

Yijiang Huang

Junior Group Leader at ETH Zurich

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Employment History

From 1/2027	Incoming Assistant Professor	Civil and Environmental Engineering, NUS
	Presidential Young Professor, National University of Singapore	
1/2025 - Now	Junior Group Leader (Oberassistent)	Computational Robotics Lab, ETH Zurich
1/23 - 12/24	Postdoctoral Fellow	Computational Robotics Lab, ETH Zurich

Education

9/2018 - 9/2022	Ph.D. in Building Technology	Department of Architecture, MIT
	Dissertation: <i>Algorithmic planning for robotic assembly of building structures</i>	
	Advised by Caitlin Mueller	
	MIT Presidential Fellow (2018)	
9/2016 - 5/2018	Master of Science in Building Technology	Department of Architecture, MIT
	Thesis: <i>Automated motion planning for robotic assembly of discrete architectural structures</i>	
	Advised by Caitlin Mueller	
	MIT Presidential Fellow (2016)	
9/2012 - 5/2016	Bachelor of Science in Applied Mathematics	University of Science and Technology of China

Research Experience

1/2025 - Now	SNSF Ambizione Junior Group Leader (Oberassistent)	Computational Robotics Lab, ETH Zurich
	Supported by the SNSF Ambizione funding scheme, I develop computational methods to enhance assembly robots' intelligence in dexterous skills, workspace design, and collaborative behaviors. Advised by Stelian Coros.	
1/23 - 12/24	Postdoctoral fellow	Computational Robotics Lab, ETH Zurich
	Supported by an ETH postdoc fellowship, I developed a computational design framework for spatial bar structures with reusable swivel coupler joints; researched planning and control for co-operative mobile robotic assembly; contributed to cross-departmental research for NCCR DFAB. Advised by Stelian Coros.	
9/2016 - 8/2022	Graduate research assistant	Digital Structures Group, MIT
	Developed planning algorithms for robotic assembly and tested them on real-world robot systems in various physical scales; developed computational matching algorithms for circular design with reused materials; collaborated with researchers at MIT, Princeton, TU Delft and ETH Zurich; published results in journal and presented findings at academic conferences and seminars; led instructions and contributed to the developments of various courses and workshops. Advised by Caitlin Mueller.	

- 6/2019 - 8/2019 **Guest researcher** Gramazio & Kohler Research Group, ETH Zurich
Integrated robotic planning algorithms to the open-source COMPAS-FAB framework; led hands-on workshops about the developed software.
- 2/2015 - 6/2016 **Undergraduate research assistant** Geometry and Graphics Computing Lab, USTC
Developed a sequence planning algorithm for robotic spatial extrusion; designed and built a customized extrusion hardware; led a collaboration with an architectural firm's R&D branch; published results at SIGGRAPH Asia. Advised by Juyong Zhang, Lei Yu, and Ligang Liu.

Professional Experience

- 9/2020 - 5/2021 **Remote technical consultant** Roboticplus Inc., virtual
Bi-weekly remote meetings with the R&D team to provide technical advice on geometric feature detection, point cloud registration, and path planning of wood-cutting and welding robots.
- 7/2015 - 8/2016 **Research intern** ArchiSolution Workshop, Beijing
Research stay to develop collaborated academic research project on robotic extrusion planning. Contributed to the assembly of large-scale 3D printers. Monitor the fabrication and shipping process of a commercial 3D printed facade. Developed a robotic layer-based printing demo for clients.

Honors and Awards

- 1/2025-12/2029 "Computational design of skills, environment, and collaborative intelligence for assembly robots" [PI]
Funding: CHF 634k. [SNSF Ambizione](#) (18% success rate)
- 1/2023-1/2025 "Robust cooperative robotic assembly of spatial structures" [PI]
Funding: CHF 232k. [ETH Zurich Postdoctoral Fellowship](#) (25% success rate)
- 9/2016, 9/2018 [MIT Presidential Fellowship](#)
Fellowship: USD 98k/year. MIT (3.5% selection rate)
- 9/2014 - 6/2016 USTC Outstanding Undergraduate Student Scholarship (500 RMB/year)

Publications

Citation count: 530, h-index: 13, i10-index: 16, (according to [Google scholar profile](#), 09-2025)
* indicates authors contributed equally.

JOURNAL ARTICLES (REFEREED)

- [J9]
2026 ConRob V.P.Y. Leung*, **Y. Huang***, Y.T. Liu, J. Genhart, Z. Li, C. Garrett, S. Coros
[A robot-friendly scaffolding system with passive error correction using tapered screw connectors](#)
Construction Robotics, 2026, vol. 10, article 29
- [J8]
2025 CAD **Y. Huang***, Z. Wang*, Y.H. Hung, C. Jiang, A.L. Gheyselinck, S. Coros
[Computational design and fabrication of reusable multi-tangent bar structures](#)
Computer-Aided Design, 2025, 188

- [J7]
2025 Str. K.J. Lee, Y. Huang, C. Mueller
[A differentiable structural analysis framework for high-performance design optimization](#)
Structures, 2025, 78, p.109292
- [J6]
2024 AIC Y. Huang, C. Garrett, C. Mueller
[Constructability-driven design of frame structures with state-space search methods](#)
Automation In Construction, 2024, 167, p.105711
- [J5]
2023 TOG Z. Wang, F. Kennel-Maushart, Y. Huang, B. Thomaszewski, S. Coros
[A Temporal Coherent Topology Optimization Approach for Assembly Planning of Bespoke Frame Structures](#)
ACM Transactions on Graphics (TOG), 2023, 42.4, pp 1-13
- [J4]
2021 ConRob Y. Huang, C. Garrett, I. Ting, S. Parascho, C. Mueller
[Robotic additive construction of bar structures: Unified sequence and motion planning](#)
Construction Robotics, vol. 5, pp. 115-130
- [J3]
2018 ConRob Y. Huang, C. Garrett, C. Mueller
[Automated sequence and motion planning for robotic spatial extrusion of 3D trusses](#)
Construction Robotics, vol. 2, no. 1-4, pp. 15-39
- [J2]
2017 IJRM K. Tam, D. Marshall, M. Gu, J. Kim, Y. Huang, J. Lavallee, C. Mueller
[Fabrication-aware structural optimisation of lattice additive-manufactured with robot-arm](#)
International Journal of Rapid Manufacturing, vol. 7, no. 2-3, pp. 120-168
- [J1]
2016 TOG Y. Huang, J. Zhang, X. Hu, G. Song, Z. Liu, L. Yu, L. Liu
[Framefab: Robotic fabrication of frame shapes](#)
ACM Transactions on Graphics (TOG), 35(6), 224
- CONFERENCE ARTICLES (REFEREED)
- [C15]
2025 IROS P. Zeng*, Y. Huang*, S. Huber, S. Coros
[Budget-optimal multi-robot layout design for box sorting](#)
Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Hangzhou, China, 2025
Top conference in robotics, acceptance rate 46%
- [C14]
2025 CoRL Y. Tian, J. Jacob, Y. Huang, J. Zhao, E. Gu, P. Ma, A. Zhang, F. Javid, B. Romero, S. Chitta, S. Sueda, H. Li, W. Matusik
[Fabrica: Dual-Arm Assembly of General Multi-Part Objects via Integrated Planning and Learning](#)
Conference on Robot Learning (CoRL), Seoul, South Korea, 2025
Best paper award: 2/263; Top conference in robot learning (Oral 16%)
- [C13]
2024 CAAD V.P.Y. Leung, Y. Huang
[Design Validation and Conflict Resolution for Robotic Fabrication: A Multi-Stage Framework for Complex and Non-Repetitive Processes](#)
Proceedings of CAAD Future, HongKong, 2025
Best paper award, 2nd runner-up

- [C12]
2024 IASS C. Jiang, Y.H. Hung, Z. Wang, Y. Huang, A.L. Gheyselinck, P. Aejmelaeus-Lindström
[Computational Design and AR-assisted Assembly of Infinitely Reusable Temporary Structures](#)
Proceedings of International Association for Shell and Spatial Structures (IASS), Zurich, 2024
- [C11]
2024 RobArch V.P.Y. Leung, Y. Huang, C. Garrett, F. Gramazio, M. Kohler
[Planning Non-repetitive Robotic Assembly Processes with Task and Motion Planning \(TAMP\)](#)
Proceedings of Robotic Fabrication in Architecture, Art and Design (RobArch), Toronto, Canada, 2024,
pp. 19-33
Major, bi-annual conference in architectural robotics; acceptance rate N/A
- [C10]
2022 ACADIA D. Tanadini, G. Boller, V.P.Y. Leung, Y. Huang, P. D'Acunto
[The CantiBox - Robotic Assembly of Interweaving Timber Linear Elements Using Bespoke Interlocking Timber-to-Timber Connections](#)
Proceedings of the 42th Annual Conference of the Association for Computer Aided Design in Architecture (ACADIA), Philadelphia, PA, USA, 27-29 October, 2022
- [C9]
2021 SCF Y. Huang, V.P.Y. Leung, C. Garrett, F. Gramazio, M. Kohler, C. Mueller
[The new analog: A protocol for linking design and construction intent with algorithmic planning for robotic assembly of complex structures](#)
Proceedings of ACM Symposium on Computational Fabrication, 2021
- [C8]
2021 SCDoS Y. Huang, L. Alkhatat, C. De Wolf, C. Mueller
[Algorithmic circular design with reused structural elements: Method and Tool](#)
Proceedings of the international FIB symposium of Conceptual Design of Structures, 2021
- [C7]
2020 RSS C. Garrett*, Y. Huang*, T. Lozano-Pérez, C. Mueller
[Scalable and Probabilistically Complete Planning for Robotic Spatial Extrusion](#)
Proceedings of Robotics: Science and Systems (RSS), virtual, 2020
Major, bi-annual conference in architectural robotics; acceptance rate N/A
- [C6]
2020 AAG F. Amtsberg*, Y. Huang*, D. Marshall, K. Gata, C. Mueller
[Structural upcycling: Matching digital and natural geometry](#)
Proceedings of Advances in Architectural Geometry, Champs-sur-Marne, France, 2020
Major conference in architectural geometry; acceptance rate N/A
- [C5]
2019 SCF R. Arora, A. Jacobson, T. Langlois, Y. Huang, C. Mueller, W. Matusik, A. Shamir, K. Singh, D. Levin
[Volumetric Michell trusses for parametric design & fabrication](#)
Proceedings of the ACM Symposium on Computational Fabrication, 2019
- [C4]
2019 ACADIA L. Tessmer, Y. Huang, C. Mueller
[Additive Casting of Mass-Customizable Bricks: Workflow for Design and Robotic Fabrication](#)
Proceedings of the 39th Annual Conference of the Association for Computer Aided Design in Architecture (ACADIA), Austin, Texas, 21-26 October, 2019
- [C3]
2018 RobArch Y. Huang, J. Carstensen, L. Tessmer, C. Mueller
[Robotic extrusion of architectural structures with nonstandard topology](#)
Proceedings of Robotic Fabrication in Architecture, Art and Design (RobArch), 2018
Major, bi-annual conference in architectural robotics; acceptance rate N/A

- [C2]
2018 IASS [Y. Huang](#), J. Carstensen, C. Mueller
[3D truss topology optimization for automated robotic spatial extrusion](#)
Proceedings of International Association for Shell and Spatial Structures (IASS), Boston, MA, 2018
- [C1]
2016 ACADIA L. Yu, [Y. Huang](#), Z. Liu, S. Xiao, L. Liu, G. Song, Y. Wang
[Highly Informed Robotic 3D Printed Polygon Mesh: A Novel Strategy of 3D Spatial Printing](#)
Proceedings of the 36th Annual Conference of the Association for Computer Aided Design in Architecture (ACADIA), Ann Arbor 27-29 October, 2016, pp. 298-307
- PREPRINTS (NON-REFEREED)
- [P4]
2025 Z. Li, Y. Zhu, Z. Zhong, Q. Ren, [Y. Huang](#)
[TAPOM: Task-Space Topology-Guided Motion Planning for Manipulating Elongated Object in Cluttered Environments](#)
- [P3]
2023 K. Doshi, [Y. Huang](#), S. Coros
[On Hand-Held Grippers and the Morphological Gap in Human Manipulation Demonstration](#)
- [P2]
2023 M. Tarek and [Y. Huang](#)
[General deflation for finding multiple local optima in non-convex optimization](#)
- [P1]
2022 J. Chen, J. Li*, [Y. Huang*](#), C. Garrett, D. Sun, C. Fan, A. Hofmann, C. Mueller, S. Koenig, B. Williams
[Cooperative Task and Motion Planning for Multi-Arm Assembly Systems](#)

Selected Software

Open-source code is available on [my website](#) for most of the publications above.

COMPAS-FAB	Contributor
A Python package for the COMPAS Framework that facilitates the planning and execution of robotic fabrication processes	
pybullet_planning	Contributor
A Python package based on the pybullet physics simulation engine to provide collision checking, kinematics, and motion planning for robotics research.	
ikfast_pybind	Author
A Python package for analytical robot kinematics.	
conmech	Author
A Python package for linear elastic analysis of spatial trusses and frames.	
TopOpt.jl	Contributor
A Julia package for flexible topology optimization on continuum and truss domains.	

Professional Service

EXTERNAL REVIEWING

Journal and Conferences

- 2026 Reviewer: Developments in the Built Environment
- 2026 Reviewer: Conference on Robot Learning (CoRL)
- 2026 Reviewer: Robotics: Science and Systems (RSS)
- 2026 Reviewer: International Symposium on Automation and Robotics in Construction (ISARC)
- 2025,2026 Reviewer: Automation in Construction

2024,2025,2026	Reviewer: IEEE Transactions on Robotics
2020-2021,2026	Reviewer: ACM Symposium on Computational Fabrication (SCF)
2018-2023,2026	Reviewer: Construction Robotics
2025	Reviewer: Nature Scientific Report
2025	Reviewer: Advances in Architectural Geometry
2020,2025	Reviewer: ACM SIGGRAPH Asia
2024	Paper committee member: International Conference on Geometric Modeling and Processing
2019	Reviewer: ACM SIGGRAPH

Grants

2023	Review Panel for ETH Zurich Career Seed Awards
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Workshop Organizing Committees

2024 CoRL	Workshop on Learning Robotic Assembly of Industrial and Everyday Objects Co-organizers: Yunsheng Tian, Xiang Zhang, Hui Li, Wojciech Matusik, Sachin Chitta
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Teaching

SEMESTER-LONG COURSES

Spring 2025, 2026	Computational Models of Motion ETH Zurich, CS Lecturer (2026), Head TA (2025; led a three-TA team, ~ 70 students per year) Promoted from Head TA to lecturer for the 2026 edition. Gave two lectures on reinforcement learning fundamentals. Led a TA team to design project-based assignments, gave tutorials, and designed the exam.
Fall 2024-25	Advanced Machine Learning ETH Zurich, CS Teaching assistant (1 of 10 TAs, ~ 300 students per year) Developed and monitored student projects. Contributed to exam questions and testing.
Spring 2024	Stochasticity and Machine Learning ETH Zurich, MAVT Teaching assistant (1 of 10 TAs, ~ 500 students per year) Developed tutorials for generative model and reinforcement learning. Contributed to exam questions and testing.
2019-2021	Computational Structural Design and Optimization (4.450) MIT Architecture Teaching assistant (~ 25 students per year) Led weekly office hours and monitored student final projects; developed new assignments and lectures to reflect recent developments and tools in optimization and fabrication; guest lecture on optimization algorithms and discrete and combinatorial optimization. (with C. Mueller)
Spring 2018	Design for Robotic Assembly (4.S48) MIT Architecture Instructor (12 students) Designed, organized, and presented a new project-based course on architectural design for robotic assembly. Students learned the basic principles of programming an industrial robotic arm and explored creative usage of the technology. Their final projects questioned the physical precision of robots, engaged in playful human-robot interactions, and produced bespoke geometries. (with C. Mueller and J. Lavalley)

WORKSHOPS

- 10/2023 Task and Motion Planning for Robotic Assembly ACADIA, hybrid
Co-instructor (17 students, three-day-long workshop)
Gave lectures and led tutorial sessions. Students used the robot planning tool developed in my research to generate robot assembly program for assemblies they designed. [Workshop summary](#). (with V.P.Y. Leung)
- 7/2020 Kintsugi, Upcycling, and Machine Learning (4.181) MIT Architecture
Co-instructor (12 students, three-week-long workshop)
Gave lectures and led tutorial sessions. Students used the optimal matching tool developed in my research to design new assemblies from recycled materials. (with C. Mueller, D. Marshall, D. White)
- 10/2019 Fabrication-informed design of robotically assembled structures Design Modeling Symposium, Berlin
Co-instructor (14 students, two-day-long workshop)
Gave lectures and tutorials. Students used the planning system developed in my research to compute robot trajectories to assemble structures they designed. (with S. Parascho, G. Wartinger, C. Mueller)
- 9/2019 Structural Upcycling workshop MIT Architecture
Co-instructor (10 students, two-week-long workshop)
Developed computational design workflow for designing structures that reuse recycled tree branches. (with F. Amtsberg, D. Marshall, K.M. Gata, C. Mueller)
- 7/2017 Parametric Architectural Design Workshop Tsinghua University, Beijing
Teaching Assistant (13 students, one-week-long workshop)
Mentored students on the design and construction of full-scale, load-bearing bridges, using generative computational design tools that link architectural expression with structural performance. (with C. Mueller)
- 7/2016 Parametric Architectural Design Workshop Tsinghua University, Beijing
Teaching Assistant (12 students, one-week-long workshop)
Mentored students on the use of industrial robots to cut customized wood notches for the assembly of a human-scale reciprocal wood vault. (with L. Yu and Z. Liu)

Mentoring

MASTER'S THESIS ADVISOR

- 5/25 - 9/25 Yen-Ting Liu ETH Zurich
Master in Digital Fabrication (Architecture). Thesis: Co-designing assembly and collaborative robot behaviours
- 11/23 - 7/24 Peiyu Zeng ETH Zurich
Master in Robotics, Systems, and Control (ME). Thesis: Computational design of automated logistic factories (with S. Huber and S. Coros)
- 5/2023 - 9/2024 Yi Hsiu Hung, Chenming Jiang ETH Zurich
Master in Digital Fabrication (Architecture). Thesis: Computational Design and Assembly of Infinitely Reusable Kit of Parts (with Z. Wang, A. Gheyselinck, P. Aejmelaeus-Lindström)

MASTER'S SEMESTER PROJECT ADVISOR

2/2024 - 6/2024	Emre Altan Master in Robotics, Systems, and Control (ME). Semester project: Real2sim MoCap calibration for mobile robotic assembly.	ETH Zurich
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ACADEMIC YEAR UNDERGRADUATE RESEARCHERS

2017	Thomas Cook Industrial robot's planning and simulation	MIT EECS Senior
2017	Kodiak Brush Thermal hotend design for robotic printing	MIT ME Senior
2017	Khanh Nguyen Portable 3D printing control system design	MIT ME Sophomore

EXTERNAL COMMITTEE MEMBER

2/2023	Gabriel Vallat Master thesis: Multi-agent Reinforcement Learning for Assembly of a Spanning Structure (with M. Kamgarpour and S. Parascho)	EPFL
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SUMMER UNDERGRADUATE AND HIGH SCHOOL RESEARCHERS

8/2021	Research mentor, Summer Geometry Institute Bonnie Magland, Cynthia Fan, Lily Kimble, Marcus Vidaurri Planned, prepared, and mentored a week-long research project for four undergraduate students (1 ME, 2 CS, 1 Math) on design optimization via shape morphing. (with C. Mueller)	Virtual, MIT
8/2020	Mentor, HerCodeCamp Mentored four female-identified high-school students on a two-week-long code camp to build a ping-pong game in Python. (with N. Sultanum)	Virtual, UToronto

Press

5/2022	MIT engineers build load-bearing structures using tree forks instead of steel joints	Dezeen
3/2022	Using nature's structures in wooden buildings	MIT News

Invited Seminar Talks

01/2025	Graphics And Mixed Environment Symposium Webinar	Online
11/2024	Kathrin Dörfler's Lab	TU Munich
7/2024	Chen Feng's Lab	New York University
5/2024	Suzumori Laboratory	Tokyo Inst. of Tech.
10/2023	AsiaGraphics Webinar	Online
7/2023	USTC computer graphics summer school	USTC
6/2023	Applied R&D at Foster + Partners	London
5/2023	Design++ seminar series	ETH Zurich
10/2022	Mark Pauly's group	EPFL
11/2021	Justin Solomon's group	MIT
11/2021	Stefanie Mueller's group	MIT
10/2020	Young series: Robotic Fabrication 3	DigitalFUTURES

6/2020	Intelligent Autonomous Systems Seminar	TU Darmstadt
9/2019	Guest lecture at Modeling and Analysis of Structures (1.571)	MIT
4/2019	AIR Seminar of the Hariri Institute of Computing	Boston University
3/2018	Disney Research Zurich	Disney
3/2018	Institute of Technology in Architecture	ETH Zurich
11/2017	Simple Person's Applied Math Seminar (SPAMS)	MIT
11/2017	Computer Graphics Seminar	MIT
4/2017	Brian Williams's group	MIT

Athletics Program Involvement

2022-2023	Member of Nestlé FC	Vevey, CH
2022-2023	Member of Vevey Sport FC 3rd team	Vevey, CH
2017-2022	Member of BKP FC	Boston
2016-2022	Member and captain (2019) of Chinese Scholar and Student Association (CSSA) Soccer Team	MIT

Reference

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