Curriculum Vitae

CHARLES G. WILLIS
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Minneapolis, MN 55455-0357
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Education

PhD, Duke University, Durham, NC, United States. Biology — June 2013
Dissertation/Thesis Title: The Role Of Dispersal And Adaptive Divergence In The Diversification And Speciation Of The Tribe Brassiceae And Genus Cakile
Advisor: Kathleen Donohue

MA, Harvard University, Cambridge, MA, United States. — June 2009
Organismal and Evolutionary Biology
Advisor: Charles C Davis

BS, University of Minnesota, Minneapolis, MN. Ecology, — December 2005
Evolution, and Behavior
Minor: History

Fellowships, Residencies, and Visiting Engagements

Fellowship

Research Fellow, Cambridge, Massachusetts, United States — September 2015 - December 2017
Harvard University Herbaria

Research Fellow, Cambridge, Massachusetts, United States — September 2013 - August 2015
Harvard University Center for the Environment

Research Associate

Research Associate, Cambridge, Massachusetts, United States — January 2017 - December 2017
Harvard University, Organismic and Evolutionary Biology

Academic Appointments

University of Minnesota
College of Biological Sciences, Biology Teaching and Learning: Teaching Assistant Professor — August 2019 - Present

University of Minnesota
College of Biological Sciences, Biology Teaching and Learning: Educational Specialist — January 2017 - July 2019

RESEARCH, SCHOLARSHIP, AND CREATIVE WORK

Grants, Contract, Awards: External Sources

Award: BII-Implementation: The causes and consequences of plant biodiversity and its emergent properties across scales in a rapidly changing world
Principal Investigator: Cavender Bares, Jeannine M.
Status: Accepted
Sponsoring Organization: THE NATIONAL SCIENCE FOUNDATION
Award Dates: September 1, 2020 - August 31, 2025

Project: Administrative - BII-Implementation: The causes and consequences of plant biodiversity and its emergent properties across scales in a rapidly changing world
Project Team: Charles Willis (Co-Investigator), Sarah Hobbie (Co-Investigator), Nathan Springer (Co-Investigator), Peter Reich (Co-Investigator), Ethan Butler (Co-Investigator), Holly Menninger (Co-Investigator), Forest Isbell (Co-Investigator), Rebecca Montgomery (Co-Investigator), Jeannine Cavender Bares (Principal), Arindam Banerjee (Co-Investigator), Artur Stefanski (Co-Investigator), LAURA WILLIAMS (Co-Investigator), Caitlin Potter (Co-Investigator), Ya Yang (Co-Investigator), Jesus Pinto Ledezma (Co-Investigator)
Status: Approved
Project Dates: September 1, 2020 - August 31, 2025

Award: RCN-UBE Incubator: ALIVE, a platform for facilitating Authentic Learning In Virtual tropical Environments
Award ID: 1919640
Project Investigators: Russell, Ann E (Contact PI), Gansemer-Topf, Ann (Co-Principal), Willis, Charles George (Steering Committee)
Status: Funded
Sponsoring Organization: National Science Foundation
Institution: Iowa State University
Date Proposal Submitted: July 2019
Award Dates: August 2019 - July 2021
Funded Amount for Entire Grant Period or Proposed Grant Period: $72,186.00

Award: BII Implementation: The causes and consequences of plant biodiversity across scales in a rapidly changing world
Award ID: 2021898
Project Investigators: Willis, Charles George (Senior Personnel, Educational assessment consultant Funded: 0%), Cavender Bares, Jeannine M (Principal), Reich, Peter B (Co-Principal)
Status: Accepted
Sponsoring Organization: National Science Foundation
Institution: University of Minnesota
Date Proposal Submitted: February 4, 2020
Award Dates: September 2020 - August 31, 2020
Funded Percent Effort: 0%
Funded Amount for Entire Grant Period or Proposed Grant Period: $5,105,356.00

Award: BIO-RISE: Biology Instruction Online-Researching Instructor and Student Experiences
Award ID: 2013209
Project Investigators: Willis, Charles George (Co-Principal), Cotner, Sehoya H (Principal), Kirkpatrick, David T (Co-Principal), Warfa, Abdi Mohamed (Co-Principal), Brooker, Robert J (Co-Principal)
Status: Not Funded
Sponsoring Organization: National Science Foundation
Institution: University of Minnesota
Date Proposal Submitted: December 2019
Funded Amount for Entire Grant Period or Proposed Grant Period: $1,998,945.00

Award: Long-term storage of North American flora niche modeling data
Project Investigators: Willis, Charles George (Contact PI)
Status: Closed
Sponsoring Organization: Amazon
Institution: Harvard University
Date Proposal Submitted: February 1, 2017
Funded Amount for Entire Grant Period or Proposed Grant Period: $2,600.00

Award: Future impacts of climate change on the availability of suitable habitat for the North American flora.
Award ID: BIO160005
Project Investigators: Willis, Charles George (Contact PI), Grady, CJ (Consultant)
Status: Closed
Sponsoring Organization: XSEDE
Institution: Harvard University
Date Proposal Submitted: January 15, 2016

Award: DDIG: Divergent selection and the evolution of reproductive isolation across the genus Cakile (Brassicaceae)
Award ID: 1011329
Project Investigators: Willis, Charles George (Co-Principal), Donohue, Kathleen (Contact PI)
Status: Closed
Sponsoring Organization: National Science Foundation
Institution: Duke University
Date Proposal Submitted: November 2009
Award Dates: May 2010 - April 2013 *Graduate*
Funded Amount for Entire Grant Period or Proposed Grant Period: $14,110.00

Pending/Submitted:

Award: RCN-UBE OCELOTS: A Platform for Facilitating Online Content for Experiential Learning of Tropical Systems
Project Investigators: Russell, Ann E (Contact PI), Macey, Suzanne (Co-Principal), Willis, Charles George (Steering Committee), Aide, T. Mitchell (Steering Committee), Beck, Chris (Steering Committee), Berglund, Jennifer (Steering Committee), Ganong, Carissa (Steering Committee), Hardin, Rebecca (Steering Committee), Klemens, Jeffery (Steering Committee), LaMar, Drew M (Steering Committee), McClearn, Deedra (Steering Committee), Middendorf, George (Steering Committee), Nufio, César (Steering Committee), Powers, Jennifer Sarah (Steering Committee), Valdez, Ursula (Steering Committee)
Status: Currently Under Review
Sponsoring Organization: National Science Foundation
Institution: Iowa State University
Date Proposal Submitted: January 2021
Funded Amount for Entire Grant Period or Proposed Grant Period: $500,000.00

Proposal: BIO-RISE: Biology Instruction Online-Researching Instructor and Student Experiences
Role: Co-Investigator
Proposal ID: CON000000084055
Status: Submitted
Sponsoring Organization: THE NATIONAL SCIENCE FOUNDATION

Date Submitted: December 2, 2019
Purpose: Research

Other Grants, Awards, Gifts, or Endowment Earnings (Internal Sources)

Award: Expanding the Scope of Distance Learning Labs with Foldscopes
Project Investigators: Willis, Charles George (Contact PI), Binkowski, Kalli-Ann (Co-Principal)
Status: Funded
Sponsoring Organization: Center for Educational Innovation
Institution: University of Minnesota
Date Proposal Submitted: March 2018
Award Dates: March 2018 - March 2019
Funded Amount for Entire Grant Period or Proposed Grant Period: $970.00

Publications
Asterisk(*) - indicates co-first author
Underline - indicates student author

Peer-Reviewed Journal Article

Zhang, C., Li, J., Willis, C. G., & Ma, Z. (2020). Among-population variation in seed mass for 190 Tibetan plant species: Phylogenetic pattern and ecological correlates. *GLOBAL ECOLOGY AND CONSERVATION, 23*. doi: 10.1016/j.gecco.2020.e01163

Park, D. S., Willis, C. G., Xi, Z., Kartesz, J. T., Davis, C. C., & Worthington, S. (2020). Machine learning predicts large scale declines in native plant phylogenetic diversity. *NEW PHYTOLOGIST, 227*(5), 1544-1556. doi: 10.1111/nph.16621

Shaw, E. C., Fowler, R., Ohadi, S., Bayly, M. J., Barrett, R. A., Tibbits, J., . . . Cousens, R. D. (2020). Explaining the worldwide distributions of two highly mobile species: Cakile edentula and Cakile maritima. *JOURNAL OF BIOGEOGRAPHY*. doi: 10.1111/jbi.14024

Palmer, M. S. (Lead Author), Willis, C. G., Barry, K., Packer, C., Moe, A., & Wassen, D. (2020). Exploring Species Interactions with "Snapshot Serengeti". *COURSESOURCE*. doi: 10.24918/cs.2020.49
Author, developed online materials

Ma, Z., Willis, C. G., Zhang, C., Zhou, H., Zhao, X., Dong, S., . . . Du, G. (2019). Direct and indirect effect of seed size on seedling survival along an experimental light availability gradient. *AGRICULTURE ECOSYSTEMS & ENVIRONMENT, 281*, 64-71. doi: 10.1016/j.agee.2019.05.009

Zhang, C., Willis, C. G., Ma, Z., Ma, M., Csontos, P., Baskin, C. C., . . . Du, G. (2019). Direct and indirect effects of long-term fertilization on the stability of the persistent seed bank. *PLANT AND SOIL, 438*(1-2), 239-250. doi: 10.1007/s11104-019-04024-x

Ellwood, E. R., Primack, R. B., Willis, C. G., & HilleRisLambers, J. (2019). Phenology models using herbarium specimens are only slightly improved by using finer-scale stages of reproduction. *APPLICATIONS IN PLANT SCIENCES, 7*(3). doi: 10.1002/aps3.1225

Yost, J. M., Sweeney, P. W., Gilbert, E., Nelson, G., Guralnick, R., Gallinat, A. S., . . . Mazer, S. J. (2018). Digitization protocol for scoring reproductive phenology from herbarium specimens of seed plants. *APPLICATIONS IN PLANT SCIENCES, 6*(2). doi: 10.1002/aps3.1022

Gallinat, A. S., Russo, L., Melaas, E. K., Willis, C. G., & Primack, R. B. (2018). Herbarium

specimens show patterns of fruiting phenology in native and invasive plant species across New England. *AMERICAN JOURNAL OF BOTANY, 105*(1), 31-41. doi: 10.1002/ajb2.1005

Gallinat, A. S., Primack, R. B., Willis, C. G., Nordt, B., Stevens, A.-D., Fahey, R., . . . Panchen, Z. A. (2018). Patterns and predictors of fleshy fruit phenology at five international botanical gardens. *AMERICAN JOURNAL OF BOTANY, 105*(11), 1824-1834. doi: 10.1002/ajb2.1189

Daru, B. H., Park, D. S., Primack, R. B., Willis, C. G., Barrington, D. S., Whitfeld, Timothy J. S., . . . Davis, C. C. (2018). Widespread sampling biases in herbaria revealed from large-scale digitization. *NEW PHYTOLOGIST, 217*(2), 939-955. doi: 10.1111/nph.14855

Willis, C. G., Law, E., Williams, A. C., Franzone, B. F., Bernardos, R., Bruno, L., . . . Davis, C. C. (2017). CrowdCurio: an online crowdsourcing platform to facilitate climate change studies using herbarium specimens. *NEW PHYTOLOGIST, 215*(1), 479-488. doi: 10.1111/nph.14535

Rubio de Casas, Rafael, Willis, C. G., Pearse, W. D., Baskin, C. C., Baskin, J. M., & Cavender-Bares, J. (2017). Global biogeography of seed dormancy is determined by seasonality and seed size: a case study in the legumes. *NEW PHYTOLOGIST, 214*(4), 1527-1536. doi: 10.1111/nph.14498

Du, Y., Chen, J., Willis, C. G., Zhou, Z., Liu, T., Dai, W., . . . Ma, K. (2017). Phylogenetic conservatism and trait correlates of spring phenological responses to climate change in northeast China. *ECOLOGY AND EVOLUTION, 7*(17), 6747-6757. doi: 10.1002/ece3.3207

Zhang, C., Willis, C. G., Klein, J. A., Ma, Z., Li, J., Zhou, H., & Zhao, X. (2017). Recovery of plant species diversity during long-term experimental warming of a species-rich alpine meadow community on the Qinghai-Tibet plateau. *BIOLOGICAL CONSERVATION, 213*, 218-224. doi: 10.1016/j.biocon.2017.07.019

Davis, C. C., Willis, C. G., Connolly, B., Kelly, C., & Ellison, A. M. (2015). Herbarium records are reliable sources of phenological change driven by climate and provide novel insights into species' phenological cueing mechanisms. *AMERICAN JOURNAL OF BOTANY, 102*(10), 1599-1609. doi: 10.3732/ajb.1500237

Panchen, Z. A., Primack, R. B., Nordt, B., Ellwood, E. R., Stevens, A.-D., Renner, S. S., . . . Davis, C. C. (2014). Leaf out times of temperate woody plants are related to phylogeny, deciduousness, growth habit and wood anatomy. *NEW PHYTOLOGIST, 203*(4), 1208-1219. doi: 10.1111/nph.12892

Zhang, C., Willis, C. G., Burghardt, L. T., Qi, W., Liu, K., de Moura Souza-Filho, Paulo Roberto, . . . Du, G. (2014). The community-level effect of light on germination timing in relation to seed mass: a source of regeneration niche differentiation. *NEW PHYTOLOGIST, 204*(3), 496-506. doi: 10.1111/nph.12955

Willis, C. G., Franzone, B. F., Xi, Z., & Davis, C. C. (2014). The establishment of Central American migratory corridors and the biogeographic origins of seasonally dry tropical forests in Mexico. *FRONTIERS IN GENETICS, 5*. doi: 10.3389/fgene.2014.00433

Willis, C. G., Baskin, C. C., Baskin, J. M., Auld, J. R., Venable, D. L., Cavender-Bares, J., . . . Rubio de Casas, Rafael (2014). The evolution of seed dormancy: environmental cues, evolutionary hubs, and diversification of the seed plants. *NEW PHYTOLOGIST, 203*(1), 300-309. doi: 10.1111/nph.12782

Wolkovich, E. M., Davies, T. J., Schaefer, H., Cleland, E. E., Cook, B. I., Travers, S. E., . . . Davis, C. C. (2013). TEMPERATURE-DEPENDENT SHIFTS IN PHENOLOGY CONTRIBUTE TO THE SUCCESS OF EXOTIC SPECIES WITH CLIMATE CHANGE. *AMERICAN JOURNAL OF BOTANY, 100*(7), 1407-1421. doi: 10.3732/ajb.1200478

de Casas, Rafael Rubio, Willis, C. G., & Donohue, K. (2012). Plant dispersal phenotypes: a seed perspective of maternal habitat selection. *DISPERSAL ECOLOGY AND EVOLUTION*, 171-184.

Willis, C. G., Ruhfel, B. R., Primack, R. B., Miller-Rushing, A. J., Losos, J. B., & Davis, C. C. (2010). Favorable Climate Change Response Explains Non-Native Species' Success in Thoreau's Woods. *PLOS ONE, 5*(1). doi: 10.1371/journal.pone.0008878

Willis, C. G., Halina, M., Lehman, C., Reich, P. B., Keen, A., McCarthy, S., & Cavender-Bares, J. (2010). Phylogenetic community structure in Minnesota oak savanna is influenced by spatial extent and environmental variation. *ECOGRAPHY, 33*(3), 565-577. doi: 10.1111/j.1600-0587.2009.05975.x

Davis, C. C., Willis, C. G., Primack, R. B., & Miller-Rushing, A. J. (2010). The importance of phylogeny to the study of phenological response to global climate change. *PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES, 365*(1555), 3201-3213. doi: 10.1098/rstb.2010.0130

Willis, C. G., Ruhfel, B., Primack, R. B., Miller-Rushing, A. J., & Davis, C. C. (2008). Phylogenetic patterns of species loss in Thoreau's woods are driven by climate change. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, 105*(44), 17029-17033. doi: 10.1073/pnas.0806446105

Weinig, C., Johnston, J. A., Willis, C. G., & Maloof, J. N. (2007). Antagonistic multilevel selection on size and architecture in variable density settings. *EVOLUTION, 61*(1), 58-67. doi: 10.1111/j.1558-5646.2007.00005.x

Letter

Willis, C. G., & Davis, C. C. (2015). *Rethinking migration* 6236th ed., vol. 348, 766-766. SCIENCE.

Willis, C. G., Ruhfel, B., Primack, R. B., Miller-Rushing, A. J., & Davis, C. C. (2009). *Reply to McDonald et al.: Climate change, not deer herbivory, has shaped species decline in Concord, Massachusetts* 10th ed., vol. 106, E29-E29. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA. doi: 10.1073/pnas.0900170106

Review

Willis, C. G., Ellwood, E. R., Primack, R. B., Davis, C. C., Pearson, K. D., Gallinat, A. S., . . . Soltis, P. S. (2017). *Old Plants, New Tricks: Phenological Research Using Herbarium Specimens* 7th ed., vol. 32, 531-546. TRENDS IN ECOLOGY & EVOLUTION. doi: 10.1016/j.tree.2017.03.015

Donohue, K., de Casas, Rafael Rubio, Burghardt, L., Kovach, K., & Willis, C. G. (2010). Germination, Postgermination Adaptation, and Species Ecological Ranges. *Annual Review of Ecology Evolution and Systematics* vol. 41, 293-319. ANNUAL REVIEW OF ECOLOGY, EVOLUTION, AND SYSTEMATICS, VOL 41.

Media Contributions

"UMN College of Biological Sciences looking to add in-demand online biology classes," Minnesota Daily https://www.mndaily.com/article/2019/10/n-umn-college-of-biological-sciences-looking-to-add-in-demand-online-biology- October 10, 2019

classes

Other Research/Research in Progress

Willis, C. G., Lane, K. Planning, "Impacts of Online Proctoring on Inclusion in Undergraduate Biology".

Willis, C. G., Klemens, J., Hebert, S. On-Going, "Development of an Online, Interactive Snapshot Serengeti Lab Module".

Willis, C. G., Gibbens, B. B. On-Going, "The Muddiest-Point Video Project".

TEACHING

Scheduled Teaching

Evolution & Ecology: BIOL 1001: Spring 2017, Spring 2017, Fall 2017, Fall 2017, Spring 2018, Summer 2018, Fall 2018, Fall 2018, Spring 2019, Spring 2019, Summer 2019

General Biology: BIOL 1009: Fall 2017, Spring 2018, Summer 2018, Fall 2018, Spring 2019, Summer 2019

Instructional Activity

University of Minnesota

Workshop, COBE Digital Teaching Workshop Series, University of Minnesota, Organizer, Host, Presenter, 60 participants — May 1, 2020 - September 8, 2020

Worked with RLT with develop a Canvas course on digital teaching best practices to help faculty prepare for the Fall 2020 Semester and the UMN's COVID response plan.

Tasks included:
- Developing content
- Building course sites
- Organizing training workshops
- Participating in training workshops

Workshop, CEI Online Science Labs Discussion Series, University of Minnesota, Panelist, 30 participants — April 24, 2020 - April 30, 2020

Online Science Labs Discussion Series was organized and hosted by the UMN's Center for Educational Innovation. I was invited to participate as a panelist to discuss ways faculty could transition from on-campus to distance learning science labs in response to the COVID-19 crisis.

Instructor, Nature of Life @ Itasca, College of Biological Sciences, 24 participants — July 22, 2019 - July 29, 2019

Instructor, Nature of Life @ Itasca, 24 participants — July 28, 2018 - July 31, 2018

Workshop, Market Science Recruitment Workshop, Market Science, Instructor, 10 participants — July 25, 2018

Workshop, Market Science Training Workshop, Market Science, Instructor, 12 participants — May 8, 2018

Instructor, Clubes de Ciencia, Universidad de Monterrey, Mexico, 20 participants — July 24, 2016 - July 30, 2016

Iowa State University

Workshop, OCELOTS Networkshop, Iowa State University, January 15, 2021
Presenter, 20 participants

OCELOTS Network is an NSF-UBE Incubator network focused on developing interactive, online labs in ecology for undergraduates.

SERVICE

Service to the University/College/Department

University of Minnesota

College

Member, Center for Online Biology Education Working Board July 1, 2018 - Present
Member, Market Science Working Board February 21, 2018 - January 18, 2019

Department

Member, Diversity, Equity, and Inclusion Committee August 1, 2020 - Present
Member, Teaching & Curriculum Committee September 1, 2019 - Present

University

Advisor, University Learning Technology Advisors October 4, 2019 - Present
Advisor, CEI Online Science Labs Discussion Series April 24, 2020 - April 30, 2020

Online Science Labs Discussion Series was organized and hosted by the UMN's Center for Educational Innovation. I was invited to participate as a panelist to discuss ways faculty could transition from on-campus to distance learning science labs in response to the COVID-19 crisis.