

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

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<b>Education</b>	<b>Ph.D., University of Colorado Boulder</b> <i>Department of Civil, Environmental, and Architectural Engineering</i>  <i>Dissertation:</i> Advancing Performance-Based Earthquake Engineering for Modern Resilience Objectives  <i>Advisor:</i> Abbie Liel	<b>2017-2021</b>
	<b>M.S., University of California, Los Angeles</b> <i>Department of Civil and Environmental Engineering</i>	<b>2014</b>
	<b>B.S., California State University, Chico</b> <i>Department of Civil and Environmental Engineering</i>	<b>2012</b>
<b>Teaching Experience</b>	<b>Teaching Assistant: Reinforced Concrete Design and Senior Design</b> <i>University of Colorado, Boulder: CEAE Department</i>  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.	<b>2018-2019</b>
	<b>Lecturer of Civil Engineering: Statics Lecture and Activity Session</b> <i>California State University Chico: Department of Civil Engineering</i>  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.	<b>2015-2016</b>
	<b>Instructor of Civil Engineering: Statics Activity Session</b> <i>California State University Chico: Department of Civil Engineering</i>  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.	<b>2013</b>
	<b>Undergraduate Instructor: Mechanics of Materials Extra Session</b> <i>California State University Chico: Department of Construction Management</i>  Conducted weekly instructional sessions for undergraduate construction management students. Provided instruction and feedback on mechanics of materials homework assignments and practice problems.	<b>2012</b>

<b>Work Experience</b>	<p><b>Research Structural Engineer</b> <i>National Institute of Standards and Technology</i></p> <p>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.</p>	<b>2021-Present</b>
	<p><b>Senior Research Engineer, Technical Developer, and Seismic Risk Consultant</b> <i>Haselton Baker Risk Group, LLC</i></p> <p>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.</p>	<b>2014-2021</b>
	<p><b>Junior Structural Engineer</b> <i>Culp and Tanner, Inc. Structural Engineers</i></p> <p>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.</p>	<b>2014-2015</b>
<b>Research Experience</b>	<p><b>NRC Postdoctoral Fellow</b> <i>National Institute of Standards and Technology</i></p> <p>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.</p>	<b>2021-2022</b>
	<p><b>Research Assistant: Liel Research Group</b> <i>University of Colorado, Boulder</i></p> <p>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.</p>	<b>2017-2021</b>
	<p><b>ATC-138: Support of Performance-Based Seismic Design of Buildings</b> <i>Funded by the Federal Emergency Management Agency (FEMA)</i></p>	<b>2020-2021</b>

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

2017-2021

**ATC-134: Performance-Based Seismic Engineering:  
Benchmarking of Existing Building Evaluation Methodologies**

*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**

*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.

2015-2018

**ATC-58-2: Development of Performance Based Seismic  
Design Guidelines: Phase 3**

*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.

2014-2017

**NEESR-CR: Full-Scale RC and HPFRC Frame Subassemblies  
Subjected to Collapse-Consistent Loading Protocols for Enhanced  
Collapse Simulation and Internal Damage Characterization**

*Funded by the National Science Foundation (NSF)*

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

2012-2017

**2012 PEER Summer Internship Program**

*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.

Summer 2012

**Publications  
and  
Presentations**

**Journal Publications**

Cook, Liel, and Safiey. *Functional Recovery of Modern Reinforced Concrete Buildings*. Journal of Structural Engineering. Volume 15, Issue 9. July 5, 2024. Awarded Editor's Choice.

Zhang, Fung, Cook, Johnson, and Sattar. *Benefit-Cost Analysis for Earthquake-Resilient Building Design and Retrofit: State of the Art and Future Research Needs*. Natural Hazards Review. Volume 25, Issue 3. May, 2024.

Baker, Almeter, Cook, Liel, and Haselton. *A Model for Partially Dependent Component Damage Fragilities in Seismic Risk Analysis*. Earthquake Spectra. Volume 40, Issue 1. October 2023.

Mohammadgholibeyki, Echeverria, Safiey, **Cook**, Koliou, and Liel. *Assessing the Feasibility of Achieving Functional Recovery Goals through Seismic Retrofit of Existing Reinforced Concrete Buildings*. Earthquake Spectra. September 2023.

Fung, Zhang, Johnson, **Cook**, and Sattar. *Multidisciplinary Research to Advance the Development of Functional Recovery for Community Resilience*. Disaster Prevention and Resilience. July 2023.

**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. May 2023.

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. May 2023. Awarded Editor's Choice.

**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

Bhatta, Mishra, van de Lindt, **Cook**, Sattar, Barbosa. *Seismic Performance of Full-Scale Code Compliant Fire Sprinkler Piping System in a Six-Story Building*. New Zealand Society for Earthquake Engineering Conference, Auckland, New Zealand, April 8<sup>th</sup> – 10<sup>th</sup>, 2025. *In Preparation*.

Valigura, **Cook**, and Sattar. *Construction Quality and Assurance for Functional Recovery Design*. Structural Engineers Association of California Convention, Portland, Oregon, September 2 – 3, 2024.

**Cook**. *Leveraging Decision Trees to Map Functional Recovery Seismic Design Provisions for Reinforced Concrete Moment Frames*. 18<sup>th</sup> World Conference on Earthquake Engineering, Milan, Italy, June 30<sup>th</sup> – July 5<sup>th</sup>, 2024.

Blowes, Molina Hutt, and **Cook**. *Evaluating the Variability in Functional Recovery Performance of Modern Buildings Across the United States*. 18<sup>th</sup> World Conference on Earthquake Engineering, Milan, Italy, June 30<sup>th</sup> – July 5<sup>th</sup>, 2024.

Baker, Haselton, Almeter, and **Cook**. *FEMA P-58 Resilience Analysis of Building Portfolios Considering Ground Motion Correlations*. 18<sup>th</sup> World Conference on Earthquake Engineering, Milan, Italy, June 30<sup>th</sup> – July 5<sup>th</sup>, 2024.

**Cook**, DeBock, and Sattar. *Risk-Targets for Recovery-Based Design of Individual Buildings Considering Regional Performance*. 14th International Conference on the Application of Statistics and Probability in Civil Engineering, Dublin, Ireland, July 9th - 13th, 2023. Accepted for presentation.

Saadat, **Cook**, DeBock, Sattar, and Nikolaou. *Enhancing the Resilience and Functional Recovery of Infrastructure Networks Following Earthquakes*. 14th International Conference on the Application of Statistics and Probability in Civil Engineering, Dublin, Ireland, July 9th - 13th, 2023.

**Cook** and Sattar. *The Impact of Nonstructural Damage on Building Function*. Fifth Annual Workshop on the Seismic Performance of Nonstructural Elements, Palo Alto, California, December 5 - 7, 2022.

**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 17<sup>th</sup> 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 17<sup>th</sup> 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 17<sup>th</sup> 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 11<sup>th</sup> National Conference on Earthquake Engineering, 2018.

Haselton and **Cook**. *Resilient Seismic Design Using Prescriptive and Non-Prescriptive Design Methods*. Paper and presentation at the 11<sup>th</sup> 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 11<sup>th</sup> 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 11<sup>th</sup> 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 11<sup>th</sup> 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, 2<sup>nd</sup> 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, 2<sup>nd</sup> 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, 2<sup>nd</sup> Conference on Improving the Seismic Performance of Existing Buildings and Other Structure, 2015.

## Other Publications

**Cook** and Sattar (2024). *A Technical Framework to Map Functional Recovery Performance Objectives to Prescriptive Seismic Design Provisions for Buildings*. NIST Special Publication 1321, National Institute of Standards and Technology, Gaithersburg, Maryland, September 2024.

Zhang, Sattar, **Cook**, Johnson, and Fung (2024). *Systematic Review of Embodied Carbon Assessment and Reduction in Building Life Cycles*. NIST Special Publication 1324, National Institute of Standards and Technology, Gaithersburg, Maryland, September 2024.

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

*A Roadmap to Functional Recovery*. UCLA Graduate Seminar Series, October 24, 2023.

*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** Fung, **Cook**, Elsibaie, Zhang, Sattar, Johnson, Welch. *Economic Evaluation at the Design Phase for Functional Recovery: Integrated Design, Assessment, and Economic Evaluation for New Buildings*. In preparation.

Bhatta, **Cook**, and Sattar. *Development of Fragility Functions for Code-Compliant Fire Sprinkler Piping Systems and Riser Pipes Based on Full-Scale Experimental Tests*. In preparation.

Blowes, Molina Hutt, Zimmerman, **Cook**, Almeter, and Haselton. *Nonstructural Component Design Requirements in Recovery-Based Seismic Design Provisions*. In preparation.

Blowes, Molina Hutt, Zimmerman, **Cook**, Almeter, and Haselton. *Limiting Safety-Critical Structural Damage in Recovery-Based Seismic Design Provisions*. Submitted to Earthquake Spectra.

Bhatta, Mishra, **Cook**, Sattar, Barbosa, van de Lindt. *Seismic Response of Pressurized Full-Scale Fire Sprinkler Piping System on Six-Story Structure*. Submitted to the Journal of Earthquake Engineering.

Reviewed Journal Papers	Journal	2019	2020	2021	2022	2023	2024
	Earthquake Spectra	--	--	3	3	1	2
	Natural Hazards Review	1	--	1	1	2	--
	Bulletin of Earthquake Engineering	--	--	1	--	--	--
	Earthquake Engineering and Structural Dynamics	--	--	--	1	--	1
	International Journal of Disaster Risk Science	--	--	--	--	--	1
	Journal of Building Engineering	--	--	--	--	--	1
	Reliability Engineering and System Safety	--	--	--	--	--	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)**

- Received 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.
- Journal of Structural Engineer Editor’s Choice for May 2024 publication.

**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
- Chair, Younger Members Committee, 2021-2023
- Executive Committee Member, World Housing Encyclopedia, since 2020.
- Secretary, World Housing Encyclopedia, 2021-2023.
- Chair, World Housing Encyclopedia, since 2023.
- Member, Business Resilience Committee, since 2022.
- Received an honorable mention for the 2019-2020 EERI/FEMA NEHRP Graduate Fellowship in Earthquake Hazard Reduction.
- Recipient of the 2022 Younger Member Award.
- Earthquake Spectra Editor’s Choice for May 2023 publication.

**Structural Engineers Association of Northern California (SEAOC)**

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

**Building Seismic Safety Council (BSSC)**

- 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.

**National Institute of Standards and Technology (NIST)**

- 2022 Special Act award for leadership in facilitating the 2022 Disaster Resilience Research Symposium.
- 2023 PEAR Accolades award for technical contributions and leadership in emerging research to support recovery-based building codes and standards.