

BOYUAN YU

Materiality and Digital Craft Researcher, Designer, Tutor, Editor

Ph.D. in Arch, MArch, BA

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EDUCATION

PhD in Architecture, The Chinese University of Hong Kong 2022 – 2026

‘Upcycled Wood Intelligence: Integrating Weave Function Collapse (WFC) algorithm and Extended Reality (XR) technologies in Circular Architecture, Engineering and Construction (CAEC)’

Supervisor: Adam Fingrut

Planned thesis submission: MAY 2026

Outstanding Students Awards 2025 CUHK

- Material Reclamation System that digitises physical irregularity into a structured database using multi-scale 3D scanning.
- Structure Generation and Assessment System that abstracts raw geometry into computable voxel units, utilising the Wave Function Collapse (WFC) algorithm for spatial optimisation and Finite Element Analysis (FEA) for structural verification
- Construction and Evaluation System that employs Mixed Reality (MR) to guide the physical assembly process.
- Generative AI in Design and Fabrication

MArch in Architectural Design, University College London 2020 – 2021

B-Pro Bronze Prize

Distinction

Supervisor: Adam Holloway, Guan Lee, Daniel Widrig

Modern Art Program, University of Oxford 2021 - 2022

Exchange

BA in Environmental Design, Harbin University of Science and Technology 2020 – 2021

Distinction

BBA in Accounting, Harbin University of Science and Technology 2020 – 2021

Distinction

PUBLICATIONS

Journal (peer review)

- **Boyuan Yu**, Yuemin Gong, Jianing Luo & Adam Fingrut (2025) Integrating CAD and Extended Robotics for Masonry Restoration: A Scalable Workflow for Historic and Heritage Buildings (HHBs) - *Nature|npj Heritage Science*, <https://doi.org/10.1038/s40494-025-02089-9>
- **Boyuan Yu**, Jianing Luo, Kiwook Rha, Balsam Al-Hadithi, Zhiyong Li, Seohyeon Kim, Zijun Zhao, Yue Lu, Provides Ng (2025) Between Social and Sustainable: A Collaborative Wood Upcycling Design Process integrating AI and Mixed Reality Tools, *Frontiers of Architectural Research*, <https://doi.org/10.1016/j.foar.2025.08.010>

- **Boyuan Yu**, Jianing Luo, Yi Shi, Mingming Zhao, Adam Fingrut, Lei Zhang (2023) Framework for sustainable building design and construction using off-cut wood, **Nature|npj Materials Sustainability**, <https://doi.org/10.1038/s44296-023-00002-8>
- **Boyuan Yu**, Fingrut Adam (2022) Sustainable building design (SBD) with reclaimed wood library constructed in collaboration with 3D scanning technology in the UK, **Resources, Conservation and Recycling**, <https://doi.org/10.1016/j.resconrec.2022.106566>
- Nur Rasyidah Nizam, Chan Seng Koh, Jianing Luo, Adam Holloway, Sebastian Hicks, Elliot Rogosin, Boyuan Yu. (2026). Resources Availability Driven Design (RADD) approach in Circular Architecture, Engineering and Construction Using Decommissioned Materials. **Results in Engineering**. <https://doi.org/10.1016/j.rineng.2026.110172>
- Jianing Luo, **Boyuan Yu**, Yuan Jiang, Adam Fingrut & Adam Holloway (2025). Upcycling of Regular Wood Trunks and Logs Using Wave Function Collapse (WFC), Augmented Reality (AR), and Mixed Reality (MR) Technologies for Circular Design. **Scientific Reports**. <https://doi.org/10.1038/s41598-025-20398-8>
- Luo, Jianing, **Boyuan Yu**. "Research hotspots and evolution trends of "Re-X brick": a bibliometric analysis based on VOSviewer and citespace 2004-2024." **Journal of Asian Architecture and Building Engineering** (2026): 1-16. <https://www.tandfonline.com/doi/full/10.1080/13467581.2026.2616546>
- Jianing Luo, **Boyuan Yu**, Yi Shi, Yangzhi Li, Adam Fingrut (2024) Voxel-based Modular-Architectural Design Strategy (VMADS) toward Autonomous Architecture, **BioResources**, <https://doi.org/10.15376/biores.19.3.6368-6379>
- Yangzhi Li, **Boyuan Yu**, Adam Fingrut, Jingwei Li (2023) Design for Manufacturing and Assembly (DfMA) of Standardized Modular Wood Components, **Technology|Architecture + Design**, <https://doi.org/10.1080/24751448.2023.2246804>

Conference (peer review)

- Ping-Ju Tung, Jianing Luo & **Boyuan Yu**. (2026). Generative Biomimicry: A Wasp Nests-inspired 'Structure-Code DNA' for MR-assisted Rapid Prototyping Using Waste Plastic and Wood Fibre. *The 31st Annual Conference for Computer-Aided Architectural Design Research in Asia (CAADRIA)*.
- Patrick So, **Boyuan Yu**, Jianing Luo, Evan Wu and Addin Cui, Provides NG, From Craft To Community: Participatory Upcycling In Public Housing Via Digital Fabrication, *CAAD Futures 2025*, Hong Kong.
- Yuemin Gong, Jianing Luo, **Boyuan Yu**, S-XAI: Augmenting Human Trust and Real-Time Oversight with Immersive Spatialized Explanations for Dynamic Robotics and Variable Fabrication. *HCI International 2026*.
- Yangzhi Li, Yuemin Gong, **Boyuan Yu**, Adam Fingrut, Machine Learning-Based Visual Recognition Approach for Handling Complex Components in Robotics Fabrication, *XXVIII SIGraDi Conference 2024|sigradi 2024 Biodigital Intelligent System xxviii conference of iberoamerican society of digital graphics punta del este, Barcelona*.
- Yuehong Zhou, Lin Li, Jianing Luo, **Boyuan Yu**, Adaptive Behavior in Digital Nomads: An Interactive Spatial Structure Study Using Machine Learning, *XXVIII SIGraDi Conference 2024|sigradi 2024 Biodigital Inteligent System xxviii conference of iberoamerican society of digital graphics punta del este, Barcelona*.
- Jianing Luo, **Boyuan Yu**, Haohan Peng, Yi Shi, Yangzhi Li, Fingrut Adam (2023) Deep generative modeling tasks: Automatic generation of building facades with Pix2Pix GAN for Hong Kong city expansion and renovation, *XXVII SIGraDi Conference 2023|sigradi 2023 accelerated landscapes!! xxvii conference of iberoamerican society of digital graphics punta del este, uruguay*.

- **Boyuan Yu**, Fingrut Adam (2023) A Deep Learning Framework of Easy-to-reuse Irregular Brick Detection and Classification with YOLOv5, *IASS 2023|The International Association for Shell and Spatial Structures (IASS) symposia 2023*
- Yangzhi Li, Yusong Hu, Tan Tan, **Boyuan Yu**, Jingwei Li, Adam Fingrut (2023) AR-Assisted Assembly in Self-Build Construction with Discrete Components, *The 30th EG-ICE: International Conference on Intelligent Computing in Engineering*. London, United Kingdom
- **Boyuan Yu**, Lei Zhang (2021) A virtual model generation based on Grasshopper-Wasp, *2021 2nd International Conference on Intelligent Design (ICID)*, DOI: 10.1109/ucid54526.2021.00052
- **Boyuan Yu**, Lei Zhang, Haoxing Zhang (2021) Towards “Autonomous”: A review of the “stereotypical” behaviors in Robotic construction, *3rd International Symposium on Architecture Research Frontiers and Ecological Environment (ARFEE 2020)*, DOI: 10.1051/e3sconf/202123704035 Part of ISSN: 2267-1242

RESEARCH FUNDING AWARDED

- PI, UABB Shenzhen Biennale Foundation, 10th Bi-City Biennale of Urbanism\Architecture 2025 Shenzhen, China – Street Heterotopia: Huaqiangbei Metaverse Interface, £ 3,300. [link](#)
- PI, Participator, E-co architecture: The use of AR-assisted CAAD tools in enhancing public participation in upcycling wood.’ Design Trust, £ 4,753. [link](#)
- PI, Tutor, XR+AI summer program, Tsinghua University £ 380
- Co-PI, Participant, Harbin Airport Terminal Planning Consultation Project 2025 HIT Asian Winter Games Atmosphere Creation Scheme Design, Harbin Institute of Technology Urban Planning and Design Institute Co., Ltd. (HITUPDI). £ 77,000
- CO-PI, Participator, Design Thinking for Prototyping, Automation, and Sustainable Material Use. Teaching Development and Language Enhancement Grant. ‘CUHK, £28,516 [link](#)
- CO-PI, Participator, Enhancing AI in Education by Exploring 3D Scanning, Body Tracking, and Point-Cloud Generation. Teaching Development and Language Enhancement Grant. ‘CUHK, £28,516 [link](#)
- CO-PI, Participator, Research on the Digitalisation and Communication Design of Ethnic Culture and Art in Heilongjiang Province under the Background of Mutual Learning Among Civilisations. 2025 Heilongjiang Provincial Social Science Research Planning Project. £ 3,000.
- CO-PI, Participator, Theoretical and Practical Innovations in Digital Therapy for Design and Aesthetic Education, Research on high-quality development of design education in the digital age, China Association of Higher Education. 2025-2027 £ 5,000.
- CO-PI, Participator, Research and exploration on the aesthetic education teaching model of colleges and universities guided by the "aesthetic education immersion" policy’. Higher education Teaching reform project of Heilongjiang Province, £ 1,050.
- Participator, Teaching Development and Language Enhancement Grant. ‘Creative Technologies – A Heuristic Approach to Digital Design and Fabrication Tools in the Classroom.’ CUHK, £ 45,000

AWARDS

- Outstanding Students Awards 2025 CUHK [link](#)
- HKSAR Government Talent Development Scholar 2024/25
- CUHK CAADRIA Commendation Award 2023/24
- MUSE Design Awards, Silver Awards 2025 [link](#)
- New York Architectural Design Awards 2025 [link](#)
- London Design Awards Platinum Awards 2025 [link](#)

- Tsinghua University (THU) "Design+" Innovation and Entrepreneurship (International) Competition The International Special Invitation Track Creativity Group Second Prize 2024
- Tsinghua University (THU), Best Social Impact Award 2024
- Asia Design Week, Excellent Award (Professional) 2024
- INTERNATIONAL DESIGN FOR SAFETY AWARDS, The Lighthouse Club, CRCV 2024
- Bronze Prize, B-Pro show winner, University College London (UCL) [link](#) 2021

CONFERENCES / INVITED TALKS

- CAADRIA 2026, Taiwan
- HCII 2026, Canada
- SiGraDi 2024, Barcelona
- CAAD FUTURES 2025, Hong Kong
- CAADRIA 2021, Hong Kong
- Oxford School of Architecture, 2024
- SUS Tech, 2023
- Harbin Institute of Technology, 2023

SUPERVISION & TEACHING EXPERIENCE

- Visiting Tutor, Oxford School of Architecture, MA Digital Craft in Architecture
 - student awards Distinction
 - Student research presented at CAADRIA 2026
 - Student research published at Results in Engineering
 - Highlight by Stone Federation Great Britain 2026
- Young Tutor, Tsinghua University, MA, MSc, BA, BFA
 - THU "Design+" Innovation and Entrepreneurship (International) Competition, The International Special Invitation Track, Creativity Group, Second Prize.
 - Best Social Impact Award
- Teaching Assistant, The Chinese University of Hong Kong, March, MA
- Tutor, Harbin University of Science and Technology, MPhil
- Instructor, HKFYG Jockey Club Jat Min Youth S.P.O.T. e-co community upcycling wood sign AI and XR workshop (public, community)

ACADEMIC SERVICE

- Executive Editorial Board, Landscape Architecture Frontiers
- TC member, reviewer, The DigitalFUTURES 8th International Conference on Computational Design and Robotic Fabrication (DigitalFUTURES CDRF 2026)
- TC member, reviewer, CAAD Futures 2025, 'Catalytic Interfaces' 21st CAAD Futures
- Organizer and Oral speaker, CUHK & Politecnico di Milano Ph.D. Symposium 2023
- Organizer and Oral speaker, CUHK Ph.D. Symposium 2022
- Journal Reviewer: Automation in Construction, Human Settlements and Sustainability, Buildings, Sustainable Futures, Construction Robotics, BioResources, Societies, Heritage, Landscape Architecture Frontiers, Guangdong Landscape Architecture IEEE Access, BioResources
- Conference Reviewer: DRS 2026, CHI 2026, CAADRIA 2026, xArch Symposium 2026, DEFSA 2025, Cumulus Association 2025, SiGraDi 2025, FINEX 2025, ICOMSE 2025, RRRST 2025, CAAD FUTURES 2025, CAADRIA 2025, ACEER 2025, ACEER 2024, IXDSA 2024, CAADRIA 2024, CAC 2022, NEFES 2022

MEDIA & DISSEMINATION

- 25 MAR 2026, Stone Federation Great Britain. Spolia: Ancient Wisdom for Modern Retrofit [link](#)
- 22 JUN 2025, Amazing Architecture. Framework for Sustainable Building Design and Construction Using Off-Cut Wood [link](#)
- 13 JUN 2025, Parametric Architecture. From Waste to Wonder: A New Framework for Sustainable Building with Off-Cut Wood. [link](#)
- 12 JUN 2025, Trending now. From Waste to Wonder: A New Framework for Sustainable Building with Off-Cut Wood [link](#)
- 12 JUN 2025, World Architecture Community. From Waste to Wonder: A New Framework for Sustainable Building with Off-Cut Wood [link](#)
- 09 JUN 2025, Designboom. Generative building facades realise architecture renewal in Hong Kong [link](#)
- 15 OCT 2024, Tsinghua University. 2024 International Summer Project Showcase | Upcycling Wood Design and Manufacturing Using XR & AI Techniques, [link](#)
- 20 AUG 2024 Tsinghua University Academy of Fine Arts "Designing the Future, Shared Vision" 2024 International Summer Program Officially Opens, Young Tutor keynote speaker, [link](#)
- 5 DEC 2023 Author, TEACHING AND LEARNING INNOVATION EXPO 2023. Design Thinking for Prototyping, Automation, and Sustainable Material Use. [link](#).
- 22 MAY 2023, Design Trust. e-Co Architecture: A Cooperative Fab-Lab Exploring Ecological Community Facilities, [link](#)
- 17 NOV 2023, Nature portfolio. Revolutionizing Construction: Upcycling Irregular Wood Waste, [link](#)
- 17 OCT 2023, Wood Central. How 3D Scanning & Robotics is Driving Timber Construction Upcycling. A new report, published in Nature, looks to better utilize "waste wood" in reconstituted products for building projects. [link](#)
- 08 Nov 2022, NewsRx. Researchers at Chinese University of Hong Kong Target Sustainable Development [Sustainable Building Design (Sbd) With Reclaimed Wood Library Constructed In Collaboration With 3d Scanning Technology In the UK] [link](#)
- Nov 2021, Book, The Bartlett B-Pro Show Book 2021, University College London, the Bartlett School of Architecture p79-83.[link](#)

EXHIBITION

- APR 2026 Milan Design Week 2026, AA School of Architecture x Alcova. Generative Biomimicry: A Wasp Nests-inspired 'Structure-Code DNA' in Design and Fabrication.
- JAN 2026 UABB 10th Bi-City Biennale of Urbanism\Architecture 2025 Shenzhen, China – Street Heterotopia: Huaqiangbei Metaverse Interface. [link](#)
- 19 SEP 2025, London Design Festival 2025 + Blackdot gallery. [link](#)
- 22 FEB 2025, HKFYG Jockey Club Jat Min Youth S.P.O.T. e-co architecture exhibition, HK [link](#)
- AUG-SEP 2024, 'Tsinghua University Design Futures Shared Vision 2024' International Summer Program (2024) Integrating XR and AI-Driven Tools for Wood Upcycling. China (Beijing, China) [link](#)
- NOV-DEC 2024, University College London, B-pro show [link](#)

LANGUAGE AND TECHNICAL SKILLS

3D Modelling: Rhino, SketchUp, Maya, 3D Max, Unity

3D Scanning: Photogrammetry: Reality Capture, laser scanning, CT scanning, Kitnet, Lidar

XR-VR/AR/MR: HP, Hololens, Oculus
Rendering: Vray, KeyShot, Luminon
Image processing: Illustrator, Photoshop, InDesign
Video and game: Twinmotion, Unreal Engine
Bibliometric analysis: Citespace, VOSviewer
Robot: ABB, UR 3, 10(e), Control: Machina, Robotics, HAL, Humanoid
Python, Machine Learning, Deep Learning

Chinese (Mandarin)
Can read, write, speak, understand and peer review
Chinese (Cantonese)
Can read, write, and peer review
English
Can read, write, speak, understand and peer review

INTERESTS

Generative AI; XR/MR/AR; Digital Craft; Robotics; Materiality; Upcycling; Circular Engineering for Architecture and Construction; Sensory Theory; Digital Media

REFERENCES

- Adam Fingrut (PhD supervisor), Assistant Dean, Senior Lecturer, School of Architecture, The Chinese University of Hong Kong, adam.fingrut@cuhk.edu.hk Tel: 852 3943 3707
- Adam Holloway, (Master supervisor), Senior Lecturer, Oxford School of Architecture, Co-director Material Architecture Lab, UCL, aholloway@brookes.ac.uk Tel: +44 7757 697264