Chloe (Soo hwa) Hong

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Research Interests

Computational Design, Computational Geometry, Reinforcement Learning, Optimization

Education

Massachusetts Institute of Technology — Cambridge, MA
- *Ph.D. in Building Technology* | *GPA: 5.0 / 5.0* — *Sep. 2023 – Present*
  Advised by Prof. Caitlin Mueller (Digital Structures)

Carnegie Mellon University — Pittsburgh, PA
- *M.S. in Computational Design* | *GPA: 4.03 / 4.3* — *Sep 2021 – May 2023*
  Advised by Prof. Daniel Cardoso Llach, Prof. Chris McComb

Seoul National University — Seoul, South Korea
- *College of Liberal Studies (Presidential Award) B.Arch, BBA* | *GPA: 4.07 / 4.3* — *Mar 2014 – Feb 2020*

Publications

Deep reinforcement learning for efficient exploration of combinatorial structural design spaces
- *Chloe S.H. Hong, Keith J. Lee, Caitlin Mueller*
  International Association for Shell and Spatial Structures (IASS) 2025

Adaptation and Challenges in Human-AI Partnership for the Design of Complex Engineering Systems
- *Zeda Xu, Chloe Hong, Nicolás F. Soria Zurita, Joshua T. Gyory, Gary Stump, Hannah Nolte, Jonathan Cagan, Christopher McComb*
  International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (ASME IDETC-CIE) 2023

Building Hanok Components & Techniques
- *Jeon BongHee, Kim Jihee, Hong Soohwa, Chae Uri, Kwon Ah-song*
  South Korea's Architecture and Urban Institute (AURI) 2017

Academic Services

- **NeurIPS Creative AI Track** Reviewer — *2024, 2025*

Awards & Grants

- **MIT Generative AI Impact Consortium (MGAIC)**
  $100,000 for AI empowered human-centered design: from identifying latent human needs to generating human-guided designs of physical systems — *2025*
- **Kwanjeong Educational Foundation Graduate Scholarship**
  One of 40 recipients to be funded for doctoral studies. — *2023-2025*
- **South Korea National Graduate Scholarship**
  One of 64 recipients rewarded by the South Korean government. — *2021-2023*
- **Carnegie Mellon University Merit Scholarship**
  Merit-based scholarship for the entirety of master's degree awared upon admission — *2021-2023*
- **Seoul National University**
  Graduated Class Representative of College of Liberal Studies — *2020*
  Merit-based Scholarship | *National Scholarship for Science and Engineering* | *Eminence Scholarship* — *2014-2020*

SELECTIVE COURSEWORK

SU CS224W : **Machine Learning with Graphs** *Prof.Jure Leskovec*
Physics informed spatial temporal graph learning

MIT 6.S978 : **Deep Generative Models** *Prof. Kaiming He*
Reinforcement Learning as Probabilistic Inference

MIT 4.450 : **Computational Structural Design and Optimization** *Prof. Caitlin Mueller*
Learning High-Performing Designs Across Topologies

MIT 6.7960 : **Deep Learning** *Prof. Philip Isola*

MIT 6.5320 : **Geometric Computing** *Prof. Piotr Indyk*
Efficient Agglomerative Hierarchical Clustering using Locality Sensitive Hashing

CMU 24679 : **Statistical Techniques in Robotics / Deep Reinforcement Learning** *Prof. David Held*
Comparison and Modification of RL Agents for Parking

CMU 24679 : **Designing and Deploying AI/ML Systems** *Prof. Chris McComb*

CMU 24354 : **Gadgetry - Sensors, Actuators and Processors** *Prof. Douglas Weber*
Sensor based Dynamic Projection Mapping

EXPERIENCE

- **Massachusetts Institute of Technology** Cambridge, MA
  Teaching Assistant *2025*
  - 4.453 Creative Machine Learning for Design The course focuses on applications of machine learning for creative design generation and data-informed design exploration, with an emphasis on visual and 3D generative systems. For a 30 person class, I graded assignments, advised final projects and gave a lecture on reinforcement learning for design tasks.
- **Autodesk** San Francisco, CA
  Research Intern *2022*
  - *RevitAssembly* I developed an assembly-aware graph representation for 3D models of building components involving geometric and semantic compositional constraints. I queried and linked geometric data and tabular annotations from Revit 3D models to generate a dataset used for generative tasks.
- **Carnegie Mellon University** Pittsburgh, PA
  Research Assistant *2021-2022*
  - *Robotic Concrete Additive Manufacturing* I designed material studies to visualize and quantify the permeation patterns of binders within concrete batches at a macro level and developed a physics-based particle simulation tool that predicts water absorption and penetration at the micro level. These studies informed the software printing parameters and hardware design for robotic concrete printing.
- **Human-Centered Computer Systems Lab, Seoul National University** Seoul, South Korea
  Research Intern *2021*
  - *Bidirectional Telepresence* I proposed a human-centered system for telepresence that integrates sensing user attention through gaze and matching coordinates of two different spaces based on body position and spatial functionality.
- **Seoul National University** Seoul, South Korea
  Research Intern *2017-2021*
  - *JoineryBIM* I developed a parametric data structure for designing complex wooden joinery, used to facilitate the design of *Hanok*, Korea's traditional building typology, in BIM software.
  - Architecture Practice I developed computational tools to facilitate the design and fabrication for private galleries, residentials the *Venice Architecture Biennale* (2018), *Venice Art Biennale Korea* exhibition space (2019), *Hyundai Outlet Mall* (2019), and *Hyundai Motors Future Lab* (2020) (with *Herzog de Meuron*).

SKILLS

- **Languages** : Python, C/C++, Julia, MATLAB
- **Frameworks** : PyTorch, Tensorflow & Keras
- **3D software** : Rhino, Grasshopper, Unity, Adobe Design Suite
- **Prototyping** : 3D printing, CNC milling, Laser cutting

updated Nov 2025