SHOKO RYU

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SUMMARY OF QUALIFICATIONS

- Master's degree in Control Engineering and bachelor's degree in Biomedical Engineering. Research focused on clinical data (neural recordings) analysis using engineering disciplines (signal processing and machine learning).
- Leverage data analysis and statistical inference to establish predictive schemes and empower clinicians' diagnostic abilities.

  E.g.) - a classification scheme to discern etiologies of comatose patients through electroencephalograms.
  - revelation of potential biomarkers for Parkinson's disease treatment through microelectrode recordings.

OBJECTIVES

My passion has always been to establish predictive models to empower and improve users' capability. I am motivated to develop comprehensive and analytical tools that allow users to extract vital information from vast amount of data, gain insights into their interests, and enhance their business models.

PROFESSIONAL EXPERIENCE

WASHINGTON UNIVERSITY, St. Louis, MO **2010 – 2015**

Graduate Researcher Sep, 2013 – Mar, 2015

- Perform clinical research in the laboratory of Prof. ShiNung Ching, Department of Electrical & Systems Engineering.

  Project 1: In collaboration with neurosurgeons and neurologists, examine the effects and mechanisms behind deep brain stimulation (DBS) therapy for Parkinson's disease.
  - Analyze neuronal recording data from recording electrode used to determine proper placement depth of DBS electrode.
  - Correlate recording data with clinical outcomes following DBS.
  - Synthesize, analyze and present results to neurosurgeons, assist in interpretation.

  Project 2: In collaboration with the Pediatrics and Neurological Surgery Departments, scrutinize brain activity in patients with various brain conditions for future diagnostic use.
  - Extract features of EEG data collected from adult comatose patients with two etiologies, and establish classifications of coma etiologies based on the features.
  - Based on signal analysis of the EEGs in depth, model and simulate pathological conditions so as to understand structural and functional mechanism of the brain.

Summer Intern Jul – Aug 2013

- Worked in the laboratory of Prof. Daniel Moran, Department of Biomedical Engineering, as a debugger.
- Created an introductory level C++ program that allowed communication between computer and hardware (USB-TTL converter).
- Self taught C++, accomplished tasks, and learned programming techniques though communication with team members.

Undergraduate Senior Design Project Research Sep – Dec 2011

- Researched preexisting cardiac device technologies and human physiologies, interacted with a physician and a clinical development engineer from St. Jude Medical to develop a novel design.
- Designed a flexible, stretchable, implantable cardiac device, using innovative materials and novel shape.
- Awarded 3rd place in best design among 16 senior class teams.

SKILLS AND TECHNIQUES

- **Computer:** MATLAB and Simulink, Python, R, MongoDB, C++, Microsoft Office (Excel, Word, PowerPoint)
- **Skills:** Signal processing techniques, statistics, and machine learning.
- **Languages:** Fluent in English and Japanese, Intermediate in Chinese.

EDUCATION

WASHINGTON UNIVERSITY IN ST LOUIS, St. Louis, MO **May, 2014**

Master in Control Engineering Candidate / Bachelor of Science in Biomedical Engineering

- Concentration in Theory and Application of Robust and Adaptive Control
- Magna Cum Laude
- Cumulative GPA: 3.75/4.00

PASADENA CITY COLLEGE, Pasadena CA **2007 – 2010**

Completed coursework for Major in Biophysics

- Transferred to Washington University in St. Louis, 2010
- Cumulative GPA: 3.71/4.00

AWARDS

Washington University

- Dean's list, 5 semesters 2010 – 2014
- Honored Christopher I. Byrnes Scholar 2011
- Gustav Kurt Mesmer Scholar 2010

Pasadena City College, Pasadena CA

- Dean's list, 6 semesters 2007 – 2010
- Honors in Calculus 2010
- Superior Achievement in Physics 2010

HACKATHON

- Education Hackathon, 1st place Apr, 2015

PRESENTATIONS

Shoko Ryu, Rory Murphy, Joshua Dowling, Keith Rich, Mwiza Ushie, Joel Perlmutter, ShiNung Ching, Scott Norris. "*Distinct patterns of phase-amplitude coupling within the subthalamic nucleus in Parkinson Disease*." Poster presentation at the 44th meeting of the Society for Neuroscience, Washington, D.C., 2014

Nuley Seo, Shoko Ryu, Rory Murphy, Jeffery Leonard, ShiNung Ching. "*Transient Spectral Dynamics Correlates with Blood Pressure Excursions During MoyaMoya Neurosurgery*." Poster presentation at annual meeting of Biomedical Engineering Society, San Antonio, TX, 2014

JOURNALS

Under preparation

Shoko Ryu, Lawrence Eisenmann, Terrance Kummer, ShiNung Ching. "*Electroencephalogram-based Classification of Structural versus Non-Structural Coma*" to Clinical Neurophysiology.

COMMUNITY SERVICE

Science Initiative. Collegiate School of Medicine & Bioscience, St. Louis, MO Aug, 2014 – Mar, 2015

- Teach and provide hands-on experience of engineering and science (wireless EEG device, MATLAB, and neuroscience) for the high school students.