

MIKHAEL JOHANES

Design++ Postdoctoral Fellow | ETH Zurich, Switzerland
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RESEARCH FOCUS

AI-driven design, Machine learning for architecture, computational design, spatial analysis, visualization, and interactive media.

EDUCATION

ENAC, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

Ph.D. (August 2019 – October 2024)

Dissertation: Machine Perception of Architectural Space - Isovist representation learning for analytical and generative applications.

Supervisor: Jeffrey Huang

Department of Architecture Universitas Indonesia (UI), Indonesia

Master in Architecture (August 2011 - August 2013)

Thesis: Spatial Cloud - Investigating the Mechanism of Spatial Representation in Architecture

Award: Fast Track Program Scholarship

Bachelor in Architecture (August 2008 - August 2012)

EXPERIENCE

ETH Zurich

Design++ Postdoctoral Fellow (December 2024 – Present)

- Developing multimodal generative models to support adaptive building reuse and renovation
- SWIRCULAR: a Swiss Digital Circular Construction Ecosystem

Media and Design Laboratory (EPFL)

Ph.D. Researcher (August 2019 – September 2024)

- Developed generative machine learning frameworks for the Artificial Design Studio series.
- Advanced parametric and visualization tools for architectural design studios.
- Designed and programmed virtual-physical immersive environments for architectural studio reviews and exhibitions.
- Designed and developed the media installation for the “*Design Brain*” series exhibited at Seoul Biennale 2021 of Architecture and Urbanism, followed by subsequent exhibitions in Lausanne and Geneva.
- Collaborated in lab’s research on machine learning for architecture, circularity, and virtual-physical environments, published three research articles, and contributed to two ongoing book publications.
- Collaborated in the 2021 International Symposium: Deep City, Climate Crisis, Democracy, and the Digital.
- Coordinated UE-X Experience Design course.
- Contributed to the drafting of a successful proposal of Innosuisse flagship project “Blue City”
- Collaborated in a research project Designing With. A New Educational Module to Integrate ML, AI, and DV in Design Curricula, a research collaboration between SUPSI, NOVA, and EPFL.
- Tutored master and undergraduate students in architectural design studios.
- Tutored architecture and computer science master students for final and semester projects.

Creative Data and Critical Design

Co-founder (2023 – Present)

- Provided technical expertise for computational design in architecture and urbanism.
- Envisioned strategy for future practice and international collaborations.

Department of Architecture Universitas Indonesia

Lecturer and Research Staff (November 2016 – July 2019)

- Researched evidence-based healthcare facility design, published three research articles.
- Researched the design of self-cleaning facilities for smart cities, published two research articles.
- Designed Sekolah Cepat Tanggap, a fast response architecture for post-disaster in Indonesia. (FGL Award 2019)
- Drafted three successful grant proposals for research and community engagement projects.
- Developed and maintained Open Journal System (OJS) platform for the journal Interiority. (Q1 SJR Architecture)

- Managed and revitalized digital fabrication lab, secured budget for new facilities, improved safety and procedures.
- Coordinated and tutored undergraduate architecture design studios.
- Taught digital fabrication course and digital modeling course.
- Advised undergraduate thesis students.
- Developed and drafted the design of the Integrated Creative Engineering Learning Laboratory (i-CELL), Faculty of Engineering UI. (Final EGDE Advanced Certification from Green Building Council Indonesia)
- Designed and coordinated the renovation of Sejiwa Canteen, Faculty of Psychology UI. (best-rated place in the university)

Research Assistant (August 2013 - October 2016)

- Researched and developed the mapping of everyday urban narratives, published two research articles.
- Designed, coordinated, and supervised the installation of the “*Between Boundaries*” for the Seoul Biennale 2017.
- Collaborated with researchers and architects from Chiba University and RHIN for community engagement projects for high-density settlements. (Acknowledgment Prize in Holcim Awards 2015 Asia Pacific Region)

MSSM Associates Jakarta

Junior Architect (December 2013 – August 2015)

- Designed and coordinated private house projects.

PUBLICATIONS

Refereed Journal Articles

- Huang, Jeffrey, **Mikhael Johannes**, Frederick Chando Kim, Christina Doumptioti, and Georg-Christoph Holz. 2021. “On GANs, NLP and Architecture: Combining Human and Machine Intelligences for the Generation and Evaluation of Meaningful Designs.” *Technology|Architecture + Design* 5 (2): 207–24. (2023 ACSA TAD Best Article Award)
- Johanes, Mikhael**, and Yandi Andri Yatmo, 2018, “Application of Visibility Analysis and Visualisation in Hospital Wayfinding Sign Design.” *Dimensi: Journal of Architecture and Built Environment* 45(1): 1–8.
- Johanes, Mikhael**, and Paramita Atmodiwirjo. 2015. “Visibility Analysis of Hospital Inpatient Ward.” *International Journal of Technology* 6 (3): 400–409.
- Johanes, Mikhael**, Paramita Atmodiwirjo, and Yandi Andri Yatmo. 2019. “Implicit Surface Modelling and Parametric Optimization for Self-Cleaning Portable Toilets Using a Rotary Jet Head Cleaning in Grasshopper.” *Computer-Aided Design and Applications* 17 (4): 674–89.
- Johanes, Mikhael**. 2021. “Expanding Agency: The mapping of architectural design discourse in Indonesia’s academic publications.” *ARSNET* 1(1): 8–23.
- Atmodiwirjo, Paramita, **Mikhael Johannes**, and Yandi Andri Yatmo. 2019. “Mapping Stories: Representing Urban Everyday Narratives and Operations.” *URBAN DESIGN International* 24 (4): 225–40. (Selected project in 2014 Unfolded - A year in review)

Conferences

- Johanes, Mikhael**, and Jeffrey Huang. 2023. “Generative Isovist Transformer: Machine learning for spatial sequence synthesis.” In *the 41st eCAADe Conference: Digital Design Reconsidered*. Graz, Austria.
- Johanes, Mikhael**, and Jeffrey Huang. 2022. “Latent Isovist: Discovery of machine-human interpretable spatial properties using inverted GANs.” In *Association for Computer Aided Design in Architecture Annual Conference, ACADIA 2022*. Philadelphia, Pennsylvania.
- Johanes, Mikhael**, and Jeffrey Huang. 2022. “Deep Learning Spatial Signature: Inverted GANs for Isovist Representation in Architectural Floorplan.” In *40th Conference on Education and Research in Computer Aided Architectural Design in Europe, eCAADe 2022*. 621–29. Ghent, Belgium.
- Johanes, Mikhael**, and Jeffrey Huang. 2021. “Deep Learning Isovist: Unsupervised Spatial Encoding in Architecture.” In *Association for Computer Aided Design in Architecture Annual Conference, ACADIA 2021*. Online + Global.
- Kim, Frederick, **Mikhael Johannes**, and Jeffrey Huang. 2023. “Flow2Form: A Flow-Driven Computational Framework for Early Stage Architectural Design.” In *Association for Computer Aided Design in Architecture Annual Conference, ACADIA 2023*. Denver, Colorado.
- Kim, Frederick, **Mikhael Johannes**, and Jeffrey Huang. 2023. “Text2Form Diffusion: Framework for learning curated architectural vocabulary.” In *the 41st eCAADe Conference: Digital Design Reconsidered*. Graz, Austria.
- Yang, Hong-Bin, **Mikhael Johannes**, Frederick Chando Kim, Mathias Berhard, and Jeffrey Huang. 2023. “Architectural Sketch to 3D Model: An experiment on simple-form houses.” In *CAAD Futures 2023: INTERCONNECTIONS: Co-computing beyond boundaries*. Delft, NL.

Huang, Jeffrey, Frederick Chando Kim, and **Mikhael Johanés**. 2023. "Parametric Sankey: Interactive mapping of complex material flows for urban and architectural design." In *The 5th International Conference on Computational Design and Robotic Fabrication (CDRF 2023)*. Shanghai, China.

Johanés, Mikhael, Gadisha Amelia Febrianti Rahayu, and Yandi Andri Yatmo. 2017. "Constructing the Meaning of Mundane Urban Places through the Mapping of Geo-Tagged Social Media Content." In UIA 2017 Seoul World Architects Congress. Seoul, South Korea. (Outstanding Papers and Design Works Award)

Exhibitions

- (2024) "Artificial Architecture – Machines and Dystopian Dream, Media x Design Lab, EPFL Pavilions, Lausanne, Switzerland.
- (2021) "Artificial Swissness, Media x Design Lab." In *Seoul Biennale of Architecture and Urbanism 2021*. Seoul, South Korea.
- (2017) "Between Boundaries: Micro Practice and Macro Perspective for Building Resilience of Urban Kampung, Megacity Design Lab." In *Seoul Biennale of Architecture and Urbanism 2017*. Seoul, South Korea.
- (2023) "World Expo Countertactics: Planetary Network of Environmental Crisis, Media x Design Lab." In *Positions: Transcalar Prospects in Climate Crisis*, Archizoom Gallery, Lausanne, Switzerland.
- (2023) "Flow2Form: From Processes to Formalization of Circular Flows, Media x Design Lab." In *Positions: Transcalar Prospects in Climate Crisis*, Archizoom Gallery, Lausanne, Switzerland.
- (2022) "Design Brain III, Media x Design Lab." In *Métamorphoses de l'espace*, HiFlow, Geneva, Switzerland.
- (2021) "Design Brain, Media x Design Lab." In *Deep City, Climate Crisis, Democracy, and the Digital*. Lausanne, Switzerland.

Lectures/Seminars/Workshops

- Machine Perception Architectural Space from Analytical to Generative Applications. ETH AI Center Post-Doctoral Symposium 2024. 29 January 2024. [Shortlisted candidate talk (top 8%)]
- Hybrid Typologies II with Jeffrey Huang and Frederick Chando Kim. Joint Design Workshop EPFL Media X Design Lab and KIT Kyoto Design Lab. 15-22 April 2023. Kyoto Institute of Technology, Japan. [Design Workshop]
- In and Out with Frederick Chando Kim. Artificial Architecture. 25 March 2024. [Symposium]
- Hybrid Typologies I with Jeffrey Huang and Frederick Chando Kim. Joint Design Workshop EPFL Media X Design Lab and KIT Kyoto Design Lab. 13-26 April 2023. Kyoto Institute of Technology, Japan. [Design Workshop]
- Research Method in Architecture Design and AI. Guest Lecture SUTD Ph.D. Research Methods Seminar. 17 February 2023. SUTD, Singapore. [Lecture]
- Refuge 2.0 Artificial Swissness with Jeffrey Huang and Frederick Chando Kim. Critical heritage and planetary dispersal design seminar, Bartlett School of Architecture. 27 May 2022. [Lecture]
- On GANs, NLP, and ARCHITECTURE: Combining Human and Machine Intelligences for the Generation and Evaluation of Meaningful Designs with Jeffrey Huang and Frederick Chando Kim. ACSA 110th Annual Meeting. 18-20 May 2022. [Seminar]
- Machine Reading of Architectural Spatial Pattern. *ArchML Visions - Leveraging Computational Methods for the Study of Architecture and the City in Historical, Present, and Future Contexts*. 24 November 2021. Bibliotheca Hertziana – Max Planck Institute for Art History. Rome, Italy. [Seminar]
- Artificial Zurich. *International Latsis Symposium "Deep City, Climate Crisis, Democracy, and the Digital,"* 24-27 March 2021. EPFL. Lausanne, Switzerland. [Seminar]

SKILLS

Architectural and experience design | Machine learning and computer vision with PyTorch and TensorFlow | Computer programming in Python, Java, and C#. | Parametric and computational design | Data analytics, mapping, and visualization | Interactive media.

AWARDS, GRANTS, AND FELLOWSHIPS

- The 2023 ACSA TAD Best Article Award - On GANs, NLP and Architecture: Combining Human and Machine Intelligences for the Generation and Evaluation of Meaningful Designs.
- Futurarc Green Leadership Award 2019 - Sekolah Indonesia Cepat Tanggap.
- Outstanding Papers and Design Works Award in UIA 2017 SEOUL World Architect Congress - Constructing the Meaning of Mundane Urban Places through the Mapping of Geo-Tagged Social Media Content.
- Acknowledgment Prize in Holcim Awards 2015 Asia Pacific Region - "Megacity Skeleton" After Fire Project.

- Wayfinding System Studies in Universitas Indonesia Hospital, Universitas Indonesia Hospital Grant (2017)
- Investigating Spatial Stories of Patient's Experience for Finding the Spatial Qualities that Support Recovery Process, Universitas Indonesia Prime Research Grant. (2016)
- Intrabuilding Simulation Movement. Hospital and Healthcare Design and Engineering Research Cluster, Universitas Indonesia Cluster Research Grant. (2015)
- Development of visibility analytical tools for healthcare design. Hospital and Healthcare Design and Engineering Research Cluster, Universitas Indonesia Cluster Research Grant. (2015)
- Ministry of Education, Culture, Research, and Technology Fast Track Program Scholarship. (2011)