

PhD.

Dr. Siddharth Bhandari

Associate Director of Research of Construction Safety Research Alliance Department of Civil, Environmental, and Architectural Engineering

University Colorado Boulder

1111 Engineering Drive, Boulder, UCB 412, CO 80309

Phone: (303)-350-7685

E-mail: siddharth.bhandari@colorado.edu

ACADEMIC BACKGROUND
University of Colorado at Boulder

(May 2019) Department of Civil, Environmental, and Architectural Engineering

Dissertation: Leveraging Emotional Engagement Techniques and Adult

Learning Principles to Transform Safety Training

M.S. University of Colorado at Boulder

(May 2017) Department of Civil, Environmental, and Architectural Engineering

Specialization track: Construction Engineering and Management (GPA: 3.8)

B.S. University of Colorado at Boulder

(December 2014) Department of Civil, Environmental, and Architectural Engineering

Specialization track: Environmental Engineering (GPA: 3.0; Major GPA: 3.3)

PROFESSIONAL EXPERIENCE

Associate Director of University of Colorado Boulder

Research Construction Safety Research Alliance and Department of Civil, Architectural

(Spring 2021 – Present) and Environmental Engineering

Research Focus: Safety Training, Behavioral Psychology, Adult Learning,

Safety Climate, Leading Indicators, and Precursor Analysis.

Research Faculty University of Colorado Boulder

(Spring 2023- Present) Department of Civil, Environmental, and Architectural Engineering

Courses: Introduction to Construction, Safety and Quality, and Construction

Equipment and Methods.

Instructor Stanford University

(Spring 2022 – Present) Center for Professional Development

Lead instructor for program designed to cultivate a diverse network of successful DOE project delivery practitioners at Stanford/DOE Project

Leadership Institute.

Assistant Professor Western Michigan University

(Fall 2019 – Fall 2020) Department of Civil and Construction Engineering

Courses: Life Cycle Cost Management Analysis (CCE 6360), Construction

Project Management (CCE 4380), Construction Planning and Scheduling

(CCE 4310) and Design of Construction Systems (CCE 6330).

Research Associate University of Colorado Boulder

(Summer 2019) Department of Civil, Environmental, and Architectural Engineering

Research Focus: Safety Training, Behavioral Psychology, Adult Learning,

Safety Climate, Leading Indicators, and Precursor Analysis.

Graduate Research Assistant University of Colorado Boulder

(Spring 2015 – Spring 2019) Department of Civil, Environmental, and Architectural Engineering

<u>Research Focus</u> Developing and testing a new safety training program that uses multimedia learning techniques, adult learning principles, and prominent behavioral psychological theories to improve knowledge retention and safety decision-making skills among construction workers.

Co-Instructor University of Colorado Boulder

(Spring 2018 & Spring 2019) Course: Construction Equipment and Methods.

Instructor on Record University of Colorado Boulder

(Fall 2017 & Fall 2018) Course: Construction Equipment and Methods.

Teaching Assistant University of Colorado Boulder (Spring 2017) Course: Introduction to Construction

Lead Instructor for Modules: Safety Management and Multi-Factor

Engineering Economics.

Teaching Assistant University of Colorado Boulder

(Fall 2016) Course: Construction Equipment and Methods.

<u>Lead Instructor for Modules:</u> Designing Blasting Operations, Techniques on Driving Sheet Piles, Risk Overview and Analysis, and Bias in Engineering.

Undergraduate Research University of Colorado Boulder

Assistant Department of Civil, Environmental, and Architectural Engineering

(Fall 2013 – Fall 2014) Responsibilities included developing hyper-realistic replicas of human hands, delivering safety training, data collection, entry, and analysis, and authoring

papers for academic publications.

Summer Study Program Lead instructor in pre-college summer study program for high-school students

to encourage them to join a STEM field. For the workshop, responsibilities included developing syllabus, delivering lectures, organizing a project,

preparing, and grading exams and homework for 70 high-school students.

Teach for Sustainability Columbine Elementary School

(Fall 2011) Interned in a CLACE' project funded by NASA as a facilitator to teach students

about sustainability, energy and conservation of environment. Responsible for

making and delivering lesson plans to a class of 20 students.

Tutor University of Colorado Boulder

(Spring 2012) Courses: Applied Math Calculus Level 1 & 2 and Business Statistics

EXTERNALLY FUNDED RESEARCH

Instructor (Summer 2014)

ID	Start Year	Project Title	Agency	Role	University	Total Amount Awarded	Bhandari Share
E*	2021- Present	Construction Safety Research Alliance	CSRA	Co-PI	UCB	\$1,600,000	\$183,600
D	2022	Understanding Mental Health Crisis	CII	PI	UCB	\$75,000	\$75,000
C.	2021	Commercial Motor Vehicle Drivers Shortage/Retention	MTSB	Co-PI	UCB	\$106,698	\$34,016

B. 2019	Indicators	CSRA	Co-PI	WMU	\$24,000	\$24,000
A. 2019	Developing a Tool to Measure Real-Time Situational Awareness	ELECTRI International	PI	WMU	\$9,000	\$9,000

^{*} Funding is recurring yearly through annual donations

Key:

CSRA - Construction Safety Research Alliance, University of Colorado Boulder (https://www.colorado.edu/lab/csra/)

 $CII-Construction\ Industry\ Institute\ (\underline{https://wikis.utexas.edu/display/ciifsc/CII+2022+Request+for+Nominations})$

OHSP – Office of Highway Safety Planning, State of Michigan [Federal Funding]

ELECTRI International - Electrical Contractors Foundation (https://electri.org/research-overview/early-career-awards/)

WMU - Western Michigan University

UCB - University of Colorado Boulder

MERIT-BASED AWARDS

- [1]. National Safety Council's Rising Stars of Safety Class of 2021 Award.
- [2]. Best Paper Award at 5th International/11th Construction Specialty Conference Vancouver, Canada, June 7-10, 2015.
- [3]. Invited Guest Editor for Special Edition Journal by Construction Management and Economics (https://think.taylorandfrancis.com/special_issues/covid-19-construction-industrys/?utm_source=TFO&utm_medium=cms&utm_campaign=JPG15743).
- [4]. Outstanding Reviewer Award for the journal *Practice Periodical on Structural Design and Construction* (2020)
- [5]. Reviewer Certificate for the journal *Safety Science* (October 2017, 2019)
- [6]. Dean's List for Academic Excellence (Spring 2014)

INVITED PROFESSIONAL WORKSHOPS AND PRESENTATIONS

Year	Organization	Торіс	Location	Approx. # of Attendees
2023	CURT	Mental Health: Where Do We Start?	Naples, FL	45
2023	American Society of Safety Professionals	Defining and Predicting Serious Injuries	San Antonio, TX	80
2023	American Pipeline Institute	Measuring Safety Performance	Nashville, TN	15
2022	Wolfcreek Safety Summit	Measuring Safety Performance	Houston, TX	24
2022	INGAA Foundation, Inc.	Science of Safety: CSRA Research Updates	Houston, TX	60
2022	Construction Industry Safety Initiative	Measuring Safety Performance & Energy-based Hazard Recognition	Chicago, IL	70
2022	Edison Electric Institute	Defining Serious Injuries	Virtual	13
2022	American Society of Safety Professionals	How should we measure safety performance?	Virtual	822
2022	Distributed Contractors Association	How should we measure safety performance?	Austin, TX	30
2021	Pipeline Contractors Association	Statistical Invalidity of Total Recordable Injury Rate	Houston, TX	60
2021	Wolfcreek Safety Summit	Quality of Safety Leading Indicators	Houston, TX	20
2021	British Columbia Municipal Safety Association and Public Works Association of British Columbia Joint Conference	Precursor Analysis	Virtual	50

2021	Caterpillar Safety Summit	Statistical Invalidity of Total Recordable Injury Rate	Virtual	50
2018	OTIS Elevator Company Southeast Asia Safety Summit	Using safety climate to reduce risk tolerance levels and propensity to break rules among workers	Ho Chi Minh, Vietnam	35
2018	Enbridge Pipelines	Live Safety Demos	Regina, Canada	10,000
2014	ConocoPhillips	Live Safety Demos	Kenedy, TX	1500
2021- Present	Academic Institutes ¹	Future of Construction Safety Research and Application	USA	20 - 40

¹ Iowa State University, Colorado State University, California Polytechnic State University, and Front Range Community College.

PUBLICATIONS

✓ Peer Reviewed Journal Papers Published

- [1]. Oguz Erkal, E. D., Hallowell, M. R., Ghriss, A., & **Bhandari**, S. (2024). Predicting Serious Injury and Fatality Exposure Using Machine Learning in Construction Projects. Journal of Construction Engineering and Management, 150(3), 04023169.
- [2]. Thallapureddy, S., Sherratt, F., Hallowell, M., & **Bhandari**, S. (2024). Effective information collection in incident investigations: A systematic review and narrative synthesis. Safety Science, 171, 106404.
- [3]. Sherratt, F., Thallapureddy, S., **Bhandari, S.**, Hansen, H., Harch, D., & Hallowell, M. R. (2023). The unintended consequences of no blame ideology for incident investigation in the US construction industry. Safety science, 166, 106247.
- [4]. Patil, K., Ayer, S. K., & **Bhandari**, S. (2023). Virtual Reality: A Tool for Enhancing Emotion Driven Decision Making in Hazardous Construction Environments. Available at SSRN 4583786.
- [5]. Bayona, A., **Bhandari, S.**, Hallowell, M., Sherratt, F., Bailey, J. M., & Upton, J. (2023). What Is a Serious Injury? A Model for Defining Serious Injuries & Fatalities. Professional Safety, 68(09).
- [6]. Thallapureddy, S., Sherratt, F., **Bhandari, S.,** Hallowell, M., & Hansen, H. (2023). Exploring bias in incident investigations: An empirical examination using construction case studies. Journal of safety research, 86, 336-345.
- [7]. Patil, K. R., **Bhandari, S.,** Agrawal, A., Ayer, S. K., Perry, L. A., & Hallowell, M. R. (2023). Analysis of YouTube Comments to Inform the Design of Virtual Reality Training Simulations to Target Emotional Arousal. Journal of Construction Engineering and Management, 149(9), 04023077.
- [8]. Erkal, E. D. O., Hallowell, M. R., & **Bhandari**, **S.** (2023). Formal evaluation of construction safety performance metrics and a case for a balanced approach. Journal of safety research.
- [9]. **Bhandari, S.,** Hallowell, M., Scheve, C., Upton, J., Alruqi, W. M., & Quashne, M. (2022). Assessing the Quality of Safety-Focused Leadership Engagements. Professional Safety, 67(01), 22-28.
- [10]. **Bhandari, S.,** and Hallowell, M. R. (2022). Influence of safety climate on risk tolerance and risk-taking behavior: A cross-cultural examination. Safety Science, 146, 105559.
- [11]. Hardison, D., Hallowell, M., Littlejohn, R., Goodrum, P., & **Bhandari**, S. (2022). The influence of spatial cognition and variability of mental workload among construction hazard prevention through design tasks. Safety Science, 152, 105770.
- [12]. Alsharef, A., Albert, A., & **Bhandari, S.** (2022). Safety challenges experienced by driver license examiners and related safety measures. Safety Science, 154, 105808.
- [13]. Oguz Erkal, E. D., Hallowell, M. R., & **Bhandari**, S. (2021). Practical Assessment of Potential Predictors of Serious Injuries and Fatalities in Construction. Journal of Construction Engineering and Management, 147(10), 04021129.

[14]. **Bhandari S.,** Hallowell, M. R., Alruqi, W., & Salas, R. (2021). "Modeling the Relationship between Personal Risk Tolerance, Work-Related Risk Tolerance, and Risk-Taking Behavior of Construction Workers." Journal of Construction Engineering and Management, 147(4), 04021016.

- [15]. **Bhandari S.**, and Hallowell M. R. (2021). "Identifying and Controlling Biases in Expert-Opinion Research: Guidelines for Variations of Delphi, Nominal Group Technique, and Focus Groups." Journal of Management in Engineering, 37(3), 04021015.
- [16]. Bhandari, S., and Molenaar, K. R. (2020). "Using Debiasing Strategies to Manage Cognitive Biases in Construction Risk Management: Recommendations for Practice and Future Research." Practice Periodical on Structural Design and Construction, 25(4), 04020033.
- [17]. **Bhandari, S.,** Hallowell, M. R., Boven, L. V., Welker, K. M., Golparvar-Fard, M., and Gruber, J. (2020). "Using Augmented Virtuality to Examine How Emotions Influence Construction-Hazard Identification, Risk Assessment, and Safety Decisions." Journal of Construction Engineering and Management, 146(2), 04019102.
- [18]. Hallowell, M. R., **Bhandari, S.,** & Alruqi, W. (2020). "Methods of safety prediction: analysis and integration of risk assessment, leading indicators, precursor analysis, and safety climate." Construction Management and Economics, 38(4), 308-321.
- [19]. Salas, R., Hallowell, M., Balaji, R., and **Bhandari, S.** (2020). "Safety Risk Tolerance in the Construction Industry: Cross-Cultural Analysis." Journal of Construction Engineering and Management, 146(4), 04020022.
- [20]. **Bhandari, S.,** Hallowell, M. R., and Correll, J. (2019). "Making Construction Safety Training Interesting: A Field-Based Quasi-Experiment to Test the Relationship between Emotional Arousal and Situational Interest Among Adult Learners." Safety Science, 117, 58-70.
- [21]. Bhandari S., and Hallowell M. R. (2017). "Emotional Engagement in Safety Training: Impact of Naturalistic Injury Simulations on the Emotional State of Construction Workers." Journal of Construction Engineering and Management, 143(12), 04017090.

✓ Peer-Reviewed Conference Proceeding Published

- [1]. **Bhandari S.**, and Hallowell M. R. (2015) New multimedia safety education program: impacts on emotions, risk perceptions, and learning. Proceedings of the Canadian Society for Civil Engineering Construction Specialty Conference, Vancouver, Canada, June 7- June 10, 2015. [Best Paper Award]
- [2]. Raeisnafchi R., Perry L., **Bhandari S.,** and Albert A. (2024) Construction Safety Training: Engaging Techniques and Technology Adoption Perspectives. Construction Research Congress 2024, Conference Proceedings [Accepted]
- [3]. Bayona A., Moyen N., Hallowell M. R., and **Bhandari S.** (2024) Exploring the hypothesized mechanisms by which serious injuries and fatalities impact business performance. Construction Research Congress 2024, Conference Proceedings [*Accepted*]
- [4]. Stoddard E., **Bhandari S.**, Sherratt F., and Colpack M. (2024) What Mental Health Stressors do Hispanic Construction Workers Actually Care About? Construction Research Congress 2024, Conference Proceedings [Accepted]
- [5]. Bhandari, S., Sherratt, F. and Stoddard, E. (2023) A critical assessment of mental health research in the construction industry, Proceedings of the CIB W099/123 Annual Conference Digital Transformation of Health and Safety in Construction, Porto, Portugal, 21-22 June 2023.
- [6]. Bayona, A., **Bhandari, S.,** & Hallowell, M. R. (2022) Defining Serious Injuries on Construction Jobsites: Lessons from the Literature. In Construction Research Congress 2022 (pp. 294-303).
- [7]. Thallapureddy, S., **Bhandari, S.,** Hallowell, M. R., Sherratt, F., Stoddard, E., & Hansen, H. (2022) Incident Investigations and Learning: Methods, Barriers, and Opportunities. In Construction Research Congress 2022 (pp. 274-283).

[8]. Lopez, J., **Bhandari, S.,** & Hallowell, M. R. Virtual Reality and Construction Industry: Review of Current State-of-Practice and Future Applications. (2022) In Construction Research Congress 2022 (pp. 174-184).

- [9]. Thallapureddy, S., **Bhandari, S.,** & Albert, A. Are Multimedia Training Interventions Effective within Traditional Safety Training Frameworks?. In Construction Research Congress 2022 (pp. 264-273).
- [10]. Alsharef, A., Uddin, S. J., Albert, A., **Bhandari, S.,** & Jaselskis, E. (2022) Construction Safety Training Interventions: State of the Science and Future Opportunities. In Construction Research Congress 2022 (pp. 531-540).
- [11]. Uddin, S. J., Alsharef, A., Albert, A., & **Bhandari, S.** Construction Hazard Recognition: A Smart Literature Review. (2022) In Construction Research Congress 2022 (pp. 412-421).
- [12]. Alruqi, W. M., & **Bhandari, S.** (2020, November). *Understanding the Influence of Perceived Productivity Pressures on Perceptions of Risk among Construction Workers*. In Construction Research Congress 2020: Safety, Workforce, and Education (pp. 49-57). Reston, VA: American Society of Civil Engineers.
- [13]. Alsharef, A., Albert, A., Jaselskis, E., & **Bhandari**, S. (2020, November). *Construction Safety Training: Barriers, Challenges, and Opportunities*. In Construction Research Congress 2020: Safety, Workforce, and Education (pp. 547-555). Reston, VA: American Society of Civil Engineers.
- [14]. Bhandari, S., Albert, A., & Hallowell, M. R. (2020, November). Construction Hazard Recognition: Themes in Scientific Research. In Construction Research Congress 2020: Safety, Workforce, and Education (pp. 58-66). Reston, VA: American Society of Civil Engineers.
- [15]. Techera, U., Bhandari, S., Hallowell, M., & Littlejohn, R. (2020, November). Impact of Worker Fatigue on Hazard Recognition Skills. In Construction Research Congress 2020: Safety, Workforce, and Education (pp. 306-314). Reston, VA: American Society of Civil Engineers.
- [16]. **Bhandari S.,** Hallowell M. R., Salas R., and Alruqi W. (2019). *Global differences in Risk Tolerance Levels Among Construction Workers*. Proceedings of Canadian Society for Civil Engineering Construction Specialty Conference/ Construction Research Congress, Laval (Greater Montreal), Canada, June 12 June 15, 2019.
- [17]. Patil K. R., **Bhandari S.**, Ayer S. K., Hallowell M. R. (2018). *Potential for Virtual Reality and Haptic Feedback to Enhance Learning Outcomes among Construction Workers*. Proceedings of the 18th International Conference on Construction Applications of Virtual Reality (CONVR), Auckland, New Zealand, November 22-23, 2018.
- [18]. **Bhandari S.,** Hallowell M. R., Van Boven L., Golparvar-Fard M., Gruber J., & Welker K. M. (2018). *Using augmented virtuality to understand the situational awareness model*. Proceedings of the American Society of Civil Engineers 2018 Construction Research Congress (CRC), New Orleans, LA, April 2-4, 2018.
- [19]. **Bhandari S.,** Hallowell M. R., Van Boven L., Gruber J., and Welker K. M. (2016). *Emotional states and their impacts on hazard identification skills*. Proceedings of the ASCE 2016 Construction Research Congress (CRC), San Juan, Puerto Rico, May 31-June 2, 2016.

PROFESSIONAL REGISTRATION AND TRAINING

- [1]. OSHA 10-hour Construction Safety and Health Certification. (Certification# 26-006017592).
- [2]. Certified National Center for the Integration of Research, Teaching, and Learning (CIRTL) Associate.
- [3]. College of Engineering and Applied Science Graduate Mentorship Certificate.

STUDENT ADVISING

Ph.D.

1 Roya Raeisinafchi*	U. Colorado Boulder	On-going	Antecedents to a Good-Quality Safety Training Program
2 Arnaldo Bayona	U. Colorado Boulder	On-going	Calculating the Return on Safety Investments

3	Jazmin Lopez	U. Colorado Boulder	On-going	Efficacies of Virtual Reality and Haptic Feedback as Training Platforms
4	Sreeja Thallapureddy	U. Colorado Boulder	On-going	Science of Incident Investigation and Learning
5	Elif Erkal	U. Colorado Boulder	Spring 2022	Safety Measurement and Predictive Science
6	Bandar Alqahtani	Western Mich. Univ.	Spring 2022	Work-related Stressors Impact on Safety Performance
*Pr	imary Advisor			
M.S	S. Thesis			
1	Evan Stoddard	U. Colorado Boulder	On-going	Addressing Mental Health Crisis in Construction Industry
2	Shreeya Bhanage	U. Colorado Boulder.	Spring 2023	Testing Efficacy of Augmented Reality
3	Arnau Altet	U. Colorado Boulder.	Spring 2022	Mental Health Crisis in the Construction Industry
4	Salvi Huix Camps	U. Colorado Boulder	Spring 2022	Using Quality of Pre-job Meetings to Predict Safety Performance
M.S	S. Report			
1	Tristian Walter	U. Colorado Boulder	Fall 2022	Developing a Test Bed Augmented Reality Testing
2	Sreeja Thallapureddy	Western Mich. Univ.	Spring 2020	Efficacy of Multimedia Based Safety Training Programs.
3	Anuj Patel	Western Mich. Univ.	Fall 2019	Using Lifecycle Cost Analysis for Repair and Renovation Projects.
4	Sumit Saha	Western Mich. Univ.	Fall 2019	Measuring Situational Awareness and Human Factors on Construction Sites.
Unc	lergraduate Research A	Assistants		
1	Sloan Russell	U. Colorado Boulder	Spring 2024	Mental Wellness Workplace Interventions Review
2	Lauren Bone	U. Colorado Boulder	Spring 2024	Mental Wellness Climate Assessment
3	Michael Colpack	U. Colorado Boulder	Spring 2023	Return on Safety Investments
4	Dylan Harsh	U. Colorado Boulder	Fall 2022	Incident Investigation and Learning
5	Haley Hansen	U. Colorado Boulder	Fall 2022	Incident Investigation and Learning
6	Evan Stoddard	U. Colorado Boulder	Spring 2022	Components of a High-Quality Safety Training
7	Morgan Hollenback	U. Colorado Boulder	Spring 2022	Safety and Technology: Perceptions of Workforce

7

TEACHING COURSE EVALUATIONS University of Colorado Boulder only. 1

Sid Bhandari, Ph.D.	January 13 th , 2024

Course Title	# Students	Term	Feedback Quality	Practical Relevance	Active Learning
CVEN 3256: Const Equip. and Methods	TBD	Fall 2024	TBD	TBD	TBD
CVEN 3256: Const Equip. and Methods	41	Fall 2023	4.4/5.0	4.8/5.0	3.8/5.0
CVEN 3256: Const Equip. and Methods	27	Spr 2023	4.5/5.0	4.9/5.0	4.8/5.0
CVEN 3256: Const Equip. and Methods	34	Spr 2022	5.0/5.0	5.0/5.0	4.8/5.0

¹Evaluation questions and scale changed.

University of Colorado Boulder only.

Course Title	# Students	Term	Course Overall	Instructor Overall	Instructor Effectiveness
CVEN 32560: Const Equip. and Methods	53	Spr 2019	5.3/6.0	5.7/6.0	5.6/6.0
CVEN 3256: Const Equip. and Methods	42	Fall 2018	5.1/6.0	5.7/6.0	5.6/6.0
CVEN 3256: Const Equip. and Methods	37	Fall 2017	5.0/6.0	5.2/6.0	5.0/6.0

⁰Co-instructor

Western Michigan University only.

Course Title	# Students	Term	Course Overall	Instructor Overall	Course Organization
CCE 6330*: Design of Construction Systems	9	Fall 2020	5.0/5.0	5.0/5.0	5.0/5.0
CCE 4310: Const. Planning and Scheduling	34	Fall 2020	4.8/5.0	4.9/5.0	4.9/5.0
CCE 4380: Const Project Mgmt.	22	Spr 2020	4.5/5.0	4.9/5.0	4.7/5.0
CCE 6360*: Life Cost Mgmt. and Analysis	16	Fall 2019	4.4/5.0	4.4/5.0	4.5/5.0

^{*}Graduate Course

SERVICE ACTIVITIES

Invited Associated Guest Editor

[1]. Construction Management and Economics Special Issue: What Have we Learnt From COVID-19 Global Pandemic: Improving the Construction Industry's Abilities to Foresee, Respond to, and Recover from Future Endemic Catastrophes. (2021)

Committee Participation (Department, College, or University)

[1]. Member of Term-Limited Professorship Award Review Committee, Western Michigan University (2019-2020).

Conference Sessions Chaired and Technical Committees:

[1]. CIB W099 and TG59 International Conference 2020: Scientific and Technical Committee Member (2021)

Peer-Reviewer (Journals)

- [1]. Journal of Management in Engineering (2021 present)
- [2]. Journal of Architectural Engineering (2020 present)
- [3]. Journal of Safety Research (2020 present)
- [4]. Practice Periodical on Structural Design and Construction (2019 present)
- [5]. Journal of Construction Economics and Management (2017-present)
- [6]. Safety Science (2016- present)

Peer-Reviewer (Conferences)

- [1]. CRC: Construction Research Congress Conference (2016 present).
- [2]. CIB W099 and TG59: International Safety, Health, and People in Construction Conference (2015 present).