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Department of Biological Sciences
Florida State University

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Dear colleagues:

This is a very enthusiastic recommendation of **Rafael Guerrero**, who is a candidate for your faculty opening in evolutionary or ecological theory. Rafael finished his Ph.D. in my lab in 2013, and I've stayed in touch with him ever since. He would be an outstanding hire.

Rafael's forte is studying genome evolution using computational approaches. The major theme of his thesis was the evolution of chromosome rearrangements. There is a rapidly growing appreciation of the importance of structural variation in the genome, but few tools to understand it from an evolutionary perspective. Rafael's 2012 and 2014 papers developed coalescent models for chromosome inversions and fusions. These have provided the foundation for the first tests of hypotheses based on molecular data for how chromosome rearrangements evolve. Rafael's paper on the sex chromosomes of frogs (*J.E.B.*, 2012) uses a clever strategy based on approximate Bayesian computation to show that their X and Y chromosomes recombine at an extremely low but evolutionarily significant rate, orders of magnitude lower than had previously been measured. This discovery suggests why the Y chromosomes of these frogs (and many other taxa) do not degenerate, as they have in mammals and flies, and provides a research paradigm to test for cryptic recombination in other animals. Rafael's contributions to our papers on an inversion in malaria mosquitoes (*Evolution*, 2013) and reinforcement in *Phlox* (*Current Biology*, 2014) were absolutely central to those projects, and are some of the best recent work to come out of our lab.

During his postdoc with Matt Hahn and Leonie Moyle, Rafael has turned his attention to the genomics of speciation. His investments in several projects are now paying off in a rather spectacular way with a flurry of strong papers. His two papers in 2016 address how expression differences lead to incompatibilities between species, providing an important link in our understanding of the mechanistic basis of speciation. The 2017 paper in *PLoS Genetics* provides critical information about interactions between genes that cause reproductive isolation, giving us a foundation for understanding the trajectory by which isolation evolves from weak to strong during speciation. The 2017 paper in *Molecular Ecology* is perhaps the most important of all. It makes the key point that genomic regions of high differentiation between species can result from ancient balanced polymorphisms rather than adaptive divergence. This idea has already changed how my lab thinks about genomic data, and it will have definite impact on the field of evolutionary genetics.

Rafael will be an effective teacher. He communicates well and has a dry sense of humor that students inevitably fall for. Rafael is an interactive colleague who is keen to collaborate and contribute to his academic community. He'll be equally popular with your undergraduates and graduate students. The fact that he's a native speaker of Spanish (Columbian by birth) will benefit your university's mission to attract and train students from diverse backgrounds.

Rafael is an outstanding scientist, colleague, and teacher. I give him my very strong recommendation. Rafael would be an excellent addition to your faculty, and I urge you to interview him.

Yours sincerely,

A handwritten signature in black ink that reads "Mark Kirkpatrick". The signature is written in a cursive style with a large, stylized "M" and "K".

Mark Kirkpatrick
T.S. Painter Centennial Professor of Genetics