Yoon Woo (Billy) Byun

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RESEARCH INTEREST	Brain-to-Machine Interface (BMI), machine learning and statistical inference techniques for neural data.

EDUCATION

Duke University, Expected 2020
Ph.D. student, Biomedical Engineering
Advisor: Miguel A. L. Nicolelis

Duke University, Dec 2013
B.S.E. Biomedical Engineering
       Electrical and Computational Engineering
A.B.   Mathematics

RESEARCH EXPERIENCE

Duke University, Mathematics Department   Research Assistant
advisor: Joshua T. Vogelstein; Durham, NC   Dec 2013 – Aug 2014
Applied subspace projection classification algorithms in development onto data sets and explored options for a model selection layer for the algorithm.

Gacheon University, Neuroscience Research Institute   Research Intern
advisor: Zang-Hee Cho; Incheon, Korea   Dec 2009 – Mar 2011
Investigated de-noising and alignment methods of PET-MRI fusion images and executed the fMRI human memory experiments.

Yonsei University, Vision, Cognition, and Consciousness Lab   Research Intern
advisor: Sang Chul Chong; Seoul, Korea   Jun 2006 - May 2007
Learned designing EEG experiments on the topic of human cognition and consciousness using the blind-spot and binocular rivalry.

PROJECTS

Temporal Difference Reinforcement Learning
advisor: Criag S. Henriquez; Durham, NC   Jan 2013 – Aug 2013
Constructed a unsupervised spiking neural network model that learns the location of the reward with a continuous-time Temporal Difference Reinforcement Learning model, using Spike-Timing Dependent Plasticity (STDP) and gradient descent.

A Wireless RS232-to-Analog Interface for BIS™ Monitor
advisor: Mark L. Palmeri; Durham, NC   Fall 2013
Developed a wireless interface that streams the Bispectral Index (BIS™) monitor data such as depth of consciousness to LabChart® that is monitored by physicians during clinical research trials that involves anesthesia.

PUBLICATIONS

Ramakrishnan, Arjun, Peter J. Ifft, Miguel Pais-Vieira, **Yoon Woo Byun**, Katie Z. Zhuang, Mikhail A. Lebedev, and Miguel AL Nicolelis. "Computing arm movements with a monkey brainet." Scientific reports 5 (2015).

PRESENTATIONS

Poster Presentation

Yoon Woo Byun, Mikhail Lebedev, Miguel Nicolelis. "Artificial Inertial Mass Perception with Visual Cue using the Brain-to-Machine Interface (BMI)", US-Korea Conference on Science, Technology, and Entrepreneurships (UKC), 2012

TEACHING EXPERIENCE	**Duke University**

Duke University

Teaching Assistant
- "Introduction to Signals and Systems", Professor Lisa Huettel   Spring 2013

Grader
- "Neural Signal Acquisition", Professor Patrick Wolf   Spring 2013

SELECTED COURSEWORK

- Statistics/Machine Learning

  Bayesian and Modern Statistics, Probability/Statistical Models (MCMC & Graphical Models), Advanced Machine Learning, Digital Image and Multidimensional Processing, Topology with Applications

- Neuroscience

  Computational Neuroengineering, Electrophysiology, Fundamentals of Neuroscience, Cognitive Psychology

- Signal Processing/Other Engineering

  Fundamental of Digital Signal Processing, Medical Instrument Design, Data Structures and Algorithms

AWARDS

KSEA-KUSCO Graduate Student Scholarship, 2015
Duke Brazil Initiative (DBI) Student Exchange Grant, 2015
Group Presentation Award, KSEA South-Atlantic Regional Conference, 2014
Poster Award, US-Korea Conference on Science, Technology, and Entrepreneurships, 2012
Dean's List with Distinction, Duke University, Fall 2011
United States Army Commendation Medal (US-ARCOM), 2010

LANGUAGES

Matlab, R, C++, Bash, Java
Arduino, PICAXE, LabView
English (fluent), Korean (native), Mandarin Chinese (conversational)
LaTeX, GitHub

SERVICE

Duke BME PhD Student Association, *First Year at Large*	2014-2015
Korean Scientist Engineer Association, Duke Student Chapter, *External Chair*	2014-2015
Full-time Military Service in Republic of Korea Army, *Sergeant*, South Korea	2009-2010