Hyoungsu Park

Postdoctoral Scholar
Civil and Construction Engineering

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1. Professional Preparation

University of Seoul (S. Korea)	Civil Engineering	B.S.	2004
University of Seoul (S. Korea)	Civil Engineering	M.S.	2006
Oregon State University	Civil and Construction Engineering	Ph.D.	2016
Oregon State University	Civil and Construction Engineering	PostDoc.	2016 –

2. Appointments

Postdoctoral Scholar	2016 –
Graduate Research Assistant Student	2011 – 2016
Researcher in Seil Engineering. Co. Ltd. (S. Korea)	2006 – 2011

3. Publications

3.1 Refereed Papers

1. Park, H. and Cox, D.T., "Probabilistic Assessment of Nearfield Tsunami Arrival time, Flow Depth, Velocity, Momentum Flux, and Duration applied to Seaside, Oregon," Submitted to *Coastal Engineering*.
2. Park, H. and Cox, D.T., Barbosa, A., "Probabilistic Tsunami Damage Assessment: Application to the City of Seaside, Oregon," in preparation for *Coastal Engineering*.
3. Park, H. and Cox, D.T., "Empirical Wave Run-up Formula for Wave, Storm Surge and Berm Width," in preparation for *Coastal Engineering special issue of Swash*. (2015, In Press)
4. Wang, H., Cramer, L., Cox, Mostafizi, A., and Park, H., "Agent-Based Modeling of Multimodal Nearfield Tsunami Evacuation: Research Questions and Knowledge gaps," in preparation for *Transportation Research Part C: Emerging Technologies*. (2015, In Press)
5. Park, H., Cox, D. T., Petroff, C. M. (2015). An Empirical Solution for Tsunami Run-up on Compound Slopes. *Natural Hazards*, 76(3), 1727-1743.
6. Wiebe, D. M., Park, H., Cox, D. T. (2014). "Application of The Goda Pressure Formulae for Horizontal Wave Loads on Elevated Structures." *KSCE Journal of Civil Engineering*, 18(6), 1573-1579.
7. Park, H., Cox, D., Lynett, P., Wiebe, D., Shin, S. (2013) "Tsunami Inundation Modeling in Constructed Environments: A Physical and Numerical Comparison of Free-Surface Elevation, Velocity, and Momentum Flux," *Coastal Engineering*, 79, 9-21.
8. Young-Jun Cho, Hyoung-Soo Park, (2008) "Seiche Characteristics of Gun-Jang Harbor", *Journal of Ocean Engineering in Korea*, 22. 1. 46-52

3.2 Conference Proceedings

1. Park, H., Cox, D., Barbosa, A., van de Lindt, D, (2016) "Probabilistic Tsunami Hazard Assessment and Building Damage Estimation: Application to the Cascadia Subduction Zone and Seaside, Oregon," *International Conference on Coastal Engineering*, ASCE. (Accepted)
2. Cox, D., Park, H., Wang, H., Mostafizi, A., Cramer, L., (2015) "Tsunami Inundation Modeling for Life Safety and Civil Infrastructure Damage: Application to the Cascadia Subduction Zone and Seaside, Oregon," *COASTAL STRUCTURES & SOLUTIONS TO COASTAL DISASTERS JOINT CONFERENCE*, ASCE.
3. Chen, Y., Chen, Y., Weber, B., Corcoran, P., Cox, D., Park, H., Reimer, J. (2014). "An Integrated Engineering-Economic Vulnerability Assessment Tool--An Assessment of Tsunami Impact on Coastal Communities". In 2014 Annual Meeting, July 27-29, 2014, Minneapolis, Minnesota (No. 170696). *Agricultural and Applied Economics Association*.
4. Park, H., Wiebe, D., Cox, D. K. Cox (2014) "Tsunami Inundation Modeling: Sensitivity of Velocity and Momentum Flux to Bottom Friction with Application to Building Damage at Seaside, Oregon," *International Conference on Coastal Engineering*, ASCE.

4. Conference Presentations, Invited Lectures and Presentations, and Attending Workshop

4.1 Conference or invited Presentations

1. "Wave run-up predictions considering storm surge and dry beach width", CCE Brownbag Seminar, Oregon State University, Winter, 2015.
2. "Tsunami Inundation Modeling: Application of Fragility Curves to Estimate Building Damage at Seaside, Oregon", 2014 STATE OF THE COAST Conference in Florence, OR, Oct, 25, 2014.
3. "An Integrated Engineering-Economic Impact Assessment Model — An Estimation of Tsunami Impact on Clatsop County," Agricultural Resource Economics seminar series, Oregon State University, Spring, 2014.
4. "Tsunami Inundation Modeling in Constructed Environments: A Physical and Numerical Comparison of Free-Surface Elevation, Velocity, and Momentum Flux", CCE Brownbag Seminar, Oregon State University, Spring, 2013.

4.2 Attended Workshop

1. "Design & Implementation of Cooperative Learning" by Karl A. Smith, Ph.D., F.ASEE, 2014, April 29.
   : Workshop about the efficient teaching skills, preparedness and feedback for current and prospective teachers.
2. "Tsunami Modeling Workshop" by Scott, Michael, Ph.D et al., Dec, 10-12 in Corvallis, OSU
   : Workshop about the validation of invited numerical models through the blind test of observed tsunami wave force on various shape of bridge decks.
3. "NOAA/NTHMP Mapping & Modeling Subcommittee Benchmarking Workshop: Tsunami Currents", Feb 9-10, 2015 in Portland, Oregon
   : Workshop about the validation of numerical model results through pre-selected benchmarking tests for tsunami current.

5. Teaching experiences

1. Graduate Teaching Assistant for CE 311, 2012 (Fluid Mechanic).
   - Provide a weekly recitation class for HW solutions and weekly quiz.
   - Grading HWs & Office hours for mentoring.
2. Graduate Teaching Assistant for ENGR 211, 2013 (Statics).
   - Provide 2 weekly recitation classes for exercise problems.
   - Grading HWs & Office hours for mentoring
3. Graduate Teaching Assistant for CE 412/512, 2013 (Hydrology).
   - Grading HWs & Office hours for mentoring
   - Supervised the mid and final terms.
4. Invited lecture in the class CE411/511, 2015 (Ocean Engineering)
   - Provide a manual to extract the synthesized tsunami data at Newport, OR and show example frame work to estimate damage on the building utilizing fragility curves.

6. Research experiences

1. Developing an empirical dune beach run-up equation.
: We introduce new empirical run-up equations on natural beach from extreme wave conditions. We implemented the effects of berm height, beach width, surge levels, and wave height on run-up equation by synthesizing the new surf-similarity based on numerical model results. New model accounts for the effect of shape of beach and dune on the run-up process at East Coast during hurricane.

2. Developing a semi-analytic solution for the wave force on elevated structures.
: We modified the Goda's wave pressure formulae for the horizontal force on elevated structures considering three types: non-breaking, broken, and impulsive breaking waves. Small-scale experiments also performed to validate the new equations.

3. Numerical and experimental modeling of tsunami inundation
: Analyzing the 3-D tsunami inundation experiment data with macro-roughness (performed in Hinsdale Wave Lab. in OSU) and validated to the numerical modelling results (COULWAVE). This work provide the sensitivity test of surface elevation, velocity and momentum flux due to bottom friction during inundation process, and utilized rather as a bench-mark test for the numerical tsunami modeling at "NOAA/NTHMP Mapping & Modeling Subcommittee Benchmarking Workshop, 2015".

4. Developing an empirical tsunami run-up equation.
: Based on the format of existing analytic solutions of tsunami run-up, we develop new run-up equation for tsunami which account for the bi-slop conditions and realistic bottom frictions. Synthesize new Iribarren number applied for tsunami run-up, and the new tsunami run-up equation validated with the surveyed 2011 Tohoku tsunami run-up.

5. Probabilistic tsunami hazard and damage assessment of the built environments
: Damage estimates to the built environment from tsunamis is important for disaster mitigation, including planning emergency response and recovery. This work evaluates the damage states of buildings in a small urban coastal city, Seaside, Oregon, from tsunami hazards generated by a Cascadia Subduction Zone (CSZ) event. This study is separated into two parts: (1) a probabilistic tsunami hazard assessment at Seaside, OR, and (2) estimates of building damage in the inundation area at community scale. We estimate the damage probability using the 1,000 year tsunami conditioned on the CSZ event. (Dissertation work)