Evolving Field. ASPRS Columbia River & Puget Sound Regions, 17th Annual Technical Exchange, 5 November, Vancouver, Washington.

71. Olsen, M.J., D.T. Gillins and C. Parrish, 2014. The Civil Engineering Geomatics Program at Oregon State University. *LidarNews*, Vol. 4, No. 5.

72. Parrish, C.E., J. Rogers†, L. Ward, and J. Dijkstra, 2014. Enhanced Coastal Mapping using Lidar Waveform Features. The 15th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 10-12 June, Mobile, Alabama.

73. Aslaksen, M., and C. Parrish, 2014. New Topographic-Bathymetric Lidar Technology for Post-Sandy Mapping. Canadian Hydrographic Conference, 14-17 April, St. John's, Newfoundland, Canada.

74. McKenna, L., J. Dijkstra, and C. Parrish, 2014. Assessing hurricane Sandy impacts on benthic habitats in Barnegat Bay with new topographic-bathymetric LIDAR technology, AGU Ocean Sciences, 23-28 Feb, Honolulu, Hawaii.

75. Hartzell, P. †, C. Glennie, D. Finnegan, and C. Parrish, 2014. Application of Commercial LiDAR Systems for Active Multispectral Remote Sensing. *Proceedings of the International LiDAR Mapping Forum* (*ILMF*), 17-19 Feb, Denver, Colorado.

76. Parrish, C., and S. Pe'eri, 2014. Satellite Derived Bathymetry over the North Slope of Alaska using multispectral imagery. Arctic Science Forum: Science in Support of Hydrography in the Arctic, University of New Hampshire, 28-29 Jan, Durham, New Hampshire.

77. Pe'eri, S., C. Azuike, and C. Parrish, 2013. Satellite-derived Bathymetry: A Reconnaissance Tool for Hydrography, *Hydro International*, Vol. 17, No 7, pp. 16-19.

78. **Yao, F.**, C.E. Parrish, B.R. Calder, S. Peeri, and Y. Rzhanov, 2013. Photogrammetry-Derived National Shoreline: Uncertainty and Sensitivity Analyses. AGU Fall Meeting, 9-13 December, San Francisco, California.

79. Parrish, C.E., J. Rogers†, and B. Calder, 2013. Lidar Waveform Shape Metrics for Salt Marsh Mapping. The 14th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 6-7 August, Mobile, Alabama.

80. Fadahunsi, O. †, S. Pe'eri, C.E. Parrish, A.A. Armstrong, and L. Alexander, 2013. Spectral characterization of the Nigerian shoreline using Landsat imagery, *Proceedings of the US Hydrographic Conference*, 25-28 March, New Orleans, Louisiana.

81. Pe'eri, S., C.E. Parrish, L. Alexander, C. Azuike†, A.A. Armstrong, and M. Sault, 2013. Future directions in hydrography using satellite-derived bathymetry, *Proceedings of the US Hydrographic Conference*, 25-28 March, New Orleans, Louisiana.

82. Parrish, C.E., 2013. Lidar Waveform: A Practical Perspective. American Society of Photogrammetry and Remote Sensing (ASPRS) Annual Conference, 24-28 March, Baltimore, Maryland.

83. Parrish, C., S. White, M. Aslaksen, M. Pfennigbauer, P. Rieger, 2012. Topographic-Bathymetric LIDAR Evaluation for Integrated Ocean and Coastal Mapping. European LiDAR Mapping Forum (ELMF), 4-5 December, Salzburg, Austria.

84. Pe'eri, S., C. Azuike†, L. Alexander, C.E. Parrish, and A.A. Armstrong, 2012. Beyond the Chart: The use of Satellite Remote Sensing for Assessing the Adequacy and Completeness Information, Canadian Hydrographic Conference, 15-17 May, Niagara Falls, Ontario, Canada.

85. Fadahunsi, O. †, A.A. Armstrong, S. Pe'eri, L. Alexander, and C.E. Parrish, 2012. Developing a Methodology for the Mapping and Characterization of the Nigerian Coastline Using Remote Sensing, Canadian Hydrographic Conference, 15-17 May, Niagara Falls, Ontario, Canada.

86. Azuike, C. †, S. Pe'eri, L. Alexander, C.E. Parrish, and A.A. Armstrong, 2012. Development of a Geo-spatial Analysis Methodology for Assessing the Adequacy of Hydrographic Surveying and Nautical Charts, Canadian Hydrographic Conference, 15-17 May, Niagara Falls, Ontario, Canada.

87. Parrish, C.E., and **R. Osiri**, 2011. Lidar Wavelength Considerations and Radiometric Performance Analysis for Coastal Applications (*Invited*). American Geophysical Union (AGU) Fall Meeting, 5-9 December, San Francisco, California.

88. Parrish, C., 2011. New Developments in Lidar Waveform Processing and Radiometric Performance Analysis. The 12th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 21-22 June, Baltimore, Maryland.

89. Parrish, C., S. White, and M. Aslaksen, 2010. New Developments in Lidar Shoreline Mapping and Full-Waveform Lidar at NOAA. *Proceedings of European Lidar Mapping Forum (ELMF)*, 30 Nov - 1 Dec, The Hague, The Netherlands.

90. Parrish, C., and I. Jeong, 2010. Full-Waveform Lidar: Applications and Post-Processing Strategies. *Proceedings of ASPRS GeoTech*, 27-28 September, Fairfax, Virginia.

91. Parrish, C.E., S.A. White, B.R. Calder, S. Pe'eri, and Y. Rzhanov, 2010. Modeling Uncertainty in Lidar-Derived NOAA Shoreline. The 11th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 25-28 May, Mobile, Alabama.

92. Parrish, C.E., S.A. White, B.R. Calder, and S. Pe'eri, 2010. Stochastic Uncertainty Analysis for Lidar-Derived Shoreline and Comparison with New Experimental Results. AGU Ocean Sciences 2010 (poster session), 22-26 February, Portland, Oregon.

93. Wijekoon, N., C. Parrish, and G. Scott, 2009. Analysis of Lidar Leaf Penetration Indices for Selected Plant Species in a Coastal Marsh and Correlation with Terrain Elevation Accuracy. American Society of Photogrammetry and Remote Sensing (ASPRS) Annual Conference (poster session), 9-13 March, Baltimore, Maryland.

94. Parrish, C., J. Sellars, S. White, C. Bachmann, M. Montes, and R. Fusina, 2008. Shoreline Mapping with Lidar and HSI-Derived Bathymetry, ASPRS GeoTech Conference, 7-8 October, Silver Spring, Maryland.

95. Parrish, C., 2008. Improved Lidar Shoreline Mapping Using Spectrally-Derived Shallow-Water Bathymetry. The 9th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 17-18 June, San Francisco, California.

96. Parrish, C., 2008. New Approach to Autoextraction and Attribution of Airport Obstructions from LIDAR Data. Transportation Research Board (TRB) 87th Annual Meeting, 13-17 January, Washington, D.C.

97. Parrish, C., 2007. Vertical Object Identification in Full-Waveform Topographic Lidar Data. The 8th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 23-24 May, Seattle, Washington.

98. Parrish, C., 2007. Imaging in Various Regions of the EM Spectrum for Mapping the National Shoreline. ASPRS GeoTech, 3-4 April, Silver Spring, Maryland.

99. Parrish, C.E., and F.L. Scarpace, 2007. Detection of Vertical Objects in Full-Waveform Lidar Data Using a 3D Wavelet-Based Approach. *Proceedings of the American Society for Photogrammetry and Remote Sensing (ASPRS) Annual Conference*, 7-11 May, Tampa, Florida.

100. Sault, M., C. Parrish, S. White, J. Sellars, and J. Woolard, 2005. A Sensor Fusion Approach to Coastal Mapping. *Proceedings of the 14th Biennial Coastal Zone Conference*, 17-21 July, New Orleans, Louisiana.

101. White, S., M. Sault, C. Parrish, J. Woolard, and J. Sellars, 2005. A Multiple Sensor Approach to Shoreline Mapping. *Earth Observation Magazine (EOM)*, 14(5).

102. Parrish, C.E., M. Sault, S.A. White, J. Sellars, 2005. Empirical Analysis of Aerial Camera Filters for Shoreline Mapping. *Proceedings of the American Society for Photogrammetry and Remote Sensing (ASPRS) Annual Conference*, 7-11 March, Baltimore, Maryland.

103. Parrish, C., 2004. Data Fusion – Hyperspectral, Topo Lidar and High-Resolution Imagery. The 5th Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), 9-10 June, St. Petersburg, Florida.

104. Parrish, C., J. Woolard, B. Kearse, and N. Case, 2004. Airborne LIDAR Technology for Airspace Obstruction Mapping, *Earth Observation Magazine (EOM)*, 13(4).

105. Parrish, C., 2004. Using Lidar in Obstruction Chart Surveys. 83rd Transportation Research Board (TRB) Annual Meeting, 11-15 January, Washington, DC.

106. Parrish, C., 2003. Dual LIDAR Application and Evaluation. LIDAR Application Refinements Session, ASPRS GeoTech, 7-8 October, Silver Spring, Maryland.

107. Anderson, F., G. Tuell, and C. Parrish, 2002. Application of LIDAR for Airport Mapping and Obstacle Detection. The 3rd International LIDAR Workshop: Mapping Geo-Surficial Processes Using Laser Altimetry, 7-9 October, Columbus, Ohio.

108. Kearse, W.B., C. Parrish, J. Schiefele, A. Friedrich, and W. Kubbat, 2001. RTCA Special Committee 193/EUROCAE Working Group 44 Airport and Terrain Database Acquisition for Aviation Applications. *Proceedings of the 54th Annual International Air Safety Seminar (IASS)*, 5-8 November, Athens, Greece.

Professional Meetings, Symposia, and Conferences

Presentations to Professional Groups (includes presentations of papers cited above)

- Invited Talk: National Academies Committee on Solid Earth Geophysics Spring 2023 Meeting, "Remote Sensing Methods for Nearshore Bathymetry and Topography"
- Contributed talk, Riverine Symposium 2023, "Bathymetric Lidar Waveform Feature Analysis, Relative Reflectance Mapping and Benthic Habitat Mapping," March 2023
- Contributed talk, Pecora 2022, "Assessment of Satellite-Based Observations of Bathymetric Change," October 2022
- Contributed talk, OCEANS 2022, "ICESat-2 Bathymetry: Advances in Methods and Science," October 2022
- Contributed talk, Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "NOAA SatBathy," June 2022
- Invited talk, AGU Fall Meeting, "Advancing Measurement of Shallow Bathymetry from Space in Support of Coastal and Nearshore Science Objectives," December 2021

- Invited talk, PacTrans Webinar "UAS Applications in Transportation," June 2021, Online: https://www.youtube.com/watch?v=etCzHpxeVYU
- Invited talk, Caltrans UAS Surveying & Photogrammetry Working Group, "UAS for Geomatics Applications," April 2021
- Contributed talk: NASCC: The Virtual Steel Conference, World Steel Bridge Symposium, "Blue Skies – Bring in the Drones," April 2021
- Invited talk: BLUE UCI 2021, "Summary of 2018 NSF Seafloor Sensing Workshop & Recommendations," January 2021
- Contributed talk: AGU Fall Meeting, NASA ICESat-2 Applications Town Hall. December 2020
- Contributed talk: Oregon UAS Summit, Virtual Workshop, "Fundamentals of Direct Georeferencing (GNSS-aided INS)," October 2020
- Contributed talk: Caltrans UAS Workshop, "UAS-Based Lidar and Structure from Motion (SfM) Photogrammetry and Operational Implementation," February 2020
- Contributed talk, PLSO Annual Conference, "Surveying the Oregon Coast: Past, Present and Future," January 2020
- Contributed talk, Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "Empirical Analysis of ICESat-2's Bathymetric Mapping Capability," June 2019
- Contributed talk, OSBEELS Symposium, "Emerging Surveying and Mapping Technologies," September 2018
- Contributed talk, PacTrans UAS in Transportation Expo, "UAS Basics for Transportation," July 2018
- Contributed talk, Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "Operational TPU Software for Topobathymetric Lidar," June 2018
- Contributed talk, Joint Canadian Hydrographic and National Surveyors' Conference, "Topographic-Bathymetric Lidar Total Propagated Uncertainty Modeling," March 2018
- Invited talk, ODOT Surveyors Training Seminar, "ODOT/OSU Research Projects," March 2018
- Invited talk, Oregon State University, Civil and Construction Engineering (CCE) Resilience seminar series, "Enhancing Coastal Resilience with UAS, Lidar and Advanced Mapping Technologies," February, 2018
- Contributed talk, International LiDAR Mapping Forum (ILMF), "Total Propagated Uncertainty Modeling for Topobathymetric LiDAR," February 2018
- Contributed talk, Annual Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "Total Propagated Uncertainty Analysis for Topobathymetric Lidar," June 2017
- Contributed talk, GIS in Action, "Unmanned Aerial Systems," April 2017
- Contributed talk, Professional Land Surveyors of Oregon (PLSO) 2017 Conference, "Surveying with Drones, Lasers, and Explosions," January 2017
- Contributed talk, NASA Melting Ice, Rising Sea Level Focus Session: Monitoring and Forecasting the Coastal and Marine Environment, November 2016
- Contributed talk, ORURISA UAS Symposium by the Sea, "UAS for Structural Inspections and OregonView STEM Education Initiatives," September 2016

- Contributed talk, Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "Advances in Seafloor Mapping with New Spaceborne and Airborne Lidar Systems," July 2016
- Contributed talk, OneNOAA Science Seminars, NOAA National Ocean Service, "New Techniques in Bathymetric Mapping and Coastal Change Analysis: from UAVs to Satellites," July, 2016
- Contributed talk, Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "Topobathymetric Lidar Waveform Features for Habitat Mapping and Hurricane Sandy Response," June 2015
- Contributed talk, European Lidar Mapping Forum, "Benthic Habitat Mapping in Barnegat Bay with Topographic-Bathymetric Lidar Waveform Features," December 2014
- Keynote address, ASPRS Columbia River & Puget Sound Regions, 17th Annual Technical Exchange, "Lidar: Trends, Opportunities and Challenges in a Rapidly-Evolving Field," November 2014
- Contributed talk, Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "Enhanced Coastal Mapping using Lidar Waveform Features," June 2014
- Invited talk, University of New Hampshire: Arctic Science Forum: Science in Support of Hydrography in the Arctic, "Satellite Derived Bathymetry over the North Slope of Alaska using multispectral imagery," January 2014
- Contributed talk, Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "Lidar Waveform Shape Metrics for Salt Marsh Mapping," August 2013
- Contributed talk, American Society of Photogrammetry and Remote Sensing (ASPRS) Annual Conference, "Lidar Waveform: A Practical Perspective," March 2013
- Contributed talk, European LiDAR Mapping Forum (ELMF), "Topographic-Bathymetric LIDAR Evaluation for Integrated Ocean and Coastal Mapping," December 2012
- Invited talk, American Geophysical Union (AGU) Fall Meeting, "Lidar Wavelength Considerations and Radiometric Performance Analysis for Coastal Applications," December 2011
- Contributed talk, Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "New Developments in Lidar Waveform Processing and Radiometric Performance Analysis," June 2011
- Contributed talk, European Lidar Mapping Forum, "New Developments in Lidar Shoreline Mapping and Full-Waveform Lidar at NOAA," December 2010
- Contributed talk, ASPRS GeoTech, Full-Waveform Lidar: Applications and Post-Processing Strategies, September 2010
- Contributed talk, OSA Optical Remote Sensing of the Environment (ORS), "New Approaches for Evaluating Lidar-Derived Shoreline," June 2010
- Contributed talk, Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "Modeling Uncertainty in Lidar-Derived NOAA Shoreline," May 2010

- Contributed talk, ASPRS GeoTech, "Shoreline Mapping with Lidar and HSI-Derived Bathymetry," October 2008
- Contributed talk, Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "Improved Lidar Shoreline Mapping Using Spectrally-Derived Shallow-Water Bathymetry," June 2008
- Contributed talk, Transportation Research Board (TRB) Annual Meeting, "New Approach to Autoextraction and Attribution of Airport Obstructions from LIDAR Data," January 2008
- Contributed talk, IEEE International Geoscience and Remote Sensing Symposium, "Exploiting Full-Waveform Lidar Data and Multiresolution Wavelet Analysis for Vertical Object Detection and Recognition," July 2007
- Contributed talk, Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), Vertical Object Identification in Full-Waveform Topographic Lidar Data, May 2007
- Contributed talk, ASPRS GeoTech, "Imaging in Various Regions of the EM Spectrum for Mapping the National Shoreline," April 2007
- Contributed talk, American Society for Photogrammetry and Remote Sensing (ASPRS) Annual Conference, "Detection of Vertical Objects in Full-Waveform Lidar Data Using a 3D Wavelet-Based Approach," May 2007
- Contributed talk, American Society for Photogrammetry and Remote Sensing (ASPRS) Annual Conference, "Empirical Analysis of Aerial Camera Filters for Shoreline Mapping," March 2005
- Contributed talk, Coastal Mapping & Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), "Data Fusion – Hyperspectral, Topo Lidar and High-Resolution Imagery," June 2004
- Contributed talk, Transportation Research Board (TRB) Annual Meeting, "Using Lidar in Obstruction Chart Surveys," January 2004
- Contributed talk, ASPRS GeoTech, "Dual LIDAR Application and Evaluation," October 2003

Participation at Invitational Workshops

- Interagency Working Group on Ocean and Coastal Mapping, IWG-OCM Workshop, October 2012
- NOAA IOCM Workshop, September 2012
- NOAA IOCM Workshop, March 2009
- Interagency Working Group on Ocean and Coastal Mapping, IWG-OCM Workshop, September 2007

Grant and Contract Support

Agency & Dates	*PI (and coPIs)*	*Title*	*Total Budget*	*My Share*
NOAA NGS (10/23 – 9/28)	Parrish, C., Olsen, M.,	NSRS Modernization and	$6,520,280	$3,530,492

	Park, J., Simpson, C., Wang, C., Seaton, C., and Bandrowski, D.J.	Geodetic Workforce Development in the Arctic and Pacific Region		
NOAA NGS (9/23 – 9/24)	Parrish, C.	Advanced Geospatial Technologies for Mapping, Modeling, and Monitoring the Coastal Zone	$316,038	$316,038
Arete (11/22 – 10/23)	Parrish, C.	Total Propagated Uncertainty Modeling and cBLUE Support for PILLS	$85,118	$85,118
FHWA (9/22 – 2/25)	Turkan, Y., M.O. Olsen, C. Parrish. J. Jung, C. Simpson, D. Tran, R. Chen, and D. Harris	Guidelines for Digital Technologies and Systems for Remote Construction Inspection for Highway Infrastructure Projects, Federal Highway Administration	$500,000	$ 27,837
NASA (9/22 - 8/24)	Parrish., C., and J. Jung	ICESat-2 Along-Track Bathymetry Product Development	$497,115	$341,930
NOAA (9/22 – 9/23)	Parrish, C.	Satellite Altimetry and Sea Surface Modeling for VDatum in Alaska	$112,429	$112,429
ODOT (10/21 – 6/24)	M.J. Olsen, J. Jung, E. Che, Y. Turkan, and C. Parrish	Automating Lidar Data to Develop and Manage Active Transportation Asset Inventories	$250,000	$0
NASA (9/21 - 8/24)	Jasinski, M., J. Borak, C. Parrish, H. Gao, J. Stoll	Shallow Water Bathymetry Products and Analysis for Near-	$571,459	$54,000

		Shore Coastal and Inland Waters		
NOAA (9/21 – 8/22)	Parrish, C.	Bathymetric Lidar Waveform Analysis and Algorithm Development for Characterizing Coral Reef Morphologies	$105,750	$105,750
NOAA (10/21 – 9/22)	Parrish, C.	Enhanced VDatum Modeling in the Pacific using Multi-Mission Satellite Altimetry Data	$108,997	$108,997
AmericaView (USGS) (9/21 - 9/24)	Parrish, C.	StateView Program Development and Operations for the state of Oregon (GY 22, 23, and 24)	$72,499	AmericaView (USGS) (9/21 - 9/24)
NOAA (10/21 - 9/26)	Chan, F., T. Baumberger, M. Banks, J. Barth, L. Ciannelli, M. Kavanaugh, S. Heppell, C. Parrish, A. Spalding, J. Beeson	Cooperative Institute for Marine Ecosystem and Resources Studies (CIMERS)	$37,000,000 (award ceiling)	Covered elsewhere in this table
UNH (NOAA) (1/21 - 12/25)	C. Parrish	Emerging Remote Sensing Technologies for Ocean and Coastal Mapping and Hydrographic Workflows (OSU Proposal in Support of UNH Joint Hydrographic Center: 2021-2025)	$708,439	$708,439
WSP (FHWA) (1/20 – 12/21)	Turkan Y., M. Olsen, C. Parrish, C. Simpson	FHWA Every Day Counts 5 (EDC5) Unmanned Aerial Systems	$147,500	$32,059
AmericaView (USGS) (9/20 – 9/21)	C. Parrish	OregonView: Landsat Bathymetric	$23,500	$23,500

		Mapping: Documenting Requirements, Capabilities and Opportunities		
NOAA (9/20 - 12/22)	C. Parrish	Marine Debris Detection Using UAS, Polarimetric Imaging, and Machine Learning	$298,861	$298,861
UCAR (NOAA) (8/20 – 9/21)	C. Parrish, and M. Wengrove	VDatum Modeling for Puerto Rico and the U.S. Virgin Islands: Satellite Altimetry, Mean Sea Surface, and Mean Dynamic Topography (Puerto Rico Preliminary Modeling)	$299,999	$203,181
NOAA (7/20-9/21)	C. Parrish	Satellite Altimetry for Enhanced NOS Modeling Capabilities in the Northern Pacific	$102,898	$102,898
ODOT (7/20-12/22)	M. Olsen, B. Leshchinsky, S. Dundas, C. Parrish, and J. Allan	US Highway 101 Coastal Hazard Vulnerability and Risk Assessment for Mitigation Prioritization	$289,500	$60,000
NOAA (7/20 – 7/21)	C. Parrish	High-Accuracy Kinematic Positioning for UAS for Shoreline Verification and Hydrographic Surveying Workflows	$23,833	$23,833
NASA (7/20 – 7/23)	L. Magruder, and C. Parrish	ICESat-2 bathymetric studies, product development, validation and continuity	$714,954	$369,578

NASA (4/20 – 3/21)	C. Parrish	Shallow Water Bathymetry - STV Incubation Program Study Team	$90,180	$90,180
PacTrans (4/20 – 10/20)	C. Parrish, and C. Simpson	Unmanned Aircraft Systems in Transportation: Research-to-Operation (R2O) Peer Exchange	$10,000	$5,000
NSF (9/19 – 8/20)	M. Olsen, M. Bailey, Y. Turkan, C. Parrish, and J. Park	Planning Grant: Engineering Research Center for Built Infrastructure Geospatial Data Acquisition, Visualization, and Analysis (BIGDAVA)	$99,999	$20,000
NOAA (8/19 – 7/20)	C. Parrish	Bathymetric Lidar Workforce Development	$26,475	$26,475
AmericaView (USGS) (9/19 – 9/20)	C. Parrish	OregonView: Netarts Bay Bathymetric Data Fusion using Satellite Imagery (Request for Continuing Support)	$23,500	$23,500
NOAA (8/19 – 9/20)	C. Parrish	Operational Implementation of Unmanned Aircraft Systems for NOAA Coastal Mapping, Monitoring and Survey Reconnaissance	$81,966	$81,966
Oregon Dept of Parks & Recreation (4/19 – 4/20)	C. Parrish (PI)	Methods and Recommendations for Readjustment of Ocean Shore Control for Aerial Photography and Coastal Change Analysis	$35,000	$35,000

AmericaView (USGS) (9/18 – 9/19)	C. Parrish (PI)	OregonView	$23,500	$23,500
NOAA (7/18 – 9/19)	C. Parrish (PI)	Leveraging UAS, ASVs and Emerging Sensor Technologies for Mapping and Monitoring of Shallow Coral Reef Environments	$82,929	$82,929
PacTrans Region 10 University Transportation Center (8/18 – 8/20)	M. Olsen (PI), and C. Parrish	Efficient Extraction and Evaluation of Complex Pavement Markings from Mobile Laser Scan Data	$30,000	$15,000
Spatial Informatics Group (Tahoe Regional Planning Agency) (9/18-4/19)	C. Parrish (PI)	Lake Tahoe Aquatic Plant Monitoring with Advanced Remote Sensing	$22,750	$22,750
Federal Aviation Administration (9/18-12/18)	J.A. Adams (PI), and C. Parrish	ASSURE: Kickoff Meeting	$10,000	$0
PacTrans Region 10 University Transportation Center (4/18-7/18)	M. Olsen (PI), and C. Parrish	3D Virtual Visibility Analysis Program	$10,000	$5,000
PacTrans Region 10 University Transportation Center (3/18-8/18)	C. Parrish (PI)	Unmanned Aircraft Systems in Transportation: Research to Operations Expo	$8,822	$8,822
NSF (4/18 – 3/19)	C. Parrish (PI), A. Trehu, H. Mason, J. Selker, and G. Hollinger	Integrating Science Needs with Advanced Seafloor Sensor Engineering to Provide Early Warning of	$50,000	$50,000

		Geohazards: Visioning Workshop and Roadmap for the Future		
PacTrans Region 10 University Transportation Center (9/17-9/19)	C. Parrish (PI), S. Sorour, A. Abdel-Rahim, and D. Hurwitz	An Airborne Lidar Scanning and Deep Learning System for Real-time Event Extraction and Control Policies in Urban Transportation Networks	$180,000	$80,000
NOAA (UNH), 1/17-12/20	C. Parrish (PI)	Total Propagated Uncertainty Analysis for Topographic-Bathymetric Lidar	$338,162	$338,162
NOAA 10/16-9/18	C. Parrish (PI)	Seafloor Reflectance Mapping for the U.S. Virgin Islands (2017-2018 sub-project: Optimizing UAS Imagery Acquisition and Processing for Shallow Bathymetric Mapping)	$96,682	$96,682
ODOT 9/16-8/17	Y. Zhang (PI), and C. Parrish	Rumble Strip Patterns	$92,577	$30,000 (estimate)
DOE/Bonneville Power Administration 9/16-8/19	R. Albertani (PI), C. Parrish, J. Cotilla-Sanchez, and Y. Turkan	Unmanned Aircraft Systems Power Equipment Inspections: Optimizing Workflows and Automation Tools	$562,252 (Note: project was canceled by sponsor in 2017)	$84,300 (estimate) (Note: project was canceled by sponsor in 2017)
ODOT 7/16-6/18	M. Olsen (PI), and C. Parrish	Lidar for Maintenance of Pavement Reflective Markings and Retro-Reflective Signs	$165,000	$82,500

ODOT 10/15-1/18	D. Gillins (PI, 2015-2016), and C. Parrish (PI, 2016-2018)	Eyes in the Sky: Bridge Inspections with Unmanned Aerial Vehicles	$180,000	$80,993
Parsons Brinckerhoff Inc. (FHWA) 10/15-4/17	M. Olsen (PI), C. Parrish, and D. Gillins	Effective Use of Geospatial Tools in Highway Construction	$65,314	$20,000
NOAA 10/15-9/17 (selected in 2 funding cycles)	D. Gillins (PI), C. Parrish, and M. Olsen	Towards Optimizing the Determination of Accurate Heights using GNSS	$200,493	$37,500
NOAA 10/15-9/18	S. Dundas (PI), D. Lewis, C. Parrish, S. Hacker, P. Ruggiero, D. Kling, D. Cox	Assessing the Benefits of Natural Infrastructure for Shoreline Stabilization: Ecosystem Service Valuation for Decision-making in Coastal Communities	$1,300,000	$150,000 (estimate)
AmericaView (USGS) 8/15-6/17 (selected in 2 funding cycles)	C. Parrish (PI)	OregonView	$38,500	$38,500
NOAA 7/15-9/16	C. Parrish (PI)	Seafloor Reflectance Mapping from EAARL-B Topobathymetric Lidar Data in the U.S. Virgin Islands	$27,765	$27,765
NASA 7/15-9/18	C. Parrish (PI), and C. Glennie	ICESat-2 ATLAS Algorithm Development in Support of Coastal Geomorphology and Coastal Zone Management	$445,677	$270,476
PacTrans Region 10 University Transportation	D. Gillins (PI), and C. Parrish	Cost-Effective Bridge Safety Inspection using Unmanned Aerial Vehicles (UAVs)	$39,785	$19,892

Center 1/15-12/15				
University of New Hampshire (NOAA) 10/14-9/15	C. Parrish (PI)	Super Storm Sandy Lidar Waveform Analysis	$21,642	$21,642
USGS 10/12-10/14	C. Parrish (PI)	EAARL-B Lidar Validation, Calibration, and Algorithm Development	$25,000	$25,000 (as NOAA NGS budget)
National Research Council (NRC), Transportation Research Board (TRB) Airport Cooperative Research Program 10/07-10/09	W. Uddin (PI), C.Parrish	Light Detection and Ranging (LIDAR) Deployment for Airport Obstruction Surveys	$350,000	$30,000 (as NOAA NGS budget)
		Totals	$53,483,139	$8,428,474

Donations

Year	*Source*	*Donation*	*Approx Value*
2023	Seafloor Systems	EchoCart with LARS	$9,635
2021	Seafloor Systems	EchoBoat-160, Autonomous Surface Vehicle	$53,000
2021	Seafloor Systems	SEA2001- HyDrone Autonomous Surface Vehicle	$8,000
2020	Seafloor Systems	EchoBoat-160, Autonomous Surface Vehicle, AutoNav, PicoMB-120 multibeam echosounder	$116,005
2018	Seafloor Systems	SEA2001- HyDrone Autonomous Surface Vehicle	$7,500

Service

University Service

- CCE Diversity, Equity, and Inclusion (DEI) Do-Group, 2020 - present

- CCE Promotion and Tenure Subcommittee Chair, 2022-2023 and 2024-2025
- OSU NOAA Strategy Working Group, 2020 - present
- Chair, Graduate Committee, Oregon State University, CCE, 2016 - 2020
- Science Advisory Council, Oregon State University, Cooperative Institute for Marine Ecosystem and Resources Studies (CIMERS, previously CIMRS), 2015 - present
- Robert E. Malouf Marine Studies Scholarship Review Committee, Oregon Sea Grant College Program, 2016
- Graduate Recruiting Committee, Oregon State University, CCE, 2014 - 2016
- Faculty Search Committee, Oregon State University, CEOAS, Assistant Professor of Geospatial Analytics and Assistant/Associate Professor of Geospatial Intelligence and Planning (both in support of Provost's Initiative in Marine Studies), 2014 - 2015
- School of Civil and Construction Engineering, Undergraduate Committee, 2015 - 2016

Service to the Profession

Journal Editorships

- Co-Guest Editor, Special Issue of *Remote Sensing* on Multi-Source Data Observations of Shallow Water Area - Methods, Ecosystem, Geomorphology and Environment, 2022-2023
- Editorial Board, *Journal of Surveying Engineering*, 2019 - present
- Associate Editor, *Marine Geodesy*, 2009 - 2015
- Co-Guest Editor, Special Issue of *Journal of Coastal Research* on Advances in Topobathymetric Mapping, Models, and Applications, 2014 - 2015

Conference and Workshop Organization

- Chair, NSF Seafloor Sensors Workshop, 2018
- Chair, UAS in Transportation Expo, 2018
- Surveying and Geomatics Educators Society (SaGES) OSU Conference Organizing Committee, 2017
- Conference Chair, ASPRS GeoTech, 2009
- Host, Coastal Mapping and Charting Workshop of the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX) 2015, LaSells Stewart Center, OSU, 2015

Conference Program Committees

- Co-Chair, Vision, Lidar, and Inertial Technologies for GNSS-Denied Navigation Session at ION GNSS+ 2018. The 31st International Technical Meeting of the Satellite Division of the Institute of Navigation, 2018
- Program Chair, Optical Society of America (OSA), Optical Remote Sensing of the Environment, 2012
- Program Committee, ASPRS GeoTech 2010
- Program Chair, Optical Society of America (OSA), Optical Remote Sensing of the Environment, 2010

Reviewing

- *Sustainable and Resilient Infrastructure*, 2024
- *International Journal of Applied Earth Observation and Geoinformation*, 2024
- *Geophysical Research Letters*, 2020
- *PFG – Journal of Photogrammetry, Remote Sensing and Geoinformation Science*, 2020
- *Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 2020
- *Computers and Geosciences*, 2019
- *Journal of Photogrammetry and Remote Sensing*, 2019
- *Eos*, American Geophysical Union, 2019
- *Journal of Waterway, Port, Coastal, and Ocean Engineering*, 2018
- *Remote Sensing of Environment*, 2017
- *Remote Sensing, 2015, 2016, 2017, 2018, 2019, 2020, and 2023*
- *International Journal of Remote Sensing*, 2012
- *Journal of Oceanic Engineering*, 2008
- *Journal of Surveying Engineering*, 2008, 2011, 2014, 2015, 2018, and 2022
- *Optics and Lasers in Engineering*, 2009
- *Journal of Coastal Research (JCR)*, 2010, 2011, and 2015
- *Transportation Research Record* and Transportation Research Board (TRB) Annual Meeting proceedings, 2010
- *Transactions on Geoscience and Remote Sensing*, 2010, 2012, 2014, 2015, 2016, and 2022, 2024
- *Surveying and Land Information Science (SaLIS)*, 2014, 2016, 2017, 2019, and 2020
- *Geoscience and Remote Sensing Letters*, 2013, and 2020
- *Photogrammetric Engineering & Remote Sensing (PE&RS)*, 2011, 2012, 2015, and 2016
- *Applied Optics*, 2014

- Grants:
  - National Science Foundation (NSF), Division of Ocean Sciences (OCE), Ocean Technology and Interdisciplinary Coordination, 2019, 2023
  - Kentucky Science and Engineering Foundation (KSEF), University Industry Research Partnership (UPAIR) Program, 2018
  - NSF, Geography and Spatial Sciences (GSS) Program, 2017
  - National Academies of Sciences, Engineering, and Medicine, Gulf Research Program, 2017
  - AmericaView, 2016-2022
  - NASA ROSES, 2014
  - NASA, 2022
  - NSF 2013
  - University of Puerto Rico Sea Grant College Program, 2011
  - Ohio Sea Grant College Program, 2011 and 2013
  - U.S. Army Corps of Engineers (USACE) Engineer Research and Development Center (ERDC) basic research (6.1) proposals, 2013 and 2016
  - NOAA SBIR, 2022

Other

- President, American Society for Photogrammetry and Remote Sensing (ASPRS), 2022
- Board Officer, ASPRS, 2020-2023
- Chair, Bathymetry Working Group of the NASA ICESat-2 Science Team, 2021 – present
- NASA Surface Topography and Vegetation (STV) Incubation Study Team, Coastal Processes/Shallow Bathymetry Lead, 2020-2021
- NASA ICESat-2 Early Adopter, 2018 – present
- Director, OregonView, 2015 – present
    - StateView under the AmericaView Consortium, a nationwide partnership of remote sensing scientists who support applied remote sensing research, K-12 Grade and higher STEM education, workforce development, and technology transfer
- Director, ASPRS Lidar Division, 2014 - 2016
- President, ASPRS Potomac Region, 2011
- Board Officer, ASPRS Potomac Region, 2009 - 2012
- American Geophysical Union, 2009 - present
- IEEE and IEEE Geoscience and Remote Sensing Society (GRS), 2007 - present
- Optical Society of America (OSA), 2009 – present

Committee/Boards

- ASPRS Diversity Task Force, Co-Chair, 2020 - present
- Bathymetry Working Group of NASA ICESat-2 Science Team, Co-Chair, 2021 – present
- NASA ICESat-2 Algorithm Theoretical Basis Document (ATBD) External Review Panelist, 2015
- Chair, National Coastal Mapping Strategy (NCMS) Committee of the Interagency Working Group on Ocean and Coastal Mapping, 2014
- National Ocean Service (NOS) Coastal Science Board, 2013 - 2014
- National Geodetic Survey (NGS) Coastal Mapping Board, 2008 - 2014
- Interagency Lidar Steering Committee, 2011 - 2014

Service to the Public

Professionally Related

- **K-12 Outreach/Education:**
    - Developed bathymetric lidar demonstration and presented it to K-12 school groups at Know the Coast Day (2012) and at Ocean Discovery Day (2013) at UNH Marine Program Labs
    - Developed and taught K-12 Remote Sensing Workshop within OregonView. To date, this workshop has been given twice to Oregon middle school students: once in February, 2016 and once in May, 2016
    - Sponsored (through OregonView) lidar/remote sensing demonstration, led by graduate student, Selina Lambert, at OSU Discovery Days: K-8 outreach event

Awards

National and International Awards

Talbert Abrams Award, with student lead author, Forrest Corcoran, ASPRS, 2024

ASPRS Outstanding Service Award, ASPRS, 2024

Claude F. Birdseye Award, ASPRS, 2023

ASPRS Outstanding Service Award, ASPRS, 2022

Outstanding Reviewer Award, *Journal of Surveying Engineering*, 2017

Sebastian Sizgoric Technical Achievement Award, presented by the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), in recognition of exemplary contributions in the field of light detection and ranging (lidar) bathymetry and airborne coastal mapping and charting, 2014

Talbert Abrams Award (Grand Award) for the peer-reviewed publication having the greatest merit by any or all of the recognized standards of originality, practical and theoretical value, clarity of exposition, and general interest, ASPRS, 2012

ERDAS Award for best scientific paper in remote sensing (3rd Prize Award), ASPRS, 2012

ASPRS John I. Davidson Award (2nd Prize) for best practical paper in peer-reviewed journal, ASPRS, 2006

State and Regional Awards

Potomac Region Member of the Year Award, ASPRS Potomac Region, 2011

PacTrans Outstanding Researcher Award, Pacific Northwest Transportation Consortium, 2020

University or Community Awards

Research Excellence Award, OSU School of Civil and Construction Engineering, 2017-2018