# Seunggeun **CHI**

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## Research Interests

My research interests lie in **Machine Learning** and its applications to real-world problems. **Representation Learning** in **Computer Vision** problems is my primary study. My research also spans over **Combinatorial Optimization** problems which aim to extract rules by applying **Reinforcement Learning**.

## Education

**Purdue University** — *West Lafayette, U.S.*

PH.D. STUDENT IN ELECTRICAL AND COMPUTER ENGINEERING — *Aug. 2021 - current*

- *C-Design Lab*, Advisor : Karthik Ramani

**Seoul National University** — *Seoul, S.Korea*

M.S. IN COMPUTER SCIENCE AND ENGINEERING — *Mar. 2019 - Aug. 2021*

- *Optimization Lab*, Advisor : ByungRo Moon

**Seoul National University** — *Seoul, S.Korea*

B.S. IN COMPUTER SCIENCE AND ENGINEERING — *Mar. 2013 - Feb. 2019*

- *Computer Architecture Lab*, Advisor : SangLyul Min

## Publications & Patents

### Conference Proceedings

- **S. Chi***, H. Chi*, Q. Huang, K. Ramani. Skeleton-ODE: Learning Representation by Predicting the Future for Online Skeleton-based Action Recognition. *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), submitted*
- [**C3**] **S. Chi***, H. Chi*, S. Chan, K. Ramani. Pose Relation Transformer: Refine Occlusions for Human Pose Estimation. *IEEE International Conference on Robotics and Automation (ICRA), 2023*
- [**C2**] H. Chi, M. H. Ha, **S. Chi**, S. Lee, Q. Huang, K. Ramani. InfoGCN: Representation Learning for Human Skeleton-based Action Recognition. *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022*
- [**C1**] M. H. Ha, **S. Chi**, S. Lee, Y. Cha, B. R. Moon. Evolution-based Meta Reinforcement Learning for Portfolio Optimization. In proceedings of the 23rd *The Genetic and Evolutionary Computation Conference (GECCO), 2021*

### Patent

- K.Ramani, H.Chi, **S.Chi**. Pose Relation Transformer And Refining Occlusions For Human Pose Estimation. U.S. Patent Application (MMB 1743-0299P)

## Skills

### Research and Development Stacks

| | |
|---|---|
| **Major Languages** | **Python**, **C/C++**, java, Verilog |
| **Machine Learning** | **PyTorch**, **TensorFlow** |
| **Computer Vision** | OpenCV, OpenGL |
| **Web Languages** | Nginx, HTML5, PHP, JavaScript, CSS |
| **Database** | MySQL, SQLite |

### Other Tools and Skills

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|---|---|
| **Other Langauges** | Shell Scripts(bszh, zsh), Matlab, R |
| **Operating Systems** | macOS, Linux Debian/Ubuntu, Windows |
| **Text Editors & IDE** | **Vim**, VSCode, Eclipse |
| **Software** | SolidWorks, Catia, AutoCAD |
| **VCS** | Git |

## Research & Project

**Action Diffusion Model: Composing action from text-based input with Diffusion Model** — *C-Design Lab, Purdue Univ.*

RESEARCH ASSISTANT — *Mar. 2023 -*

- Aligned motion representation and text representation in the latent space.
- Developed latent diffusion model for effective diffusion process.
- Established novel action composition algorithm.

**Skeleton-based action sequence generation with salient atomic actions** — *C-Design Lab, Purdue Univ.*

RESEARCH ASSISTANT — *Dec. 2022 -*

- Encode latent action trajectory with Neural ODE.
- Extract the salient action frames of actions, and define atomic actions with the salient action frames.
- Apply diffusion model to generate continuous action sequences with atomic actions.

**Designing spatial-navigation on chrome-extension** — *ArchiLab, Seoul National Univ.*

Research Assistant — *Sep. 2018 - Dec. 2018*

- formulated malfunctioning cases and defined user-friendly environment
- Developed user-friendly navigation UI
- `https://github.com/WICG/spatial-navigation`

## Academic Activities

### Reviewer

- **The IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023**
- **Conference on Neural Information Processing Systems (NeurIPS), 2023**

### Education Outreach

- **Gifted Education Research & Resource Institute (GER$^2$I), 2022 Summer**

## Working Experience

**SK Hynix** — *Icheon, S.Korea*

Intern Researcher — *Sep. 2017 - Dec. 2017*

- Designed an exclusive chip for testing 3D NAND flash architecture and verified the reliabilty of existing architectures
- Developed a module for predicting locality of data and tested it with real data

**Korean National Police Agency** — *Dokdo, S.Korea*

Auxiliary Police — *Dec. 2013 - Sep. 2015*

## Teaching Experience

### Seoul National University

| | | |
|---|---|---|
| CS.4190.681A | **Genetic Algorithm**, 2019-spring, 2021-spring | *Teaching Assistant* |
| CS.4190.407 | **Algorithm**, 2019-fall, 2020-spring | *Teaching Assistant* |
| CS.M1522.407 | **Data Structure**, 2019-spring, 2020-spring, 2021-spring | *Teaching Assistant* |
| CS.4190.308 | **Computer architecture**, 2018-spring | *Teaching Assistant* |
| CS.035.001 | **Digital Computer Concept and Practice**, 2017-fall, 2018-fall | *Teaching Assistant* |
| PE.051.004 | **Volley ball**, 2018-fall, 2019-spring, 2021-spring | *Teaching Assistant* |

## Honors & Awards

**Competition of accelerating General-Purpose GPU sponsored by Intel** — *Manycore Programming Lab*

1st place — *2018*

**The National Scholarship for Science and Engineering** — *Korea Ministry of Science and ICT*

Full scholarship — *Mar. 2018 - Aug. 2021*

## Invited Talk

**Yonsei University** — *Seoul, S.Korea*

Guest Lecturer: Representation Learning for Human Action Recognition and Generation — *Apr. 2023*

**Purdue Interdisciplinary Graduate Programs** — *West Lafayette*

Presenter: Representation Learning for Human Skeleton-based Action Recognition — *May. 2023*