Andrew Leslie

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Geological Sciences Department • Stanford University
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EDUCATION

Ph.D., University of Chicago (Chicago, IL) 2010
Department of the Geophysical Sciences

> **Dissertation**: *Forms following functions: exploring the evolution of morphological diversity in seed plant reproductive structures*. C. Kevin Boyce (advisor), Peter Crane, David Jablonski, Michael LaBarbera, Manfred Rudat

B.A. (with honors), University of Pennsylvania 2004
Geology (honors); Biochemistry (honors)

> **Honors thesis:** *Leaf development in Carboniferous seed plants.* Hermann Pfefferkorn (advisor)

APPOINTMENTS

Assistant Professor 2014-2019
Department of Ecology and Evolutionary Biology, Brown University

Assistant Professor 2019-
Geological Sciences, Stanford University

RESEARCH EXPERIENCE

Postdoctoral research associate, Yale University 2010-2014

> *Projects*: Fossil conifer descriptions, conifer phylogenetics, conifer reproductive biology, molecular dating techniques, character evolution (advisors: Peter Crane, Michael Donoghue)

Doctoral dissertation research, University of Chicago 2004-2010

> *Topics*: Conifer evolution, pollination biology, functional morphology (advisor: C. Kevin Boyce)

Research assistant, University of Chicago 2007-2009

> *Project*: Cretaceous plant fossil descriptions from Upatoi Creek, Georgia (advisor: Peter Crane)

Research assistant, University of North Carolina, Chapel Hill 2006

Project: Reproductive morphology of the Devonian plant *Rhacophyton* (advisor: Patricia Gensel)

Research assistant, University of Chicago 2006

Project: Evolutionary patterns in foraminfera (advisors: Bjarte Hannisdal, Susan Kidwell)

FIELD EXPERIENCE

Research

- Middle Jurassic conifers from the Chubut Group, *Patagonia, Argentina* 2015, 2016
- Devonian plants from Catskill clastic wedge, *New York, USA* 2014
- Late Cretaceous and Miocene plant fossils, *New Caledonia* 2013
- Late Cretaceous mesofossils from the Magothy Formation, *New England* 2013
- Early Cretaceous plants from the Tevshiin Govi Formation, *Mongolia* 2012, 2013

Field courses

- Tropical plant diversity (*Miami, Florida*; with P. Barry Tomlinson) 2005
- Modern carbonate environments (*Sonora, Mexico*; with Susan Kidwell) 2005

TEACHING EXPERIENCE

Brown University

Professor 2015-2017

Biology 0350: The Fossil Record: Life on Earth Through Time, Spring 2016, 2017

Biology 1495: 500 Million Years of Land Plants, Fall 2015

Responsibilities: develop lectures and lab sections, develop assignments and student assessments, lead discussion sections, lead fieldtrips

University of Chicago

Teaching Assistant 2004-2010

Biological Evolution, 2004-2010

Environmental History of the Earth, 2004-2008

Evolution of the Solar System, 2008

Diversity and Evolution of Plants, 2006

Responsibilities: lead weekly labs, grade homework and exams, guest lectures, mentor students

MENTORING EXPERIENCE

Postdoctoral

- Mekala Sundaram, Brown/Stanford University (2017-present)
- Juan Losada, Brown University, Harvard University (2015-present)

Graduate

- Nikole Bonacorsi, Ph.D. dissertation research, Brown University (2015-present)

Undergraduate

- Heather Huminski, Brown University, Senior Thesis Research (2018-2019)
- Karishma Swarup, Brown University, Senior Thesis Research (2017-2019)
- Juan Macros Rodriguez, Brown University (2017)
- Noah Trac, Brown University (2016; 2018)
- Michelle Pombrol, Brown University (2016)
- John Diedrich, Brown University, Senior Thesis Research (2014-2015)
- Jessica Fisher, Brown University, Senior Thesis Research (2014-2015)

PROFESSIONAL DEVELOPMENT

Professional Affiliations

- Botanical Society of America 2004-present
- Geological Society of America 2004-present
- Society for the Study of Evolution 2014-present

Professional Service

Moseley Award panel member, Botanical Society of America 2014-2016
(*prize given annually for best student talk in development/structure*)

Secretary Treasurer, Paleobotanical Section, Botanical Society of America 2017-2020

Reviewer for: *American Journal of Botany, Annals of Botany, Biological Invasions, Botanical Journal of the Linnean Society, Cretaceous Research, Evolutionary Biology, Geology, Global Ecology and Biogeography, International Journal of Plant Sciences, Journal of Biogeography, The Journal of the Torrey Botanical Society, New Phytologist, Paleobiology, Plant Signaling and Behavior, PLoS One, Proceedings of the National Academy of Sciences USA, National Science Foundation, Proceedings of the Royal Society of London B, Quaternary Research, Sexual Plant Reproduction, Systematic Biology, Taxon*

Outreach

Collections up close: conifers. 2018
Public lecture and guided tour, Arnold Arboretum, Boston, MA

Conifer pollination: sex among evergreens. 2017
Adult education class, Arnold Arboretum, Boston, MA

INVITED SEMINARS

- Long Island Botanical Society 2019
- Department of Biological Sciences, University of Arkansas 2018
- Department of Earth And Environmental Sciences, University of Pennsylvania 2018
- Tate Geological Museum, Casper College 2018
- Department of Botany, Smithsonian Institution 2018
- New England Botanical Club, Harvard University 2018
- Department of Geological Sciences, Stanford University 2017
- Center for Biodiversity and Global Change, Yale University 2017
- Museo Paleontológico Egidio Feruglio, Trelew, Argetina 2016
- School of Biology and Ecology, University of Maine 2015
- Arnold Arboretum, Harvard University 2015
- Department of Biology, Humboldt State University 2015
- Department of Ecology and Evolutionary Biology, Yale University 2014
- Department of Geology and Environmental Geosciences, Lafayette College 2013
- Department of Geology and Geophysics, Yale University 2013
- Department of Geosciences, Virginia Polytechnic Institute 2013
- Department of Botany, University of Wyoming 2013
- Department of Ecology and Evolutionary Biology, Brown University 2013
- Department of Biological Sciences, Waikato University, New Zealand 2012
- Department of Environmental and Plant Biology, Ohio University 2011
- Department of Earth and Environmental Sciences, Vanderbilt University 2009

GRANTS, AWARDS, AND HONORS

Using the Fossil Record of Patagonia to Unravel the History of Southern Hemisphere Forests, $3000, *Brown University Global Mobility Program: Faculty Research Grant,* 2015

Invited to present at the 9th annual University of Michigan Early Career Scientists Symposium; 2013

The Discovery of New Caledonia's First Fossil Plants and Arthropods: Exploring the Island's Terrestrial Paleoecology, $24,900, *National Geographic Committee for Research and Exploration*, 2012

Isabel C. Cookson Award, best student paper in paleobotany or palynology, 2010

Geological Society of America Graduate Student Research Grant, $2530, *Geological Society of America,* 2007

Hinds Fund Grant, Ultrastructure of *Rhacophyton* spores, $1200, *University of Chicago,* 2006

Hinds Fund Grant, Tropical plant diversity field course, $1763, *University of Chicago,* 2005

Vagelos Scholar in the Life Sciences, *University of Pennsylvania*, 2000-2004

PUBLICATIONS

Peer Reviewed Publications

Leslie, A.B. and Losada, J.M. *In press.* Reproductive ontogeny and the evolution of morphological diversity in conifers and other plants**.** *Integrative and Comparative Biology*.

Bonacorsi, N.K. and **Leslie, A.B.** 2019. Sporangium position, branching architecture, and the evolution of reproductive morphology in Devonian plants. *International Journal of Plant Sciences* 180: 493-503.

Bonacorsi, N.K. and **Leslie, A.B.** 2019. Functional diversity and convergence in the evolution of plant reproductive structures. *Annals of Botany* 123: 145-152.

Diefendorf, A.F., **Leslie, A.B.**, Wing, S.L. 2019. A phylogenetic analysis of conifer diterpenoids and their carbon isotopes for chemotaxonomic applications. *Organic Geochemistry 127: 50-58*.

Losada, J.M., Blanco-Moure, N, **Leslie, A.B.** 2019. Not all "pine cones" flex: functional trade-offs and the evolution of seed release mechanisms. *New Phytologist* 222: 396-406.

Perret, D.L., **Leslie, A.B.**, Sax, D.F. 2018. Naturalized distributions show that climatic disequilibrium is structured by niche size in pines (*Pinus* L.). *Global Ecology and Biogeography* DOI: 10.1111/geb.12862.

Leslie, A.B., Beaulieu, J.M., Holman, G., Campbell, C.S., Mei, W., Raubeson, L.R., Mathews, S. 2018. An overview of extant conifer evolution from the perspective of the fossil record. *American Journal of Botany* 105: 1-14.

Losada, J.M. and **Leslie, A.B.** 2018. Why are the seed cones of conifers so diverse at pollination? *Annals of Botany* 121: 1319-1331. *Editor's Choice.

Shi, G., Li, H., **Leslie, A.B.**, Zhou, Z. 2018. *Araucaria* bract-scale complex and associated foliage from the early-middle Eocene of Antarctica and their implications for Gondwanan biogeography. *Historical Biology* DOI: 10.1080/08912963.2018.1472255.

Saladin, B., **Leslie, A.B.,** Wuest, R.O., Litsios, G., Conti, E., Salamin, N., Zimmermann, N.E. 2017. Fossils matter: improved estimates of divergence times in *Pinus* reveal older diversification. *BMC*

Evolutionary Biology 17: 95.

Leslie, A.B., Beaulieu, J.M., Mathews, S. 2017. Variation in seed size is structured by dispersal syndrome and cone morphology in conifers and other nonflowering seed plants. *New Phytologist* 216: 429-437.

Escapa, I. and **Leslie, A.B.** 2017. A new Cheirolepidaceae (Coniferales) from the Early Jurassic of Patagonia (Argentina): reconciling the records of impression and permineralized fossils. *American Journal of Botany* 104: 322-334.

Shi, G., Herrera, F., Herendeen, P.S**, Leslie, A.B**., Ichinnorov, N., Takahashi, M., Crane, P.R. 2017. Leaves of *Podozamites* and *Pseudotorellia* from the Early Cretaceous of Mongolia: stomatal patterns and implications for relationships. *Journal of Systematic Paleontology*. DOI: 10.1080/14772019.2016.1274343.

Herrera, F., Shi, G., Knopf, P., **Leslie, A.B**., Ichinnorov, N., Takahashi, M., Crane, P.R., Herendeen, P.S. 2017. Cupressaceae conifers from the Early Cretaceous of Mongolia. *International Journal of Plant Sciences* 178: 19-41.

Herrera, F., **Leslie, A.B**., Shi, G., Knopf, P., Ichinnorov, N., Takahashi, M., Crane, P.R., Herendeen, P.S. 2016. New fossil Pinaceae from the Early Cretaceous of Mongolia. *Botany* 94: 885-915.

Condamine, F.L., **Leslie, A.B**., Antonelli, A. 2016. Ancient islands acted as refugia and pumps for conifer diversity. *Cladistics*. DOI: 10.1111/cla.12155

Shi, G., **Leslie, A.B.**, Herendeen, P.S., Herrera, F., Ichinnorov, N., Takahashi, M., Knopf, P. and Crane, P.R., 2016. Early Cretaceous *Umkomasia* from Mongolia: implications for homology of corystosperm cupules. *New Phytologist* 210*:* 1418-1429.

Herrera, F., Shi, G., **Leslie, A.B**., Ichinnorov, N., Takahashi, M., Knopf, P., Crane, P.R., Herendeen, P.S. 2015. A new Voltzian seed cone from the Early Cretaceous of Mongolia and its implications for the evolution of ancient conifers. *International Journal of Plant Sciences* 176: 791-809.

Diefendorf, A.F., **Leslie, A.B.,** Wing, S.L. 2015. Leaf wax composition and carbon isotopes vary among major conifer groups. *Geochemica et Cosmochemica Acta* 170: 145-156

Leslie, A.B., Beaulieu, J.M., Crane, P.R., Knopf, P., and Donoghue, M.J. 2015. Integration and macroevolutionary patterns in the pollination biology of conifers. *Evolution* 69: 1573-1583

Shi, G., **Leslie, A.B.,** Herendeen, P.S., Ichinnorov, N., Takahashi, M., Knopf, P., Crane, P.R. 2014. Whole-plant reconstruction and phylogenetic relationships of *Elatides* zhoui sp. nov. (Cupressaceae) from the Early Cretaceous of Mongolia. *International Journal of Plant Sciences* 175: 911-930.

Leslie, A.B., Beaulieu, J.M., Crane, P.R., and Donoghue, M.J. 2014. Cone size is related to branching architecture in conifers. *New Phytologist* 203: 1119-1127.

Leslie, A.B., Glasspool, I., Herendeen, P.S., Ichinnorov, N., Knopf, P., Takahashi, M., Crane, P.R. 2013. Pinaceae-like reproductive morphology in *Schizolepidopsis canicularis*, sp. nov. from the Early Cretaceous (Aptian-Albian) of Mongolia. *American Journal of Botany* 100: 2426-2436.

Leslie, A.B., Beaulieu, J.M., Crane, P.R., and Donoghue, M.J. 2013. Explaining the distribution of breeding and dispersal syndromes in conifers. *Proceedings of the Royal Society of London* B 280: 20131812.

Leslie, A.B., Beaulieu, J.M., Rai, H.S., Crane, P.R., Donoghue, M.J., and Mathews, S. 2012. Hemisphere-scale differences in conifer evolutionary dynamics. *Proceedings of the National Academy of Sciences, USA* 109: 1617-1622.

Leslie, A.B. 2012. Branching habit and the allocation of reproductive resources in conifers. *Annals of Botany* 110: 915-921.

Leslie, A.B. and Boyce, C.K. 2012. Ovule function and the evolution of angiosperm reproductive innovations. *International Journal of Plant Sciences* 173: 640-648.

Boyce, C.K. and **Leslie, A.B.** 2012. The paleontological context of angiosperm vegetative evolution. *International Journal of Plant Sciences* 173: 561-568.

Leslie, A.B. 2011. Predation and protection in the macroevolutionary history of conifer cones. *Proceedings of the Royal Society of London* B 278: 3003-3008.

Leslie, A.B. 2011. Shifting functional roles and the evolution of conifer pollen-producing and seed-producing cones. *Paleobiology* 37: 587-602.

Leslie, A.B. 2010. Flotation preferentially selects saccate pollen during conifer pollination. *New Phytologist* 188: 273-279.

Leslie, A.B., and Pfefferkorn, H.W. 2010. Fossil floras from the Emma Fiord Formation (Visean, Mississippian) of the Canadian Arctic Archipelago and their paleoenvironmental context. *Review of Palaeobotany and Palynology* 159: 195-203.

Leslie, A.B., Herendeen, P.S., and Crane, P.R. 2009. *Upatoia barnardii* gen. et sp. nov., an araucarian pollen cone with *in situ* pollen from the Late Cretaceous (Santonian) of Georgia, USA. *Grana* 48: 128-135.

Leslie, A.B. 2008. Interpreting the function of saccate pollen in ancient conifers and other seed plants. *International Journal of Plant Sciences* 169: 1038-1045.

Book Chapters

Crane, P.R. and **Leslie, A.B.** 2014. Major Events in the Evolution of Land Plants. *In*: The Princeton Guide to Evolution, J. Losos (Ed.), Princeton University Press, Princeton, USA, pp. 143-151.