

Education

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| 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

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| 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

- Surface-Toolpath Twins of Shell Components in 3D Concrete Printing for Optimized Buildability and Surface Quality**
Yefan Zhi, Masoud Akbarzadeh
- 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)

- [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 Troussset, 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 Troussset, 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 Troussset, 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.

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| 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

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| 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 |