

Jaehoon Jung, Ph.D.

Assistant Professor, Senior Research

Geomatics, School of Civil and Construction Engineering

Oregon State University

101 Kearney Hall, Corvallis, OR 97331, USA, (541) 737-4934

CTO, EZDataMD LLC: <https://lidartools.com/>

Email: jaehoon.jung@oregonstate.edu

Google scholar profile: <https://scholar.google.co.kr/citations?user=cHZB52QAAAAJ&hl=en>

EDUCATION

- | | | | |
|----------|---|-------------------|------|
| 1. Ph.D. | Civil and Environmental Engineering (Geomatics) | Yonsei University | 2014 |
| 2. B.S. | Civil and Environmental Engineering | Yonsei University | 2007 |

PROFESSIONAL EMPLOYMENT

- | | | | |
|--------|-----------------------|--------------|----------------|
| 1. CTO | Tech transfer company | EZDataMD LLC | 2021 - Present |
|--------|-----------------------|--------------|----------------|

ACADEMIC EMPLOYMENT

- | | | | |
|-------------------------------|-------------------------------------|-------------------------|----------------|
| 1. Assistant Professor (S.R.) | Civil and Construction Engineering | Oregon State University | 2021 - Present |
| 2. Research Associate | Civil and Construction Engineering | Oregon State University | 2017 - 2020 |
| 3. Visiting Researcher | Department of Photogrammetry | University of Bonn | 2015 - 2016 |
| 4. Research Associate | Civil and Environmental Engineering | Yonsei University | 2014 - 2015 |

PUBLICATIONS

BOOK CHAPTERS

- Olsen, M.J., **Jung, J.**, Che, E., and Parrish C. (2022) "Surveying and Geomatics Engineering: Principles, Technologies, and Applications - Chapter 9: Mobile Terrestrial Laser Scanning and Mapping", *American Society of Civil Engineers*, pp. 303-340, <https://doi.org/10.1061/9780784416037.ch9>
- Turkan, Y., Bolkas D., **Jung, J.**, O'banion M.S., and Bunn, M. (2022) "Surveying and Geomatics Engineering: Principles, Technologies, and Applications - Chapter 14: Information Systems in Civil Engineering", *American Society of Civil Engineers*, pp. 451-487, <https://doi.org/10.1061/9780784416037.ch14>

PEER-REVIEWED JOURNAL ARTICLES

- Jung, J.**, Parrish, C. E., Callahan, B., & Dennis, M. L. (2022) "Recovery and Readjustment of Historical Ocean Coast Control Stations in Oregon", *Journal of Surveying Engineering*, 148(2), 05021007.
- Jung, J.**, Lee, J., and Parrish, C. E. (2021) "Inverse Histogram-Based Clustering Approach to Seafloor Segmentation from Bathymetric Lidar Data", *Remote Sensing*, 13(18), 3665
- Che, E., Olsen, M.J., and **Jung, J.**, (2021) "Efficient segment-based ground filtering and adaptive road detection from mobile light detection and ranging (LiDAR) data", *International Journal of Remote Sensing*, 42(10), 3633-3659
- Jung, J.**, Che, E., Olsen, M.J., and Shafer K.C. (2020) "Automated and Efficient Powerline Extraction from Lidar Data using an Intelligent Subsampling based Hierarchical Approach", *ISPRS Journal of Photogrammetry and Remote Sensing* 163, 343-361
- Kim, B., Kim, C., Han, S., Bae J., and **Jung, J.** (2020) "Is it a good time to develop commercial photovoltaic systems on farmland? An American-style option with crop price risk", *Renewable & Sustainable Energy Reviews* 125, 109827
- Heo, J., **Jung, J.**, Kim, B., Han, S. (2020) "Digital elevation model-based convolutional neural network modeling for searching of high solar energy regions: a case study in South Korea", *Applied Energy* 262, 114588
- Jung, Y., **Jung, J.**, Kim, B., and Han, S. (2020) "Long-short term memory recurrent neural network for modeling of temporal patterns in long-term power forecasting of solar PV facilities: case study of South Korea", *Journal of Cleaner Production* 250, 119476
- Kim, B., Han, S., Heo, J., and **Jung, J.** (2020) "Proof-of-concept of a two-stage approach for selecting suitable slopes on a highway network for solar photovoltaic systems: a case study in South Korea", *Renewable Energy* 151, 366-377

9. Eren, F., **Jung, J.**, Parrish, C., Forfinski-Sarkozi, N, and Calder, B. (2019) "Total Vertical Uncertainty (TVU) modeling for topo-bathymetric lidar systems", *Photogrammetric Engineering & Remote Sensing* 85(8), 585-596
10. Che, E., Olsen, M.J., Parrish, C., and **Jung, J.** (2019) "Pavement Marking Retroreflectivity Estimation and Evaluation using Mobile Lidar Data", *Photogrammetric Engineering & Remote Sensing* 85(8), 573-583
11. **Jung, J.**, Han, S., and Kim, B. (2019) "Digital Numerical Map-Oriented Estimation of Solar Energy Potential for Site Selection of Photovoltaic Solar Panels on National Highway Slopes", *Applied Energy* 242, 57-68
12. Che, E., **Jung, J.**, and Olsen, M.J. (2019) "Object Recognition, Segmentation, and Classification of Mobile Laser Scanning Point Clouds: State of the Art Review", *Sensors* 19(4), 810
13. **Jung, J.**, Che, E., Olsen, M.J., and Parrish C. (2019) "Efficient and robust lane marking extraction from mobile lidar point clouds", *ISPRS Journal of Photogrammetry and Remote Sensing* 147, 1-18
14. **Jung, J.**, Stachniss, C., Ju, S., and Heo, J. (2018) "Automated 3D volumetric reconstruction of building interior with multiple rooms for as-built BIM", *Advanced Engineering Informatics* 38, 811-825
15. **Jung, J.**, Olsen, M.J., Hurwitz D.S., Kashani A.G., and Buker K. (2018), "3D virtual intersection sight distance analysis using lidar Data", *Transportation Research Part C: Emerging Technologies* 86, 563-579
16. **Jung, J.**, Stachniss, C., and Kim, C. (2017) "Automatic room segmentation of 3D laser data using morphological processing", *ISPRS International Journal of Geo-Information* 6(7), 206
17. Kim, C., Habib, A., Pyeon, M., Kwon, G., **Jung, J.**, and Heo, J. (2016) "Segmentation of planar surfaces from laser scanning data using the magnitude of normal position vector for adaptive neighborhoods", *Sensors* 16(2), 140
18. **Jung, J.**, Hong, S., Yoon, S., Kim, J., and Heo, J. (2016) "Automated 3D wireframe modeling of indoor structures from point clouds using constrained least squares adjustment for as-built BIM", *Journal of Computing in Civil Engineering* 30(4), 04015074
19. Kim, S., Kim, J., **Jung, J.**, and Heo, J. (2015) "Development of a 3D underground cadastral system with indoor mapping for as-built BIM: the case study of Gangnam subway station in Korea", *Sensors* 15(12), 30870-30893
20. **Jung, J.**, Kim, S., Yoon, S., and Heo, J. (2015) "Development of kinematic 3D laser scanning system for indoor mapping and As-Built BIM using constrained SLAM approach", *Sensors* 15(10), 26430-26456
21. Nguyen, H.C., **Jung, J.**, Lee, J., Choi, S., Hong, S., and Heo, J. (2015) "Atmospheric correction on estimation of above-ground biomass based on remote sensing method", *Sensors* 15(8), 18865-18886
22. Hong, S., **Jung, J.**, Kim, S., Cho, H., Lee, J., and Heo, J. (2015) "Semi-automated approach to indoor mapping for 3D as-built building information modeling", *Computers, Environment and Urban Systems* 51, 34-46
23. **Jung, J.**, Kim, J., Yoon, S., Kim, S., Cho, H., and Heo, J. (2015) "Bore-sight Calibration of Multiple Laser Range Finders for Developed Kinematic 3D Laser Scanning System", *Sensors* 15(5), 10292-10314
24. Luo, W., Pingel, T., Heo, J., Howard, A., and **Jung, J.** (2015) "A progressive black top hat transformation algorithm for estimating valley volumes on Mars", *Computers & Geosciences* 75, 17-23
25. **Jung, J.**, Hong, S., Jeong, S., Kim, S., Cho, H., Hong, S., and Heo, J. (2014) "Productive modeling for development of as-built BIM of existing indoor structures", *Automation in Construction* 42, 68-77
26. Jeong, S., **Jung, J.**, Kim, S., Hong, S., Sohn, H., and Heo, J. (2014) "Buffering-based approach to fluctuation analysis of glacier calving fronts using Landsat-7 ETM+, with a case study of Jakobshavn Isbræ", *Computers & Geosciences* 64, 115-125
27. **Jung, J.**, Kim, S., Hong, S., Kim, K., Kim, E., Im, J., and Heo, J. (2013) "Effects of national forest inventory plot location error on forest carbon stock estimation using k-nearest neighbor algorithm", *ISPRS Journal of Photogrammetry and Remote Sensing* 81, 82-92
28. **Jung, J.**, Kim, C., Jayakumar, S., Kim, S., Han, S., Kim, D., and Heo, J. (2013) "Forest fire risk mapping of Kolli Hills, India, considering subjectivity and inconsistency issues", *Natural hazards* 65(3), 2129-2146
29. Heo, J., Jeong, S., Park, H., **Jung, J.**, Han, S., Hong, S., and Sohn, H. (2013) "Productive high-complexity 3D city modeling with point clouds collected from terrestrial lidar", *Computers, Environment and Urban Systems* 41, 26-38
30. Han, S., Kim, S., **Jung, J.**, Kim, C., Yu, K., and Heo, J. (2012) "Development of a hashing-based data structure for the fast retrieval of 3D terrestrial laser scanned data", *Computers & Geosciences* 39, 1-10
31. Han, S., Cho, H., Kim, S., **Jung, J.**, and Heo, J. (2012) "Automated and efficient method for extraction of tunnel cross sections using terrestrial laser scanned data", *Journal of Computing in Civil Engineering* 27(3), 274-281
32. Kim, C., Heo, J., Lee, J., Han, S., **Jung, J.**, and Jayakumar, S. (2012) "A synergetic approach to estimating timber age using integrated remotely sensed optical image and InSAR height data", *International Journal of Remote Sensing* 33(1), 243-260

1. Heo, J., Park, B., Jung, Y., Jung, J., Kim, B., and Han, S. (2020) "Searching of photovoltaic panel installation sites on highway network using LSTM RNN-based power output estimation", *Journal of the Korean Society for Geospatial Information Science* 28(1), 25-33
2. Lee, J., Jung, J., Kim, H., (2020) "Segmentation of seabed points from airborne bathymetric LiDAR point clouds using cloth simulation filtering algorithm", *Journal of the Korean Society of Survey, Geodesy, Photogrammetry, and Cartography* 38(1), 1-9
3. **Jung, J.** and Kim, B. (2016) "Using numerical maps to select solar panel installation sites no expressway slopes", *Korean Journal of Construction Engineering and Management* 17(5), 72-78
4. Kim, B., Chul, S., and **Jung, J.**, (2016) "An agent-based modeling approach for estimating inundation areas over time", *Korean Journal of Construction Engineering and Management* 17(4), 20-27
5. **Jung, J.**, Yoon, S., Stachniss, C., and Heo, J. (2016) "A study on 3D indoor mapping for As-Built BIM creation by using Graph-based SLAM", *Korean Journal of Construction Engineering and Management* 17(3), 32-42
6. Kim, K., Lee, J., and **Jung, J.** (2015) "Comparison of forest carbon stocks estimation methods using forest type map and Landsat TM satellite imagery", *Korean Journal of Remote Sensing*, 31(5), 449-459
7. Kim, J., Kim, S., Kim, S., Kim, S., **Jung, J.**, and Heo, J. (2015) "A study on the reorganization of the National Spatial Information System", *Journal of the Korean Society of Surveying, Geodesy, Photogrammetry and Cartography*, 33(5), 373-383
8. Kim, H., **Jung, J.**, Lee, J., Kim, S., and Heo, J. (2014) "Selection of optimal variables for clustering of Seoul using genetic algorithm", *Journal of the Korean Society for Geospatial Information System*, 22(4), 175-181
9. Kim, S., **Jung, J.**, Lee, J., Heo, J., Hong, S., and Cho, H. (2014) "Update of digital map by using the terrestrial lidar data and modified RANSAC", *Journal of the Korean Society for Geospatial Information System*, 22(4), 3-11
10. **Jung, J.**, Nguyen H.C., Heo, J., Kim, K., and Im, J. (2014) "Estimation of aboveground forest biomass carbon stock by satellite remote sensing - a comparison between k-nearest neighbor and regression tree analysis", *Korean Journal of Remote Sensing*, 30(5), 651-664
11. Hong, S., **Jung, J.**, Kim, S., Hong, S., and Heo, J. (2013) "Semi-automatic method for constructing 2D and 3D indoor GIS maps based on point clouds from terrestrial lidar", *Journal of the Korean Society for Geospatial Information System*, 21(2), 175-181
12. **Jung, J.**, Heo, J., Kim, C., and Luo, W. (2012) "Estimating volume of Martian valleys using adaptive TIN filtering algorithm", *Journal of the Korean Society for Geospatial Information System*, 20(3), 3-10
13. Kim, S., Heo, J., **Jung, J.**, Yoo, S., and Kim, K. (2011) "Effect of Location Error on the Estimation of Aboveground Biomass Carbon Stock", *Journal of the Korean Society of Surveying, Geodesy, Photogrammetry and Cartography*, 29(2), 133-139
14. Hong, M., Sohn, H., **Jung, J.**, Cho, H., and Han, S. (2011) "Optimal site selection of carbon storage facility using satellite images and GIS", *Korean Journal of Remote Sensing*, 27(1), 1-10
15. Yoo, S., Heo, J., **Jung, J.**, Han, S., and Kim, K. (2011) "Estimation of aboveground biomass carbon stock using Landsat TM and ratio images", *Journal of the Korean Society for Geospatial Information System*, 19(2), 39-48
16. Cho, K., Heo, J., **Jung, J.**, Kim, C., and Kim, K. (2011) "Review and comparative analysis of forest biomass estimation using remotely sensed data: from five different perspectives", *Journal of the Korean Society for Geospatial Information System*, 19(1), 87-96
17. Kang, K., Bang, K., Sohn, H., **Jung, J.**, and Kim, C. (2011) "A study on the construction of eco-industrial park and recycling network using GIS approach", *Journal of the Korean Society for Geospatial Information System*, 19(1), 71-78
18. **Jung, J.**, Heo, J., Yoo, S., Kim, K., and Lee, J. (2010) "Estimation of aboveground biomass carbon stock in Danyang area using kNN algorithm and Landsat TM seasonal satellite images", *Journal of the Korean Society for Geospatial Information System* 18(3), 29-35
19. Yoo, S., Heo, J., Jung, J., and Han, S. (2010) "Building a model for estimate the soil organic carbon using decision tree algorithm", *Journal of the Korean Society for Geospatial Information System*, 19(1), 71-78
20. Kim, S., **Jung, J.**, Kim, E., Yoo, H., and Sohn, H. (2008) "Geocoding of low altitude UAV imagery using affine transformation model", *Journal of the Korean Society for Geospatial Information System*, 16(4), 79-87

PEER-REVIEWED JOURNAL ARTICLES IN PREPARATION/UNDER REVIEW

1. Alam, M.S., Simpson, B., Barbosa, A., **Jung, J.**, and Parulekar, N. (under review) "Probabilistic seismic damage and loss assessment methodology for wastewater network incorporating modeling uncertainty and correlations", *Earthquake Spectra*

2. **Jung, J.**, Parrish, C., and Costa B. (in preparation) "Combined use of bathymetric lidar waveform data and satellite imagery for classification of coral reef morphologies in Saipan"
3. Kim, H., **Jung, J.**, Lee, J., and Wie, G. (in preparation) "Airborne bathymetric LiDAR data classification using pseudo-waveform decomposition for shallow sea"

PEER-REVIEWED CONFERENCE PAPERS

1. Jung, Y., **Jung, J.**, Kim, B., and Han, S. (2019) "Estimating the monthly power generation of a photovoltaic plant using a locally weighted linear regression", *International Conference on Smart Design, Construction IT and BIM*, July 7 - 10, Penang, Malaysia
2. Che, E., Olsen M.J., Parrish, C., and **Jung, J.** (2019) "Pavement marking reflectivity evaluation through radiometric calibration of the Leica P40 terrestrial laser scanner", *ISPRS Workshop Laser Scanning 2019*, June 12 - 13, Enschede, The Netherlands
3. Heo, J., **Jung, J.**, Kim, B., and Han, S. (2019) "DEM-based convolutional neural network modeling for estimation of the solar irradiation: comparison on the effect of DEM resolutions", *The 36th International Symposium on Automation and Robotics in Construction*, May 21 - 24, Banff Alberta, Canada
4. Yoon, S., **Jung, J.**, and Heo, J. (2015) "Practical implementation of semi-automated as-built BIM creation for complex indoor environments", *The International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences – Indoor-Outdoor Seamless Modeling and Navigation*, May 21 - 22, Tokyo, Japan

OTHER CONFERENCE PAPERS AND SELECTED ABSTRACTS

1. **Jung, J.**, Lee, J., and Parrish, C. (2020) "A morphological approach to seabed detection from bathymetric lidar point clouds", *International Conference on Aquatic Science & Technology*, October 27 - 30, Busan, South Korea
2. **Jung, J.**, Olsen, M.J., Che, E., and Parrish, C. (2020) "An Efficient Approach to Automated Detection and Classification of Pavement Markings from Mobile Lidar Data", *Northwest Transportation Conference*, March 9, Corvallis, Oregon, USA
3. Parrish, C., Callahan, B., **Jung, J.**, and Dennis M. (2020) "Surveying the Oregon Coast: Past, Present and Future", *2020 Annual Conference / Professional Land Surveyors of Oregon*, January 23, Portland, Oregon, USA
4. **Jung, J.**, Che, E., Olsen, M.J., Parrish, C. (2019) "Efficient extraction and classification of complex pavement markings from mobile laser data", *2019 PacTrans / CSET region 10 Transportation Conference*, October 11, Seattle, Washington, USA
5. Parrish C., Eren F., **Jung, J.**, Forfinski-Sarkozi N., Galder B., White S., Imahori G., Kum J., and Aslakse M. (2018) "Operational TPU software for topobathymetric lidar", *The 19th Annual JALBTCX Coastal Mapping and Charting Workshop*, June 26 - 28, Providence, Rhode Island, USA
6. **Jung, J.**, Che, E., Olsen, M.J., Parrish, C. (2018) "Using mobile lidar data for automated extraction and evaluation of pavement markings", *Northwest Transportation Conference (NWTC)*, March 13 - 15, Corvallis, Oregon, USA
7. **Jung, J.**, Che, E., Olsen, M.J., Parrish, C. (2017) "Pavement marking extraction and condition evaluation with mobile lidar", *Surveying and Geomatics Educators Society (SaGES) Conference*, July 30 - August 3, Corvallis, Oregon, USA
8. Parrish C., Eren F., **Jung, J.**, Imahori G., and White S. (2017) "Total propagated uncertainty analysis for topobathymetric lidar", *The 18th Annual JALBTCX Coastal Mapping and Charting Workshop*, June 6 - 8, Savannah, Georgia, USA
9. Nguyen, H.C., **Jung, J.**, Zhao, S., and Heo, J. (2014) "Atmospheric correction for estimation of above-ground crop biomass – A comparison", *The 35th Asian Conference on Remote Sensing*, October 27 - 31, Nay Pyi Taw, Myanmar
10. **Jung, J.**, Hong, S., and Heo, J. (2013) "A kinematic 3D laser scanning of building interior using SLAM technique", *The 34th Asian Conference on Remote Sensing*, October 20 - 24, Bali, Indonesia
11. Hong, S., **Jung, J.**, Kim, S., Kim, N., Sohn, H., and Heo, J. (2013) "Semi-automatic method for 2D/3D modeling building interiors", *The 34th Asian Conference on Remote Sensing*, October 20 - 24, Bali, Indonesia
12. **Jung, J.**, Heo, J., Kim, C., and Luo, W. (2012) "Extraction of Martian valley networks using adaptive tin filtering algorithm", *The 33rd Asian Conference on Remote Sensing*, November 26 - 30, Pattaya, Thailand
13. **Jung, J.**, Sohn, H., and Hong M. (2011) "Estimation of forest carbon stock using satellite imagery and NFI data - Comparing kNN algorithm and regression model", *The 32th Asian Conference on Remote Sensing*, October 3 - 7, Tapei, Taiwan

14. **Jung, J.**, Heo, J., Yoo, S., Cho, K., Kim, K., and Lee, J. (2010) "Estimation of aboveground carbon using *k*NN algorithm: A case study in Danyang, Korea", *The 31st Asian Conference on Remote Sensing*, November 1 - 5, Hanoi, Vietnam
15. **Jung, J.**, Heo, J., Yoo, S., Cho, K., Kim, K., and Lee, J. (2010) "Forest fire risk assessment for conservation and management – A geospatial approach", *XXIII International Union of Forest Research Organizations World Congress*, August 23 - 28, Seoul, South Korea

PATENT

UNITED STATES

1. **Jung, J.**, Olsen, M.J., and Che, E. (under review) "Method and apparatus to extract powerlines from lidar point cloud data", 02.P030-US (OSU-19-84P)

KOREA

1. Heo, J., **Jung, J.**, and Park, H. (2013) "Carrier phase ambiguity resolution for GPS relative positioning", 10-1302674
2. Moon, J., Kim, D., and **Jung, J.** (2014) "Calculation of linear coordinate transformation coefficient for notification of topographical map", 10-1385111
3. Moon, J., Kim, D., Oh, J., **Jung, J.**, Kim, S., Kang, M., Hong, S., Kim, S., and Jo, H. (2017) "Method for inspecting cadastral survey results", 10-1783838

DEVELOPMENT OF ALGORITHMS AND SOFTWARE

1. "AdaBoost"
A C++ implementation of AdaBoost machine learning algorithm designed for classification of water surface from ground using bathymetric lidar point cloud data.
2. "Seafloor Extraction Tool"
The developed software can automatically extract seafloor returns in bathymetric lidar point cloud data. Its intended users are scientists and practitioners working on applications of bathymetric lidar. The extracted seafloor can be used for nautical charting, shoreline mapping, regional sediment management, and benthic habitat mapping.
3. "Automated Powerline Extraction Method"
A computational method to extract powerlines from point clouds acquired in a variety of conditions, such as urban, rural, and forest locales. The developed method can be applied to both terrestrial laser scanning and mobile laser scanning data without requiring supplemental data.
4. "Oregon Hazard Explorer for Lifelines Program (O-HELP) 3D"
A 3D web-based GIS tool to assess potential earthquake hazards in Oregon, developed with support from the Cascadia Lifelines Program (CLiP). The website contains previously mapped hazard information in a simple and powerful web-based interface. The tool is available at <http://ohelp.oregonstate.edu/>.
5. "Sight Object Distance Analysis (SODA)"
A computer program enables users to virtually evaluate available sight distances in a 3D context using lidar data. A variety of objects, vehicle types, and multi-modal forms of transportation (e.g., bicycle, pedestrian) can be simulated. The SODA program is available at <http://learnmobilelidar.com/software-tools/>.
6. "Road Marking Extraction (RoME)"
A computer program enables users to automatically extract lane markings from lidar data as well as estimate the retro-reflectivity that can be utilized for informed decision making for effective maintenance. The RoME program v.1.2 is available at <http://learnmobilelidar.com/software-tools/>. The RoME program v2.1 is now under development, which is capable of extraction and classification of complex road markings, such as arrows, text, and pedestrian crosswalk.
7. "Comprehensive Bathymetric Lidar Uncertainty Estimator (cBLUE)"
A computer program for a comprehensive total vertical uncertainty model (TVU) for topobathymetric lidar systems. The TVU model consists of a combination of analytical uncertainty propagation for the subaerial (above water) portion and Monte Carlo simulation models for the subaqueous portion (water surface to seafloor).
8. "Highway Slope-Integrated Photovoltaic (HSIPV) systems"
A computational method to perform estimation of available solar energy and suitable site selection of photovoltaic solar panels on highway fill slopes.
9. "As-Built Modeling Tools"

A suite of tools for automated as-built modeling of building interiors containing multiple rooms using lidar data. The 3D model output consists of a set of geometric components for the floor, the ceiling, volumetric walls, windows and doors, corresponding to level of detail 3.

10. "Room Segmentation Algorithm"

An automated algorithm for segmentation of a point-cloud acquisition of an indoor environment into separate rooms based on morphological processing. The proposed room segmentation is also applicable to 2D grid map inputs.

11. "Graph-based SLAM Method"

A graph-based Simultaneous Localization and Mapping (SLAM) technique for operation of mobile scanning system for continuous 3D mapping of indoor environment. The Adaboost machine learning based loop closure is incorporated to reduce the accumulated errors in the trajectory of the platform.

12. "Multi-antenna GPS system"

A tool to perform precise positioning and attitude determination for behavior analysis of a high-rise building. This makes use of relative positioning method based on carrier phase measurements to provide accurate position and attitude information.

RESEARCH EXPERIENCE

FUNDED RESEARCH

1. Co-PI, "Prototyping automated framework for asset extraction and characterization from mobile lidar data"
Oregon Department of Transportation, \$285k 2022 - Present
2. Co-PI, "Living webGIS survey control database"
Oregon Department of Transportation, \$90k 2022 - Present
3. Co-PI, "Automating Lidar Data to Develop and Manage Active Transportation Asset Inventories"
Oregon Department of Transportation, \$250k 2021 - Present
4. PI, "Development of webGIS-based tool for probabilistic damage and restoration modeling of lifeline systems"
Cascadia Lifelines Program (CLiP), \$58k 2021 - Present
5. "Extraction and Classification of Pavement Marking Program"
Pacific NW Transportation Consortium, \$10k 2020
6. "Efficient extraction and evaluation of complex pavement markings from mobile laser scan data"
Pacific NW Transportation Consortium, \$30k 2018 - 2020
7. "3D Virtual Visibility Analysis Program"
Pacific NW Transportation Consortium, \$10k 2018
8. PI, "Verification of applicability of mobile robot sensors in monitoring extreme environments"
Korea Institute of Civil Engineering and Building Technology, \$3k 2017
9. PI, "A study on productive 3D as-built BIM creation of indoor environment using point-cloud data"
National Research Foundation of Korea, \$30k 2015 - 2016

PARTICIPATED RESEARCH

1. "Bathymetric lidar waveform analysis and algorithm development for characterizing coral reef morphologies"
National Oceanic and Atmospheric Administration 2021 - Present
2. "NSF Convergence Accelerator track D: rapid development of intelligent, built environment geo-databases using AI and data-driven models", National Science Foundation 2020 - Present
3. "Water surface modeling, refraction, and reflectance correction for topobathy lidar system"
Quantum Spatial 2020 - 2021
4. "O-HELP: a web-based GIS tool for assessing earthquake hazards in Oregon"
Cascadia Lifelines Program 2019 - 2020
5. "Cycle slip detection and repair for multi-frequency GNSS"
National Geodetic Survey 2020
6. "High Dimensional Spatial Data Processing for Searching of Photovoltaic Panel Installation Sites on Highway Network", Korea Agency for Infrastructure Technology Advancement 2018 - 2019
7. "Methods and recommendations for readjustment of ocean shore control for aerial photography and costal change analysis", Oregon Parks and Recreation Department 2019
8. "Advanced, 3D infrastructure information modeling using lidar"
National Science Foundation 2018 - 2019
9. "Total propagated uncertainty analysis for topographic-bathymetric lidar" 2017 - 2018

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| | National Oceanic and Atmospheric Administration | |
| 10. | "Lidar for maintenance of pavement reflective markings and retro-reflective signs"
Oregon Department of Transportation | 2016 - 2018 |
| 11. | "Development for advanced technology of realistic 3D GIS"
Korea Institute of Construction Engineering and Management | 2013 - 2015 |
| 12. | "Development of spatial model for estimation of carbon stocks in aboveground forest biomass"
Korea Forest Research Institute | 2010 - 2012 |
| 13. | "Cutting edge urban development–Korean land spatialization research project"
Ministry of Construction & Transpiration of Korea | 2007 - 2012 |
| 14. | "Development of a multi-antenna GPS system for behavior analysis of a high-rise building"
Hong Kong Polytech University | 2009 |

ADVISING

POSTDOCTORAL RESEARCHERS

- | | | | |
|----|------------------------|-------------------------|----------------|
| 1. | Mohammad Shafiqul Alam | Oregon State University | 2021 - Present |
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GRADUATE ADVISEES

- | | | | |
|----|----------------|-------------------------|------------|
| 1. | Kenney Kenneth | Oregon State University | 2022, Fall |
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UNDERGRADUATE RESEARCH

- | | | | |
|----|------------------|-------------------------|----------------|
| 1. | Lael P. Case | Oregon State University | 2022 - Present |
| 2. | Kat Holtan | Oregon State University | 2019 |
| 3. | Joseph Greenwood | Oregon State University | 2017 - 2018 |

TEACHING EXPERIENCE

CREDIT COURSES

- | | | | |
|----|--|-------------------|------------|
| 1. | Geospatial Machine Learning
Oregon State University | CE560 (3 credits) | 2022, Fall |
| 2. | Geomatics Seminar – Deep Learning for Semantic Segmentation
Oregon State University | CE507 (1 credits) | 2022 |
| 3. | Geomatics Seminar – Machine Learning for Geospatial Application
Oregon State University | CE507 (1 credits) | 2021 |
| 4. | Geomatics Seminar - ArcGIS API for Javascript
Oregon State University | CE507 (1 credits) | 2020 |
| 5. | Reading and Conference - Lidar Data Segmentation and Classification
Oregon State University | CE505 (2 credits) | 2019 |
| 6. | Geomatics Seminar - Machine Learning for Geospatial Application
Oregon State University | CE507 (1 credits) | 2019 |
| 7. | Geomatics Seminar - Simultaneous Localization and Mapping
Oregon State University | CE507 (1 credits) | 2018 |

TEACHING ASSISTANT

- | | | | | |
|----|------------------------|---------|-------------------|------|
| 1. | General surveying | CEE3202 | Yonsei University | 2009 |
| 2. | Digital photogrammetry | CEE3419 | Yonsei University | 2009 |
| 3. | General surveying | CEE3202 | Yonsei University | 2008 |
| 4. | Elemental surveying | CEE3301 | Yonsei University | 2008 |

AWARDS AND HONORS

- | | | | |
|----|----------------------------|--|-------------|
| 1. | Best Paper Award | Korea Institute of Construction Engineering and Management | 2013 |
| 2. | Outstanding Research Award | Korea Forest Service | 2011 |
| 3. | Scholarship | Yonsei University | 2007 - 2012 |

INVITED TALKS

1. Automated generation of digital twins for existing buildings	Purdue University	2022
2. SCAN-to-BIM	Professional Land Surveyors of Oregon	2022
3. ML-driven SCAN-to-BIM	24th Annual GIS/Valuation Technologies Conference	2021
4. SCAN-to-BIM	Professional Land Surveyors of Oregon	2019
5. Graph-based SLAM	Korea Institute of Civil Engineering and Building Technology	2017
6. Introduction to SLAM	Seoul National University	2016
7. Toward Automated 3D City Reconstruction	Andong National University	2016

WEBINAR

1. Probabilistic seismic damage and loss assessment of wastewater network accounting for modeling uncertainty and damage correlation	Cascadia Lifelines Program	2022
2. Oregon Hazards Explorer for Lifelines Program WebGIS Tools	Cascadia Lifelines Program	2020

CAMPUS OR DEPARTMENTAL TALKS

1. 3D Laser Scanning and Imaging	CE566	Oregon State University	2020
2. 3D Laser Scanning and Imaging	CE566	Oregon State University	2019
3. GIScience I: Introduction to GIS	GEOG560	Oregon State University	2018
4. 3D Laser Scanning and Imaging	CE566	Oregon State University	2018
5. Kinematic Positioning & Navigation	CE661	Oregon State University	2018
6. 3D Laser Scanning and Imaging	CE566	Oregon State University	2017
7. Geomatics Seminar	CE507	Oregon State University	2017
8. Geospatial Information and GIS	CE202	Oregon State University	2017

LICENSES AND CERTIFICATIONS

CERTIFIED

1. Spatial Data Science	ESRI Training	2020
2. ArcGIS API for Javascript	ESRI Training	2019
3. Teaching and Learning	Center for Teaching and Learning, Oregon State University	2018

LICENSED

1. Engineer Surveying GIS	Human Resources Development Service of Korea	2011
2. Engineer Civil Engineering	Human Resources Development Service of Korea	2008

PROFESSIONAL MEMBERSHIPS

1. Organizer	Workshop on Computer vision in the Build Environment	CVPR	2021 - Present
2. Secretary	Working Group 1 on Topography & Assets	OpenLSEF	2018

OUTREACH ACTIVITIES

1. AGC/Willamette Promise Educator Externship	OSU	2019 - Present
2. SESEY - Summer Experience in Science and Engineering for Youth	OSU	2018
3. Summer Undergraduate Research Fellowship	OSU	2017

LANGUAGE

1. Korean	Native
2. English	Proficient

TECHNICAL SKILLS

1. Programming	Python, Matlab, JavaScript, C++
2. Tools	Maptek, ArcGIS, CloudCompare, STAR*NET, OPUS Project, Qt Creator