Yefan Zhi

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https://yefan-zhi.github.io/

Education

Doctor of Philosophy - PhD, Architecture, University of Pennsylvania *Philadelphia, PA, US*   Jul 2023 - Present

Master of Science in Design - MSD, Architecture, University of Pennsylvania *Philadelphia, PA, US*   Aug 2021 - Aug 2022

Bachelor of Architecture - BArch, Architecture, Tsinghua University *Beijing, China*   Aug 2016 - Jun 2021

Bachelor of Arts - BA, Sociology, Tsinghua University *Beijing, China*   Aug 2016 - Jun 2020

Research Experience

Polyhedral Structures Laboratory, University of Pennsylvania *Philadelphia, PA, US*
- PhD Fellow, Full-Time. National Science Foundation (NSF) Future Manufacturing Research Grant   Jul 2023 - Present
- Research Assistant, Full-Time. Advanced Research Projects Agency–Energy (ARPA-E) Grant   Sep 2022 - Jun 2023

People's Architecture Office *Beijing, China*
- Research Intern, Full-Time   Jul 2019 - Sep 2019

Under Review Papers

Design-to-Fabrication Workflow for 3D Concrete Printed Structures with Embedded Periodic Anticlastic Surfaces
Hua Chai, Mathias Bernhard, *Yefan Zhi*, Maximilian E. Ororbia, Masoud Akbarzadeh
Submitted to Automation in Construction

Journal Papers (Peer-Reviewed)

[J5] **3D Concrete Printing of Triply Periodic Minimum Surfaces for Enhanced Carbon Capture and Storage**
Kun-Hao Yu, Teng Teng, So Hee Nah, Hua Chai, *Yefan Zhi*, Kun-Yu Wang, Yinding Chi, Peter Psarras, Masoud Akbarzadeh, Shu Yang
Advanced Functional Materials 2025

[J4] **Automated Toolpath Design of 3D Concrete Printing Structural Components**
Yefan Zhi, Hua Chai, Teng Teng, Masoud Akbarzadeh
Additive Manufacturing 2025

[J3] **Prototyping High-Fidelity Multifunctional Objects Using Single-Nozzle Multi-Filament Additive Manufacturing System with Active Mixing**
Teng Teng, *Yefan Zhi*, Masoud Akbarzadeh
Materials & Design 2025

[J2] **Designing 3D-Printed Concrete Structures with Scaled Fabrication Models**
Yefan Zhi, Teng Teng, Masoud Akbarzadeh
Architectural Intelligence 2024

[J1] **Research on the Villagers' Behavior Characteristics in Rural Area: Analysis Using Spatio-Temporal Data from Wi-Fi and Surveillance Video**
Yefan Zhi, Ziyu Huang, Weixin Huang
Urban, Environment, Design (UED) 2023 *in Chinese, on Cover*

Conference Papers (Peer-Reviewed)

[C9] **KlimaStol: 3D-printed Cooling Chair for Mitigating Outdoor Heat Stress**
Ji Yoon Bae, *Yefan Zhi*, Eric Teitelbaum, Masoud Akbarzadeh, Dorit Aviv
Association for Computer Aided Design in Architecture (ACADIA) Annual Conference 2025 (Project Paper) *Miami, FL, US*

[C8] **Merged Force Diagrams for Expanded Tension-Compression Design Space in Polyhedral Graphic Statics**
Hua Chai, Yao Lu, *Yefan Zhi*, Masoud Akbarzadeh
Advances in Architectural Geometry 2025 *Boston, MA, US*

[C7] **Functionally Graded Architectural Materials: Integrated and Tailored Thermal Insulation through Gradient Multimaterial Additive Manufacturing for Masonry Architectural Components**
Teng Teng, *Yefan Zhi*, Masoud Akbarzadeh
Association for Computer Aided Design in Architecture (ACADIA) Annual Conference 2024 *Banff, Canada*
Best Paper Award (Runner-Up)

[C6] **The Effect of Post-Tensioning on the Behavior of Small-Scale 3D-Printed Concrete Beams**
Damon Bolhassani, Fahimeh Yavartanoo, Javier Tapia, Masoud Akbarzadeh, Maximilian E. Ororbia, Hua Chai, *Yefan Zhi*, Mylene Bernard, Leon Trousset, Karolina Pajak, Blaise Waligun, Paul Kassabian
International Association for Shell and Spatial Structures (IASS) Annual Symposia 2024 *Zurich, Switzerland*

[C5] **Experimental Study of a Funicular Concrete Beam Prototype**
Maximilian Ororbia, Hua Chai, *Yefan Zhi*, Pouria Vakhshouri, Jorge Huisa Chacon, Joseph R. Yost, Mathias Bernhard, Fahimeh Yavartanoo, Javier Tapia, Damon Bolhassani, Mylene Bernard, Leon Trousset, Karolina Pajak, Blaise Waligun, Paul Kassabian, Masoud Akbarzadeh
International Association for Shell and Spatial Structures (IASS) Annual Symposia 2024 *Zurich, Switzerland*

[C4] **Design Approach for a Post-tensioned Funicular Concrete Beam**
Hua Chai, Maximilian Ororbia, *Yefan Zhi*, Ryan Welch, Billie Faircloth, Fahimeh Yavartanoo, Damon Bolhassani, Masoud Akbarzadeh
International Association for Shell and Spatial Structures (IASS) Annual Symposia 2024 *Zurich, Switzerland*

[C3] **Diamanti: 3D-Printed, Post-Tensioned Concrete Canopy**
Masoud Akbarzadeh, Hua Chai, *Yefan Zhi*, Maximilian E. Ororbia, Teng Teng, Mathias Bernhard, Damon Bolhassani, Fahimeh Yavartanoo, Javier Tapia, Karolina Pajak, Mylene Bernard, Leon Trousset, Paul Kassabian, Blaise Waligun
FABRICATE 2024 *Copenhagen, Denmark*

[C2] **Local Optimization of Self-Supporting Shell Structures in 3D Printing: a Skeleton Method**
Yefan Zhi, Hua Chai, Teng Teng, Masoud Akbarzadeh
International Association for Shell and Spatial Structures (IASS) Annual Symposia 2023 *Melbourne, Australia*

[C1] **Continuous Multi-Filament 3D Printing for Tension-Compression Structure Components**
Teng Teng, *Yefan Zhi*, Kun-Hao Yu, Shu Yang, Masoud Akbarzadeh
International Association for Shell and Spatial Structures (IASS) Annual Symposia 2023 *Melbourne, Australia*

Book Chapters

Broader Applications of Polyhedral Graphical Statics
Masoud Akbarzadeh, *Yefan Zhi*, Georgios Athanasopoulos, Marina Konstantatou, Maximilian E. Ororbia, Salma Mozaffari, Teng Teng, Mostafa Akbari, Hao Zheng, Hossein Mofatteh, Hamid Akbarzadeh, Armin Mirabolghasemi, Zakaria Hsain, James Pikul, Yao Lu, Shu Yang, Kun-Hao Yu, Hua Chai, Mohammad Bolhassani, Paria Yavartanoo, Allan McRobie, Joseph Robert Yost, Jen Schneider
Chapter in *Polyhedral Graphical Statics: For Funicular Structural Form Finding* by Masoud Akbarzadeh, 2025, Cambridge University Press *Cambridge, UK*

Theses

A Wi-Fi and Video Data-Based Study on Spatial-Temporal Characteristics of Rural Space Behavior
Yefan Zhi, Advised by Weixin Huang
Bachelor of Architecture thesis 2021, Tsinghua University *Beijing, China, in Chinese*

Forming Norms in a Small Community: a Sociological Study of Birdwatching
Yefan Zhi, Advised by Yue Du
Bachelor of Arts in Sociology thesis 2020, Tsinghua University *Beijing, China, in Chinese*

Software

Ovenbird, A cross-scale shell printing slicer and optimizer   Sep 2022 - Present
Yefan Zhi, Hua Chai, Teng Teng, Masoud Akbarzadeh

BibGallery, A light, simple literature management library on Python   Dec 2022
Yefan Zhi

Teaching

Workshops
Ovenbird: Automated toolpath design for 3D concrete printing   Nov 2025
Advances in Architectural Geometry *Boston, MA, US*

Courses (Teaching Assistance)
ARCH 5350 Structures I *University of Pennsylvania*   Fall 2025
Richard Farley, Masoud Akbarzadeh

Design/Construction Projects

Projects not associated with academic publications are listed here.

Diamanti, Venice 2025 Architecture Biennial Exhibition by European Cultural Centre *Venice, Italy*   May - Nov 2025
 - As designer

Glass Bridge, Corning Museum of Glass *Corning, NY, US*   Dec 2024 - Sep 2025
 - As part of the installation/disassembly team

Floralis: an ETFE-Clad, Multilaminar Timber Structure, Florissant Fossil Beds *Denver, CO, US*   Dec 2024
 - As part of the installation team

Inventory-Constrained Design Competition by Eventscape 2022 *New York, NY, US*   May 2024
 - First place: **Dove Wave: Inventory Constrained Design**, as lead researcher

Exhibitions

Advanced Research Projects Agency–Energy (ARPA-E) Energy Innovation Summit 2025 *Washington, DC, US*   Mar 2025
 - 3D concrete printing technology showcase

Greenbuild International Conference & Expo 2024 *Philadelphia, PA, US*   Nov 2024
 - 3D concrete printing technology showcase

Advanced Research Projects Agency–Energy (ARPA-E) Energy Innovation Summit 2024 *Dallas, TX, US*   Mar 2024
 - 3D concrete printing technology showcase

Advanced Research Projects Agency–Energy (ARPA-E) Energy Innovation Summit 2023 *Washington, DC, US*   Apr 2023
 - 3D concrete printing technology showcase

Association for Computer Aided Design in Architecture (ACADIA) Conference 2022 *Philadelphia, PA, US*   Oct 2022
 - Faculty research exhibition, as part of Polyhedral Structures Laboratory research team
 - Student work exhibition, as part of Master of Science in Design program

Weitzman School Year End Show 2022 *Philadelphia, PA, US*   May 2022
 - Student work exhibition, as part of Master of Science in Design program