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To whom it may concern:

I am writing to communicate my enthusiastic endorsement of Mr. Jeremie Kalfons's application to graduate school. My work has addressed four major themes lying at the intersection of engineering, machine learning, and experimental neuroscience. During my PhD, I developed mechanisms and algorithms for the self-organization of complex systems (15 publications with 500+ citations) that have found application in industrial procurement scenarios (patent), and received a competitive prize from the EU. At Pompeu Fabra University, I devised signal processing algorithms and neural models to be deployed on a neuroprosthetic microchip. At Princeton University, I developed behavioral and physiological methods for chronic imaging during associative learning in the cerebellum of awake behaving rodents, and pioneered the use of genetically encoded calcium indicators for long-term imaging of targeted cerebellar neuronal subpopulations. This opened up the possibility to image neuronal types previously inaccessible to measurement, isolate dendritic signals from specific populations and shed light on coding issues. More recently, at the Simons Foundation I develop computational methods for the quantification of behavior and the analysis of large imaging datasets. My algorithms are deployed by hundreds of laboratories worldwide.

I have been working with many graduate and undergraduate students in the last years, before at the IIIA-CSIC and UPF in Barcelona, later at Princeton University and now at the Simons Foundation. The dedication and overall skills and knowledge of these students are in general outstanding. Even within such environment, Mr. Kalfon stands out against his peers, not only for dedication and independence, but above all for his exceptional ability to master advanced knowledge and techniques in a very short amount of time.

I came to know Mr. Kalfon when he applied to our group as an undergraduate research intern. I worked with Mr. Kalfon for three months, since May to August 2017. We worked together on software tools for the analysis of large brain imaging datasets. Specifically, the overall goal of the project was to develop continuous integration tools for CaImAn, a software suite created and maintained by the Simons Foundation (<https://github.com/simonsfoundation/CaImAn/>). Mr. Kalfon has been successfully involved in this project and the infrastructure he implemented is currently used by several laboratories worldwide.

In the initial phase, Mr. Kalfon was involved in documenting CaImAn functions and classes in order to get familiar with the code base. Within less than two weeks he was routinely and successfully contributing to the code base at a constant and steady pace. Not only he was able to perform routine maintenance but he was also able to troubleshoot problems and fix bugs. Importantly, in order to understand the code base of CaImAn, one needs to have a deep understanding of the underlying optimization algorithms, which Mr. Kalfon quickly grasped.

Given his quick master of the task at hand, I gave Mr. Kalfon more challenging responsibilities. Since CaImAn is available in several flavors (Matlab, Python2 and Python3) and operates on different platforms (Windows, Mac OS, and Linux), testing the code manually became time consuming and prone to errors. Therefore, I instructed Mr Kalfon to implement a set of tests to guarantee that novel code contributions would not affect the performance of our algorithms. Jeremy successfully implemented a framework that not only allows to identify disruptive bugs in the code, but also automatically evaluate the performance of the algorithms on a set of benchmarks.

The infrastructure Mr. Kalfon deployed is not only greatly benefiting the area of neuroscience in general, but also saved a large amount of work to the group in terms of code maintenance, and allowed to transform CaImAn into a truly open source tool.

I am completely confident that Mr. Kalfon would make a perfect candidate for graduate school. He is extremely intelligent, a diligent student, a very humble person and a talented researcher, all features that I know are required for success in graduate school, and later as a well-established researcher. On the personal side, Mr. Kalfon is always very respectful and kind, very careful about the details of interpersonal communication, not only towards his mentors but also with his fellow students, and is the kind of understanding and prepared person you would like to have as a student and member of your team. He impressed other colleagues in the same way he impressed me previously. I am sure that he will be an outstanding student and will similarly impress you. It is my hope that you will accept his application to graduate school. Feel free to contact me if you need further clarifications.

Sincerely,

Andrea Giovannucci, PhD
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