

Yao Lu

Ph.D., M.S., M.Arch, B.Eng

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SHORT BIO

Yao Lu is an Assistant Professor of Architecture at Thomas Jefferson University. He is a researcher and designer with specialization in combining emerging computational technologies with structures as a design tool. As a researcher, he was awarded the Hangai Prize medal at the International Association for Shell and Spatial Structures (IASS) Annual Symposium in 2022 and received the YoungCAADRIA Award at the 2020 International Conference of the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA) for his research on efficient structures and computational methodologies. As a designer and builder, his projects have received several awards including the R & D Award of 2022 and the DigitalFUTURES Project Award of 2022. As a software developer, the computational tools he developed have been downloaded thousands of times by worldwide users.

EDUCATION

• University of Pennsylvania <i>Ph.D. in Architecture</i>	Philadelphia, PA, US Aug 2020 - Aug 2024
• Cornell University <i>M.S. in Matter Design Computation</i>	Ithaca, NY, US Aug 2018 - May 2020
• Tongji University <i>M.Arch</i>	Shanghai, China Sep 2014 - June 2017
• Tongji University <i>B.Eng in Architecture</i>	Shanghai, China Sep 2010 - May 2014

EMPLOYMENT

• The University of Arizona <i>Assistant Professor</i>	Tucson, AZ Aug 2026 - Present
• Thomas Jefferson University <i>Assistant Professor</i>	Philadelphia, PA Aug 2024 - Aug 2026
• University of Pennsylvania <i>Doctoral Teaching Fellow</i>	Philadelphia, PA Aug 2020 - August 2024
• JSLab, Cornell University <i>Research Assistant</i>	Ithaca, NY Aug 2018 - May 2020
• Cornell University <i>Teaching Assistant</i>	Ithaca, NY Aug 2018 - May 2020
• Tongji Architectural Design Co. (TJAD) <i>Part-time Architectural Designer</i>	Shanghai, China Oct 2014 - May 2017

PUBLICATIONS

PEER-REVIEWED JOURNAL PAPERS

- Masoud Akbarzadeh, Yefan Zhi, and **Yao Lu**. Research and applications of polyhedral graphic statics in structural form-finding. *Architectural Journal*, 325:26–35, April 2026. ISSN 0141-0296. doi: 10.19819/j.cnki.ISSN0529-1399.202604004
- Joseph Robert Yost, Matthew Cregan, Damon Bolhassani, Philipp Amir Chhadeh, Jens Schneider, **Yao Lu**, and Masoud Akbarzadeh. Experimental investigation of the bearing capacity between short hollow glass columns and a transparent thermoplastic interface material. *Engineering Structures*, 325:119407, February 2025. ISSN 0141-0296. doi: 10.1016/j.engstruct.2024.119407
- **Yao Lu**, Márton Habcsek, and Masoud Akbarzadeh. Algebraic 3D graphic statics with edge and vertex constraints: A comprehensive approach to extend the solution space for polyhedral form-finding. *Computer-Aided Design*, 166:103620, Jan 2024. doi: 10.1016/j.cad.2023.103620
- **Yao Lu**, Thamer Alsalem, and Masoud Akbarzadeh. A method for designing multi-layer sheet-based lightweight funicular structures. *Journal of the International Association for Shell and Spatial Structures*, 63(4):252–262, Dec 2022a. doi: 10.20898/j.iass.2022.018

- **Yao Lu**, Alireza Seyedahmadian, Philipp Amir Chhadeh, Matthew Cregan, Mohammad Bolhassani, Jens Schneider, Joseph Robert Yost, Gareth Brennan, and Masoud Akbarzadeh. Funicular glass bridge prototype: design optimization, fabrication, and assembly challenges. *Glass Structures & Engineering*, 7(2):319–330, Aug 2022c. ISSN 2363-5150. doi: 10.1007/s40940-022-00177-x

PEER-REVIEWED CONFERENCE PAPERS

- (Preprint, under review) Yefan Zhi, **Yao Lu**, and Masoud Akbarzadeh. Point group symmetry of polyhedral diagrams in graphic statics. (arXiv:2604.25695), April 2026. doi: 10.48550/arXiv.2604.25695. URL <http://arxiv.org/abs/2604.25695>. arXiv:2604.25695 [cs]
- Harnoor Singh, Sangram Ramesh Shinde, Aanchal Ram Kanojia, Christopher Pastore, and **Yao Lu**. Soft shells: Carbon-absorbing concrete structures through fabric formwork. In Jeffrey Collins and Giovanni Loreto, editors, *Proceedings of the 2026 ARCC-EAAE International Conference*, Atlanta, GA, US, Apr 8-11 2026
- Hua Chai, **Yao Lu**, Yefan Zhi, and Masoud Akbarzadeh. Merged force diagrams for expanded tension-compression design space in polyhedral graphic statics. In John Ochsendorf Iman Fayyad Jonathan Rabagliati Caitlin Mueller, Konstantinos Gavril, editor, *Advances in Architectural Geometry 2025*, Cambridge, MA, US, Nov 16-19 2025
- Yulun Liu, Yiliang Shao, Yicheng Zhang, and **Yao Lu**. Notra: A kerf-bent polyhedral timber frame. In *The Projects Catalog of the 45th Annual Conference for the Association for Computer Aided Design in Architecture (ACADIA)*, pages 2–7, Miami, FL, November 6-8 2025
- **Yao Lu**. Objective-driven form-finding in algebraic 3D graphic statics via mixed-integer linear programming. In *Proceedings of IASS Symposium and Spatial Structures Conference 2025, The living past as a source of innovation*, México City, México, October 2025
- Damon Bolhassani, Delaram Hassanlou, Fahimeh Yavartanoo, Masoud Akbarzadeh, **Yao Lu**, Joseph R. Yost, Jorge H. Chacon, Jens Schneider, and Philipp A. Chhadeh. Numerical analysis with experimental verification of a multi-layer sheet-based funicular glass bridge. In Philippe Block, Giulia Boller, Catherine DeWolf, Jacqueline Pauli, and Walter Kaufmann, editors, *Proceedings of the IASS 2024 Symposium: Redefining the Art of Structural Design*, Zurich, Switzerland, Aug 26-30 2024
- Joseph Robert Yost, Jorge Huisa Chacon, **Yao Lu**, Masoud Akbarzadeh, Damon Bolhassani, Fahimeh Yavartanoo, Philipp Amir Chhadeh, and Jens Schneider. Experimental behavior of a prototype 3m-span modular glass pedestrian bridge. In *Challenging Glass Conference Proceedings*, volume 9. Stichting OpenAccess Foundation, June 2024. doi: 10.47982/cgc.9.620. URL <http://dx.doi.org/10.47982/cgc.9.620>
- Hua Chai, **Yao Lu**, Márton Hablicsek, and Masoud Akbarzadeh. Generation of a compression-tension combined funicular polyhedral beam structure. In *Proceedings of IASS 2023 symposium Integration of Design and Fabrication*, Melbourne, Australia, July 10-14 2023
- **Yao Lu**, Hua Chai, and Masoud Akbarzadeh. Towards a novel form-finding approach using matrix analysis: exploiting nodal displacements of pin-jointed frameworks. In *Proceedings of IASS Symposium and Spatial Structures Conference 2023, Integration of Design and Fabrication*, Melbourne, Australia, July 2023a
- **Yao Lu**, Márton Hablicsek, and Masoud Akbarzadeh, Abdolhamid Akbarzadeh. 3D auxetic materials designed with algebraic polyhedral graphic statics. In *Proceedings of IASS Symposium and Spatial Structures Conference 2023, Integration of Design and Fabrication*, Melbourne, Australia, July 2023b
- **Yao Lu**, Alireza Seyedahmadian, Philipp Amir Chhadeh, Matthew Cregan, Mohammad Bolhassani, Jens Schneider, Joseph Robert Yost, Gareth Brennan, and Masoud Akbarzadeh. Tortuca: An ultra-thin funicular hollow glass bridge. In *The Projects Catalog of the 42nd Annual Conference for the Association for Computer Aided Design in Architecture (ACADIA)*, pages 166–171, Philadelphia, PA, October 27-29 2022b
- Joseph Robert Yost, Matthew Cregan, Mohammad Bolhassani, Masoud Akbarzadeh, **Yao Lu**, Philipp Amir Chhadeh, and Jens Schneider. Experimental investigation of a transparent interface material for glass compression members. In *Proceedings of Challenging Glass Conference 8*, volume 8, Ghent, Belgium, Jun 2022. doi: 10.47982/cgc.8.395
- Mostafa Akbari, **Yao Lu**, and Masoud Akbarzadeh. From design to the fabrication of shellular funicular structures. In *Proceedings of the 41st Annual Conference of the Association for Computer Aided Design in Architecture (ACADIA)*, Virtual, Online, Nov 2021. URL <https://papers.cumincad.org/cgi-bin/works/paper/acadia21.328>
- Yulun Liu, **Yao Lu**, and Masoud Akbarzadeh. Kerf bending and zipper in spatial timber tectonics: A polyhedral timber space frame system manufacturable by 3-axis cnc milling machine. In *Proceedings of the 41st Annual Conference of the Association for Computer Aided Design in Architecture (ACADIA)*, Virtual, Online, Nov 2021. URL <https://papers.cumincad.org/cgi-bin/works/paper/acadia21.354>
- **Yao Lu**, Matthew Cregan, Philipp Chhadeh, Alireza Seyedahmadian, Mohammad Bolhassani, Jens Schneider, Joseph Yost, and Masoud Akbarzadeh. All glass, compression-dominant polyhedral bridge prototype: form-finding and fabrication. In *Proceedings of the 7th International Conference on Spatial Structures and the Annual Symposium of the IASS*, pages 326–336, Surrey, UK, Aug 2021
- **Yao Lu**, Eda Begum Birol, Colby Johnson, Christopher Hernandez, and Jenny Sabin. A method for load-responsive inhomogeneity and anisotropy in 3D lattice generation based on ellipsoid packing. In *Proceedings of the 25th Annual Conference of The Association for Computer-Aided Architectural Design Research in Asia (CAADRIA)*, pages 395–404, Bangkok, Thailand, Aug 2020. URL <http://papers.cumincad.org/cgi-bin/works/paper/caadria2020.257>
- Eda Begum Birol, **Yao Lu**, Ege Sekkin, Colby Johnson, David Moy, Yaseen Islam, and Jenny Sabin. POLYBRICK 2.0: Bio-integrative load bearing structures. In *Proceedings of the 39th Annual Conference of the Association for Computer Aided Design in Architecture (ACADIA)*, pages 222–233, Austin, USA, October 2019. URL <http://papers.cumincad.org/cgi-bin/works/paper/acadia19.222>

BOOK CHAPTERS

- Masoud Akbarzadeh, Marton Hablicsek, and **Yao Lu**. *Algebraic Formulation for Polyhedral Graphic Statics*, pages 359–444. Cambridge University Press, Cambridge, 2025. ISBN 978-1-108-49473-1. doi: 10.1017/9781108859769.011. URL <https://www.cambridge.org/core/books/polyhedral-graphic-statics/algebraic-formulation-for-polyhedral-graphic-statics/E36F798002004E106E65CE903901EFCB>

THESES & DISSERTATION

- **Yao Lu**. *Lightweight, Efficient Sheet-Based Spatial Structures Designed With Polyhedral Graphic Statics*. Ph.d., University of Pennsylvania, United States – Pennsylvania, 2024
- **Yao Lu**. POLYBRICK 2.0: Bio-Integrative Load-Bearing Lattice Structures. Master of Science in Matter Design Computation, Cornell University, United States – New York, 2020
- **Yao Lu**. Inspiration of Concrete Shells: Investigating the Structural Legacy of Félix Candela. Master of Architecture, Tongji University, China – Shanghai, 2017

ARTICLES BY OTHERS – FEATURING LU’S WORK

- Masoud Akbarzadeh. *Architected Structures*. DETAIL, München, 2025. ISBN 978-3-95553-650-3
- May issue of Domus Magazine (n.1101), curated by Bjarke Ingels
- Deborah Balthazar. Using origami to design more sustainable structures. *Thomas Jefferson University News Pages*, April 2025. URL <https://www.jefferson.edu/news/2025/04/using-origami-to-design-more-sustainable-structures.html>
- Tecture Mag editorial department. CNCによるデジファブ建築特集. *TECTURE MAG* (テクチャーマガジン), August 2023. URL <https://mag.ecture.jp/feature/20230830-cnc-architecture/>
- Tecture Mag editorial department. ガラスが構造材の透明な橋!? *TECTURE MAG* (テクチャーマガジン), September 2022. URL <https://mag.ecture.jp/culture/20220915-tortuca/>
- Edward Keegan. R+D Award: Tortuca. *Architect*, pages 70–71, Aug 2022. URL https://www.architectmagazine.com/awards/r-d-awards/r-d-award-tortuca_o
- Jenny Sabin. Sabin Design Lab: PolyBrick Series. *A+U Magazine*, 595:162–173, March 2020

EXHIBITIONS

- **October 2025** DesignPhiladelphia Festival
Designing with Glass: Two Bridges
- **December 2024 - September 2025** Corning Museum of Glass
The Ten-Meter Glass Bridge: A Clear Path to Sustainability
- **May 2022** Eventscape, NY
An NYC×Design Festival activity: A three-meter glass bridge prototype

RESEARCH GRANTS AND FUNDING

PENDING AND AWARDED

- **2025, PI (Pending)** NSF - Engineering Research Initiative, \$199,553.
Title: *ERI: From Thin Sheets to Spatial Structures: Material-Efficient Design with Polyhedral Graphic Statics*.
- **2025, Co-PI** Thomas Jefferson University Martinson Block Grant, \$5,000.
Title: *Robotic Hot-Wire Cutting for Self-Stabilizing Lightweight Shell Structures*. Yang Yang, Yao Lu
- **2025, PI** Thomas Jefferson University Martinson Block Grant, \$5,000.
Title: *Visualization of Brain Responses: Interactive Space Frame Installation with Sensor-Driven Light Network*. Yao Lu, Edgar Stach, Mijail D. Serruya
- **2025, PI** Thomas Jefferson University Faculty Seed Grant, \$4,100
Title: *Advancing Algebraic 3D Graphic Statics: Objective-Driven Structural Form-Finding via Linear Programming*
- **2024, PI** JeffSmart Seed Grant, \$10,000
Title: *Reducing Structural Carbon Emissions: Using Fabric Formwork for Lightweight, Carbon-Absorbing Concrete Thin Shell Structures*

DECLINED GRANT APPLICATIONS

- **2025, PI** 2025 AIA Upjohn Research Initiative, \$30,000.
Title: *Circular Transparency: Advancing Hollow Glass Unit Construction for Durable and Recyclable Outdoor Architecture*.

HONORS AND AWARDS

- **2025** Architizer Vision Awards
Project: *A 10m Glass Bridge - Transparent Link between Design and Engineering*. Team
- **2022** IASS Hangai medal
Webpage: www.design.upenn.edu/architecture/graduate/post/phd-researcher-wins-hangai-prize-iass-2022
- **2022** R&D Award
Webpage: www.architectmagazine.com/awards/r-d-awards/r-d-award-tortuca_o
- **2022** DigitalFUTURES Project Award
Webpage: digitalfutures.international/project-award/
- **2022** Dezeen Award longlisted
Webpage: www.dezeen.com/awards/2022/longlists/tortuca/
- **2020** Young CAADRIA Award
- **2017** 1st Prize of Youth Design Competition for Suqian City
- **2016** 3rd Prize of International Student Urban Design Competition for Shanghai Railway Station (Group Work)
- **2015** 2nd prize of Shanghai College Students' Modern Drama Festival (Group Work)
- **2014** 1st Prize of Vertical City Asia International Competition (Group Work)
- **2014** 1st Prize of Architecture Competition of Taiwan and Mainland Students (Group Work)
- **2013** 2nd Prize of East Asia Architecture and Urban Planning Competition

SOFTWARE PRODUCTS

- **PolyFrame 2** A polyhedral funicular form-finding plug-in for Rhino® and Grasshopper®
Download: www.food4rhino.com/en/app/polyframe-2
- **Earthworms** A Python scripting environment for Rhino® with enhanced interactivity and flexibility
Download: www.food4rhino.com/app/earthworms
- **PolyBrick** A load-responsive lattice generation plug-in for Grasshopper® (available upon request)
Demo: yaolu.page/polybrick.plugin

TEACHING

COURSES

- **2026 Spring** Instructor of the seminar ARCH 324/627 *Visual: Experimental Modeling* at Thomas Jefferson University
- **2025 Spring - 2026 Spring** Coordinator and Instructor of the design studio ARCH 412/615 *Design 8/5 for Architecture: Comprehensive Studio* at Thomas Jefferson University
- **2025 Spring - 2026 Spring** Coordinator and Instructor of the seminar ARCH 416/645 *Tech 5: Documentation and Detailing* at Thomas Jefferson University
- **2025 Spring** Independent Study Advisor of Owen Felty, Title: *Experimental Facade*, Thomas Jefferson University
- **2025 Spring** Thesis Advisor of Sangram Ramesh Shinde, Title: *Fabric Formwork for Concrete: A Sustainable and Cost-Efficient Approach to Low-Carbon Construction*, Thomas Jefferson University
- **2024 Fall** Instructor of the design studio ARCH 412/615 *Design 8/5 for Architecture: Comprehensive Studio* at Thomas Jefferson University
- **2024 Fall** Instructor of the seminar ARCH 416/645 *Tech 5: Documentation and Detailing* at Thomas Jefferson University
- **2023 Fall** Instructor of the seminar ARCH 7326 *Tech Designated Elective: Developing Computational Solutions for Design Problems* at University of Pennsylvania, co-teach with Mostafa Akbari
- **2023 Spring** Teaching Fellow of the design studio ARCH 602 *Generative Prefabrication: A Design Research In Building Prefabrication and Assembly*, Instructor: Prof. Masoud Akbarzadeh
- **2021 Spring** Teaching Fellow of the design studio ARCH 705 *Innovative Mid-rise Timber: Timber Tectonics Meets Spatial Force Flow*, Instructor: Prof. Masoud Akbarzadeh
- **2020 Spring** TA of the design studio *Cinecitta to Thin Cities*, Instructor: Prof. John Zissovici
- **2019 Fall** TA of the design studio *The Anthropocene Style*, Instructor: Prof. Sarosh Anklesaria
- **2019 Spring** TA of the design studio ARCH 5116 *Matter Design Computation: Human-centered Adaptive Architecture in the UAE*, Instructor: Prof. Jenny Sabin
- **2018 Fall** TA of the lecture ARCH 2614/5614 *Building Technology*, Instructor: Prof. Jonathan Ochshorn

WORKSHOPS

- **2023 August** Instructor of the *IASS 2023 Masterclass on PolyFrame 2*, co-teach with Prof. Masoud Akbarzadeh
- **2023 April** Instructor of the *Workshop for Summum Engineering on PolyFrame 2*

LECTURE

PUBLIC LECTURES & TALKS

- **2026 January** Guest lecture, *Build Bridges with Glass Sheets* for the *Digital Fabrication for Architecture Seminar* at Texas A&M
- **2025 November** Guest lecture, *Designing efficient sheet-based structures using polyhedral graphic statics* for the *Structural Engineering, Mechanics and Materials (SEMM) Seminar* at GeorgiaTech
- **2025 November** Guest lecture, *Transforming Flat Sheets into Spatial Structures* for the Seminar ARCH-732: *Geometric Structural Design* at University of Pennsylvania
- **2025 October** Forum Moderator, *Complex Geometries in Facade Design* for Facade Tectonics Forum at Thomas Jefferson University
- **2025 September** Guest lecture, *Transforming Flat Sheets into Spatial Structures* for the Architecture PhD Talk at University of Pennsylvania
- **2024 November** Guest lecture, *Light Weight, Efficient Sheet-Based Spatial Structures Designed with Polyhedral Graphic Statics* for the Architecture PhD Talk at University of Pennsylvania
- **2023 May** Guest lecture, *Introduction to Polyhedral Graphic Statics and Algebraic Formulations of Polyhedral Graphic Statics* for the course *Performance-based Design in Architecture* at Tongji University
- **2022 May** Guest talk, *Computational design of Tortuca the glass bridge* for the *Glass Bridge Exhibition & Presentation* at the NYC×Design festival.

INVITED GUEST CRITIC

- **2025 December** Stuart Weitzman School of Design, University of Pennsylvania, Philadelphia, PA, USA. ARCH-7375 *Matter, Making & Testing: Designing with Next Generation Precast Concrete Seminar Final Review*. Instructor: Richard Garber
- **2025 December** Stuart Weitzman School of Design, University of Pennsylvania, Philadelphia, PA, USA. ARCH-732 *Geometric Structural Design Seminar Final Review*. Instructor: Masoud Akbarzadeh
- **2025 December** College of Architecture, Texas A&M, College Station, TX, USA. ARCH-605.602 *Expo Timber Tech — Rethinking Lightweight Wooden Structures*. Instructor: Mostafa Akbari
- **2025 December** College of Architecture, Texas A&M, College Station, TX, USA. ARCH-605.603 *Langford Architecture Complex*. Instructor: Fabrizio Aimar
- **2025 November** Stuart Weitzman School of Design, University of Pennsylvania, Philadelphia, PA, USA. ARCH-732 *Geometric Structural Design Seminar Mid-Term Review*. Instructor: Masoud Akbarzadeh
- **2025 October** Stuart Weitzman School of Design, University of Pennsylvania, Philadelphia, PA, USA. ARCH-601 *Urban Housing Studio: The Modular Economy Mid-Term Review*. Instructor: Richard Garber
- **2025 June** The Antoinette Westphal College of Media Arts & Design, Drexel University, Philadelphia, PA, USA. *Architecture Comprehensive Studio Final Review*. Instructor: Stephen Cantando

CONSULTING

- **SOM - Skidmore, Owings & Merrill** Chicago, IL
Software Developing Consultant Dec 2024 - Aug 2025

SCHOLARLY SERVICE

- **2026** Peer reviewer, ARCC 2026 International Conference
- **2025** Peer reviewer, International Journal of Architectural Computing (IJAC)
- **2025** Peer reviewer, ACM Symposium on Computational Fabrication 2025
- **Since 2025** First-year architecture student advisor, Thomas Jefferson University
- **Since 2025** CABE Lecture Committee member, Thomas Jefferson University
- **Since 2025** CABE Committee on Academic Outcomes Assessment member, Thomas Jefferson University
- **2025** Peer reviewer, ARCC 2025 International Conference
- **Since 2024** Upper-level architecture student advisor, Thomas Jefferson University
- **Since 2024** Peer reviewer, Journal: Architectural Intelligence
- **Since 2022** Peer reviewer, Annual Conference of the Association for Computer Aided Design in Architecture (ACADIA)
- **Since 2021** Peer reviewer, Annual Conference of The Association for Computer-Aided Architectural Design Research in Asia (CAADRIA)

PROFESSIONAL CERTIFICATION

- **LEED AP BD+C**
U.S. Green Building Council (USGBC) Credential ID: 11588854-AP-BD+C Oct 2025 - Present