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Fulbright Statement of Purpose Draft 1  
August 3, 2015

I am applying to the Institute of International Education and the Swiss Federal Commission for Scholarships for Foreign Students (FCS) for a Fulbright Award, particularly the Swiss Government Excellence Scholarship. This fellowship would facilitate the natural extension of the research I started in the summer of 2015 under a ThinkSwiss fellowship I received from FCS. During my 70 days at the Center for Neuroprosthetics at EPFL, I helped develop a new framework for neuroprosthetic device control from EEG scalp recordings. There are a lot of open ended projects I would be passionate about working on, most interestingly the simulated control of a prosthetic arm through EEG data. A Fulbright Award to carry out a 12-month research project in Switzerland would make this project possible. Since, I will be finishing my bachelor’s degree next year, having a full-year to develop my research skills and creative independent thinking would provide an outstanding running start for research in graduate school.

My research project funded by the Fulbright fellowship would be to write control software for a prosthetic arm controlled by EEG recordings. Using the novel algorithms we developed in my first internship at the Center for Neuroprosthetics, we will design a controller based on this model. We will test the EEG-based controller using a prosthetic arm simulation by replaying the raw EEG data to control the simulation in real time. The first three-four months will be spent designing the controller and building the simulation. Using a Kalman filter for arm position and velocity control, we will need to design on a proper way to parameterize the controller based on the pattern extraction methods learned from my previous internship. This would be the first ever motor control achieved from EEG. We are confident that this will work based on our recent findings linking EEG microstates, the “atoms of thought” to muscle activation patterns. The remaining nine months will be used for design iteration and exploration of better control techniques.

Since I am continuing my work in the Translational Engineering Laboratory in the Center for Neuroprosthetics at EPFL, my affiliate for the Fulbright application will be Prof. Silvestro Micera. Prof. Micera has demonstrated his excellence in the field of neuroprosthetics, most notably developing a bionic hand with sensory feedback. I am choosing him as my affiliate not only because this project is an extension of my previous work with him, but also because his lab is ideal for doing revolutionary research in neuroprosthetics.

This spring, I will graduate from Carnegie Mellon University with my bachelor’s degree in Electrical and Computer Engineering. Through my courses I have learned the systems engineering knowledge necessary to build a real-time neuroprosthetic controller. From my rigorous computer science courses and industry experience developing software for a humanoid robot, I have the software development skills to build a prosthetic arm simulation from scratch. Finally, my success in three unrelated undergraduate academic research projects demonstrates my ability to dive into any subject, and use my creative problem solving abilities to find solutions to scientific problems and research roadblocks. I am confident that if I have the opportunity to work on this project full-time for an entire year, we will get meaningful results.

[how to engage broader community]

A year sponsored by a Fulbright fellowship has so much to offer me. Foremost, I will have an entire year to engage with the locals of Lausanne and immerse myself in Swiss culture. [talk about rewards of community engagement.] From a technical perspective, I will have a full year to develop the skills necessary to become a leader in academic or industrial research like creative problem solving, collaborative communication, and also self-reliance. The most rewarding experience will be the opportunity to design an entire neuroprosthetic technology from scratch. I have been working hard since my first computer engineering class to develop my systems engineering skills, and now I will put it all to the test.