

ZACHARY CALAMARI
zcalamari@amnh.org - (212)769-5554

EDUCATION

Richard Gilder Graduate School at the American Museum of Natural History, New York City
Doctor of Philosophy, Comparative Biology, expected graduation: August 2017

University of Michigan, Ann Arbor
Bachelor of Science with Distinction, Geological Sciences and History (double major), 2011

GRANTS, FELLOWSHIPS, AND SCHOLARSHIPS

National Science Foundation Doctoral Dissertation Improvement Grant - \$19,348, one year
- “Assessing Homology of Hoofed Mammal Headgear with 3D Morphometrics and Next-Generation Transcriptomics”

Geological Society of America Graduate Research Grant - \$1,825, two years

Richard Gilder Graduate School Fellowship and Research Assistantship – \$138,856, four years

BP Geoscience Field Camp Fellowship – \$2000

Stewart R. Wallace Scholarship for Geological Sciences – \$500

Robert C. Byrd Honors Scholarship – \$4500, three years

Michigan Tradition Scholar – \$40,000, four years

AWARDS AND HONORS

Honorable Mention – National Science Foundation Graduate Research Fellowship 2015

Honorable Mention – National Science Foundation Graduate Research Fellowship 2014

Camp Davis Field Geologist Award – 2012

- Awarded for outstanding performance in the rigorous upper-level field course

James B. Angell Scholar – 2012

- Awarded for two or more consecutive semesters with a 4.0 grade record.

University Honors – 2007, 2008, 2009, 2010, 2011

- Awarded to students with a GPA of 3.5 or higher

PUBLICATIONS (PEER-REVIEWED)

• denotes undergraduate coauthor

9. **Calamari, Z.T.** 2017. Age-related differences in the horn growth transcriptome of juvenile cattle (*Bos taurus*). *In prep, intended submittal to Journal of Dairy Science*.

8. **Calamari, Z.T.** 2017. Next-generation transcriptomics insights for cattle horn growth and ruminant cranial appendage transcriptome homology. *In revision, intended submittal to Journal of Anatomy*.

7. **Calamari, Z.T.** 2017. Total evidence phylogenetic analyses of morphology and mitochondrial, nuclear, and ancient DNA for the exploration of morphological synapomorphies in Bovidae (Mammalia, Artiodactyla). *In prep, intended submittal to Journal of Mammalian Evolution*.

6. **Calamari, Z.T., • Fossum, R.** 2017. Shape disparity of bovid (Mammalia, Artiodactyla) horn sheaths and horn cores allows discrimination by species in 3D geometric morphometric analyses. *Submitted, Journal of Morphology*.

5. **Calamari, Z.T.** 2016. Sexual maturity and shape development in cranial appendages of extant ruminants. *Ecology and Evolution*, 6: 7820-7830.
4. Zelditch, M.L., **Calamari, Z.T.**, Swiderski, D.L. 2016. Disparate postnatal ontogenies do not add to the shape disparity of infants. *Evolutionary Biology*, 43: 188-207.
3. Miller, I.M., J.S. Pigati, R.S. Anderson, K.R. Johnson ... **Z.T. Calamari**, et al. 2014. *Summary of the Snowmastodon Project Special Volume: A high-elevation, multi-proxy biotic and environmental record of MIS 6-4 from the Ziegler Reservoir fossil site, Snowmass Village, Colorado, USA. Quaternary Research*, 82: 618-634.
2. Fisher, D.C., M.D. Cherney, C. Newton, A.N. Rountrey, **Z.T. Calamari**, R. Stucky, C. Lucking, L. Petrie. 2014. Taxonomy and tusk growth analyses of Ziegler Reservoir proboscideans. *Quaternary Research*, 82: 518-532.
1. Fisher, D.C., E.A. Shirley, C.D. Whalen, **Z.T. Calamari**, A.N. Rountrey, A.N. Tikhonov, B. Buigues, F. Lacomat, S. Grigoriev, P.A. Lazarev. 2014. X-ray computed tomography of two mammoth calf mummies. *Journal of Paleontology*, 88: 664-675.

TEACHING AND MENTORSHIP

Teaching Assistant

Evolution, Richard Gilder Graduate School, Spring 2015

- Design and implement labs on evolutionary biology data, software, and programming
- Guide students in formulating and completing individual research projects for publication in peer-reviewed journals

Teaching Assistant

Structures (Human Gross Anatomy), Mount Sinai School of Medicine, Fall 2015

- Teach students strategies for improving cadaver dissections and mastering identification and function of anatomical structures
- Create and proctor mock lab exams to help students prepare for in-lab assessments

Research Mentor for Undergraduate Ryanna Fossum

Photogrammetry and Geometric Morphometrics, Summer 2016

- Train and oversee student in generation of photogrammetry models
- Instruct in geometric morphometric methods

Senior Teaching Assistant

Structures (Human Gross Anatomy), Mount Sinai School of Medicine, Fall 2016

- Teach students strategies for improving cadaver dissections and mastering identification and function of anatomical structures
- Prepare cadavers for students by performing difficult and time consuming dissection steps outside of lab hours

MUSEUM EDUCATION

Guest Scientist, “Meet the Scientist,” February 2017

American Museum of Natural History Discovery Room

- Present three lessons on ruminant cranial appendages and methods of paleobiology
- Guide students and parents through hands-on demonstrations of real skulls to learn differences between horns, antlers, and pronghorns

Facebook Live Presenter, August 2016 and November 2016

AMNH Hall of Advanced Mammals, Hall of North American Mammals

- “Horns and Other Headgear with Zac Calamari,” URL: goo.gl/Ssehaf
- “Zac Calamari Talks Horns and More in the Hall of North American Mammals,” URL: goo.gl/NVfyvl
- Interact with viewers from around the world during explanations of fossil and living ruminants and their cranial appendages

Content Consultant, “Bovids and Cervids of Asia Event,” August 2016

American Museum of Natural History Education Department

- Instruct Education Department staff in biology and ecology of Asian ruminants on display in the Hall of Asian Mammals
- Attend event to answer visitor questions and provide feedback on activities

Guest Presenter, “Tree of Life Class: Careers in Paleontology,” December 2015, April 2016

American Museum of Natural History After School Program

- Excite students training for high school research projects at AMNH about research at the museum
- Present and answer questions about graduate training and paleontology jobs

Content Consultant, “Lang Science Program Paleontology Curriculum,” Summer 2015

American Museum of Natural History Education Department

- Train 6th grade curriculum designers in basics of ancestral state reconstructions
- Provide advice, publications, and potential activities in support of curriculum

Guest Speaker, “Why be poisonous?” and “From Ants to Whales: How Evolution Works,”

October 2013 and February 2014 (with P. Barden)

Johns Hopkins Center for Talented Youth and AMNH Education Department

- Design and present entertaining science talks to audiences of pre-High School students
- Challenge students to master material through active question-based learning

Outreach Facilitator, January 2011 – March 2011

Supervisor: Amanda Paige

University of Michigan Museum of Natural History Family Science and Reading Program

- Lead science education activities for parents and children in Detroit-area libraries
- Learn science curricula to enrich presentations and raise interest in science in families

- Prepare and maintain personal supplies for presentations and activities

Docent Representative, Spring 2010 – Spring 2012

University of Michigan Museum of Natural History Board of Advisors

- Coordinate docent involvement in hiring a new Student Affairs Program Manager
- Represent all docents at Museum Advisory Board meetings
- Plan and execute docent community-building events

Docent, September 2008 – August 2013

Supervisors: Sarah Thompson

University of Michigan Museum of Natural History

Brittany Chunn

- Train new docents to present effective science content in tours
- Lead tours of pre-K to grade 12 students focusing on prehistoric life and evolution
- Schedule group visits and calculate sales in the museum store and office

ADDITIONAL SCIENCE OUTREACH AND BROADER IMPACTS

Classroom Guest Speaker, “How Paleontology Works”

St. Hilda’s and St. Hugh’s, New York, November 2015, December 2016

Organizer, 5th Annual Northeast Regional Vertebrate Evolution Symposium

Adelphi University, April 2016

Remote Guest Speaker, “Skype with a Scientist”

Brightworks School, San Francisco, CA, October 2015

Instructor, “Ignore My Research! Best Practices for Presenting Research in Posters and Talks”

NSF-REU Professional Development Workshop at AMNH, July 2014

PRESENTATIONS (PUBLISHED ABSTRACTS)

11. **Calamari, Z.T.** 2016. Beneath the sheaths: Do horn cores of bovids (Artiodactyla, Mammalia) represent living horn shape in geometric morphometric analyses? *Journal of Vertebrate Paleontology, Programs and Abstracts*, 2016. p. 108.
10. **Calamari, Z.T.** 2015. No bone unturned: Detecting hard tissue synapomorphies for bovids (Artiodactyla, Mammalia) through total evidence analyses of morphology and mitochondrial, nuclear, and ancient DNA. *Journal of Vertebrate Paleontology, Programs and Abstracts*, 2015. p. 101.
9. **Calamari, Z.T.** 2014. Exploring development in the fossil record with ancestral state reconstruction of cranial appendages. *Journal of Vertebrate Paleontology, Programs and Abstracts*, 2014, p. 103. *Poster*.
8. **Calamari, Z.T.** 2014. A next generation transcriptomics approach to testing homologies in hoofed mammal cranial appendages. *Evolution 2014 Abstracts*, p. 410. *Poster*.
7. Fisher, D.C., J. El Adli, **Z.T. Calamari**. 2013. 3D osteology of the American mastodon. *Journal of Vertebrate Paleontology, Program and Abstracts*, 2013, p. 127.

6. Cherney, M.D., **Z.T. Calamari**, D. C. Fisher. 2013. No observed effects of climate change on Snowmass mastodon tusk growth. *Journal of Vertebrate Paleontology, Program and Abstracts*, 2013, p. 104.
5. Fisher, D.C., M.D. Cherney, A.N. Rountrey, **Z.T. Calamari**. 2013. Paleobiology of Snowmass proboscideans (Pleistocene, Colorado). *Geological Society of America Abstracts with Programs*, 45: 7, p. 854.
4. Whalen, C.D., E. Shirley, D.C. Fisher, A.N. Rountrey, **Z.T. Calamari**, A.N. Tikhonov, B. Buigues, S. Grigoriev, C.E. Holmes, F. Lacomat. 2012. 3D visualization and analysis of CT imaging in two mammoth calves. *Geological Society of America Abstracts with Programs*, 44: 7, p. 370.
3. Cherney, M.D., D.C. Fisher, A.N. Rountrey, **Z.T. Calamari**. 2012. Isotope analyses support use of CT scans for identifying annual increments in Snowmass mastodon mandibular tusks. *Journal of Vertebrate Paleontology, Program and Abstracts*, 2012, p. 77.
2. Fisher, D.C., M.D. Cherney, A.N. Rountrey, S.G. Beld, **Z.T. Calamari**. 2012. Snowmass mastodon tusks as records of life and death: perspectives on climate change and circumstances of death. *Denver Museum of Nature and Science Technical Report 2012-5: Program and Abstracts for the First Snowmastodon Science Team Meeting*, pp. 11-12.
1. Cherney, M.D., D.C. Fisher, A.N. Rountrey, **Z.T. Calamari**. 2012. Isotope analyses support use of CT scans for identifying annual increments in Snowmass mastodon tusks. *Denver Museum of Nature and Science Technical Report 2012-5: Program and Abstracts for the First Snowmastodon Science Team Meeting*. pp. 8-9.

PRESENTATIONS (NO ABSTRACTS)

5. **Calamari, Z.T.** Next-generation transcriptomics insights for understanding horn development in juvenile cattle (*Bos taurus*). *Evolution 2016*. Austin, June 2016.
4. **Calamari, Z.T.** Next-generation transcriptomics of horn growth and the future of cranial appendage homology. *Northeast Regional Vertebrate Evolution Symposium*. Garden City, NY, April 2016.
3. **Calamari, Z.T.** Correlating cranial appendage shape with age at sexual maturity in ruminants (Artiodactyla: Mammalia). *Northeast Regional Vertebrate Evolution Symposium*. New York City, March 2015.
2. **Calamari, Z.T.** Morphological synapomorphies of the Bovidae (Artiodactyla: Mammalia). *Second Annual Symposium of the Metropolitan Society of Natural Historians*. New York City, January 2014.
1. **Calamari, Z.T.**, E.A. Shirley, D.L. Swiderski, M.L. Zelditch. *Ontogeny of Rodent Mandibles*. *Michigan Morphometrics Symposium*. Lansing, March 2013.

PRIOR RESEARCH EXPERIENCE

Laboratory Technician, January 2011 – August 2013 Supervisor: Daniel C. Fisher
University of Michigan Museum of Paleontology

- Process proboscidean tusk samples for isotopic analysis
- Map anatomical photographs onto digital 3D models of proboscidean bones
- Create 3D bone models using a laser scanner
- Modify laser scanning and model processing methods to improve model quality
- Direct undergraduates working on proboscidean digitization

Morphometrics Research Group, Fall 2011 – Present Supervisor: Miriam Zelditch
University of Michigan Museum of Paleontology

- Study concepts and methods of morphometrics research
- Process photographs for morphometric analysis
- Participate in project studying ontogeny of rodent mandibles

FIELD WORK

Washakie Basin AMNH Expedition: Wyoming, USA, August 2016

- Collect Eocene mammal fossils
- Identify and catalogue material for accession into American Museum of Natural History collections

Yakutia Expedition: Sakha, Russia, August 2012

- Collect Pleistocene mammoth remains in regions along the Arctic Ocean
- Catalogue material for export permits
- Develop relationships with researchers in Yakutsk, Sakha, Russia and communities near field sites

Geology Field Course: Wyoming, USA, Summer 2011

- Maintain detailed field notes of strike and dip measurements, and lithology
- Draft stratigraphic columns, cross sections, and bedrock maps from field data

ADDITIONAL EXPERIENCE

Weekend Staff, October 2009 – August 2013 Supervisor: Amy Harris
University of Michigan Museum of Natural History

- Ensure a safe environment in the museum for student staff and visiting public
- Interact with public as the ranking member of museum staff in the building

Resident Advisor, August 2009 – May 2010 Supervisor: Shira Duncan
University of Michigan Residence Education, South Quadrangle

- Guarantee the wellbeing of residents in South Quadrangle
- Plan and coordinate hall and building events with other members of Residence Staff

Co-Chair, September 2008 – May 2009 Supervisor: Jessica Condelee
Ambatana Multicultural Council, South Quadrangle

- Facilitate communication between Ambatana and other campus multicultural groups
- Create and run educational events focusing on multiculturalism and social justice

PROFESSIONAL MEMBERSHIPS

Society of Vertebrate Paleontology

The Paleontological Society

Geological Society of America

Society for the Study of Evolution