Dustin T. Cook, Ph.D., P.E.

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Education

Ph.D., University of Colorado Boulder — **2017-2021**
Department of Civil, Environmental, and Architectural Engineering

Dissertation: Advancing Performance-Based Earthquake Engineering for Modern Resilience Objectives

Advisor: Abbie Liel

M.S., University of California, Los Angeles — **2014**
Department of Civil and Environmental Engineering

B.S., California State University, Chico — **2012**
Department of Civil and Environmental Engineering

Teaching Experience

Teaching Assistant: Reinforced Concrete Design and Senior Design — **2018-2019**
University of Colorado, Boulder: CEAE Department

Provided teaching and administrative assistance to aid professors in providing instruction to undergraduate engineering students for reinforced concrete design in the Fall of 2018 and senior design in the Spring of 2019. Corresponded with students via email, held bi-weekly office hours, graded student assignments, organized guest lectures, developed and facilitated lab-based activities and student experiments, and occasionally lectured on class material.

Lecturer of Civil Engineering: Statics Lecture and Activity Session — **2015-2016**
California State University Chico: Department of Civil Engineering

Instructed undergraduate engineering students in the resolution of forces on rigid bodies in 2D and 3D space through structured lecture and activity sessions in the Fall of 2015 and the Spring of 2016. Monitored student learning through regular exams, graded homework assignments, in-class activity assignments, and regularly held office hours.

Instructor of Civil Engineering: Statics Activity Session — **2013**
California State University Chico: Department of Civil Engineering

Instructed three statics activity sessions for undergraduate engineering students. Facilitated student learning through in-class example problems and demonstrated statics fundamentals through hands-on activities. Graded activities and homework assignments.

Undergraduate Instructor: Mechanics of Materials Extra Session — **2012**
California State University Chico: Department of Construction Management

Conducted weekly instructional sessions for undergraduate construction management students. Provided instruction and feedback on mechanics of materials homework assignments and practice problems.

Work Experience

NRC Postdoctoral Fellow **2021-2022**
National Institute of Standards and Technology

Postdoctoral researcher as part of the earthquake engineering group at NIST. Working to develop prescriptive design requirements for U.S. codes and standards targeting functional recovery performance objectives. Specifically, I am using performance-based seismic risk assessment methods to assess the damage, financial loss, functionality and recovery time of modern code conforming buildings and alternative designs. Additional projects include exploring cost and benefits of recovery-based design, quantifying earthquake fragility and consequence data for nonstructural components, and analyzing functional recovery of utility networks, lifelines, and other regionally distributed infrastructure assets.

Research Engineer, Technical Developer, and Seismic Risk Consultant **2014-2021**
Haselton Baker Risk Group, LLC

Developed the Seismic Performance Prediction Program software (SP3) for performance-based earthquake engineering. Researched and developed new methods for rapid building structural analysis estimation and performance model population to expedite the PBEE and risk assessment process. Assisted clients in performing seismic risk assessments.

Junior Structural Engineer **2014-2015**
Culp and Tanner, Inc. Structural Engineers

Reviewed shop drawings related to reinforced concrete, post tensioned cable, and steel reinforcing components. Aided in the design of reinforced concrete columns for parking garage systems.

Research Experience

NRC Postdoctoral Fellow **2021-2022**
National Institute of Standards and Technology

Postdoctoral researcher as part of the earthquake engineering group at NIST. Currently working to develop prescriptive design requirements to inform functional recovery-based performance targets in future building codes and standards.

Research Assistant: Liel Research Group **2017-2021**
University of Colorado, Boulder

Graduate research assistant. Worked on benchmarking and updating the state-of-the-art in performance-based earthquake engineering and seismic risk assessment methods. Used opensource structural analysis tools, such as OpenSees, to investigate seismic evaluation procedures and standards for new and existing buildings. Developed a performance-based method to assess the function and functional recovery of buildings given component-level damage.

ATC-138: Support of Performance-Based Seismic Design of Buildings **2020-2021**
Funded by the Federal Emergency Management Agency (FEMA)

Working group member. Worked to improve and validate newly a developed framework for the performance-based assessment of building functional recovery.

ATC-134: Performance-Based Seismic Engineering:

Benchmarking of Existing Building Evaluation Methodologies **2017-2021**
Funded by the National Institute of Science and Technology (NIST)

Working group member. Used OpenSees to compare the response of an ASCE 41 analytical model with the observed damage and instrumented response of a building damaged in the 1979 Imperial Valley Earthquake.

ATC-123: Improving Seismic Design of Buildings with Configuration Irregularities **2015-2018**
Funded by the Federal Emergency Management Agency (FEMA)

Working group member. Analytically investigated the structural response of modern RC moment frame structures with vertical irregularities.

ATC-58-2: Development of Performance Based Seismic Design Guidelines: Phase 3 **2014-2017**
Funded by the Federal Emergency Management Agency (FEMA)

Working group member. Helped develop guidelines, resources, and methods for the improvement of the FEMA P-58 seismic risk assessment method.

NEESR-CR: Full-Scale RC and HPFRC Frame Subassemblies Subjected to Collapse-Consistent Loading Protocols for Enhanced Collapse Simulation and Internal Damage Characterization **2012-2017**
Funded by the National Science Foundation (NSF)

Working group member. Developed near fault loading protocols for experimental tests of RC moment frame subassemblies.

2012 PEER Summer Internship Program **Summer 2012**
Funded by the National Science Foundation (NSF)

Student Intern. Investigated shear wall boundary element behavior under axial loads through a series of full-scale experimental tests.

Publications and Presentations

Journal Publications

Cook, Liel, Haselton, and Koliou. *A Framework for Operationalizing the Assessment of Post-Earthquake Functional Recovery of Buildings.* Earthquake Spectra. March 2022.

Cook, Liel, DeBock, and Haselton. *Benchmarking FEMA P-58 Repair Costs and Unsafe Placards from the Northridge Earthquake: Implications for Performance-Based Engineering.* International Journal of Disaster Risk Reduction. February 2021.

Cook and Liel. *A Framework to Relate Component Response to Global Consequences.* Bulletin of Earthquake Engineering: Advances in Seismic Fragility and Vulnerability Assessment. August 2021.

Conference Papers and Presentation

Cook and Sattar. *The Effect of Increased Strength and Stiffness Requirements on the Functional Recovery Performance of Reinforced Concrete Special Moment Frames.* Paper and Presentation at the 12th National Conference on Earthquake Engineering, Salt Lake City, Utah, June 27-July 1, 2022.

Sattar, **Cook**, and Johnson. *Preliminary Recovery Categories and Times for a Functional Recovery Framework*. Paper and Presentation at the 12th National Conference on Earthquake Engineering, Salt Lake City, Utah, June 27-July 1, 2022.

Fung, **Cook**, Zhang, Johnson, and Sattar. *Economic considerations for recovery-based design.* Paper and Presentation at the 12th National Conference on Earthquake Engineering, Salt Lake City, Utah, June 27-July 1, 2022.

Berkowitz, Sen, and **Cook**. *ASCE/SEI 41 Assessment of Reinforced Concrete Buildings: Benchmarking ASCE/SEI 41 Linear and Nonlinear Dynamic Procedures with Empirical Damage Observations*. Presentation at the Los Angeles Tall Building Structural Design Council Conference, 2021.

Haselton, Almeter, **Cook**, and Liel. *Resilient Design for Functional Recovery: Recent Traction in the S.E. Profession, New Technical Developments, and Proposed Next Steps.* Paper and Presentation at the Structural Engineers Association of California Virtual Convention, 2021.

Cook, Liel, Haselton, Koliou, and Almeter. *Functional Recovery: A New Framework to Quantify Recovery Time for Resilient Design*. Presentation at the Architectural Engineering Institute Virtual Conference, 2021.

Haselton, **Cook**, Almeter, Liel, and Wade. *Test Applications of the Working Pre-Beta FEMA P-58 Functional Recovery Assessment Method.* Presentation at the Earthquake Engineering Research Institute Annual Meeting, 2021.

Liel, **Cook**, Haselton, and Koliou. *Overview and Development of a Method for Assessing Building Functional Recovery*. Presentation at the Earthquake Engineering Research Institute Annual Meeting, 2021.

Cook and Liel. *A Performance-Based Framework for Assessing Building-Specific Functional Recovery*. Presentation at the Structural Engineers Association of California Convention, 2020.

Cook and Liel. *ASCE 41 Assessment of the Imperial County Services Building and Comparison with Recorded Response.* Paper and presentation at the 17th World Conference on Earthquake Engineering, 2020.

Cook, Liel, DeBock, Haselton. *Hindcasting Loss Estimate for the 1994 Northridge Earthquake: Implications for Loss Assessment at Low Intensity Shaking.* Paper and poster at the 17th World Conference on Earthquake Engineering, 2020.

Haselton, **Cook**, DeBock, Almeter, Wade. *Resilient Seismic Design for Functional Recovery Using Prescriptive and Non-Prescriptive Design Methods.* Paper at the 17th World Conference on Earthquake Engineering, 2020.

Cook, Liel, Luco, Almeter, and Haselton. *Implications of Seismic Design Values for Economic Losses*. Paper and presentation at the 13th International Conference on Applications of Statistics and Probability in Civil Engineering, ICASP13, 2019.

Cook, Liel, and Haselton. *Benchmarking of Seismic Loss Estimations from FEMA P-58 Compared to Other Methods.* Presentation at ASCE & SEI Structures Congress, 2019.

Wade, DeBock, Haselton, **Cook**, and Almeter. *Expected Performance of New Building-Code-Compliant Buildings in California.* Paper and presentation at the SEAOC Convention, 2018.

Cook, Wade, Haselton, Baker, and DeBock. *A Structural Response Prediction Engine to Support Advanced Seismic Risk Assessment.* Paper at the 11th National Conference on Earthquake Engineering, 2018.

Haselton and **Cook**. *Resilient Seismic Design Using Prescriptive and Non-Prescriptive Design Methods.* Paper and presentation at the 11th National Conference on Earthquake Engineering, 2018.

Debock, **Cook**, Haselton, and Wade. *New Developments for Rapid Seismic Risk Assessment of Wood Light-Frame Buildings.* Paper and presentation at the 11th National Conference on Earthquake Engineering, 2018.

Debock, Wade, **Cook**, Haselton, Valley, and Sabol. *Quantitative Assessments of Code Provisions for Vertical Building Irregularities in Frame Buildings.* Paper and presentation at the 11th National Conference on Earthquake Engineering, 2018.

Wade, Debock, Lawson, Koliou, **Cook**, and Haselton. *Seismic Risk Assessment of Tilt-Up Buildings using the FEMA P-58 Method.* Paper and presentation at the 11th National Conference on Earthquake Engineering, 2018.

Debock, Fitzgerald, **Cook**, Haselton. *New Developments in FEMA P-58 Seismic Risk Assessment of Wood Light-Frame Buildings.* Paper and presentation at the SEAOC Convention, 2016.

Cook, Fitzgerald, Chrupalo, Haselton, Baker. *Building Loss Estimation Methods: A Comparison of Methods and Recommendations for the Future.* Paper and presentation at the ATC & SEI, 2nd Conference on Improving the Seismic Performance of Existing Buildings and Other Structure, 2015.

Fitzgerald, **Cook**, Haselton. *Building Loss Estimation Methods: NSF NEESR Full-Scale Ductile RC Columns Subjected to Collapse-Consistent Loading Protocols: Learning from the Test Data and Recommendations for Simulating Collapse Behavior and Estimating Building Collapse Safety*. Paper and presentation at the ATC & SEI, 2nd Conference on Improving the Seismic Performance of Existing Buildings and Other Structure, 2015.

Haselton, **Cook**, Fitzgerald, Baker. *Progress on Resilience-Based Seismic Design and Assessment Supported by Advanced Prediction of Building Damage, Repair Cost, and Building Closure Time.* Paper and Presentation at the ATC & SEI, 2nd Conference on Improving the Seismic Performance of Existing Buildings and Other Structure, 2015.

Other Publications

Fung, Zhang, Johnson, **Cook**, and Sattar. (2022) *A Framework to Evaluate the Cost-Effectiveness of Recovery-Based Design.* NIST Special Publication 1277, National Institute of Standards and Technology, Gaithersburg, Maryland, May 2022.

Haselton, DeBock, and **Cook**. *Post-Earthquake Reoccupancy and Functional Recovery Times for New Residential Buildings in California: What do current codes and building practices provide?* White paper, Haselton-Baker Risk Group, 2021.

Tremayne, Mahin, Anderson, **Cook**, Erceg, Esparza, Jimenez, Krausz, Lo, Lopez, McCurdy, Shipman, Strum, *Earthquake Engineering for Resilient Communities: 2012 PEER Internship Program Research Report Collection*. Paper published by PEER 2012/07.

Datasets and Code Repositories

PBEE-Recovery. Matlab codebase for quantifying building-specific functional recovery and reoccupancy based on a probabilistic performance-based earthquake engineering framework. https://github.com/OpenPBEE/PBEE-Recovery

Webinars and Invited Presentations

Performance-Based Assessment of the Functional Recovery of Buildings. Stanford University, March 3, 2022.

Functional Recovery: A New Framework to Quantify Recovery Time for Resilient Design. SEAONC Summer Seminar on Functional Recovery and Resilient Design, 2021.

Quantifying Building Functional Recovery Time: New Developments and Ongoing Work. SP3 Webinar Series. Haselton Baker Risk Group, 2021.

Benchmarking SP3 against Northridge Losses. SP3 Webinar Series. Haselton Baker Risk Group, 2020.

Detailed Benchmarking and Validation Studies of the SP3-RiskModel: An Overview of Findings. SP3-RiskModel Webinar Series. Haselton Baker Risk Group, 2018.

Upcoming Publications

Cook, Sen, Liel, Basnet, Koodiani, Creagh, Liel, Berkowitz, Ghannoum, Hortacsu, Kim, Lehman, Lowes, Matamoros, Naeim, Sattar, and Smith. *ASCE/SEI 41 Assessment of Reinforced Concrete Buildings: Benchmarking ASCE/SEI 41 Nonlinear Dynamic Procedures with Empirical Damage Observations.* Earthquake Spectra. Submitted July 2022.

Sen, **Cook**, Liel, Basnet, Koodiani, Creagh, Liel, Berkowitz, Ghannoum, Hortacsu, Kim, Lehman, Lowes, Matamoros, Naeim, Sattar, and Smith. *ASCE/SEI 41 Assessment of Reinforced Concrete Buildings: Comparison of the Nonlinear Dynamic Procedure with Other Evaluation Methods.* Earthquake Spectra. Submitted July 2022.

Yang, Fung, **Cook**, Johnson, and Sattar. *Benefit-cost analysis for earthquake resilient building design: The state of the art and future research needs*. Submitted to the Journal of Earthquake Engineering.

Reviewed Journal Papers

Journal	2019	2020	2021	2022
Earthquake Spectra	--	--	3	2
Natural Hazards Review	1	--	1	1
Bulletin of Earthquake Engineering	--	--	1	--

Professional Affiliations, Activities, and Awards

California Board for Professional Engineers, Land Surveyors and Geologists

- Professional Engineer, since 2016. License number: 86539

United Government of Graduate Students (UGGS)

- Awarded the 2019-2020 Graduate Teaching Excellence Award

California Office of Emergency Services (CalOES)

- Certified Disaster Service Worker under the Safety Assessment Program (SAP)

American Society of Civil Engineers (ASCE)

- Member since 2017.
- Member of the Risk and Resilience Measurements Committee
- Reviewer for journal articles in *Natural Hazards Review*.

American Concrete Institute (ACI)

- Member since 2022.
- Member of ACI 374A subcommittee on functional recovery

Earthquake Engineering Research Institute (EERI)

- Member since 2017.
- Secretary, Younger Members Committee, 2019-2021
- Co-Chair, Younger Members Committee, since 2021
- Executive Committee Member, World Housing Encyclopedia, since 2020.

- Secretary, World Housing Encyclopedia, since 2021.
- Member, Business Resilience Committee, since 2022.
- Received an honorable mention for the 2019-2020 EERI/FEMA NEHRP Graduate Fellowship in Earthquake Hazard Reduction.
- Reviewer for journal articles in *Earthquake Spectra*.

Structural Engineers Association of Northern California (SEAOC)

- Member since 2016.
- Member of the Resilience Committee since 2022

Building Seismic Safety Council

- Chair of a functional recovery topic subcommittee for the 2022-2026 Provisions Update Committee
- NIST liaison for the 2022-2026 Provisions Update Committee

National Research Council (NRC)

- Selected as National Research Council Postdoctoral Fellow for the National Institute of Standards and Technology