I am a French student from Paris who has always wanted to become a researcher, I have quickly become conscious that my passion for astrophysics was missing something fundamental. As I got older I made mine Socrates' idea that we should understand ourselves first if we want to improve the life of every human being. It nourished my passion for understanding the intricate mechanisms of our beings, from the networks of our brains to the networks of pathways in our cells. I was lucky enough to discover my interest early thanks to trips to foreign countries and to the infinite amount of knowledge I found on the web and my computer. This interest was always interdisciplinary, ranging from mathematics and computer science to genetics, physics and neuroscience. I was also amazed at the spur given to knowledge by some visionary minds. Indeed, few people made me more aware of the need for entrepreneurship in science than Elon Musk and Nikola Tesla. I think that today, only teamwork can bring success and disruption. Such an idea quickly gave me the inclination to bring people together and produce materials and tools that required the cohesion of a team : something echoed through my work in the making of the biggest music festival on my campus -the NoLarsen Festival- as well as an award winning startup in professional messaging called PiPle.

In 2013, I went to an integrated* preparatory school in Paris. During my two years of PTSI** studies , I was given intensive courses on a broad range of subjects in mathematics, electronics, physics and computer science, which gave me the foundation I needed for the next stages of my studies.

I was happy to master in Biomedical engineering and felt closer to where I wanted to be while studying data science, physiology, imaging, signal processing and robotics. I enjoyed gathering courses from friends in M.D. as well.

I think it is thanks to this enlarged knowledge, together with a semester abroad in Mexico -at TEC de Monterrey- plus a particularly interesting internship in Highlife -a R&D startup in semi-biological heart valve implantology- that I have been able to make my way as an intern at the Flatiron Institute. In this NYC computational research facility, I grasped what research life is made of and I got the opportunity of meeting many interdisciplinary researchers and discovered a lot about machine learning and data science. By working under the supervision of Andrea Giovannucci and Eftychios Pnevmatikakis, I have created a comparison function of CaImAn's output, a -Calcium Imaging Analysis- software able to infer neurons and their activity from recordings of in vivo brain tissues, allowing better benchmarkings and debuggings. I also worked on explaining the software with a documentation & description of the algorithms for our community of open source contributors and neuroscientists. This experience confirmed my wish to use machine learning to augment biomedical research. An idea that drove me to participate to Human Brain Project workshops in Lausanne and Geneva where I learnt about neural nets modeling and the novel neuromorphic architectures like SpiNNaker and BrainScaleS.

Teaching to students in my engineering school improved and matured my way of looking at topics and I realized that machine learning seemed to capture most of the complexity and potentials of my projects and ideas, I have felt I needed to focus on it. That is why I have managed to get a double degree arrangement with the University of Kent in England for an M.Sc. in Computational Intelligence, studying statistics, neural networks and data mining. I am applying this teaching at the University with a team of researchers in trying to understand the complexity of the codon usage bias through intensive statistical data exploration of thousands of genomes. All those choices and experiences, have led me to this letter.

My future work decisions will be driven, on the one hand by my interest in machine learning and genomics and on the other hand by my hope to work in the most promising technologies and teams to improve the life of next generations. It seems essential to me to understand the importance of reproducible science and of bringing researchers together into interdisciplinary projects, of making complex systems comprehensible to all and apply discoveries to real world problems. I think that this letter shows a background that addresses these future challenges, it is dictated by my curiosity and life-long motivation.

Jérémie KALFON

* *Even if they are quite arduous, integrated preparatory schools prepare students to integrate an Engineering school to which they are associated, allowing them to succeed. Instead of preparing for two years and then choosing a college according to an exam, they take the exam first for a subset of colleges and then prepare for it for two years, thus alleviating the uncertainty of the famous French Concours.*

** *PTSI - Physics Technology & Engineering Sciences*