

Ph.D. Candidate in Architecture  
 Polyhedral Structures Laboratory  
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## EDUCATION

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

## PUBLICATIONS

### PEER-REVIEWED JOURNAL PAPERS

- Yao Lu, Márton Hablicsek, 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.ias.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 2022b. ISSN 2363-5150. doi: 10.1007/s40940-022-00177-x

### PEER-REVIEWED CONFERENCE PAPERS

- 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
- 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. CUMINCAD. URL [https://papers.cumincad.org/cgi-bin/works/paper/acadia21\\_328](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. CUMINCAD. URL [https://papers.cumincad.org/cgi-bin/works/paper/acadia21\\_354](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. CUMINCAD. URL [http://papers.cumincad.org/cgi-bin/works/paper/caadria2020\\_257](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. CUMINCAD. URL [http://papers.cumincad.org/cgi-bin/works/paper/acadia19\\_222](http://papers.cumincad.org/cgi-bin/works/paper/acadia19_222)

## BOOK CHAPTERS

- (In preparation) Masoud Akbarzadeh, Márton Hablicsek, and Yao Lu. Chapter 7: Algebraic Formulations of Polyhedral Graphic Statics. In Masoud Akbarzadeh (Ed.) *Polyhedral Graphic Statics: A Design Guide For Funicular Structural Form-Finding*. Cambridge University Press

## THESES & DISSERTATION

- Yao Lu. Lightweight, Efficient Sheet-Based Spatial Structures Designed with Polyhedral Graphic Statics. Ph.D. thesis, University of Pennsylvania, Philadelphia, PA, US, In progress
- Yao Lu. POLYBRICK 2.0: Bio-Integrative Load-Bearing Lattice Structures. Master's thesis, Cornell University, Ithaca, NY, US, 2020
- Yao Lu. Inspiration of Concrete Shells: Investigating the Architectural and Structural Legacy of Félix Candela. Master's thesis, Tongji University, Shanghai, China, 2017

## ARTICLES BY OTHERS – FEATURING LU'S WORK

- 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>

## HONORS AND AWARDS

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- **2022** IASS Hangai Medal  
Webpage: [www.design.upenn.edu/architecture/graduate/post/phd-researcher-wins-hangai-prize-iass-2022](http://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](http://www.architectmagazine.com/awards/r-d-awards/r-d-award-tortuca.o)
- **2022** DigitalFUTURES Project Award  
Webpage: [digitalfutures.international/project-award/](http://digitalfutures.international/project-award/)
- **2022** Dezeen Award longlisted  
Webpage: [www.dezeen.com/awards/2022/longlists/tortuca/](http://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

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- **PolyFrame 2** A polyhedral funicular form-finding plug-in for Rhino® and Grasshopper®  
Download: [www.food4rhino.com/en/app/polyframe-2](http://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](http://www.food4rhino.com/app/earthworms)
- **PolyBrick** A load-responsive lattice generation plug-in for Grasshopper® (available upon request)  
Demo: [yaolu.page/polybrick.plugin](http://yaolu.page/polybrick.plugin)

## TEACHING

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### COURSES

- **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  
Webpage: [www.iass2023.org.au/masterclasses.php](http://www.iass2023.org.au/masterclasses.php)
- **2023 April** **Instructor** of the *Workshop for Summum Engineering on PolyFrame 2*

## GUEST LECTURES & TALKS

- **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. Webpage: [festival.nycxdesign.org/event/eventscape-nyc-glass-bridge-exhibition-presentation/](https://festival.nycxdesign.org/event/eventscape-nyc-glass-bridge-exhibition-presentation/)

## SCHOLARLY SERVICE

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- **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)

## EXPERIENCE

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| • <b>University of Pennsylvania</b><br><i>Teaching Fellow</i>                        | Philadelphia, PA<br><i>Aug 2020 - present</i> |
| • <b>JSLab, Cornell University</b><br><i>Research Assistant</i>                      | Ithaca, NY<br><i>Aug 2018 - May 2020</i>      |
| • <b>Cornell University</b><br><i>Teaching Assistant</i>                             | Ithaca, NY<br><i>Aug 2018 - May 2020</i>      |
| • <b>Tongji Architectural Design Co. (TJAD)</b><br><i>Part-time Junior Architect</i> | Shanghai, China<br><i>Oct 2014 - May 2017</i> |