UNIVERSITY OF
SOUTH DAKOTA

29 April 2022

To Whom It May Concern:

It is with great pleasure that I write to you today to recommend Martin Etave for admission into a PhD program focusing on the evolution of arboreality in squamates. Martin is an exceptional student with enormous drive and potential, and with a true passion for examining the anatomical traits in reptilian evolution, particularly of arboreal taxa. I have complete confidence in his abilities and know he would excel as a PhD student.

I have known Martin through online reptile hobbyist communities for a number of years now, but most recently he has been completing a 6-month internship in my lab as part of his MS degree. As a member of the general reptile hobbyist community, I have found Martin to be a very logical and level-headed individual with a clear fascination with reptiles and impressive background knowledge of the topic. While his internship in my lab is still ongoing (ending in August of this year), I have been incredibly impressed with the work he has done so far and think it shows exceptional potential!

Martin has been using a µCT scan database of chameleon specimens in my lab to test questions related to whether chameleons can be accurately assigned to their appropriate taxonomic genera based on cranial anatomy. The impetus for this work relates to a fossil chameleon skull from Kenya that was recently assigned to the Malagasy chameleon genus *Calumma* based on a morphological character matrix including 23 extant chameleon species that included ten chameleon genera. With over 220 described chameleon species in twelve genera, Martin is expanding this character matrix to include additional species representing all genera and all major lineages within those genera. He will then test whether the analyses used to assign this fossil to the *Calumma* genus accurately place extant species in their correct genus and whether this fossil is still placed in the same genus using this larger character matrix.

In the process of collecting the data for this project, Martin has been extremely thorough in examining the characters included in this matrix. In a number of cases, Martin has identified previously unrecognized correlation issues between different traits included in the matrix that may confound analyses and taken steps to separate these in his own matrix to increase the robustness of the analysis. Further, while many of these traits were originally quite qualitative, he has substantially improved these characters by examining a wide range of species and coming up with good quantitative methods to characterize these traits. In the process, he has also gone to great lengths to create exceptional graphics illustrating what each of these characters actually represent and how

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the different states of each can be distinguished. Brilliantly, each of these advancements to the condition of the original character matrix have been completely driven by Martin's own focus and dedication to doing this type of analysis properly, not because he was guided or instructed by me to make those types of changes. In the process of doing so, however, Martin has done an exceptional job of documenting what he thinks should be modified, communicating those issues to me, and working in a way so that he is making progress that can be effortlessly adapted to these changes without risk of losing momentum and progress in the event that I were to disagree on a change and have him continue with the original form of the character description. In my opinion, these are phenomenal traits for a graduate student and reinforce my belief that Martin would be well suited to pursuing a PhD in the field.

Martin has also done an excellent job working with my existing graduate and undergraduate students. He collaborates well with them to learn techniques they have experience and has participated well in lab meeting discussions, including presenting results from his first internship for his MS degree.

My experience with Martin strongly indicates that he would make an exceptional PhD student. He is very driven and dedicated to his work and has a true passion for arboreal reptiles in particular. The process by which he proceeds with his data collection is thorough and thoughtful, taking initiative to strengthen the data he is collecting in the process. He is extremely effective in communicating his progress, questions and initiative, and is a very fast learner with new techniques. I am very excited to see what the future holds for Martin and have complete confidence that he will excel in research as he completes his PhD.

Please feel free to contact me with any additional questions or concerns you may have about Martin. I would be happy to help provide any additional insight I can.

Sincerely,

Christopher V. Anderson, Ph.D.
Assistant Professor

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