Masoud Akbarzadeh *Sep 20, 1981*

Assistant Professor of Architecture and Structural Design
Founder and Director of Polyhedral Structures Laboratory
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Education

2016	ETH Zurich **Doctor of Science** ZURICH, SWITZERLAND
2012	Massachusetts Institute of Technology **Master of Science** in Design Computation CAMBRIDGE, MA, US
2011	Massachusetts Institute of Technology **Master of Architecture** CAMBRIDGE, MA, US
2007	Iran University of Science and Technology **Master of Science** in Earthquake Engineering and Dynamics of Structure TEHRAN, IRAN
2004	Zanjan University **Bachelor of Science** in Civil and Environmental Engineering ZANJAN, IRAN

Appointments

2017-	University of Pennsylvania **Weitzman School of Design** Assistant Professor
2012-16	ETH Zurich **Institute of Technology in Architecture** First ITA Fellowship, PhD candidate
2008-12	Massachusetts Institute of Technology **Department of Architecture** Research & Teaching Assistant

Research Grants & Awards

2020	Co-PI in National Science Foundation Future of Manufacturing Grant (NSF-FM) $4,600,000
2020	National Science Foundation CAREER Award $599,722
2020	A'Design Award and Competition Silver A'Design Award for 'Saltatur: The Dancer'
2019	University Research Foundation Grant $36,000
2018	University Research Foundation Grant $49,495
2018	Penn Undergraduate Research Mentoring Program (PURM) $8,000
2012	Swiss Federal Institute of Technology ITA Fellowship Award
2011	Skidmore, Owings and Merrill LLP $20,000
2010	Massachusetts Institute of Technology Show Case competition: First Prize
2008	Massachusetts Institute of Technology Merit-Based Scholarship

Publications

Book Contracts

2019

M. Akbarzadeh. *3D Graphic Statics and Design of Structures*. will be announced soon

M. Akbarzadeh. *Funicular Polyhedral Structures: Design and Materialization*. will be announced soon

Books

2016

M. Akbarzadeh. *3D Graphic Statics using Reciporcal Polyhedral Diagrams*. PhD thesis, ETH Zürich, Zürich, Switzerland, 2016

2015

M. Akbarzadeh. *Designed For Water: Infrastructures taming the water and producing energy*. SOM Foundation, 2015

Book Chapters

2020

M. Akbarzadeh, T. Van Mele, and P. Block. 3D Polyhedral Reciprocal Diagrams. In W. Baker, P. Block, C. Fivet, and J. Ochsendorf, editors, *J.C. Maxwell and the Geometry of Structures*. *in preparation*

Journals

2020

S. Mozaffari, M. Akbarzadeh, and T. Vogel. Graphic statics in a continuum: strut-and-tie models for reinforced concrete. *Computers and Structures*, November 2020

A. Nejur and M. Akbarzadeh. PolyFrame: Efficient Computation for 3D Graphic Statics. *Computer-Aided Design Journal*, 2020. *under review*

M. Akbarzadeh and M. Hablicsek. Algberaic 3D graphic statics: Constrained Areas. *Computer-Aided Design*, 2020. *under review*.

J. Yost, M. Akbarzadeh, M. Bolhassani, A.P. Chaddeh, and J. Schneider. Behavior of Modular Components in a Funicular Glass Bridge. *Engineering Structures*, 2020. *in preparation*.

H. Zheng, V. Moosavi, and M. Akbarzadeh. Iterative Machine Learning for Structural Form Finding with Fabrication constraints. *Automation in Construction*, November 2020

2018

Márton Hablicsek, Masoud Akbarzadeh, and Yi Guo. Algebraic 3D graphic statics: Reciprocal constructions. *Computer-Aided Design*, 108:30 – 41, 2019

2017

M Bolhassani, M Akbarzadeh, M. Mahnia, and R. Taherian. On Structural Behavior of a Funicular Concrete Polyhedral Frame Designed by 3D Graphic Statics. *Structures*, 14:56 – 68, 2018

2016

M. Akbarzadeh, T. Van Mele, and P. Block. Three-dimensional Graphic Statics: Initial explorations with polyhedral form and force diagrams. *International Journal of Space Structures*, 31(2):217–226, June - September 2016

2015

M. Akbarzadeh, T. Van Mele, and P. Block. On the equilibrium of funicular polyhedral frames and convex polyhedral force diagrams. *Computer-Aided Design*, 63:118–128, 2015

Conference Proceedings

2019

M. Akbarzadeh and M. Hablicsek. Geometric Degrees of Freedom and Non-Conventional Spatial Structural Forms. In C. Gengnagel, O. Baverel, J. Burry, M.R. Thomsen, and S. Weinzierl, editors, *Impact: Design With All Senses: Proceedings of the Design Modelling Symposium*, Berlin, Germany, September 23-25 2020. Springer International Publishing

M. Akbarzadeh, M. Bolhassani, A. Nejur, J. R. Yost, C. Byrnes, J. Schneider, U. Knaack, and C. Borg Costanzi. The Design of an Ultra-Transparent Funicular Glass Structure. In *Structures Congress 2019*, Orlando, Florida, April 24-27 2019

S. Mozaffari, M. Akbarzadeh, and T. Vogel. Generation of strut-and-tie models and stress fields for structural concrete. In *Structures Congress 2019*, Orlando, Florida, April 24-27 2019

M. Akbari, M. Bolhassani, and M. Akbarzadeh. From Polyhedral to Minimal Surface Funicular Spatial Structures. In *Proceedings of IASS Symposium 2019 and Structural Membranes 2019, FORM and FORCE*, Barcelona, Spain, October 7-10 2019

2018

M. Akbarzadeh, M. Hablicsek, and Y. Guo. Developing Algebraic Constraints for Reciprocal Polyhedral Diagrams of 3D Graphic Statics. In *Proceedings of the IASS Symposium 2018, Creativity in Structural Design*, MIT, Boston, USA, July 16-20 2018

G. S. Athanasopoulos, M. Akbarzadeh, and A. McRobie. Graphic Statics: Constrained Form Finding for Parallel System of Forces Using Corsican Sum. In C. Mueller and S. Adriaenssens, editors, *Proceedings of the IASS Symposium 2018, Creativity in Structural Design*, MIT, Boston, USA, July 16-20 2018

A. Tabatabaei Ghomi, M. Bolhassan, A. Nejur, and M. Akbarzadeh. Effect of Subdivision of Force Diagrams on the Local Buckling, Load-Path and Material Use of Founded Forms. In C. Mueller and S. Adriaenssens, editors, *Proceedings of the IASS Symposium 2018, Creativity in Structural Design*, MIT, Boston, USA, July 16-20 2018

M. Bolhassan, A. Tabatabaei Ghomi, A. , and M. Akbarzadeh. Structural Behavior of a Cast-in-Place Funicular Polyhedral Concrete: Applied 3D Graphic Statics. In C. Mueller and S. Adriaenssens, editors, *Proceedings of the IASS Symposium 2018, Creativity in Structural Design*, MIT, Boston, USA, July 16-20 2018

A. Nejur and M. Akbarzadeh. Constrained Manipulation of Polyhedral Systems. In *Proceedings of the IASS Symposium 2018, Creativity in Structural Design*, MIT, Boston, USA, July 16-20 2018

2017

Akbarzadeh Masoud, Mahnia Mehrad, Taherian Ramtin, and Tabrizi Amir Hossein. Hedracrete; Prefab, Funicular, Spatial Concrete. In *DISCIPLINES & DISRUPTION: Projects Catalog of the 37th Annual Conference of the Association for Computer Aided Design in Architecture (ACADIA)*. Association for Computer Aided Design in Architecture (ACADIA), 2017

M. Akbarzadeh, M. Mahnia, R. Taherian, and A. Tabrizi. Prefab, Concrete Polyhedral Frame: Materializing 3D Graphic Statics. In A. Bögle and M. Grohmann, editors, *Proceedings of the IASS Annual Symposium 2017, Interfaces: architecture . engineering . science*, Hamburg, Germany, September 25 - 28th 2017. IASS. Submitted for review

2017

T. H. Nielsen, M. Akbarzadeh, and P. Goltermann. Addressing buckling of compression members using subdivision of force diagrams. In A. Bögle and M. Grohmann, editors, *Proceedings of the IASS Annual Symposium 2017, Interfaces: architecture . engineering . science*, Hamburg, Germany, September 25 – 28th 2017. IASS. Submitted for review

2015

M. Akbarzadeh, T. Van Mele, and P. Block. Three-dimensional Compression Form Finding through Subdivision. In *Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium*, Amsterdam, The Netherlands, 2015

M. Akbarzadeh, T. Van Mele, and P. Block. 3D Graphic Statics: Geometric Construction of Global Equilibrium. In *Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium*, Amsterdam, The Netherlands, 2015

M. Akbarzadeh, T. Van Mele, and P. Block. Three-dimensional Compression Form Finding through Subdivision. In *Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium*, Amsterdam, The Netherlands, 2015

2014

D. Löpez Löpez, D. Veenendaal, M. Akbarzadeh, and P. Block. Prototype of an ultra-thin, concrete vaulted floor system. In *Proceedings of the IASS-SLTE 2014 Symposium*, Brasilia, Brazil, 2014

M. Akbarzadeh, T. Van Mele, and P. Block. Compression-only form finding through finite subdivision of the external force polygon. In *Proceedings of the IASS-SLTE 2014 Symposium*, Brasilia, Brazil, 2014

2013

M. Akbarzadeh, T. Van Mele, and P. Block. Equilibrium of spatial networks using 3D reciprocal diagrams. In J.B. Obrbski and R. Tarczewski, editors, *Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2013*, Wroclaw, Poland, September 2013

2012

M. Akbarzadeh. Performative Surfaces: Making Adaptive Tools to design Roofs and Landscapes based on Computational Interpretation of Flow Patterns. In *Association for Computer-Aided Design in Architecture 2013 International Conference: Adaptive Architecture*, Cambridge, Ontario, Canada, 2013

2011

M. Akbarzadeh. Robot arm. In S. Hirschman, editor, *Testing to Failure: Design and Research in MIT's Department of Architecture*. SA+P Press, 2011

2009

M. Akbarzadeh. Tensional integrity. In A. Miljacki, L. Pauli, and B. Pinney, M. Sleeper, editors, *Uncertain Futures, Two Years of Student Research at The MIT Department of Architecture*. SA+P Press, 2009

2007

M. Zahedi, G. Ghodrati Amiri, and M. Akbarzadeh. Characteristics of vertical spectrum of earthquake in nearfeild regions and its effects on the dynamic responses of bridges. In *4th International Conference on Earthquake Geotechnical Engineering, ICEGE*, Thessaloniki, Greece, June 25-28 2007

Software Products

M Akbarzadeh and A Nejur. PolyFrame: Structural Form Finding Tool Using 3D Graphic Statics. `https://www.food4rhino.com/app/polyframe`, 2017–2019

Synergistic Activities

2020 American Society of Civil Engineers **Washington** Session Co-Chair

2020 ACM Symposium on Computational Fabrication **Boston** Chair of Architectural Design

2021 Association of Computer Aided Design in Architecture (ACADIA) **University of Pennsylvania** Conference Co-Chair

2021 International Association of Shell and Spatial Structures **University of Surrey** Scientific Committee

2019 Association of Computer Aided Design in Architecture (ACADIA) **The University of Texas at Austin** Scientific Committee

2019 International Association of Shell and Spatial Structures **Barcelona, Spain** Session Co-Chair

2019- Swiss National Science Foundation (SNF) Peer Reviewer

2019 International Association of Shell and Spatial Structures **MIT** Scientific Committee

2018- MDPI open Access Journals Peer Reviewer

2018- Computer-Aided Design Journal Peer Reviewer

2017- Technology Committee at PennDesign Chair

2017- International Journal of Space Structures Peer Reviewer

2017 John Stewardson Competition Jury

Supervising Experience

Postdoctoral researchers: 3.
Doctoral students: 3 PhD; ongoing.
Graduate students: 8 (3 Female).
Undergraduate students: 2 (1 Female).

Invited lectures

2020 HDR, Portland , OR, US. Invited by Mr. Michael Roberts

2020 Cooper Union, NYC, NY, US. Invited by Mr. Thorsten Helbig

2019 American Institute of Architects (AIA) , Philadelphia, PA, US. invited by Mrs. Rebecca Johnson

2019 Courant Institute of Mathematical Sciences, NYU, New York City, US. invited by Dr. Daniele Panozzo.

2019 schlaich bergermann partner (sbp), New York City, US. invited by Dr. Powell Draper.

2019 Facade Forum 2019, Thomas Jefferson University, Philadelphia, PA, US. invited by Dr. Jens Schneider.

2019 Knippers Helbig Advanced Engineering, New York City, US. invited by Mr. Thorsten Helbig.

2019 Princeton UniversityPrinceton, NJ, US. invited by Prof. Sigrid Adriaenssens.

2019 Skidmore, Owings & Merrill Co., Chicago, MI, US. invited by Mr. William F. Baker.

2019 Mechanical Engineering and Applied Mechanics Department, UPenn, Philadelphia, PA, US. invited by Prof. Mark Yim.

2018 Weitzman School of Design, University of Pennsylvania , Philadelphia, PA, US. MASTERLECTURE Series.

2018 Mechanical Engineering and Applied Mechanics Department, UPenn, Philadelphia, PA, US. invited by Prof. Mark Yim.

2017 HOK, San Francisco/New York City, US. in Research Talks.

2017 San Francisco Dynamo User Group, San Francisco, CA, US.Monthly Research Talks for Dynamo visual programming enthusiasts.

2017 Weitzman School of Design, University of Pennsylvania , Philadelphia, PA, US. MASTERLECTURE Series.

2016 ETH Zurich, (NCCR) Digital Fabrication, Zurich, Switzerland. Lecture for Master of Advanced Studies.

Exhibitions

2019 American Institute of Architects (AIA) in Philadelphia at Center for Architecture and Design (upcoming)

2019 Design Philadelphia at Pier 9

2018 Design Philadelphia at Pennovation Center