

Brandon S. Byers, EIT, WELL AP

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RESEARCH INTERESTS	Broadly interested in digital transformation and circular economy for the construction industry, he is exploring decentralized data storage and modeling solutions of building components to create, store, and share necessary information for facilitating reuse.	
EDUCATION	ETH Zurich , Zurich, Switzerland D.Sc. Candidate in Civil Engineering, September 2021 - Present Advisor: Prof. Catherine De Wolf, <i>Circular Engineering for Architecture</i> Stanford University , Palo Alto, CA M.Sc. Sustainable Design and Construction, June 2021 Advisor: Prof. Sarah Billington Georgia Institute of Technology , Atlanta, GA B.Sc. Civil Engineering, <i>High Honors</i> , May 2017 Academic Exchange at Nanyang Technical University	
HONORS AND AWARDS	<ul style="list-style-type: none">• Highly Rated Paper at European Conference on Computing in Construction, Rhodes, Greece, 2022• Dean E. Stephan and Charles Pankow Builders Fellowship in Civil Engineering, Stanford University, 2019 - 2020• Chi Epsilon, Civil Engineering Honor Society, inducted 2016• George International Scholarship, Georgia Tech, 2014• Energy Solutions Scholarship, Georgia Tech, 2012	
PROFESSIONAL EXPERIENCE	Clark Construction , BART Union City, CA <i>Summer Associate</i> <i>June 2020 - July 2020</i> <ul style="list-style-type: none">• Developed data visualization dashboard using Power BI to track subcontractor performance• Utilized SketchUp to develop construction site plans• Assisted tracking materials and resources for LEED credit• Developed Site Specific Work Plan and provided construction support AECOM , Washington DC + <i>Structural Engineer</i> <i>July 2017 - August 2019</i> <ul style="list-style-type: none">• Analyzed and modeled steel surge tanks attached to hydropower facility using Finite Element Analysis• Provided engineering support for dam rehabilitation alternatives for Crane Lake Dam, MO by performing preliminary design calculations, initial design drawings, construction cost estimates, and a written design alternatives report• Quality engineer in assignment for FEMA to produce 17,546,644 meals shipped through 775 truckloads to both Puerto Rico and U.S. Virgin Islands for hurricane relief• Developed recommendations for hillside development code in cooperation with FEMA to aid in supporting building code development in the U.S. Virgin Islands	

AECOM, Mosul Dam, Iraq

Office Engineer

July 2018 - February 2019

- Calculated grouting pressures to be used for a grout curtain underneath the dam foundation
- Managed a team of local subcontractors in scanning and electronic indexing of historic design and as-built drawings
- Performed Quality Control of grout mix design and batch tests
- Developed and executed a training program to integrate Office Engineers from the Iraqi Ministry of Water Resources into supporting the field and technical staff of the dam

RESEARCH
EXPERIENCE

Tecnalia, Bilbao, Spain

Visiting Researcher

September 2023 - October 2023

- In collaboration for the Horizon Europe ReCharged project on climate-aware resilience for sustainable critical and interdependent infrastructure systems enhanced by emerging digital technologies
- Developed taxonomy of critical transport and energy systems of assets and interdependency methodologies

Hybrid Physical + Digital Spaces, Stanford University, Palo Alto, CA

Graduate Research Assistant

March 2020 - June 2021

Dr. Sarah Billington

- Lead a team of three in developing a methodology for recreating a lab study in Virtual Reality and comparing the room impacts on the occupant in the physical room to the virtual room representation
- Analyzed test data in R for descriptive statistics and data visualization of lab studies to demonstrate the influence of room environment on occupant wellbeing
- Performed reliability and variance statistical analysis on survey studies on building feature impact on occupants

Structural Engineering, Mechanics and Materials Group, Georgia Institute of Technology, Atlanta, GA

Undergraduate Research Assistant

January 2017 - May 2017

Dr. Abdul-Hamid Zureick

- Performed destructive testing and analysis on pultruded Fiberglass Reinforced Plastic members in bolted connections
- Developed research report to further develop industry code for minimum bolt edge distance performance equations

TEACHING
EXPERIENCE

Digital Transformation for Circular Construction, ETH Zurich

Course Assistant: 101-0531-00L, Prof. Catherine De Wolf

February 2023 - June 2023

- Approximately 25 graduate students from civil engineering, architecture, and computer science
- Developed, taught, and managed the course modules on Material Passports, Blockchain, and the Metaverse

Materials for Sustainable Built Environments, Stanford University

Course Assistant: CEE-223, Prof. Sarah Billington

March 2021 - June 2021

- Approximately 25 graduate students
- Developed embodied carbon of buildings module and supporting assignments
- Built up final project to include carbon calculations and constructability estimates

Structural Design, Stanford University

Course Assistant: CEE-182, Prof. Sarah Billington

January 2021 - March 2021

- Approximately 20 undergraduate students
- Assisted in developing syllabus for the first year that offered a combined structural steel and reinforced concrete design course

Building Modeling for Design and Construction, Stanford University

Course Assistant: CEE-220A, Glenn Katz

September 2020 - November 2020

- Approximately 40 undergraduate and graduate students

PRESENTATIONS

Invited Talks

- *Implemia - Future of Living*, "Decentralized Sustainability: P2P and B2B Circularity" Zurich, September 2023
- 1st *Holcim Foundation Sounding Board*, "Beyond Recycling: Why Reuse is Vital for Resilience and Regeneration" Zurich, March 2023
- *The Future of Construction Symposium*, "Computation for Circular Construction" - ETH Zurich, June 2022

Academic Presentations

- *European Conference on Computing in Construction*, "Using Engraved QR Codes to Connect Building Components to Materials Passports for Circular Construction" - Plenary Session, Rhodes, Greece, July 2022

Exhibitions and Other Media

- *World Resources Forum*, "The Need for Circularity in the Building and Construction Sector" - Exhibition, September 2023
- *BBC News, Click*, "Digitalization for Circular Construction" - Interview, February 2023
- *Swiss Sustainability Forum*, "Sustainable Digital Construction: Use Less, Use Alternative, Reuse" - Exhibition, September 2022

PUBLICATIONS

Journal Publications

- Mollaei, A., **Byers, B.S.**, Christovan, C., Olumo, A., De Wolf, C., Bachmann, C., Haas, C. (2023). "A global perspective on building material recovery incorporating the impact of regional factors", *Journal of Cleaner Production*.
- ***Byers, B.S.**, *Dougherty, T.R., Horo, U. (2023). "Peer review in a pickle: Policy approaches for academic peer review", *MIT Science Policy Review*.
- **Byers, B.S.**, De Wolf, C. (2023). "QR Code-Based Material Passports for Component Reuse Across Life Cycle Stages in Small-Scale Construction", *Journal of Circular Economy*.
- De Wolf, C., Cordella, M., Dodd, N., **Byers, B.S.**, Donatello, S. (2023). "Whole life cycle environmental impact assessment of buildings: Developing software tool and database support for the EU framework Level(s)", *Resources, Conservation and Recycling*.
- Altaf, B., Bianchi, E., Douglas, IP., Douglas, K., **Byers, B.S.**, Paredes, PE., Ardoin, NM., Markus, HR., Murnane, EL., Bencharit, LZ., Landay, JA., Billington, SB. (2022). "Use of Crowdsourced Online Surveys to Study the Impact of Architectural and Design Choices on Wellbeing", *Frontiers in Sustainable Cities*.

* denotes co-first author

Conference Publications

- **Byers, B.S.**, Gordon, M., Iuorio, O., De Wolf, C. (2023). "Calculating embodied

carbon for reused structural components with laser scanning” *IALCCE 2023: Eighth International Symposium on Life-Cycle Civil Engineering*.

- Dounas, T., Hunhevicz, J., **Byers, B.S.** (2023). ”Design dimensions for blockchain oracles in the AEC industry” *Proceedings of the 2023 European Conference on Computing in Construction*.
- Xiong, Z., Gordon, M., **Byers, B.S.**, De Wolf, C. (2022). ”Reality capture and site-scanning techniques for material reuse planning” *International Association for Shell and Spatial Structures*.
- **Byers, B.S.**, Cheriyaamulla, S., Ewason, J., Hall, DM., De Wolf, C. (2022). ”Using Engraved QR Codes to Connect Building Components to Materials Passports for Circular Construction” *Proceedings of the 2022 European Conference on Computing in Construction*.

ADVISING AND SUPERVISION

Supervisor at Master level

Master Thesis: L. Schönfelder, ”Formalization of Inventory Processes: Towards a steel element reuse ontology for reuse of steel elements in the building industry” - ETH Zurich, 2023

Master Thesis: K. Kulik, ”Building preservation and circularity in the built environment: a literature review mapping the research gap” - ETH Zurich, 2023

Master Project: M. Hoch, ”Strategies for the Implementation of a Material Passport into the Swiss Standard” - ETH Zurich, 2023

Master Thesis: F. Geiser, ”Writing a guideline to measure and apply circularity in construction for Switzerland” - ETH Zurich, 2023

Master Thesis: S. Sanchez, ”Development of an IFC-based tool for an automated assessment of the cost and environmental impact of buildings to support circular construction decision-makers” - ETH Zurich, 2023

Master Thesis: S. Cheriyaamulla, ”Application of lean management principles to the data management of building materials for reuse” - ETH Zurich, 2022

Master Project: K. Kulik, ”BIM-based Material Passport Testing” - ETH Zurich, 2022

Master Project: L. Schönfelder, ”Integration of Reuse-Potential Assessments in Building Inventories by Non-Reuse-Experts: A Case Study” - ETH Zurich, 2022

Master Thesis: A. Menasce, ”Information flow for building components reuse. Potential applications of Materials Passports” - ETH Zurich, 2021

AFFILIATION AND SERVICE

Academic Organizations

- Events Coordinator for Leaders of the Built Environment, 2019-2020, *Stanford University*
- Team Captain for Stanford’s Integrated Project Delivery competition team in the Associated Schools of Construction Student Competition, 2020, *Stanford University*
- CEE Peer Mentoring Program, 2020, *Stanford University*
- Trip Leader, Outdoor Recreation Georgia Tech, 2015-2017, *Georgia Tech*
- Team Lead, Engineers Without Borders, 2016, *Georgia Tech*

Professional Organizations

- Associate Member, American Society of Civil Engineers, inducted 2017
- Garden Guild Volunteer Member, Franciscan Monastery of the Holy Land, 2017-2018

TECHNICAL SKILLS

Registered: WELL Accredited Professional, Engineer-In-Training (EIT)

Programming: Python, R, Dynamo

Software: BIM, Revit, EC3, SimaPro, OneClickLCA, SketchUp, Power BI

(last updated November 2023)