

# Sanghyun Yi

MC 228-77, Pasadena CA 91125, USA  
syi@caltech.edu • <https://www.sanghyunyi.com>

## RESEARCH INTERESTS

Computational cognitive neuroscience, reinforcement learning, affordance theory, decision-making, neural decoding, biologically plausible learning, deep learning, and brain-inspired AI.

## EDUCATION

PhD student, **Caltech**, Pasadena, USA Sep 2018 – Present

- Social and Decision Neuroscience
- Supervisor: John O’Doherty
- Chen graduate fellow

BS, **Seoul National Univeristy**, Seoul, Korea Mar 2011 – Feb 2018

- College of Liberal Studies
- Major: Mathematics
- Minor: Computer Science, Statistics
- Cum laude

## RESEARCH & WORK EXPERIENCE

**Alexa AI**, Amazon Lab126 Mar 2018 – Aug 2018

- Applied Scientist Intern
- Project:  
Building coherent and engaging conversational models by developing automatic conversation evaluators.
- Research areas: Natural language processing, conversational AI.

**Laboratory for Brain and Machine Intelligence**, KAIST Jun 2017 – Feb 2018

- Undergraduate Research Intern
- Project:  
Manipulating human’s prediction error for human optimization using a reinforcement learning agent.  
Meta-controlling the model-based and model-free controllers to mimic the decision making strategy of human.  
Optimizing explorations of a reinforcement learning agent by modeling uncertainties of environments.
- Supervisor: Sangwan Lee
- Research areas: Reinforcement learning, computational neuroscience, human optimization.

**Machine Intelligence Lab**, Seoul National University Jan 2016 – Dec 2016

- Undergraduate Research Intern
- Project:  
Building parallel English-Korean-Chinese corpora and designing a neural net based machine translation model.
- Designed a bilingual sentence alignment algorithm based on length, word representational vectors and dictionary information.
- Proposed a CNN based encoder in attention based encoder decoder model.
- Supervisor: Kyomin Jung
- Research areas: Machine translation, deep learning, natural language processing.

**Natural Language Processing Group**, MIT Jun 2011 – Aug 2011

- Undergraduate Research Intern
- Project: Building graph on co-working relationship among MIT faculties.
- Supervisor: Regina Barzillay
- Research areas: Natural language processing

## PUBLICATIONS

- [1] Kiyohito Iigaya, Sanghyun Yi, Iman Wahle, Sandy Tanwisuth and John P. O’Doherty, “Neural mechanisms underlying the hierarchical construction of aesthetic value”, 2021. (Under revision)
- [2] Kiyohito Iigaya, Sanghyun Yi, Iman Wahle, Sandy Tanwisuth and John P. O’Doherty, “Aesthetic preference for art can be predicted from a mixture of low- and high-level visual features”, in *Nature Human Behaviour* 5, 743-755 2021.
- [3] Kiyohito Iigaya, Sanghyun Yi, Iman Wahle, Sandy Tanwisuth and John P. O’Doherty, “Aesthetic preference for art emerges from a weighted integration over hierarchically structured visual features in the brain”, in *BioRxiv* 2020.
- [4] Kiyohito Iigaya, Sanghyun Yi, Iman Wahle, Sandy Tanwisuth, Aniek Franssen and John P. O’Doherty, “Computational principles of value construction”, in *Computational and Systems Neuroscience (COSYNE)* 2021.
- [5] Sanghyun Yi, Rahul Goel, Chandra Khatri, Alessandra Cervone, Tagyoung Chung, Behnam Hedayatnia, Anu Venkatesh, Raefer Gabriel and Dilek Hakkani-Tur, “Towards Coherent and Engaging Spoken Dialog Response Generation Using Automatic Conversation Evaluators”, in *International Conference on Natural Language Generation (INLG)*, Tokyo, Japan, 2019. (Oral presentation)
- [6] Kiyohito Iigaya, Sanghyun Yi, Iman Wahle, Sandy Tanwisuth and John P. O’Doherty, “Science meets art: Attribute-based computation as a general principle for building subjective value”, in *The Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM)*, Montréal, Québec, Canada, 2019.
- [7] Chihyung Jeon , Hanbyul Jeong , Heesun Shin , Heewon Kim , Sungeun Kim and Sanghyun Yi, “Can AI Read Your Politics? Social and Ethical Implications of Artificial Political Intelligence”, in *When Robots Think. Interdisciplinary Views on Intelligent Automation*, Münster, Germany, 2018.
- [8] Sanghyun Yi, Jeehang Lee, Changhwa Lee, Juno Kim, Sujin An and Sang Wan Lee, “A Competitive Path to Build Artificial Football Agents for AI Worldcup”, in *IEEE/IEIE International Conference on Consumer Electronics (ICCE) Asia*, Jeju, Korea, 2018.
- [9] Sanghyun Yi, Jeehang Lee and Sang Wan Lee, “Maximally separating and correlating model-based and model-free reinforcement learning”, in *Computational and Systems Neuroscience (COSYNE)*, Denver, USA, 2018.
- [10] Sanghyun Yi and Kyomin Jung, “A Chatbot by Combining Finite State Machine, Information Retrieval, and Bot-Initiative Strategy”, in *1st Proceedings of Alexa Prize (Alexa Prize 2017)*, Las Vegas, USA, 2017.

## PATENTS

- [1] Rahul Goel, Chandra Prakash Khatri, Tagyoung Chung, Raefer Christopher Gabriel, Anushree Venkatesh, Behnam Hedayatina, Sanghyun Yi, “Dialog Response Generation”, US patent (11194973)
- [2] Sang Wan Lee, JeeHang Lee, Sanghyun Yi, “Apparatus and method for eliciting optimal strategy of the humans in the interactive games using artificial intelligence”, US patent pending (16381954)
- [3] Sang Wan Lee, JeeHang Lee, Sanghyun Yi, “Apparatus and method for eliciting optimal strategy of the humans in the interactive games using artificial intelligence”, Korean patent (10-2018-0089185)

<b>ACADEMIC AWARDS</b>	<ul style="list-style-type: none"> <li>▪ <b>Chen Graduate Innovator Grant Awards</b>, Chen Institute for Neuroscience, Caltech, 2022 Awarded \$10,000</li> <li>▪ <b>National Science Foundation Graduate Research Fellowship</b>, National Science Foundation, 2020 Honorable Mention</li> <li>▪ <b>Chen Graduate Fellow</b>, Chen Institute for Neuroscience, Caltech 2018 – 2019</li> <li>▪ <b>National Scholarship for Science and Engineering</b>, Korea Student Aid Foundation 2011 – 2016 Full tuition &amp; fee. For outstanding academic performance.</li> <li>▪ <b>Semifinalist, The Alexa Prize</b> Aug 2017 10th place among 18 semifinalists which include 12 sponsored teams. I was the de facto leader of the team, which was unsponsored and was the only semifinalist team from Asia.</li> <li>▪ <b>3rd place, Nvidia Deep Learning Contest</b> Oct 2016 Achieved 85.1% accuracy on food image classification. The only undergraduate awardee.</li> <li>▪ <b>3rd place, AI World Cup 2017</b> Dec 2017 1st place at the preliminary league and 3rd place at the final tournament where the top 4 teams of the preliminary participated in. Awarded approx \$1500. Gave a talk about the result at The 5th International Conference on Robot Intelligence Technology and Applications(RiTA).</li> </ul>
<b>TEACHING</b>	<ul style="list-style-type: none"> <li>▪ TA for Psy 13:Introduction to Cognitive Neuroscience Spring 2020, 2021</li> <li>▪ TA for EC/ACM/CS 112:Bayesian Statistics Winter 2020, 2021</li> </ul>
<b>MILITARY SERVICE</b>	<p><b>259 Company</b>, Gangbuk Police, Seoul Metropolitan Police Agency Oct 2013 – Jul 2015</p> <ul style="list-style-type: none"> <li>▪ Company Commander (Sergeant)</li> <li>▪ Mandatory military service.</li> <li>▪ I led a company of about 100 constables.</li> <li>▪ I was awarded commendations from the Commissioner of Seoul Metropolitan Police Agency and the Senior Superintendent of Gangbuk Police for my achievements during the service.</li> </ul>
<b>CITIZENSHIP</b>	United States of America & Republic of Korea
<b>LANGUAGES</b>	<ul style="list-style-type: none"> <li>▪ English: fluent.</li> <li>▪ Korean: native language.</li> <li>▪ Chinese, Japanese: basic.</li> </ul>
<b>SKILLS</b>	Tensorflow, PyTorch, Python, R, C/C++, Fortran, Ocaml, Java, MATLAB, HTML, CSS, L <sup>A</sup> T <sub>E</sub> X.

[CV compiled on 2022-02-23]