Sustainable Architecture: form and material

Creating synergies between Architecture and Engineering [1]

DAMON BOLHASSANI[2]

[1]Prepared for: Department of Architecture and Architectural Engineering; Institute of Construction and Environmental Engineering, Seoul National University

[2]https://ssa.ccny.cuny.edu/blog/people/mohammad-bolhassani/

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Introduction

Damon (Mohammad) Bolhassani (PhD., PE), Assistant Professor of Architectural Structures
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1.1 Bio

Dr. Damon Bolhassani is an assistant professor of architecture in structural design, at Spitzer School of Architecture at the City College of New York (CCNY). He is the director of the Advanced Building Construction Lab (ABC Lab) and Masonry Center at CCNY. Damon research focuses on sustainable construction and geometric form-finding of compression-only minimal surface structures. Dr. Bolhassani is a Professional Engineer (PE) and holds an M.S. and Ph.D. in Structural Engineering with a focus on the seismic enhancement of masonry structures. He has held appointments at Drexel University, Bucknell University, and the University of Pennsylvania.

1.2 Talk Summary

In this talk, we reflect on the shifting relationship between humanity and nature, emphasizing the pivotal role of Sustainable Architecture in our contemporary context. Our focus centers on the convergence of architectural and engineering disciplines to achieve sustainability in both form and material. Within the realm of Sustainable Architecture, we hone in on the structural design perspective as a means to reduce construction materials and minimize our carbon footprint through the seamless integration of design and technology. We explore pressing questions concerning the rapid depletion of our natural resources and our responsibility to future generations, recognizing the urgency in reevaluating our resource consumption patterns and seeking sustainable solutions for environmental preservation. Highlighting a striking statistic, we reveal that a substantial 90% of all materials produced ultimately go to waste, landfills, or combustion, with only 10% recycled, primarily in the form of polymers. With an eye toward the future, we acknowledge the imperative for the Architecture, Engineering, and Construction Industry to pioneer new methods of design, beginning with education at the university level, to empower our future decision-makers – architects, engineers, and construction managers. This talk is dedicated to the exploration of innovative strategies aimed at optimizing structural systems and reducing construction materials, fostering a sustainable and environmentally responsible built environment.

1.3 CV

Re: Curriculum Vitae October, 27, 2023

Damon Bolhassani (PhD., PE), Assistant Professor of Architectural Structures
Spitzer School of Architecture, The City College of New York
Phone (215) 407-5848, E-mail: mbolhassani@ccny.cuny.edu
141 Convent Avenue, New York, NY 10031

APPOINTMENTS

Assistant Professor, School of Architecture, City College of New York, *August 2019 – Present*
Visiting Assistant Professor, Civil Engineering, Bucknell University, *August 2018 – June 2019*
Postdoc fellow, Lecturer, University of Pennsylvania, School of Design, *January 2017 – June 2018*
Postdoc fellow, Adjunct Faculty, Drexel University, *January 2016 – December 2016*

EDUCATION

Drexel University — Philadelphia, PA
Doctor of Philosophy in Civil Engineering (Structural Engineering) — *September 2011 – December 2015*

Drexel University — Philadelphia, PA
Master of Science (Structural Engineering) — *September 2011 – March 2015*

K. N. Toosi University of Technology — Tehran, Iran
Bachelor and Master of Science in Civil Engineering — *September 2005 - June 2011*

TEACHING EXPERIENCE

City College of New York — New York, NY
Assistant Professor — *August 2019 – present*

- Spring Semesters (2020-2023):
  - core Studio 5 (consulting);
  - integrated Design of Tension/ Compression Structures (Structure I: ARCH 24303/M.ARCH 62401)
  - integrated Design of Bending Structures (Structures III, ARCH 36402/M.ARCH 74401)
- Fall Semesters (2019-2022):
  - Topics in Technology ARCH 51560, and 61560, Masonry Structures - Undergrad and Graduate students
  - Integrated Design of Tension and Compression Structures (Structure II: ARCH 35402/M.ARCH 73401)
  - Core Studio 3 (consulting)
  - Independent studies on research, Structures II

Bucknell University — Lewisburg, PA
Visiting Assistant Professor — *August 2018 – June 2019*

- Spring 2019 Semester: CEEG 300: Intro. To Struct. Analysis; CEEG 405: Steel Design
- Fall 2018 Semester: CEEG 401: Structural Analysis; ENGR 239L: Solid Mechanics Lab

University of Pennsylvania — Philadelphia, PA
Lecturer — *January 2017 – June 2018*

- ARCH535-401 (Co-teaching): Structures I
- ARCH701-204 (Co-teaching): Design Studio V

Drexel University — Philadelphia, PA
Adjunct faculty — *January 2016 – December 2016*

- CIVE 401: Structural Design II, Reinforced Concrete Design

Drexel University — Philadelphia, PA
Teaching Assistant — *September 2011 – December 2015*

- CIVE 210: Measurements
- CIVE 302: Structural Analysis I
- CIVE 372: Structural Design Laboratory, Instructor (SAP 2000, Non Structural Major)
- CIVE 400: Structural Design I (Loading of the Structures)
- CIVE 401: Structural Design II (Reinforced Concrete and Masonry Structures)
- CIVE 402: Structural Design III (Steel Structures)

K.N.T University of Technology — Tehran, Iran
Teaching Assistant — *September 2009 – July 2011*

- Construction Materials Lab
- Concrete Technology
- Concrete Design

RESEARCH EXPERIENCE

City College of New York — New York, NY
Assistant Professor — *August 2019 – present*

- Structural efficiency: geometry-based structural design and analysis, graphic statics in 2D and 3D
- Production of low carbon, high-performance construction and building materials using advanced manufacturing techniques (natural cement, geopolymer, infused co_2 concrete)
- Masonry structures: Design and analysis of innovative masonry forms (spatial structures)
- Glass and timber structures, design, analysis and fabrication of shellular, modular structures

University of Pennsylvania — Philadelphia, PA
Postdoctoral fellow — *January 2017 – June 2018*

- Geometry-based structural design and analysis

- Dynamic behavior and resistance characteristics of historical structures
- Sustainable and high-performance construction and building materials

Drexel University — Philadelphia, PA
Postdoctoral fellow — *January 2016 – December 2016*

- Developing a new analytical model for concrete masonry structures
- Writing an ebook; Introduction to Design of Building Structures
- Writing proposals on the subject of multi-hazard analysis of masonry structures using traditional and non-destructive instruments

Drexel University — Philadelphia, PA
PhD student — *September 2011 – December 2015*

- Enhancement of seismic performance of masonry shear walls
  - Design, construct and testing 5 full-scale concrete masonry shear walls, Drexel University
  - Implement automated damage detection system using NDT equipment, Drexel
  - University and University of California San-Diego (UCSD)
  - Failure analysis and damage detection of masonry walls by enhancing deformation measurement using digital image correlation (DIC)
- Developing a simplified numerical modeling for partially grouted masonry shear walls
- Development of improved shear strength formula for the masonry code (TMS 402)
- Design and test three full scale concrete masonry shear walls in University of Minnesota structural lab

K.N.T University of Technology — Tehran, Iran
Master of science student — *September 2009 – July 2011*

- Investigating the effect of nano-particles on mechanical properties of soil and cementitious materials

ACADEMIC AND PROFESSIONAL HONORS

- The winner of the Joan B. Calambokidis Masonry Innovation Competition in Material Exploration Category, Perforated Masonry, 2022
- Dean's Teaching Excellence Award, City College of New York University, 2022
- Dezeen Awards, Sustainability longlist, Tortuca, 2022
- Silver A' Design Award by the International Design Academy, concrete table, 2020
- Young Architects/Engineers winner of the Joan B. Calambokidis Masonry Innovation Competition, Spatial Masonry Project, 2020
- Honorable thesis award, Drexel 2016
- Continuing Teaching Excellence Award, Drexel University, 2016
- Teaching Excellence Award, college of engineering, Drexel University, 2015
- 12 North America Masonry Conference registration and travel award, PhD, 2015

- Student Travel Award, college of engineering, Drexel University, 2015
- NSF (NEESR) research assistantship, Drexel University, 2013
- Teaching Assistantship, Drexel University, 2012
- Distinguished student of K. N. Toosi University of Technology, Tehran, Iran, 2009
- Ranked first place in the High Resistance Concrete Competition, 4th National Civil Engineering Students Festival, Iran, 2008

RESEARCH, SCHOLARSHIP, AND CREATIVE WORK

1. Book and book chapters:

- Funicular structures: the art of building efficiently- under contract, Routledge. 2022
- Introduction to design of building structures, ebook (co-author) 2017

2. Articles: Click to My Personal Google Scholar Page

- Masoud Akbarzadeh, Hua Chai, Yefan Zhi, Maximilian E. Ororbia, Teng Teng, Mathias Bernhard, M. Bolhassani, Fahimeh Yavartanoo, Javier Tapia, Karolina Pajak, Mylene Bernard, Leon Trousset, Paul Kassabian, Blaise Waligun, "Design and Fabrication of a 3D Concrete Printed Post-tensioned Periodic Anticlastic Funicular Canopy," Fabricate-Accepted.
- M. Bolhassani, V. Abarca, A. Sanchez "Mechanics of Spatial Funicular Masonry Structures," 14NAMC, North American Masonry Conference, Omaha NE, June 11-l4, 2023-Accepted.
- M. Bolhassani, T. Plotzker, A. Moris "Construction of the New York City Hall Subway Station," CHSA, Construction History Society of America 8th Meeting, Urbana Champaign, June 22-24, 2023-Accepted.
- M. Bolhassani, A. Helal, "Decoding Da Vinci's Sketch To The Ottomans: Galata Bridge," 110th Annual Meeting l May 18 - 20, 2022.
- M. Bolhassani, S. Wisniewski, "Design and Fabrication of a Post-Tensioned Funicular Masonry Structure," IASS 2022 Conference, Beijing, china.
- H. Kamyab; M. Yeganeh; M. Bolhassani, "Structural muqarnas: Reconstructing muqarnas using 3DGS," IASS 2022 Conference, Beijing, China.
- M. Akbarzadeh, Y. Lu, J. R. Yost, P. A. Chaddeh, M. Cregan, M. Bolhassani, J. Schmeider, A. Seyedahmadian, G. Brennan, "Funicular Hollow Glass Bridge Prototype: Challenges, Outcome, and Outlook for Future," IASS 2022 Conference, Beijing, china.
- Y. Lu, A. Seyedahmadian, P. A. Chaddeh, M. Cregan, M. Bolhassani, J. Schmeider, J. R. Yost, G. Brennan, M. Akbarzadeh, "Funicular Glass Bridge Prototype: Design Optimization, Fabrication, and Assembly Challenges," Challenging Glass Conference Proceedings – Volume 8 – June 2022. 23 24 June 2022 – Ghent University – Belgium.
- J. R. Yost, M. Cregan, M. Bolhassani, M. Akbarzadeh, Y. Lu, P. A. Chaddeh, J. Schmeider, "Experimental Investigation of a Transparent Interface Material for Glass Compression Members," Challenging Glass Journal.
- M. Akbarzadeh, A. Tabatabaie Ghomi, M. Bolhassani, M. Akbari, A. Seyedahmadian, J. Sun, H. Yao, J. Miziumski, and K. Papalexiou, "Saltatur: Node-Based Assembly of Funicular Spatial Concrete,"

ACADIA 2020, October 24-30, 2020.

- M. Akbari, A. Mirabolghasemi, M. Bolhassani, A.H. Akbarzadeh, M. Akbarzadeh, "Design and mechanical behavior of strut-based cellular to shellular funicular polyhedralmaterials," Journal of Advanced Functional Materials, 2109725.
- J.R. Yost, M. Bolhassani, P.A. Chhadeh, L. Ryan, J. Schneider, M. Akbarzadeh, "Mechanical Performance of Polyhedral Hollow Glass Units Under Compression," Journal of Engineering Structures, 254 (2022): 113730.
- R.M. Harrison , M. Bolhassani, "Pragmatic design and fabrication of elastic timber gridshell dwellings," IASS 2020/2021 Conference, Surrey, UK, 24-28 August 2021.
- M. Bernhard, M. Bolhassani, M. Akbarzadeh, "Performative Porosity – adaptive infills for architectural elements," IASS 2020/2021 Conference, Surrey, UK, 24-28 August 2021.
- J.R. Yost, M. Akbarzadeh, M. Bolhassani, L. Ryan, J. Schneider, P.A. Chadeh, "Behavior of polyhedral built-up glass compression members," Journal of Architectural Design and Construction Technology, Volume 3, Issue 1.
- J.R. Yost, M. Akbarzadeh, M. Bolhassani, L. Ryan, J. Schneider, P.A. Chadeh, "Behavior of polyhedral built-up glass compression members," International Conference on Civil Engineering and Architectural Design, CEAD 2021, Germany.
- Y. Lu, M. Cregan, P.A. Chadeh, A. Seyedahmadian, M. Bolhassani, J. Schneider, J.R. Yost, M. Akbarzadeh, "All Glass, Compression-Dominant Polyhedral Bridge Prototype: Form-Finding and Fabrication," IASS 2020/2021 Conference, Surrey, UK, 24-28 August 2021.
- M. Bolhassani, C. Byrnes, J. R. Yost, M. Akbarzadeh, J. Schneider, and A. Nejur. Behavior of Modular Components in a Funicular Glass Bridge. IASS Conference, Barcelona, Spain, October 2019.
- M. Akbari, M. Bolhassani, M. Akbarzadeh, "From Polyhedral to Anticlastic Surface Funicular Spatial Structures," IASS Conference, Barcelona, Spain, October 2019.
- M. Akbarzadeh, M. Bolhassani, A. Nejur, J. R. Yost, C. Byrnes, J. Schneider, U. Knaack, and C. B. Costanzi. "The design of an ultra-transparent funicular glass structure." In Structures Congress, pp. 24-27, 2019.
- M. Bolhassani, M. Akbarzadeh, M. Mahnia, R. Taherian, On Structural Behavior of the First Funicular Polyhedral Frame Designed by 3D Graphic Statics, Structures, Vol. 14. Elsevier, 2018.
- M. Bolhassani, A. T. Ghomi, A. Najur, M. Akbarzadeh, Structural Behavior of a Cast-in-Place Funicular Polyhedral Concrete: Applied 3D Graphic Statics. IASS Conference, MIT, June 2018.
- A. T. Ghomi, M. Bolhassani, A. Najur, M. Akbarzadeh, The Effect of Subdivision of Force Diagrams on the Local Buckling, Load-Path and Material Use of Founded Forms. IASS Conference, MIT, June 2018.
- A. A. Hamid, M. Bolhassani, Introduction to Design of Building Structures, 2017, Amazon, eBook.
- M. Bolhassani, A. A. Hamid, F. L. Moon, "Failure Analysis and Damage Detection of Concrete Masonry Walls by Enhancing Deformation Measurement Using DIC," Engineering Structures, 134 (2017): 262-275.
- S. Rajaram, P. A. Vanniamparambil, F. Khan, M. Bolhassani, A. Koutras, I. Bartoli, F.L. Moon, A.A Hamid, P. B. Shing, J. Tyson and A. Kontsos, "Full Field Deformation Measurements During Seismic Loading of Masonry Buildings," Structural Health Monitoring Journal, 24.4 (2017).

- M. Bolhassani, A. A. Hamid, "New Design Detail for Partially Grouted Masonry Walls," 13th Canadian Masonry Symposium, Halifax, Canada, June 7, 2017.
- M. Bolhassani, A. A. Hamid, C. Johnson, A. E. Schultz, "Shear Strength Expression for Partially Grouted Masonry Walls," Engineering Structures, 127 (2016): 475-494.
- M. Bolhassani, C. Johnson, A. A. Hamid, A. Schultz, F. L. Moon, "A New Design Detail to Enhance the Seismic Performance of Ordinary Reinforced Partially-Grouted Masonry Structures," Journal of Structural Engineering, ASCE, 142.12 (2016): 04016142.
- M. Bolhassani, S. Rajaram, A. A. Hamid, F. L. Moon, A. Kontsos, I. Bartoli, "Damage Detection of Concrete Masonry Structures by Enhancing Deformation Measurement Using DIC," Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure X, SPIE 2016.
- M. Bolhassani, A. A. Hamid, F. L. Moon, "Enhancement of In-Plane Capacity of Partially Grouted Concrete Masonry Shear Walls," Engineering Structures, 108 (2016): 59-76.
- M. Bolhassani, A. A. Hamid, A. C.W. Lau, F. L. Moon, "Simplified Micro Modeling of Partially Grouted Masonry Assemblages Using Surface-Based Cohesive Behavior" Construction and Building Materials, 83 (2015): 159-173.
- F. Khan, M. Bolhassani, A. Kontsos, A. A. Hamid, I. Bartoli, "Modeling and Experimental Implementation of Infrared Thermography on Concrete Masonry Structures" Infrared Physics Technology Journal, 69 (2015): 228-237.
- F. Khan, S. Rajaram, P. A. Vanniamparambil, M. Bolhassani, A. A. Hamid, A. Kontsos, I. Bartoli, "Multi-sensing NDT for damage assessment of concrete masonry walls," Structural Control and Health Monitoring, 22.3 (2015): 449-462.
- P. A. Vanniamparambil, M. Bolhassani, R. Carmi, F. Khan, A. A. Hamid, F. L. Moon, I. Bartoli and A. Kontsos, "A Data Fusion Approach for Progressive Damage Quantification in Reinforced Concrete Masonry Walls," Journal of Smart Mater. Struct. 23.1 (2014): 015007.
- F. Khan, M. Bolhassani, S. Rajaram, P.A. Vanniamparambil, A.A. Hamid, A. Kontsos and I. Bartoli, "Non Destructive Assessment of Progressively Damaged Concrete Masonry Shear Walls," 12th North American Masonry Conference, Denver, Colorado, May 17 – 20, 2015.
- M. Bolhassani, A. A. Hamid, F. L. Moon, "Effect of Axial Load on the Behavior of Doubly Reinforced Partially Grouted Reinforced Masonry Shear Walls," 12th North American Masonry Conference, Denver, Colorado, May 17 – 20, 2015.
- M. Bolhassani, M. Sayyahmanesh, "Effects of Magnetite-Silica Core-Shell Nano-Composites on Properties of Cement Paste as Compared with Nano-Magnetite and Nano-Silica Particles," Advances in cement research, 27.10 (2015): 571-580.
- M. Bolhassani, M. R. Samani, "Consequences of Colloidal Nanosilica Specific Surface on Its Performance in Concrete," Advances in Civil Engineering Materials Journal, ASTM, 4.1 (2015): 80-93.
- M. Bolhassani, M. R. Samani, "Effect of Type, Size and Dosage of Nano and Micro Silica on Properties of Cement Paste and Mortar," ACI Material Journal 111 (1-6), 2014.
- M. Bolhassani, A. A. Hamid, F. L. Moon, "Enhancement of Seismic Performance of Partially Grouted Concrete Masonry Shear Walls," 10th US National Conference on Earthquake Engineering, Anchorage, Alaska, July 21 – 25, 2014.

- M. Bolhassani, A. A. Hamid, "Acoustic and Temperature Based Non-destructive Testing for Damage Assessment of Concrete Masonry System Subjected to Seismic Loading" SPIE Smart Structures/NDE2014, San Diego, California, March 9-13, 2014.
- A. Hamid, M. Bolhassani, A. Turner, E. Minaei, F. Moon, "Mechanical Properties of Ungrouted and Grouted Concrete Masonry Assemblages", 12th Canadian Masonry Symposium, Vancouver, British Columbia, June 2-5, 2013.
- P.A. Vanniamparambil, F. Khan, R. Carmi, E. Schwartz, A. Kontsos, I. Bartoli, M. Bolhassani, Hamid, A., "Multiple Cross Validated Sensing System for Damage Monitoring in Civil Structural Components," Proceedings of the 9th International Workshop on Structural Health Monitoring 2013.
- P.A. Vanniamparambil, F. Khan, R. Carmi, E. Schwartz, A. Kontsos, I. Bartoli, M. Bolhassani, Hamid, A., "Using DIC to measure deformation fields of concrete masonry test specimens." In 12th Canadian Masonry Symposium, Vancouver, British Columbia. 2013.
- A. R. Khaloo, A. G. Vayghan, M. Bolhassani, "Mechanical and microstructural properties of cement paste incorporating nano silica particles with various specific surface areas," In Key Engineering Materials (Vol. 478, pp. 19-24), 2011. Trans Tech Publications Ltd.

3. Critically reviewed work:

- Presenter at ASCE Sustainability Committee: Sustainable and Lightweight Glass Bridge, September 18, 2023.
- Panelist: Advanced manufacturing in architecture and structural design, Presentation and round table with Winka Dubbeldam (chair, school of design, Upenn), Catie Newell (University of Michigan) and Nat Oppenheimer (Vice president at Silman), EventScape. May, 12, 2022. the announcements link
- Panelist: How technology is informing the future of masonry design, Masonry educational webinar, with: Jenny Sabin (Jenny Sabin studio at Cornell university). International Masonry Institute, July 19th, 2022. the announcements link
- Featured at CCNY news: Da Vinci's bridge design is decoded by CCNY professor Damon (Mohammad) Bolhassani. the announcements link
- Featured at Spitzer news, wining IRG award, Professor Bolhassani Wins $15K CUNY Interdisciplinary Climate Crisis Research Grant. the announcement link

4. Other articles and contributed presentations:

- featuring at CUNY-TV, Sustainability Talk, CCNY Architecture, October 14, 2023.
- CCNY Architecture department Lunchtime Lecture, November 23, 2021.
- International Masonry Institute (IMI), National webinar talk, Innovation in Masonry structures, October 1, 2021.
- Research was feathered in the Research and Innovation at City College electronic magazine (the RICC), April 2022 Issue, Utilizing Masonry Structures to Educate Future Architectures and Engineers. the announcement link

GRANTS, FELLOWSHIPS, AND AWARDS

- Submitted: Hybrid robotic fabrication and concrete 3D printing system for low-carbon masonry construction
  Agency: NSF-FMRG: ECO
  Role of a faculty member: PI (collaboration with University of Miami, Alfred University, and Spherical Block, LLC)
  Total Award: $2,700,000 Funding period: 2023-2027

- Title: CarbonCrete: Storing Carbon in Concrete
  Agency: Cycle 53 PSC-CUNY Research Award: (Tradition A)-Has been submitted
  Funding period: 2022-2023
  Role of a faculty member: Lead PI
  Total Award: $11,000
  Funding period: 2022-2023

- Title: High-Performance Whole Building Design With 3D-printed Carbon-Absorbing Funicular Structures
  Agency: Department of Energy, DOE ARPA-E HESTIA
  Role of a faculty member: Co-PI (collaboration with Upenn (PI), Texas AM, Kieran Timberlake and Sika Switzerland)
  Total Award: $2,458,505 (CCNY: $350,000) Funding period: 2022-2024

- Title: Employing a new construction material and technique to reduce the global CO2 emission
  Agency: Interdisciplinary Research Grant, Climate Crises (IRG, CUNY)
  Role of a faculty member: Lead PI
  Budget: $15,000 Funding period: 2020-2021

- Title: Industrial robotic equipment for architecture lab
  Agency: Graduate Research Technology Initiative (GRTI) Round 21
  Role of a faculty member: Lead PI
  Co-PI's: Ahu Aydogan, Christian Volkmann, Frank Melendez
  Total Award: $50,000
  Funding period: 2020-2021

- Title: Reinventing Unreinforced Masonry Structures
  Agency: Cycle 52 PSC-CUNY Research Award: (Tradition B)
  Funding period: 2021-2022
  Role of faculty member: Lead PI
  Total Award: $6,000
  Funding period: 2021-2022

- Title: In Search for Structural Efficiency and Sustainability Through Geometry
  Agency: Cycle 51 PSC-CUNY Research Award: (Tradition A)
  Role of faculty member: Lead PI
  Total Award: $3,500
  Funding period: 2020-2021

- Title: Letter of agreement with International Masonry Institute (IMI) and The Foundation for City College
  Agency: IMI
  Role of faculty member: PI
  Budget: Yearly contract $5,000

Funding period: 2021

- Title: Ultra Lightweight, High Performance Structural Elements: Innovative Design, Analysis, and Fabrication Using 3D Graphic Statics
  Agency: University Research Funding (URF), University of Pennsylvania
  Role of faculty member: Co-PI, Postdoc Budget: $50,000
  Funding period: 2018-2019

PROFESSIONAL ACTIVITIES

1. Leadership roles and accomplishments:

Establishing, funding, and fitting out two new lab spaces within Spitzer School facilities, one indoors and one outdoors:

- Advanced Construction Building Laboratory ("ABC Lab"), SSA 004, 430sf, establishment and equipping of a new space for faculty-led research in the building and construction tech area.
- Masonry Educational and Research Laboratory, in collaboration with International Masonry Institute

2. Accrediting or licensing boards:

- Professional Engineer, PE (Pennsylvania, New Jersey) *April 2019*
- Fundamentals of Engineering, Engineer in Training (FE), E.I.T *February 2015*
- Health and Safety Certificate, Drexel University *July 2013*
- Certificate from Iranian Home Entrepreneurship *March 2008*
- ISO 9001:2000 Principles Requirements, Niscert *February 2008*

3. Government panels:

Natural Sciences and Engineering Research Council of Canada (NSERC) in the Alliance Grant funding.

4. Conference boards, panels, workshops, etc.:

- PSC-CUNY, TRADA, Physics and Engineering Reviewer Cycle 53, 2023.
- Co-chair of WG17/WG5 Shells- Sustainable Heritage: Challenges and Strategies in the Preservation and Conservation of 20th Century Historic Concrete Shells– International Association for Shells and Spatial Structures (IASS), September 2022
- Review committee member for the ACADIA 2022, Hybrids Haecceities, October 26-29, 2022, University of Pennsylvania, Philadelphia, PA
- Review committee member for the track Simulation for Architecture and Urban Design (SimAUD) at ANNSIM 2022.
- Co-chair on Masonry Structures Session: International Conference on Civil Engineering and Architectural Design: Munich, Germany during July 01-03, 2021.
- Technical committee member, 14th Canadian Masonry Symposium, May 16-19th, Montreal, Canada.
- SCF'20: Symposium on Computational Fabrication.

- Member of professor team, Judge for the 2023-2024 JUMP into STEM Challenge Competition, department of energy.
- Michael Sorkin Memorial Library Design Team at Spitzer School of Architecture.

5. Review panels:

Faculty	**School**	**Level** 2022/2023
Ezio Blasetti	University of Pennsylvania	Robotics and Autonomous Systems
Frank Melendez,	City College of New York	Ceramic architectural assemblies
Christian Volkmann,	City College of New York	Core 5, Site with a Boulder

Faculty	**School**	**Level** 2021/2022
Suzan Wines	City College of New York	Histories and Voices-Core Studio
Gordon Gebert	City College of New York	Advanced Robotics Studio
Viren Brahmbhatt	City College of New York	Advanced Studio
Jacob Alspector	City College of New York	3rd year undergraduate design studio
Christian Volkmann	City College of New York	Core 5, studio
Ali Hocek	City College of New York	Advanced Studio

Faculty	**School**	**Level** 2020/2021
Masoud Akbarzadeh	University of Pennsylvania	Advanced studio, Geometric design
Christian Volkmann	City College of New York	Advanced Studio

6. Editorial panels and/or agencies, journals or presses for whom the candidate is a reviewer:

- CAAD Futures 2023
- Journal of Architectural Engineering
- Hybrids Haecceities, ACADIA 2022 conference
- Journal of Construction and Building Materials
- Structures Journal
- ACI Material Journal

7. Membership in professional societies:

- Voting member of ACI Subcommittee 343-0A, Bridge Design
- American Society of Civil Engineering (ASCE)
- The Masonry Society (TMS)

INSTRUCTIONAL ACTIVITIES

1. Student evaluations and peer observations:

- ARCH 51200 /85600 ARCH MANAGEMENT / PRO PRAC, Grosso Jennifer, Spring 2022
- ARCH 36402 STRUCTURES 3, Matthias Peltz, Spring 2022

- ARCH 51560/61560 FORENSIC ARCHITECTURE, John Murry, Spring 2022
- ARCH 51570/61570 HYPOTHETICAL CONSTRUCTS, Ali Askarinejad, Fall 2021
- ARCH 51600 LOW ENERGY BUILDINGS, Jeremy Latriano, Fall 2021
- ARCH 35302 SITE TECH, Krystal Kaler, Fall 2021
- ARCH 35302 SITE TECH, Joo Jin Lee, Fall 2021

2. Innovative instructional activities, including curriculum and program development:
Elective course for Architects and engineers: "Masonry Structures" Fall 2021
Developing content for a comprehensive understanding of principles, and advances in the design, and technology of Masonry structures by using geometry and structural analysis. This course tries to answer questions on the form and shape of masonry structures by teaching the basic and advanced topics in structural design, and analysis following classic equations and geometry-based methods.

ADVISING MENTORING ACTIVITIES

1. Academic advising:

- Independent research study: Studying the efficiency in bridge design using 3DGS, Fall 2022
  Advising an undergraduate student to work on finding the secret behind the Da Vinci's design and tried to apply that in other structures such as Masonry.
- Independent research study: Design and fabrication of elastic timber gridshell, Fall 2021
  Advising an undergraduate student on exploring the design of a timber gridshell structure to create a small habitable dwelling.
- Independent study: Funicular Masonry Structures, Fall 2020
  Advising an undergraduate student to work on design and developing the first Spatial Masonry. The subject of the research pertains to creating a pavilion using a digital version of the system Antoni Gaudi used to design the Barcelona Cathedral.

2. Student project/research mentoring activities:

- Advising a group of undergraduate students to participate in the Department of Energy JUMP to STEM competition, 2022-2023.
- Advising an undergraduate student from Mechanical Engineering Department as part of my ongoing research with CUNY traditional B research during the summer of 2022.
- Stablishing and advising undergraduate Masonry team (4 students): Association for Preservation Technology (APT) competition, Spring 2021. They ranked first in the design and Historical analysis in the competition by APT.
- Advising undergraduate Timber team (5 students): Association for Preservation Technology (APT) competition, Spring 2022. The team has successfully moved to Phase 3 which will be held in Chicago, November 2022 for full scale construction and testing of the timber bridge.
- Working with undergraduate students in writing research proposal for Opportunities in Research and Creative Arts (ORCA) Program at City College of New York summer grant, hiring and advising four students during summer 2021 and 2022 as listed below:

- Title: 3D Printable Natural Concrete, The Future of Green Construction Agency
  Funding period: Summer of 2022
  Students: Tamar Plotzker and Izak Lee
- Title: Structures of Nature Agency
  Funding period: Summer of 2021
  Students: Manfei Shi, Lanhua Weng

3. Advising activities for student associations and societies:

Academic advisor of Future Architects of the Middle East (FAME) organization, 2021-now

SERVICE

1. Service and contributions in leadership positions (e.g. Chair, Program Director, etc.):
Attending College Research Council on behalf of the Dean.

2. Service on departmental, divisional, College, and University-wide committees:

- Voting Member of College Research Council (CRC), City College of New York.
- Chair of the course and standing committee, Spitzer school of architecture, 2020 to present
- Member of Master of science admission committee, Spitzer school of architecture, 2021 to present
- Member of Spitzer school of architecture executive committee, 2022 to present
- Member of ad-hoc committee to advise the president on filling the dean vacancy 2020
- Member of Robert E. Markinson architecture award committee, Spitzer school of architecture 2020
- Creative challenge review committee for B-Arch admission 2022
- Member of the operational manager hiring committee, Spitzer school of architecture