Caleb Charpentier

PhD Student · Biological Sciences

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Education

Virginia Tech — *Blacksburg, VA*

PhD Student - Ecology and Evolutionary Biology — *Auguest 2022 - present*

- Advisor: Dr. Josef Uyeda

Southeastern Louisiana University — *Hammond, LA*

B.S. in Biological Sciences | Minor in Computer Science — *August 2018 - May 2022*

- Undergraduate Mentor: Dr. April Wright

Professional & Research Experience

2020 **Undergraduate Research Volunteer**, O'Mara Lab, Department of Biological Sciences, Southeastern Louisiana University

2019-2022 **Undergraduate Research Assistant**, Wright Lab, Department of Biological Sciences, Southeastern Louisiana University

2020-2022 **Undergraduate Research Assistant**, Schwartz Lab, Department of Biological Sciences, The University of Rhode Island

2023 **Graduate Research Assistant**, Uyeda Lab, Department of Biological Sciences, Virginia Tech

Publications

Published

Mohannad Elhamod, Mridul Khurana, Harish Babu Manogaran, Josef Uyeda, Meghan Balk, Wasila Dahdul, Yasin Bakis, Henry Bart, Paula Mabee, Hilmar Lapp, James Balhoff, **Caleb Charpentier**, David Carlyn, Wei-Lun Chao, Charles Stewart, Daniel Rubenstein, Tanya Berger-Wolf, and Anuj Karpatne. 2023. "Discovering Novel Biological Traits from Images using Phylogeny-guided Neural Networks". *29th SIGKDD Conference on Knowledge Discovery and Data Mining*

Caleb Charpentier, April Wright. 2022. "Revticulate: An R framework for interaction with RevBayes". *Methods in Ecology and Evolution*, https://doi.org/10.1111/2041-210X.13852

In Review

Diego S. Porto, Sergei Tarasov, **Caleb Charpentier**, Hilmar Lapp, James P. Balhoff, Todd J. Vision, Wasila M. Dahdul, Paula M. Mabee, Josef Uyeda. 2023. "rphenoscate: An R package for semantic-aware evolutionary analyses of anatomical traits" . *Methods in Ecology and Evolution*, In Review. Preprint DOI: https://doi.org/10.1101/2023.02.19.528613, *bioRxiv*.

Awards, Fellowships, & Grants

2022-Present **NSF GRFP Fellowship**, National Science Foundation

2021-2022 **Hammond Garden Club Scholarship**, Hammond Garden Club

2019-2020 **Hammond Garden Club Scholarship**, Hammond Garden Club

2018 **Burger King McLAMOR Scholarship**, The Burger King Foundation

AT&T First Generation Scholarship, The AT&T Foundation

30+ Priority Scholarship, Southeastern Louisiana University

TOPS Honors Award, Southeastern Louisiana University

Presentations

Charpentier, Caleb, Uyeda, Josef. 2023. *Automated Character Construction with Knowledge-Guided Deep Learning*. Evolution 2023. Albaqurque, New Mexico.

Charpentier, Caleb, Wright, April. 2021. *Revticulate: An R framework for Bayesian Phylogenetics*. SouthEast Regional IDeA Conference. San Juan, Puerto Rico.

Charpentier, Caleb, Wright, April. 2021. *RevR: An Integration of Bayesian Phylogenetics with the R Programming Environment*. Louisiana Biomedical Research Network 19th Annual Meeting. Virtual.

Teaching Experience

2020	**Calculus and Algebra Tutor**, Center for Student Excellence, Southeastern Louisiana University
2021-2022	**High School Mathematics Tutor**, Varsity Tutors, Online
2021-Present	**Python & R Programming Tutor**, Wyzant, Online
Fall 2022	**Principles of Biology Laboratory (BIOL_1115)**, Graduate Teaching Assistant

Outreach & Professional Development

Service and Outreach

2019	**Ruaha Carnivore Project Kids for Cats Program**, Outreach Volunteer, Southeastern Louisiana University Lab School
2019	**Math Science Upward Bound**, Teaching Assistant, Southeastern Louisiana University

Development

NSF Workshop on High-Dimensional Data Visualization - The workshop was a meeting of domain scientists and data visualization experts to help better understand how domain scientists actually use and visualize dimensional reduction methods in their work. We had useful discussions about the theoretical implications of using dimensionality reduction for knowledge discovery versus knowledge compression, and a paper is currently being written from the discussions. June 13-15, 2023.

Imageomics All-Hands Meeting - This meeting was about discussing the current projects associated with the Imageomics Institute and how the institute as a whole can move forward. This meeting helped me to better understand some of the communication problems that were happening between the biologists and computer scientists in the institute, and helped to guide my research interests for my dissertation. March 21 - 24, 2023.

Phenoscape TraitFest - This workshop was about using computer vision technologies and biological ontology software, such as the Phenoscape Knowledgebase, the better understand traits. During the workshop, I developed a small pipeline to rapidly annotate landmarks from images of mammal teeth: (https://github.com/calcharp/TraitFest_mlmorph). Jan 23-26, 2023.

Software

rphenoscate - An R package for semantic-aware evolutionary analyses of anatomical traits (https://github.com/uyedaj/rphenoscate)

Revticulate – A package for interacting with the Rev language via R (https://github.com/revbayes/Revticulate)

SISRS - A Python-based pipeline for identifying phylogenetically informative sites from next-generation whole-genome sequencing of multiple species (https://github.com/SchwartzLabURI/SISRS)

Professional Memberships

The Society for the Study of Evolution