Chloe (Soo hwa) Hong

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Research Interests

Computational Design, Computational Geometry, Generative Models, Reinforcement Learning, Optimization, Fabrication

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

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*

Selective Coursework

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

MIT 18.085 : **Computational Science and Engineering** *Prof. David Kouskoulas*

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

CMU 15387 : **Computational Perception** *Prof. Tai Sing Lee*

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

CMU 15281 : **Artificial Intelligence: Representation and Problem Solving** *Prof. Stephanie Rosenthal*

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

CMU 15122 : **Principles of Imperative Computation**

Experience

- **Autodesk** — San Francisco, CA
  Research Intern — *May 2022 - Aug 2022*
  - *RevitAssembly* I developed a pipeline to create 3D model datasets with user-generated procedural information that can support ML-based systems for design data exchange on the cloud platform, Forge. I use a novel approach to extract user annotations of dimensions and geometric constraints from Revit 3D models and output a graph representation of the topology and shape.
- **Carnegie Mellon University** — Pittsburgh, PA
  Research Assistant — *Sep 2021 - May 2022*
  - *Robotic Concrete Additive Manufacturing* I designed material studies to visualize and quantify the permeation patterns of the binder within the concrete batch at a macro level and developed a physics-based particle simulation tool with Grasshopper 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 — *Apr 2021 - Aug 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.
- **Architecture History Lab, Seoul National University** — Seoul, South Korea
  Research Intern — *Dec 2016 - Apr 2017, Apr 2021 - Aug 2021*
  - *Building Hanok Components & Techniques* I created a glossary and translation for the book *'Building Hanok Components & Techniques'*, published by South Korea's Architecture and Urban Institute (AURI). Based on historical archives, I document the components and building process for the traditional Korean building typology, *Hanok*, while establishing terminology for the distinct structural wooden joinery based on their functions and geometry, and processes for assembling and crafting building components only previously passed down through apprenticeship.
  - *JoineryBIM* I developed a parametric data structure fit for complex wooden joinery, used in Revit to facilitate the design of *Hanok*, Korea's traditional building typology, in BIM software.
- **Lab for Architecture Culture, Seoul National University** — Seoul, South Korea
  Research Intern — *Jan 2017 - Dec 2020*
  - 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*).

Awards

- **Kwanjeong Educational Foundation Graduate Scholarship** — *2023-2025*
  One of 40 recipients to be funded for doctoral studies.
- **South Korea National Graduate Scholarship** — *2021-2023*
  One of 64 recipients rewarded by the South Korean government.
- **Carnegie Mellon University Merit Scholarship** — *2021-2023*
  Merit-based scholarship for the entirety of master's degree awared upon admission
- **SNU Presidential Dean's Award** — *2020*
  Awarded as the class representative for the class of 2020 College of Liberal Studies
- **SNU Merit Scholarships**
  Merit-based Scholarship — *2014-2015*
  National Scholarship for Science and Engineering — *2015-2017*
  Eminence Scholarship — *2017-2020*

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 Jan 2025