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Dr. Carol Lee  
Department of Integrative Biology  
University of Wisconsin–Madison

Dear Dr. Lee and search committee members,

I am writing to apply for the position of Assistant Professor of Evolutionary Biology in the Department of Integrative Biology at the University of Wisconsin–Madison. As a computational biologist, I use theoretical and empirical analyses to understand the evolutionary mechanisms that shape molecular and organismal variation. My research combines building evolutionary theory, implementing statistical and computational approaches, and applying them to large-scale sequencing datasets to make inferences from data. I am primarily interested in understanding how genome biology, selection, and demographic processes interact to shape genetic variation, and then leveraging these insights to learn human evolutionary history, genomic effects of selection, and the architecture of complex traits.

I earned my Ph.D. working with Ryan Gutenkunst at the University of Arizona, and I am currently a post-doc with Simon Gravel in the Department of Human Genetics at McGill University. During my graduate studies, the interdisciplinary Applied Mathematics program allowed me to pursue research topics at the interface of mathematical and numerical methods, evolutionary theory, and statistical analysis. There, I built novel theory and methods to analyze whole-genome sequencing data, and I used these approaches to reconstruct demographic histories of a range of organisms, such as fruit flies, humans, and domesticated crops, and to infer more fundamental aspects of evolutionary biology such as the distribution of fitness effects of new mutations.

As a post-doc I have continued to work in population genetics, with one focus the inference of human origins from genetic data. Here, I developed theory and computational tools to predict patterns of linkage disequilibrium and diversity measures for large numbers of populations with complex demography. I used this to infer detailed models of deep human history, which has spurred ongoing work to quantify deep population structure and the evolutionary history of our species over the last hundreds of thousands of years. I am also interested in how natural selection and genome biology interact to shape genetic diversity and bias evolutionary inference, and I am developing methods to simulate those effects and mitigate such biases in inference.

My research program would continue in these directions, with the development of evolutionary theory and computational tools to analyze genomic data to answer questions in evolutionary and statistical genetics. My students would be encouraged to choose projects in this vein, or to develop new directions for incorporating population genetics theory and methods to address more broad biological questions. As I have found that I am most productive and enjoy my research when it is collaborative, I look forward to cultivating joint research projects with other faculty in the Department of Integrative Biology, and I would welcome the opportunity to co-advise graduate students of diverse interests with other faculty in the department.

As an educator, I believe that learning is best facilitated by doing, where the foundational concepts of a topic are grasped by gaining practice in their applications to biological or statistical problems. My teaching combines lectures with workshop-style activities in the classroom, with the goal of drawing the link between course material and practical problem-solving skills. I taught as instructor-of-record for undergraduate math courses during my graduate studies, which provided opportunities to hone my skills as the sole instructor in the classroom and gave me valuable experience in balancing the simultaneous demands of both research and teaching. As a post-doc, I have mentored multiple undergraduate students, including proposing research projects that fit their individual interests and skillsets. I look forward to the opportunity to expand my mentoring roles.

Please find attached my curriculum vitae and research, teaching, and diversity statement, and I have asked for reference letters to be sent upon request from Ryan Gutenkunst, Simon Gravel, and Mike Barker. Thank you for your consideration of my application, and I look forward to hearing back from you.

Sincerely,  
Aaron Ragsdale