# Alexander E. White *curriculum vitae*

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## Education

Ph.D. Ecology and Evolution, University of Chicago, 2018
Dissertation: *Regional influences on community structure across the tropical-temperate divide*

B.S. *with Distinction*, Ecology and Evolutionary Biology, University of Michigan, 2009

## Training

Smithsonian Institution, September 2018–2022. Machine Learning Postdoctoral Fellow, Data Science Lab. Advised by Dr. Rebecca Dikow

Smithsonian Institution, September 2018–2022. Postdoctoral Fellow, Department of Botany, National Museum of Natural History. Advised by Dr. Eric Schuettpelz

University of Copenhagen, January 2016–August 2016. Visiting Scholar, Center for Macroecology, Evolution, and Climate. Co-advised by Drs. Carsten Rahbek and Sally Keith

## Publications

### *Peer-reviewed original research*

Dikow RB, Ekwealor JT, Mattingly WJ, Trizna MG, Harmon E, Dikow T, Arias CF, Hodel RG, Spillane J, Tsuchiya MT, Villanueva L, **White AE**, Bursell MG, Curry T, Inema C, Geranimo-Anctil K. 2023. Let the Records Show: Attribution of Scientific Credit in Natural History Collections. *International Journal of Plant Sciences*. 184, 392-404.

Robillard AJ, Trizna MG, Ruiz-Tafur M, Dávila Panduro EL, de Santana CD, **White AE**, Dikow RB, Deichmann JL. 2023. Application of a deep learning image classifier for identification of Amazonian fishes. *Ecology and Evolution*. 13, e9987.

Rana SK, **White AE**, Price TD. Key roles for the freezing line and disturbance in driving the low plant species richness of temperate regions. 2022. Global Ecology and Biogeography. 31, 280-293.

**White AE**, Dey KK, Stephens M, and Price TD. 2021. Dispersal syndromes drive the formation of biogeographical regions, illustrated by the case of Wallace's Line. *Global Ecology and Biogeography*. 30, 685-696.

**White AE**, Dikow RB, Baugh M*, Jenkins A*, and Frandsen PB. 2020. Generating segmentation masks of herbarium specimens and a dataset for training segmentation models using deep learning. *Applications in Plant Sciences*. 8, e11352. **undergraduate mentee*.

Schumm M*, **White AE**, Supriya K, and Price TD. 2020. Ecological limits as the driver of bird species richness patterns along the east Himalayan elevational gradient. *American Naturalist*. 195, 802-817. **undergraduate mentee*

**White AE**, Dey KK, Mohan DM, Stephens M, and Price TD. 2019. Regional influences on community structure across the tropical-temperate divide. *Nature Communications*. 10, 2646.

Schumm M*, Edie SM, Collins KS, Gómez-Bahamón V, Supriya K, **White AE**, Price TD, and Jablonski D. 2019. Common latitudinal gradients in functional richness and functional evenness across marine and terrestrial systems. *Proceedings of the Royal Society B*. 286, 20190745. **undergraduate mentee*

**White AE**. 2016. Geographical barriers and dispersal propensity interact to limit range expansions of Himalayan birds. *American Naturalist*. 188, 99-112.

Tomašových A, Kennedy JD, Betzner TJ, Kuehnle NB, Edie S, Kim S, Supriya K, **White AE**, Rahbek C, Huang S, Price TD, and Jablonski D. 2016. Unifying latitudinal gradients in range size and richness across marine and terrestrial systems. *Proceedings of the Royal Society B*. 283, 20153027.

### *Peer-reviewed reviews and commentaries*

Borowiec ML, Dikow RB, Frandsen PB, McKeeken A, Valentini G, **White AE**. Deep learning as a tool for ecology and evolution. Methods in Ecology and Evolution. 13, 1640-1660.

**White AE**. 2020. Deep learning in deep time. *Proceedings of the National Academy of Sciences*. 117, 29268-29270. **Commentary*.

Pearson K, Nelson G, Aronson M, Bonnet P, Brenskelle L, Davis C, Denny E, Goëau H, Heberling JM, Joly A, Lorieul T, Mazer S, Meineke E, Stucky B, Sweeney P, **White AE**, and Stoltis P. 2020. Machine learning using digitized herbarium specimens to accelerate phenological research. *BioScience*. 70, 610-620.

### *Software*

**White AE** and Dey KK. 2023. ecostructure: grade-of-membership clustering and visualization for ecology in R. R package version 2.0.0. https://github.com/sidatasciencelab/ecostructure

**White AE** and Dey KK. 2018. ecostructure package for R. R package version 0.99.0. https://kkdey.github.io/ecostructure/

## Awards and Honors

Invited Speaker, 16$^{th}$ Annual Early Career Scientist Symposium, *Natural History Collections: Drivers of Innovation*. Department of Ecology and Evolution, University of Michigan, 2020

Best Dissertation. Biological Sciences Division, University of Chicago, 2019

## Grants and Fellowships

Smithsonian American Women's History Initiative, *Ms. Attribution: building best practices for more inclusive natural history collections records*, 2023 (79,800 USD) **Co-PI*

Smithsonian Latino Initiatives Pool, *UCSB-Smithsonian Scholars Program: Success in Guiding Undergraduate Experiences (SIGUE)*, 2023 (195,480 USD) **Co-PI*

Machine Learning Postdoctoral Fellowship, Data Science Lab, Smithsonian Institution, 2018

American Society of Naturalists Travel Grant, 2017 (500 USD)

GAANN Quantitative Ecology Fellowship. Dept. of Ecology and Evolution, University of Chicago, 2016

National Science Foundation Graduate Research Opportunities Worldwide Fellowship, NSF and Danish National Research Fund, 2015

Oxford Nanopore MinION Access Programme, 2015 (MinION device awarded)

Society for the Study of Evolution Travel Grant, 2015 (500 USD)

National Science Foundation Graduate Research Fellowship, 2013

National Geographic Society Young Explorer Grant, 2011 (5,000 USD)

## Teaching Experience

### *Primary Instructor*

*Data Science, Conservation, and Tropical Biology*, field course at the Smithsonian Tropical Research Institute, Panama City, Panama. University of California Santa Barbara-Smithsonian Scholars Program, August 2023

*¡ERES! - Early Research Experience for Students Data Science Bootcamp*, Online. University of California Santa Barbara-Smithsonian Scholars Program, Summer 2023

*¡ERES! - Early Research Experience for Students Data Science Bootcamp*, Online. University of California Santa Barbara-Smithsonian Scholars Program, Summer 2022

*¡ERES! - Early Research Experience for Students Data Science Bootcamp*, Online. University of California Santa Barbara-Smithsonian Scholars Program, Summer 2021

*R for Ecology*, Online. University of California Santa Barbara-Smithsonian Scholars Program, Summer 2020

*Data Science, Conservation, and Tropical Biology*, field course at the Smithsonian Tropical Research Institute, Panama City, Panama. University of California Santa Barbara-Smithsonian Scholars Program, Summer 2019

Certified Software and Data Carpentry Instructor, 2018

Park Ranger - Wolf Creek Environmental Education Center, Redwood National and State Parks, 2006

### *Assistantships*

TA, *Ecology of the Anthropocene.* University of Chicago, Winter 2017.
Instructor: Dr. Trevor Price

TA, *Ecology and Conservation.* University of Chicago, Fall 2015.
Instructor: Dr. Cathy Pfister

TA, *Ecology and Evolution in the Southwest: Field School.* University of Chicago, Summer 2014.
Instructor: Dr. Eric Larsen

TA, *Environmental Ecology.* University of Chicago, Winter 2014.
Instructor: Dr. Trevor Price

TA, *Biology of Birds.* University of Michigan Biological Station, Summer 2010.
Instructor: Dr. David Ewert

## Research Mentorship

### *Undergraduate mentees*

Richard Montes-Lemus (UC Santa Barbara; 2023–)

Zach Willson (UC Davis; 2023–)

Alan Feria (UC Santa Barbara; June 2022–January 2023)

Zumonjay Jackson (East LA College; June 2022–August 2022)

Isabella Schrader (Marshall University; June 2021–August 2021)

Alison Day (Stanford University; 2019–2021)

Makinnon Baugh (Brigham Young University; January, 2019–2020)

Abby Jenkins (Brigham Young University; January, 2019–2020)

Alejandro Sanchez (UC Davis; June, 2019–August, 2019)

Matthew Schumm (University of Chicago, 2014–2019)

### *High school mentees*

Russell Ang (Stevenson High School, Illinois, 2013–2015)

Bharadwaj Srivatsav (Stevenson High School, Illinois, 2014–2015)

Jessie Wang (Stevenson High School, Illinois 2013–2014)

## Talks

### *Invited Conference Presentations*

**White AE**, Dikow RB, and Frandsen PB. Museum collections, deep learning, and biogeography: a global case study of ferns. Park of the *Using machine learning to understand the evolution of biodiversity* symposium. Evolution. Virtual, June 2021.

**White AE**. Biogeography of fern shapes as revealed by deep learning. University of Michigan Department of Ecology and Evolutionary Biology Early Career Scientists Symposium, *Natural History Collections: Drivers of Innovation.* Ann Arbor, March 2021.

**White AE**. Biogeography of fern leaf shapes. Applications of machine learning to the analysis and interpretation of functional traits from digitized herbarium specimens meeting. Yale University, June 2020.

**White AE**, Dikow RB, Baugh M, Jenkins A, and Frandsen PB. Generating masks for image segmentation in digitized herbarium specimens. Part of the *Machine learning: an emerging toolkit for biodiversity science using museum collections* symposium. Biodiversity Next. Leiden, Netherlands, October 2019.

**White AE**, Trizna M, Frandsen PB, Dorr LJ, Dikow RB, and Schuettpelz E. Evaluating geographic patterns of morphological disparity in ferns and lycophytes using deep neural networks. Part of the *Machine learning: an emerging toolkit for biodiversity science using museum collections* symposium. Biodiversity Next. Leiden, Netherlands, October 2019.

**White AE**, Trizna M, Frandsen PB, Dorr LJ, Dikow RB, and Schuettpelz E. Evaluating geographic patterns of morphological disparity in ferns and lycophytes using deep neural networks. Part of the *Machine Learning in Plant Biology* symposium. Botany. Tuscon, August 2019.

**White AE.** Deep learning, biogeography, and the evolution of plants. Machine Vision for Cultural Heritage and Natural Science Collections Meeting. Yale University, April 2019.

**White AE.** Modeling and visualizing ecological structure across the tropical- temperate divide. Section on Machine Learning. Biological Data Science. Cold Spring Harbor Laboratory, November 2018.

### *Contributed Conference Presentations*

**White AE.** Evaluating geographic patterns of morphological disparity in ferns and lycophytes using deep neural networks. Digital Data in Biodiversity Research Conference. Yale University, June 2019.

*poster* Earl C, **White AE**, Trizna MG, Frandsen PB, Kawahara A Y, Brady SG, and Dikow RB. Using machine learning to distinguish between and discover patterns of biodiversity in insects. Biological Data Science. Cold Spring Harbor Laboratory, November, 2018.

*poster* **White AE,** Dikow RB, Trizna MG, Orli S, Schuettpelz E, Frandsen PB, and Dorr LJ. Applications of deep convolutional neural networks to digitized herbarium specimens. Biological Data Science. Cold Spring Harbor Laboratory, November, 2018.

**White AE.** Himalayan bird communities reveal the integration of tropical, temperate and arid biomes. Conference of the American Society of Naturalists, Asilomar, CA, January 2018.

**White AE.** Phylogenetic beta diversity across geographic and elevational gradients in Himalayan birds. Evolution. Guarujá, Brazil, June 2015.

**White AE.** Dispersal and elevation drive regional avian richness across the Himalayas. Conference of the American Society of Naturalists, Asilomar, CA. January 2014.

**White AE.** Evaluating acoustic signatures in a cooperatively breeding corvid. American Ornithologists' Union Meeting, Jacksonville, FL. July 2011.

**White AE.** Repertoire size and song sharing among American Redstarts (*Setophaga ruticilla*). Annual Undergraduate Research Symposium. University of Michigan Biological Station, MI, August 2009.

### *Invited Seminar Presentations*

**White, AE.** Assembly of Himalayan Birds: Identifying the roles of history and ecology in structuring a diverse continental fauna. National Museum of Natural History Data Science Seminar. Smithsonian Institution, March 2018.

**White, AE.** Geographical barriers and dispersal propensity interact to limit range expansions of Himalayan birds. Center for Macroecology, Evolution, and Climate Seminar. University of Copenhagen, March 2016.

**White, AE.** Avian diversity in the Himalayas. Molecular Ecology Seminar. Dominican University, September 2015.

## Research Employment

Tempus Inc. 2017. Data Science Intern, Research Analytics Team. (Chicago, IL)

Archbold Biological Station, 2011. Research Intern, Avian Ecology Lab. (Sebring, FL)

Cornell University, 2011. Field Assistant for Dr. Emma Grieg (Queensland, AUS)

University of Chicago, 2010. Field Assistant for Dr. Stephen Pruett-Jones (South Australia, AUS)

## Service

### *Peer Review*

Associate Editor, *Ornithology* (formerly *The Auk*). Areas of responsibility include: quantitative ecology, machine learning, data science, and biogeography, 2020 –

Journal reviews (*ad hoc*) for *American Naturalist*, *Applications in Plant Sciences*, *The Auk: Ornithological Advances*, *Biological Journal of the Linnaean Society*, *Ecology Letters*, *Emu–Austral Ornithology*, *Global Ecology and Biogeography*, *Journal of Biogeography*, *Molecular Ecology Resources*, *Oikos*, *PeerJ*, *PLOS One*, *Proceedings of the National Academy of Sciences*, *Proceedings of the Royal Society: B*

Grant reviews (*ad hoc*) for Alfred P. Sloane Foundation

### *Professional*

Mentor, University of California Santa Barbara–Smithsonian Scholars Program, 2018 –

Mentor, SPARK Program, Stevenson High School, 2013–2015

### *Departmental*

Organized annual departmental retreat, 2017

Organized weekly departmental reading group, 2016–2017

Peer graduate student mentor, 2014

Graduate Student Mental Health Advisory Board member, 2014

## Professional Affiliations

American Ornithologists Union, member since 2012

American Society of Naturalists, member since 2012

International Biogeography Society, member since 2014

Society for the Study of Evolution, member since 2014