

# Cheol Jun Cho

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## EDUCATION

### Seoul National University (SNU)

*B.S. in Computer Science and Engineering*

- Summa Cum Laude & the Valedictorian for the College of Engineering (GPA: 4.2/4.3)

Seoul, Korea

Aug 2020

## RESEARCH EXPERIENCE

### JeeLab, Center for Neuroscience, Brain Science Institute

*Computational Neuroscience; Cognitive Neuroscience; System Neuroscience*

KIST, Seoul, Korea

Jul 2020 - Present

Research Intern, Advisor: **Dr. Jee Hyun Choi**

- Incorporating machine learning algorithms to specify and predict mice behavior patterns correlated with transient gamma oscillation in the basolateral amygdala.
- Processed and analyzed data for the wireless real-time neuro-reporting platform (CBRAIN). Developed a program to extract mouse-tracking data and neural report data from recorded videos of mouse experiments.

### Computational Clinical Science Laboratory

*Computational Psychiatry; Computational Neuroscience*

SNU, Seoul, Korea

Mar 2020 - Present

Research Assistant, Advisor: **Dr. Woo-Young Ahn**

- Developing a analytical framework combining Multi-Voxel Pattern Analysis and Bayesian analysis to get brain activation patterns correlated with latent processes of human behavior.
- Designed computational models by integrating the prospect theory and the drift-diffusion model. Conducted hierarchical Bayesian analysis on risky choice task data. (choice, reaction time and eye-gaze)

### KAIST Interaction Laboratory (KIXLab)

*Human Computer Interaction; Natural Language Processing*

KAIST, Daejeon, Korea

Jun 2019 - Aug 2019

Summer Research Intern, Advisor: **Dr. Juho Kim**

- Participated in the speech act based chatbot project. Designed/experimented deep learning models for the speech act classification using Bi-LSTM and word embedding models. Devised a pooling method using the attention mechanism to integrate word-wise vectors into sentence-wise vectors. Tested models on the Switchboard Dialog Act (SwDA) corpus and Verbal Response Mode dataset.

### Computing and Memory Architecture Laboratory (CMALab)

*Computer Vision*

SNU, Seoul, Korea

Dec 2018 - Jun 2019

Research Intern, Advisor: **Dr. Sungjoo Yoo**

- Experimented an online-training framework adopting the teacher-student method to improve the computing efficiency of deep learning models. Tested the framework on the video object segmentation and the video object detection task.

## PUBLICATIONS

Kim, J., Kim, C.\*, Han, H., **Cho, C.J.**, Yeom, W., Lee, S.Q\*, Choi, J.H.\*, A Bird's Eye View of Brain Activity in Socially Interacting Mice through Mobile Edge Computing (MEC), ***Science Advances***, In press (2020)

Lee, Y. **Cho, C.J.\***, Kim, J., Kim, J.H., Han, H., Ahn, W., Choi, J.H., Investigation of hierarchy-dependency in the intragroup vigilance convergence and transmission, the 23rd annual meeting of ***the Korean Society for Brain and Neural Sciences***, poster presentation (2020), *selected as excellent poster (\* equal contribution)*

## PROJECTS

### Bachelor's Thesis

*Computer Vision; Natural Language Processing*

SNU, Seoul, Korea

Mar 2020 - Jun 2020

Independent Research

- Title: Neural Symbolic Visual Question Answering System: application to real world data and limitation
- Implemented a neural symbolic system (question-to-symbols encoder, scene graph generator, and symbolic program executor). Tested the system on General Question Answering Dataset and analyzed the associated limitations of the application.

## Brain-Mind-Behavior Independent Research Course

SNU, Seoul, Korea

*Natural Language Processing; Interpretable AI*

Sep 2019 – Dec 2019

### Independent Research

- Title: Deep Neural Networks with Attention Pooling for Dialogue Act Recognition
- Conducted research as an extension of work in the summer internship at KIXLab. Devised a self-attentive pooling method and compared it with the baseline (average pooling). Interpreted model inference process by analyzing attention weights.
- Received best research award in 2019 Brain-Mind-Behavior Research Presentation.

## SNU Creative Design Fair

SNU, Seoul, Korea

*Robotics; Human Robot Interaction (HRI); Computer Vision*

Jun 2019 – Sep 2019

### Project: Interactive Robotic Vacuum

- Participated in SNU Creative Design Fair as a team of four.
- Built a unique pointed-shape body with omnidirectional wheels. Developed the embedded AI with Arduino. Developed a smartphone app. featured by the embedded hand gesture detecting model. Devised a novel HRI platform where users interact with the robot using hand gestures.
- Won 2nd place at the SNU Creative Design Fair, and attained 1st place at the International Capstone Design Fair.

## Creative Integrated Design Course

SNU, Seoul, Korea

*Computer Vision; Interpretable AI*

Sep 2018 – Dec 2018

### Project: Plant Disease Detecting Web Service

- Developed a plant disease detection web service by utilizing deep learning as a team of three.
- Trained/evaluated image classification models for the plant disease detection. Visualized the inference process utilizing Guided GRAD-CAM. Implemented the back-end server for the application.

## TECHNICAL SKILLS

**Programming Languages:** Python, R, Stan, C, C++, Arduino,

**Software Packages:** Deep Learning (Pytorch, Tensorflow, Keras), Computer Vision (openCV), Natural Language Processing (Gensim, NLTK), Data Analysis (Rstan, hBayesDM), fMRI analysis (SPM12), Web Programming (Django), Machine Learning (Scikit learn)

## AWARDS AND HONORS

President's Award for 1st ranked graduation at SNU College of Engineering	Aug 2020
Best research award from 2019 Brain-Mind-Behavior Research Presentation at SNU	Sep 2019
1st place of International Capstone Design Fair 2019 (Korea, China)	Nov 2019
2nd place of SNU Creative Design Fair of SNU College of Engineering	Sep 2019
SNU's Tomorrow's Engineers Membership (honor society of college of engineering)	May 2016
Korea National Scholarship (fully funded)	2016 Spring, 2018 Fall-2019 Fall
Army Commendation Medal (ARCOM)	Jun 2018
Certificate of Appreciation (CA) from US 8th Army	Jun 2018
SNU Merit Scholarship (fully funded)	2015 Spring, Fall
SNU Merit Scholarship (half funded)	2014 Fall

## OTHER SERVICES AND ACTIVITIES

### STEM Mini Vision Mentoring

2016, 2019

- Visited middle and high schools as mentor.
- Introduced Engineering School, especially about Computer Science,
- Shared my own learning strategies and experiences.

### Korean Augmentation to the United States Army (KATUSA)

Sep 2016 - Jun 2018

- Served in 8th Army HHB IS G4 Information Management Office.
- Supported electrical automation and equipment maintenance for operations.

### S20 project contest by Shinhan Bank

Mar 2016 - Jun 2016

- Won 1st place as SNU's Tomorrow's Engineers Membership team.
- Presented idea for smart banking with AI technologies.