

# Christopher D. Whalen, PhD

## *Curriculum Vitae*

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### **Postdoctoral Fellowships:**

National Science Foundation, Postdoctoral Research Fellowship in Biology

- American Museum of Natural History, New York, NY (2020-2022)
- Yale University, New Haven, CT (2020-2022)

### **Graduate Education:**

Yale University, New Haven, CT

Doctor of Philosophy (Ph.D.) in Earth & Planetary Sciences (2014 – 2020)

- Dissertation: *Macroevolutionary, phylogenetic, and paleoecological patterns in the Paleozoic water column, with an emphasis on early deuterostomes and cephalopods*
- Advisory Committee: Prof. Derek E. G. Briggs (primary), Prof. Pincelli M. Hull, Prof. Jacques A. Gauthier, Prof. Bhart-Anjan Bhullar

Master of Philosophy (M.Phil.) in Geology & Geophysics (2014 – 2016)

### **Undergraduate Education:**

University of Michigan, Ann Arbor, MI

Bachelor of Science (B.S.) with Distinction and Honors (2010 – 2014)

- Major: Geological Sciences
  - Major: Ecology and Evolutionary Biology
  - Minor: Paleontology
  - Honors Thesis: *Quantitative approach to rib identification at an Alaskan Pleistocene site*
  - Advisor: Prof. Daniel C. Fisher
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### **Research Interests:**

Paleobiology, Macroevolution, Phylogenetic Systematics, Paleodiversity, Paleoecology, Morphometrics, Invertebrate Paleontology (Cephalopods, Early Deuterostomes), Vertebrate Paleontology (Paleozoic Fishes)

I am interested in the macroevolutionary patterns and trends exhibited by marine animals in the water column during the Paleozoic era (~541 to 252 million years ago). My research encompasses large paleoecological compilations, diversity through time analyses, phylogenetics of early nautiloid cephalopods and early vertebrate fishes (stem gnathostomes), morphometrics (ammonoids), specimen based analyses of material from exceptionally preserved biotas (Fezouata, Mazon Creek, Bear Gulch), and original fieldwork (Cunningham Creek, Chinle).

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**Publications:**

- 2020:** Whalen C.D., Hull P.M., Briggs D.E.G. Paleozoic ammonoid ecomorphometrics test ecospace availability as a driver of morphological diversification. *Science Advances*. 6: eabc2365.
- 2020:** McCoy V.E., Wiemann J., Lamsdell J.C., Whalen C.D., Lidgard S., Mayer P., Holger Petermann H., Briggs D.E.G. Chemical signatures of soft tissues distinguish between vertebrates and invertebrates from the Carboniferous Mazon Creek Lagerstätte of Illinois. *Geobiology*. 18:560–565.
- 2018:** Whalen C.D., Briggs D.E.G. The Palaeozoic colonization of the water column and the rise of global nekton. *Proceedings of the Royal Society B* 285: 20180883.
- 2016:** McCoy V.E., Saupe E.E., Lamsdell J.C., Tarhan L.G., McMahon S., Lidgard S., Mayer P., Whalen C.D., Soriano C., Finney L., Vogt S., Clark E.G., Anderson R.P., Peterman H., Locatelli E.R., Briggs D.E.G. The Tully Monster is a vertebrate. *Nature* 532: 496-499.
- 2014:** Fisher D.C., Shirley E.A., Whalen C.D., Calamari Z.T., Rountrey A.N., Tikhonov A.N., Buigues B., Lacombe F., Grigoriev S., Lazarev P.A. X-ray computed tomography of two mammoth calf mummies. *Journal of Paleontology* 88: 664-675.

**Grants:**

- 2019:** Yale Graduate Student Assembly *Conference Travel Award (\$750)*
- 2018:** Yale Graduate Student Assembly *Conference Travel Award (\$750)*
- 2018:** Paleontological Society *Ellis L. Yochelson Award (\$1,200)*
- 2016:** American Philosophical Society *Lewis and Clark Fund for Exploration and Field Research (\$2,400)*
- 2016:** Yale Institute of Biospheric Studies *Doctoral Pilot Award (\$3,000)*
- 2012:** University of Michigan, Department of Ecology & Evolutionary Biology *Summer Research Fellowship (\$1,000)*

**Awards:**

- 2019:** *Best Talk Award:* North American Paleontological Convention, 11<sup>th</sup> International Meeting (\$50)
- 2019:** *George Gaylord Simpson Prize:* Yale Peabody Museum (\$1000)
- For the best publication on macroevolution and the fossil record by a current or recently graduated Yale PhD student
- 2014:** *Undergraduate Academic Excellence Award:* University of Michigan, Ann Arbor; Department of Earth & Environmental Science (\$500)
- 2014:** *Camp Davis Field Geologist Award:* University of Michigan, Ann Arbor; Department of Earth & Environmental Science (\$150)
- F2013:** *University Honors:* University of Michigan, Ann Arbor
- S2013:** *University Honors:* University of Michigan, Ann Arbor
- F2012:** *University Honors:* University of Michigan, Ann Arbor
- S2012:** *University Honors:* University of Michigan, Ann Arbor
- F2011:** *University Honors:* University of Michigan, Ann Arbor
- S2011:** *University Honors:* University of Michigan, Ann Arbor

**Leadership & Organizational Experience:**

- 2019:** Volunteer geoscientist and ecologist, evolutionary biologist, and paleontologist for Ashoka (international nonprofit) *NextNow* climate & technology initiative
- 2018 – 2019:** Elected representative to the Yale Graduate Student Assembly
- Facilities and Healthcare Committee
  - Charter Review Committee
  - Summer Steering Committee
- 2015 – 2018:** Organized weekly Yale paleontology seminars/meetings

**Conference Abstracts:**

- 2019:** **Whalen C.D.**, Briggs D.E.G. Vetulicolians, conodonts, and jawless fishes: resolving the interrelationships of early deuterostomes using Bayesian tip-dated phylogenetics. *Geological Society of America Annual Meeting*. Phoenix, AZ. September 22 – 25.
- Whalen C.D.**, Briggs D.E.G. The paleoecological dimension of Paleozoic ammonoid evolution. *North American Paleontological Convention, 11<sup>th</sup> International Meeting*. Riverside, CA. June 23 – 27.
- 2018:** **Whalen C.D.**, Briggs D.E.G. An Early Ordovician vertebrate from the Fezouata Lagerstätte of Morocco. *Geological Society of America Annual Meeting*. Indianapolis, IN. November 4 – 7.
- 2017:** **Whalen C.D.**, Briggs D.E.G. Paleozoic pelagic and benthopelagic macroecology: Was there a Devonian Nekton Revolution? *Geological Society of America Annual Meeting*. Seattle, WA. October 22 – 25.
- Whalen C.D.**, Briggs D.E.G. New insights into Paleozoic ammonoid macroevolution and paleoecology from Westermann Morphospace. *Geological Society of America Annual Meeting*. Seattle, WA. October 22 – 25.
- Whalen C.D.**, Briggs D.E.G. The Paleozoic rise of eunektic vertebrates. *Society of Vertebrate Paleontology, 77<sup>th</sup> Annual Meeting*. Calgary, AB, Canada. August 23 – 26.
- 2016:** **Whalen C.D.**, Briggs D.E.G. Ecological assessments reveal complex history of Paleozoic nektonization. *Geological Society of America Annual Meeting*. Denver, CO. September 25 – 18.
- 2015:** **Whalen C.D.**, Briggs D.E.G. Diversification of ammonoids and vertebrates during the Devonian Nekton Revolution. *Geological Society of America Annual Meeting*. Baltimore, MD. November 1 – 4.
- Whalen C.D.** Trends in vertebrate and cephalopod diversity in the “Age of Fishes”. *Society of Vertebrate Paleontology, 75<sup>th</sup> Annual Meeting*. Dallas, TX. October 14 – 17.
- 2013:** **Whalen C.D.**, Fisher D.C., Rountrey A.N., Holmes C. Quantitative approach to rib identification at an Alaskan Pleistocene site. *Society of Vertebrate Paleontology, 73<sup>rd</sup> Annual Meeting*. Los Angeles, CA. October 30 – November 2.
- 2012:** **Whalen C.D.**, Shirley E.A., Fisher D.C., Rountrey A.N., Calamari Z.T., Tikhonov A.N., Buigues B., Grigoriev S., Holmes C., Lacombe F. 3D Visualization and analysis of CT imaging in two mammoth calves. *Geological Society of America Annual Meeting*. Charlotte, NC. November 4 – 7.

**Field Experience:**

- 2016:** Collected fossils from the Silurian Cunningham Creek Formation, NB, Canada (independent research)
- 2015:** Yale Connecticut metamorphic geology field-trip (led by Prof. Jay Ague & Prof. Brian Skinner)
- 2015:** Yale geology graduate field course in Germany, Switzerland, and Italy (led by Prof. Mark Brandon & Prof. Derek E. G. Briggs)
- 2015:** Collected fossils from vertebrate and plant localities of the Triassic Chinle Formation, Petrified Forest National Park, AZ (with Prof. Alan Gishlick, Dr. Shusheng Hu, fossil preparator Marilyn Fox, and colleagues)
- 2014:** Yale Connecticut Quaternary geology field-trip (led by Prof. Mark Brandon & Prof. David A. D. Evans)
- 2013:** Field mapping and stratigraphy course (Earth 440) at the University of Michigan field station (Camp Davis) in Jackson Hole, WY (Prof. John Geissman, Prof. Nathan Sheldon, Prof. Nathan Niemi)
- 2012:** Collected fossils from various Pleistocene megafaunal localities in northern Siberia, Sakha Republic, Russian Federation (led by Prof. Daniel C. Fisher)
- 2011:** Introductory field geology course (GeoSci 116) at the University of Michigan field station (Camp Davis) in Jackson Hole, WY

**Teaching Experience:**

- F2019:** Yale Teaching Fellow (TF) for G&G 513: Invertebrate Paleontology (Prof. Derek E. G. Briggs)
- Contributed lecture on fossil cephalopods
- F2018:** Yale Teaching Fellow (TF) for G&G 655: Extraordinary Glimpses of Past Life (Prof. Derek E. G. Briggs)
- S2018:** Yale Teaching Fellow (TF) for G&G/E&EB 125 and 125b: History of Life and History of Life Lab (Prof. Derek E. G. Briggs & Prof. Pincelli Hull)
- Designed lab on patterns in the history of life
  - Designed lab on fossil fishes
  - Contributed to lab on fossil reptiles & birds
  - Designed lab on fossil mammals
- F2016:** Contributed to lectures on placoderm fishes and other early jawed vertebrates in G&G 525: Vertebrate Paleontology (Prof. Jacques Gauthier)
- F2016:** Yale Teaching Fellow (TF) for G&G 513: Invertebrate Paleontology (Prof. Derek E. G. Briggs)
- Contributed lecture on fossil cephalopods
- S2016:** Yale Teaching Fellow (TF) for G&G/E&EB 125: History of Life (Prof. Derek E. G. Briggs & Prof. Bhart-Anjan Bhullar)
- S2015:** Yale Teaching Fellow (TF) for G&G/E&EB 125: History of Life (Prof. Pincelli Hull & Dr. Lidya Tarhan)
- F2013:** University of Michigan Undergraduate Teaching Assistant (UTA) for Biology 252: Vertebrate Diversity & Comparative Anatomy (Prof. Daniel Rabosky)
- F2011:** University of Michigan, Science Learning Center Study Group Leader for Biology 172: Introductory Molecular, Cellular, and Developmental Biology

**Public Outreach:**

**2016 – present:** Volunteer Data Enterer for the Paleobiology Database

**2017 – 2018:** Volunteer invertebrate paleontologist for the Yale Peabody Museum’s “Dinosaur Days” meet-the-scientist event

**2015 – 2018:** Led public behind-the-scenes tours of the Invertebrate Paleontology collections at the Yale Peabody Museum

**2016:** Volunteer invertebrate paleontologist for the Yale Peabody Museum’s 150<sup>th</sup> Anniversary Celebration

**2015:** Volunteer for the Johns Hopkins Center for Talented Youth overnight event at the Yale Peabody Museum, led activity on micro-vertebrate remains of the Late Cretaceous Lance Formation

**2015:** Volunteer vertebrate paleontologist for the Yale Peabody Museum’s “Dinosaur Days” meet-the-scientist event

**Societies:**

- Paleontological Society
- Palaeontological Association
- Society of Vertebrate Paleontology
- Phi Beta Kappa National Honors Society
- Golden Key National Honors Society

**Computational Skills:**

- Programming & Statistics:
  - R (intermediate)
  - Minitab (advanced)
- Phylogenetics:
  - TNT (intermediate)
  - RevBayes (intermediate)
  - PAUP4 (intermediate)
  - Mesquite (intermediate)
- Visualization & Imaging:
  - Amira (advanced)
  - VGSTUDIO MAX (intermediate)
  - MeshLab (intermediate)
  - Landmark (advanced)
  - 3-matic (basic)
  - Magics (basic)
- Adobe Suite (intermediate)
- Microsoft Office (advanced)

**Languages:**

- English (primary); Spanish (basic)