Dear UCLA Admissions Team,

During my studies in fundamental physics track, I worked with many physical models that explain nature from different perspectives; the Schrödinger equation, the Fermi gas, or weak gravitational lensing, are some of the ones I enjoyed the most. My enjoyment of these models is echoed through physicist Murray Gell-Mann's quote; *How can it be that writing down a few simple and elegant formulae, like short poems [...], can predict universal regularities of Nature?*. As I advanced into my junior year, I gradually came to appreciate the field of programming when I enrolled in courses such as Computational Physics, Statistics & Data Analysis, and Dynamic Systems & Feedback. Simultaneously, I started developing a deep interest in Astronomy when I took the course Extragalactic Astrophysics. My growing interest in these areas lead me to combine my computational skills with astrophysics in two of my research projects: my final thesis and my collaboration scholarship research project. As much as I enjoyed research in computational astrophysics, I started asking myself how much impact my research would have in helping to solve humanity's most pressing challenges, particularly climate change.

I was raised in an off-the-grid house in the countryside. From a very young age, my parents instilled in my brother and me the fundamental values of conscious consumption and respect for the environment. My research experience in the US made me reflect on the role I wanted to play in society regarding climate change as I grew older. As a result, I decided to switch to the field of ecology and started the MSc Computational Methods in Ecology and Evolution (CMEE) at Imperial College London. While studying CMEE, I am reinforcing my computational skills, and being introduced to the world of theoretical ecology through my research in Metabolic Theory with Dr. Samraat Pawar. I am realizing now that the complexity of ecological systems makes it very hard for a theoretical approach. There is a sweet spot between the physicist's spherical cow[1] strategy to tackle problems (one that sacrifices realism to generality and precision) and the biologist's phenomenological way (one that sacrifices generality to realism and precision). The happy medium between the two strategies captures the complexity of real ecological systems from a mechanistic point of view. This delicate approach is the one I believe will generate the most successful models.

I would like to extend my research on theoretical ecology with this perspective through a Ph.D. at UCLA. I am particularly interested in the work of Dr. Van Savage on these topics, and I would like to further develop his research on how climate change affects the metabolism of organisms since it is directly linked to the collective behavior of ecosystems. I believe that my background in physics and ecology, along with the computational skills I have acquired during my undergraduate and master studies, make me a unique candidate. I aspire to contribute with a mechanistic and intuitive perspective to solve the next generation of problems arising in Theoretical Ecology.

[1] A spherical cow is a humorous metaphor for highly simplified scientific models of complex real-life phenomena.