# James Boyko

## PERSONAL DETAILS

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|---|---|
| *Address* | Michigan Institute of Data Science |
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| | University of Michigan |
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| *Github* | jboyko |

## ACADEMIC QUALIFICATIONS

**Ph.D. Biological Sciences**                                    Aug. 2017 - Aug. 2022
*University of Arkansas, USA*

> Supervisor: Dr. Jeremy M. Beaulieu
>
> Thesis Title: Hiding in plain sight: accounting for rate heterogeneity in trait evolution models

**M.Sc. Evolutionary Biology and Ecology**                       Aug. 2015 - Jul. 2017
*University of Toronto, Canada*

> Supervisor: Dr. D. Luke Mahler
>
> Thesis Title: The Effect of Congeners on Trait Evolution and Sexual Dimorphism in Lesser Antillean Anolis Lizards

**B.Sc Double Major in Biology and History**                     Sept. 2010 - Jun. 2015
*University of Toronto, Canada*

## PROFESSIONAL EXPERIENCE

**Schmidt Futures post-doctoral fellow**                         Jan. 2023 - present
*University of Michigan, USA*

> Supervisors: Dr. Dan Rabosky and Dr. Yuanfang Guan
>
> Project Title: Deep-neural networks as a framework for understanding major evolutionary transitions in animal body form

**Post-doctoral research associate**                             Oct. 2022 - Jan. 2023
*University of Tennessee, Knoxville, USA*

> Supervisor: Dr. Brian O'Meara
>
> Project Title: Assessing ascertainment bias in diversification rate estimates

## PUBLICATIONS

1. Boyko J, Cohen J, Fox N, et al. An Interdisciplinary Outlook on Large Language Models for Scientific Research. 2023.

2. Hagen ER, Vasconcelos T, Boyko JD, and Beaulieu JM. Historical causes for the greater proportion of polyploid plants in higher latitudes. bioRxiv 2023.

3. Boyko JD and O'Meara BC. dentist: Computing uncertainty by sampling points around maximum likelihood estimates. bioRxiv 2023.

4. Boyko JD, Hagen ER, Beaulieu JM, and Vasconcelos T. The evolutionary responses of life-history strategies to climatic variability in flowering plants. The New phytologist 2023.

5. Boyko JD, O'Meara BC, and Beaulieu JM. A novel method for jointly modeling the evolution of discrete and continuous traits. Evolution 2023.

6. Boyko JD and Beaulieu JM. Reducing the biases in false correlations between discrete characters. Systematic biology 2022.

7. Mortimer SME, Boyko JD, Beaulieu JM, and Tank DC. Synthesizing Existing Phylogenetic Data to Advance Phylogenetic Research in Orobanchaceae. Systematic Botany 2022;47:533–44.

8. Vasconcelos T, Boyko JD, and Beaulieu JM. Linking mode of seed dispersal and climatic niche evolution in flowering plants. Journal of Biogeography 2021;50:43–56.

9. Boyko JD and Beaulieu JM. Generalized hidden Markov models for phylogenetic comparative datasets. Methods in Ecology and Evolution 2021;12:468–78.

10. Nakov T, Boyko JD, Alverson AJ, and Beaulieu JM. Models with unequal transition rates favor marine origins of Cyanobacteria and photosynthetic eukaryotes. Proceedings of the National Academy of Sciences 2017;114:E10606–E10607.

## AWARDS AND GRANTS

**UMPDA Professional Development Award**     2023
*$250 USD*
**Journal of Biogeography Innovation Award**     2022
*$750 USD*
**Outstanding Graduate Student Research Award**     2021
*$1000 USD*
**American Society of Naturalists Travel Grant**     2019
*$500 USD*
**Distinguished Doctoral Fellowship**     2017 - 2021
*$80,000 USD*
**SGS Conference Grant**     2017
*$750 USD*
**Phylogenetic Symposium Travel Grant**     2016
*$400 USD*

## CODING AND HIGH PERFORMANCE COMPUTING

**R**     Advanced
**Python**     Advanced
**Bash**     Proficient
**High Performance Computing**     Proficient

## SOFTWARE CONTRIBUTIONS

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|---|---|
| *corHMM* | Correlated Hidden Markov Models for comparative biology |
| *dentist* | Computing uncertainty by sampling points around maximum likelihood estimates |
| *hiSSE* | Hidden State Dependent Speciation Extinction models |
| *OUwie* | Continuous character evolution under Ornstein-Uhlenbeck (OU) models |

## COMPETITIONS AND DATA CHALLENGES

**Japan Aerospace Exploration Agency (JAXA)**     2023
*8th place*

# PEER REVIEW

Nautre Communications
Systematic Biology
Evolution
Journal of Biogeography
Methods in Ecology and Evolution
New Phytologist

# TEACHING

**Tutorial Instructor (2023)**                                      University of Michigan
*Writing, Planning, and Literature Review: Enhancing Professional Productivity with Generative AI*

**Teaching Assistant (2017-2022)**                                    University of Arkansas
*Evolutionary Biology*

**Teaching Assistant (2016-2017)**                                     University of Toronto
*Macroevolution*

**Teaching Assistant(2016-2017)**                                      University of Toronto
*Biostatistics*

**Teaching Assistant (2015-2016**                                      University of Toronto
*From Genomes to Ecosystems in a Changing World*

**Teaching Assistant (2015-2016)**                                     University of Toronto
*Adaptation and Biodiversity*

# PRESENTATIONS

1. Cohen, Y., Rauch, A., Li, J., Modenesi, B., Boyko, J.D., Wang, Y., Byon, E., and Huan, X. (2023) Sparse Modeling of Wavelet Features for Fault Classification and Regression in Spacecraft Propulsion Systems (PHMAP: Poster - International conference)

2. Boyko, J.D., Hagen. E.R., Beaulieu, J.M., Vasconcelos, T.N.C. (2023) The evolutionary responses of life-history strategies to climatic variability in flowering plants (Botany: Oral presentation - International conference)

3. Boyko, J.D., O'Meara B.C., Beaulieu, J.M. (2023) A Novel Method for Jointly Modeling the Evolution of Discrete and Continuous Traits (Evolution: Oral presentation - International conference)

4. Boyko, J.D., Beaulieu, J.M. (2022) Reducing the biases in false correlations between discrete characters. (Evolution: Poster presentation - International Conference)

5. Boyko, J.D., Beaulieu, J.M. (2019) Quantifying the limits of our knowledge in phylogenetic comparative studies. (Quantitative Genetics Workshop: Oral presentation - International Workshop)

6. Boyko, J.D., Nakov, T., Alverson, A.J. and Beaulieu, J.M. (2019) Quantifying the limits of our knowledge in phylogenetic comparative studies. (Botany: Oral presentation – International Conference)

7. Boyko, J.D., Nakov, T., Alverson, A.J. and Beaulieu, J.M. (2019) Quantifying the limits of our knowledge in phylogenetic comparative studies. (Botany: Oral presentation – International Conference)

8. Boyko, J.D., Nakov, T., Alverson, A.J. and Beaulieu, J.M. (2018) Testing the signal of marine versus freshwater origins of photosynthetic eukaryotes. (Botany: Oral presentation – International Conference)

9. Boyko, J.D., Mahler, D. L. (2017) Testing for character displacement in Lesser Antillean anoles. (Atwood Colloquium: Oral presentation – Institutional Conference)

10. Boyko, J.D., Mahler, D. L. (2016) Character displacement in Lesser Antillean Anolis lizards. (Evolution: Oral presentation – International Conference)

11. Boyko, J.D., Mahler, D. L. (2016) Testing for repeated character displacement in Anolis lizards. (OE3C: Oral presentation – Provincial Conference)

## REFERENCES

**Dr. Jeremy Beaulieu**
*University of Arkansas*
*Department of Biological Sciences*
*Science-Engineering Building*
*Fayetteville AR*
*jmbeauli@uark.edu*
*(479) 575-2618*

**Dr. Brian O'Meara**
*University of Tennessee, Knoxville*
*Department of Evolutionary biology and Ecology*
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**Dr. Dan Rabosky**
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**Dr. Stephen Smith**
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