Stanford

Andrew Leslie

Assistant Professor of Earth and Planetary Sciences

Earth & Planetary Sciences

Curriculum Vitae available Online

Bio

BIO

I have collected rocks and fossils since I was a kid, but I became interested in fossil plants in particular while an undergraduate at the University of Pennsylvania, working with Hermann Pfefferkorn on Carboniferous floras from the Canadian Arctic. I continued to pursue paleobotany in my graduate work with Kevin Boyce at the University of Chicago, where I studied the evolution of reproductive morphology in fossil and living conifers. I then spent several years as a postdoc at Yale, working with Peter Crane in the School of Forestry and Michael Donoghue in the Department of Ecology and Evolutionary Biology. Before joining the faculty at Stanford, I was a professor in the Ecology and Evolutionary Biology Department at Brown University.

ACADEMIC APPOINTMENTS

- Assistant Professor, Earth & Planetary Sciences

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Secretary-Treasurer, Paleobotanical Section of the Botanical Society of America (2017 - 2020)
- Editor, Paleobiology (2024 - present)
- Member, Geological Society of America (2005 - present)
- Member, Botanical Society of America (2005 - present)

PROFESSIONAL EDUCATION

- PhD, University of Chicago , Paleontology (2010)
- BA, University of Pennsylvania , Biochemistry, Geology (2004)

LINKS

- Lab website: https://www.andrewleslielab.com/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

I am interested in morphological evolution. I approach this broad topic by investigating how interactions among form, function, and environment have influenced evolutionary patterns in plant reproductive structures over million-year time scales. This approach requires synthesizing information from different disciplines, and my work uses approaches from paleontology, biomechanics, phylogenetics, and biogeography.

Teaching

COURSES

2025-26

- 500 Million Years of Land Plant Evolution: EPS 139, EPS 239 (Win)
- Coevolution of Earth and Life: EARTHSYS 4, EPS 4 (Aut)

2024-25

- Coevolution of Earth and Life: EARTHSYS 4, EPS 4 (Aut)
- Quantitative Methods in Paleobiology: EPS 161, EPS 261 (Spr)

2023-24

- 500 Million Years of Land Plant Evolution: EPS 139, EPS 239 (Spr)
- Coevolution of Earth and Life: EARTHSYS 4, EPS 4 (Aut)

2022-23

- 500 Million Years of Land Plant Evolution: GEOLSCI 139, GEOLSCI 239 (Spr)
- Coevolution of Earth and Life: EARTHSYS 4, GEOLSCI 4 (Aut)

STANFORD ADVISEES

Doctoral (Program)

Emily Ellefson, Stepfan Huntsman, Nidhi Patel

Publications

PUBLICATIONS

- **The ontogeny of disparity in Cupressaceae seed cones.** *The New phytologist*
  Huntsman, S. V., Leslie, A. B.
  2023
- **Quantifying the complexity of plant reproductive structures reveals a history of morphological and functional integration.** *Proceedings. Biological sciences*
  Leslie, A. B., Mander, L.
  2023; 290 (2010): 20231810
- **Hidden functional complexity in the flora of an early land ecosystem.** *The New phytologist*
  D'Ario, M., Lane, B., Fioratti Junod, M., Leslie, A., Mosca, G., Smith, R. S.
  2023
- **Neontological and paleontological congruence in the evolution of Podocarpaceae (coniferales) reproductive morphology** *FRONTIERS IN ECOLOGY AND EVOLUTION*
  Leslie, A. B., Benson, R. B. J.
  2022; 10
- **How many ways can you build a conifer cone? A commentary on 'Origin and evolution of Podocarpaceae seed cones'.** *Annals of botany*
  Leslie, A. B.
  2022
- **LEAVES IN IRON OXIDE: REMARKABLE PRESERVATION OF A NEOGENE FLORA FROM NEW CALEDONIA** *PALAIOS*
  Locatelli, E. R., Briggs, D. E. G., Leslie, A., Munzinger, J., Grandcolas, P., Lowry, P. P., Cantrill, D. J., Maurizot, P., Cluzel, D., Folcher, N., Garrouste, R., Nel, A.
  2022; 37 (10): 622-632

- **Understanding the appearance of heterospory and derived plant reproductive strategies in the Devonian** *PALEOBIOLOGY*
  Leslie, A. B., Bonacorsi, N. K.
  2022

- **New fossil discoveries illustrate the diversity of past terrestrial ecosystems in New Caledonia.** *Scientific reports*
  Garrouste, R., Munzinger, J., Leslie, A., Fisher, J., Folcher, N., Locatelli, E., Foy, W., Chaillon, T., Cantrill, D. J., Maurizot, P., Cluzel, D., Lowry, P. P., Crane, et al
  2021; 11 (1): 18388

- **Early Cretaceous abietoid Pinaceae from Mongolia and the history of seed scale shedding.** *American journal of botany*
  Herrera, F., Shi, G., Bickner, M. A., Ichinnorov, N., Leslie, A. B., Crane, P. R., Herendeen, P. S.
  2021

- **The influence of climate and palaeoclimate on distributions of global conifer clades depends on geographical range size** *JOURNAL OF BIOGEOGRAPHY*
  Sundaram, M., Leslie, A. B.
  2021

- **Omniastrobus gen. nov., an Emsian Plant with Implications for the Evolution of Heterospory in the Early Devonian** *INTERNATIONAL JOURNAL OF PLANT SCIENCES*
  Bonacorsi, N. K., Gensel, P. G., Hueber, F. M., Leslie, A. B.
  2021

- **SEROTINY AND THE EVOLUTION OF SEED CONE SIZE IN CUPRESSACEAE CONIFERS** *INTERNATIONAL JOURNAL OF PLANT SCIENCES*
  Swarup, K., Contreras, D., Leslie, A. B.
  2021

- **Reproductive innovations and pulsed rise in plant complexity.** *Science (New York, N.Y.)*
  Leslie, A. B., Simpson, C., Mander, L.
  2021; 373 (6561): 1368-1372

- **A novel reproductive strategy in an Early Devonian plant** *CURRENT BIOLOGY*
  Bonacorsi, N. K., Gensel, P. G., Hueber, F. M., Wellman, C. H., Leslie, A. B.
  2020; 30 (9): R388–R389

- **Accumulation over evolutionary time as a major cause of biodiversity hotspots in conifers** *PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES*
  Sundaram, M., Donoghue, M. J., Farjon, A., Filer, D., Mathews, S., Jetz, W., Leslie, A. B.
  2019; 286 (1912): 20191887

- **Naturalized distributions show that climatic disequilibrium is structured by niche size in pines (Pinus L.)** *GLOBAL ECOLOGY AND BIOGEOGRAPHY*
  Perret, D. L., Leslie, A. B., Sax, D. F.
  2019; 28 (4): 429–41

- **Not all 'pine cones' flex: functional trade-offs and the evolution of seed release mechanisms** *NEW PHYTOLOGIST*
  Losada, J. M., Blanco-Moure, N., Leslie, A. B.
  2019; 222 (1): 396–407

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

- **Reproductive ontogeny and the evolution of morphological diversity in conifers and other plants** *INTEGRATIVE AND COMPARATIVE BIOLOGY*
  Leslie, A. B., Losada, J. M.
  2019; 59: 548-558

- **Sporangium position, branching architecture, and the evolution of reproductive morphology in Devonian plants** *INTERNATIONAL JOURNAL OF PLANT SCIENCES*
  Bonacorsi, N. K., Leslie, A. B.

2019; 180: 493-503

- **Functional diversity and convergence in the evolution of plant reproductive structures** *ANNALS OF BOTANY*
  Bonacorsi, N. K., Leslie, A. B.
  2019; 123 (1): 145–52
- **An overview of extant conifer evolution from the perspective of the fossil record** *AMERICAN JOURNAL OF BOTANY*
  Leslie, A. B., Beaulieu, J., Holman, G., Campbell, C. S., Mei, W., Raubeson, L. R., Mathews, S.
  2018; 105 (9): 1531–44
- **Why are the seed cones of conifers so diverse at pollination?** *ANNALS OF BOTANY*
  Losada, J. M., Leslie, A. B.
  2018; 121 (7): 1319–31
- **Leaves of Podozamites and Pseudotorellia from the Early Cretaceous of Mongolia: stomatal patterns and implications for relationships** *JOURNAL OF SYSTEMATIC PALAEONTOLOGY*
  Shi, G., Herrera, F., Herendeen, P. S., Leslie, A. B., Ichinnorov, N., Takahashi, M., Crane, P. R.
  2018; 16 (2): 111–37
- **Araucaria bract-scale complex and associated foliage from the early-middle Eocene of Antarctica and their implications for Gondwanan biogeography** *HISTORICAL BIOLOGY*
  Shi, G., Li, H., Leslie, A. B., Zhou, Z.
  2018
- **Variation in seed size is structured by dispersal syndrome and cone morphology in conifers and other nonflowering seed plants** *NEW PHYTOLOGIST*
  Leslie, A. B., Beaulieu, J. M., Mathews, S.
  2017; 216 (2): 429–37
- **Fossils matter: improved estimates of divergence times in Pinus reveal older diversification** *BMC EVOLUTIONARY BIOLOGY*
  Saladin, B., Leslie, A. B., Wueest, R. O., Litsios, G., Conti, E., Salamin, N., Zimmermann, N. E.
  2017; 17: 95
- **Ancient islands acted as refugia and pumps for conifer diversity** *CLADISTICS*
  Condamine, F. L., Leslie, A. B., Antonelli, A.
  2017; 33 (1): 69–92
- **Cupressaceae Conifers from the Early Cretaceous of Mongolia** *INTERNATIONAL JOURNAL OF PLANT SCIENCES*
  Herrera, F., Shi, G., Knopf, P., Leslie, A. B., Ichinnorov, N., Takahashi, M., Crane, P. R., Herendeen, P. S.
  2017; 178 (1): 19–41
- **A new Cheirolepidaceae (Coniferales) from the Early Jurassic of Patagonia (Argentina): reconciling the records of impression and permineralized fossils** *AMERICAN JOURNAL OF BOTANY*
  Escapa, I., Leslie, A. B.
  2017; 104: 322-334
- **Early Cretaceous Umkomasia from Mongolia: implications for homology of corystosperm cupules** *NEW PHYTOLOGIST*
  Shi, G., Leslie, A. B., Herendeen, P. S., Herrera, F., Ichinnorov, N., Takahashi, M., Knopf, P., Crane, P. R.
  2016; 210 (4): 1418–29
- **New fossil Pinaceae from the Early Cretaceous of Mongolia** *BOTANY*
  Herrera, F., Shi, G., Knopf, P., Leslie, A. B., Ichinnorov, N., Takahashi, M., Crane, P. R., Herendeen, P. S.
  2016; 94: 885-915
- **Leaf wax composition and carbon isotopes vary among major conifer groups** *GEOCHIMICA ET COSMOCHIMICA ACTA*
  Diefendorf, A. F., Leslie, A. B., Wing, S. L.
  2015; 170: 145–56
- **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*
  Herrera, F., Shi, G., Leslie, A. B., Knopf, P., Ichinnorov, N., Takahashi, M., Crane, P. R., Herendeen, P. S.

2015; 176 (8): 791–809

- **Integration and macroevolutionary patterns in the pollination biology of conifers** *EVOLUTION*
  Leslie, A. B., Beaulieu, J. M., Crane, P. R., Knopf, P., Donoghue, M. J.
  2015; 69 (6): 1573–83
- **WHOLE-PLANT RECONSTRUCTION AND PHYLOGENETIC RELATIONSHIPS OF ELATIDES ZHOUI SP NOV (CUPRESSACEAE) FROM THE EARLY CRETACEOUS OF MONGOLIA** *INTERNATIONAL JOURNAL OF PLANT SCIENCES*
  Shi, G., Leslie, A. B., Herendeen, P. S., Ichinnorov, N., Takahashi, M., Knopf, P., Crane, P. R.
  2014; 175 (8): 911–30
- **Cone size is related to branching architecture in conifers** *NEW PHYTOLOGIST*
  Leslie, A. B., Beaulieu, J. M., Crane, P. R., Donoghue, M. J.
  2014; 203 (4): 1119–27
- **Major Events in the Evolution of Land Plants** *Princeton Guide to Evolution*
  Crane, P. R., Leslie, A. B.
  2014: 143–151
- **PINACEAE-LIKE REPRODUCTIVE MORPHOLOGY IN SCHIZOLEPIDOPSIS CANICULARIS SP NOV FROM THE EARLY CRETACEOUS (APTIAN-ALBIAN) OF MONGOLIA** *AMERICAN JOURNAL OF BOTANY*
  Leslie, A. B., Glasspool, I., Herendeen, P. S., Ichinnorov, N., Knopf, P., Takahashi, M., Crane, P. R.
  2013; 100 (12): 2426–36
- **Explaining the distribution of breeding and dispersal syndromes in conifers** *PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES*
  Leslie, A. B., Beaulieu, J. M., Crane, P. R., Donoghue, M. J.
  2013; 280 (1770): 20131812
- **Hemisphere-scale differences in conifer evolutionary dynamics** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Leslie, A. B., Beaulieu, J. M., Rai, H. S., Crane, P. R., Donoghue, M. J., Mathews, S.
  2012; 109 (40): 16217–21
- **Branching habit and the allocation of reproductive resources in conifers** *ANNALS OF BOTANY*
  Leslie, A. B.
  2012; 110 (4): 915–21
- **THE PALEONTOLOGICAL CONTEXT OF ANGIOSPERM VEGETATIVE EVOLUTION** *INTERNATIONAL JOURNAL OF PLANT SCIENCES*
  Boyce, C. K., Leslie, A. B.
  2012; 173 (6): 561-568
- **OVULE FUNCTION AND THE EVOLUTION OF ANGIOSPERM REPRODUCTIVE INNOVATIONS** *INTERNATIONAL JOURNAL OF PLANT SCIENCES*
  Leslie, A. B., Boyce, C. K.
  2012; 173 (6): 640-648
- **Predation and protection in the macroevolutionary history of conifer cones** *PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES*
  Leslie, A. B.
  2011; 278 (1720): 3003–8
- **Shifting functional roles and the evolution of conifer pollen-producing and seed-producing cones** *PALEOBIOLOGY*
  Leslie, A. B.
  2011; 37 (4): 587–602
- **Fossil floras from the Emma Fiord Formation (Visean, Mississippian) of the Canadian Arctic Archipelago and their paleoenvironmental context** *REVIEW OF PALAEOBOTANY AND PALYNOLOGY*
  Leslie, A. B., Pfefferkorn, H. W.
  2010; 159 (3-4): 195–203

- **Flotation preferentially selects saccate pollen during conifer pollination** *NEW PHYTOLOGIST*
  Leslie, A. B.
  2010; 188 (1): 273–79

- **Upatoia barnardii gen. et sp nov., an araucarian pollen cone with in situ pollen from the Late Cretaceous (Santonian) of Georgia, USA** *GRANA*
  Leslie, A. B., Herendeen, P. S., Crane, P. R.
  2009; 48 (2): 128–35

- **INTERPRETING THE FUNCTION OF SACCATE POLLEN IN ANCIENT CONIFERS AND OTHER SEED PLANTS** *INTERNATIONAL JOURNAL OF PLANT SCIENCES*
  Leslie, A. B.
  2008; 169 (8): 1038–45