

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 - Research Assistant, Full-Time. Advanced Research Projects Agency–Energy (ARPA-E) Grant	Jul 2023 - Present Sep 2022 - Jun 2023
People's Architecture Office <i>Beijing, China</i> - 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)

- [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 Trouset, 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 Trouset, 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 Trouset, 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 Yefan Zhi, Hua Chai, Teng Teng, Masoud Akbarzadeh	Sep 2022 - Present
BibGallery , A light, simple literature management library on Python Yefan Zhi	Dec 2022 - Present

Design/Construction Projects

Projects not associated with academic publications are listed here.

Diamanti , Venice 2025 Architecture Biennial Exhibition by European Cultural Centre <i>Venice, Italy</i> - As designer	May - Nov 2025
Glass Bridge , Corning Museum of Glass <i>Corning, NY, US</i> - As part of the installation team	Dec 2024 - Sep 2025
Floralis: an ETFE-Clad, Multilaminar Timber Structure , Florissant Fossil Beds <i>Denver, CO, US</i> - As part of the installation team	Dec 2024
Inventory-Constrained Design Competition by Eventscape 2022 <i>New York, NY, US</i> - First place: Dove Wave: Inventory Constrained Design , as lead researcher	May 2024

Exhibitions

Advanced Research Projects Agency–Energy (ARPA-E) Energy Innovation Summit 2025 <i>Washington, DC, US</i> - 3D concrete printing technology showcase	Mar 2025
Greenbuild International Conference & Expo 2024 <i>Philadelphia, PA, US</i> - 3D concrete printing technology showcase	Nov 2024
Advanced Research Projects Agency–Energy (ARPA-E) Energy Innovation Summit 2024 <i>Dallas, TX, US</i> - 3D concrete printing technology showcase	Mar 2024
Advanced Research Projects Agency–Energy (ARPA-E) Energy Innovation Summit 2023 <i>Washington, DC, US</i> - 3D concrete printing technology showcase	Apr 2023
Association for Computer Aided Design in Architecture (ACADIA) Conference 2022 <i>Philadelphia, PA, US</i> - Faculty research exhibition, as part of Polyhedral Structures Laboratory research team - Student work exhibition, as part of Master of Science in Design program	Oct 2022
Weitzman School Year End Show 2022 <i>Philadelphia, PA, US</i> - Student work exhibition, as part of Master of Science in Design program	May 2022