THE WAGNER FREE INSTITUTE OF SCIENCE

Winter 2020
BIOLOGICAL SCIENCES/PALEONTOLOGY SERIES
Field-Based Paleontology in Pennsylvania and the Canadian Arctic
Professor Jason Downs

This course is co-sponsored by the Penn Museum**,** located at 33rd and Spruce Streets, Philadelphia. The entrance for the course is at the east end of the building**.**

Dates: 8 Saturdays from January 25 – March 14, 2020
Time: Lectures meet from 10:30 AM TO NOON

This course requires pre-registration. To sign-up, click on the link on the Wagner's course schedule webpage or call 215-763-6529 x23.

Course Description
This course will share research results from the last two decades of Philadelphia-based paleontological projects by Professor Jason Downs and his collaborators. The course will communicate the process of paleontology, from fieldwork and collection building to observations and descriptive writing to statistical analysis of quantitative paleontological data. The subjects of the projects covered will include *Tiktaalik roseae* and the vertebrate fin-to-limb transition, ancient armored aquatic vertebrates from tiny juveniles to a gigantic new species, and the origin and early evolution of the jawed vertebrate skeleton.

Course Schedule

1. **Saturday, January 25, 2020 – Introduction to the science**
This lecture will introduce paleontology as a science and will explore field expeditions using personal stories from Pennsylvania and the Canadian Arctic.

2. **Saturday, February 1, 2020 – Devonian Period sharks of Pennsylvania**
A study of shark teeth from the Catskill Formation (Late Devonian Period) of Pennsylvania addresses the question: how many species?

3. **Saturday, February 8, 2020 – The vertebrate skeleton at the origin of jaws**
Microstructural comparative study of living jawed vertebrates and the original jawed vertebrates addresses the changes the vertebrate skeleton experienced at the origin of jaws.

4. **Saturday, February 15, 2020 – The internal head skeleton of *Tiktaalik roseae***
Tiktaalik roseae is a remarkable Devonian species in the vertebrate fin-to-limb transition. This lecture will look at its braincase, gill skeleton, and jaws to address skull changes across the vertebrate transition to land.

5. **Saturday, February 22, 2020 – Armored aquatic vertebrates, big and small**
A death assemblage of tiny armored individuals from the Devonian Period of Pennsylvania is studied to address the question: do these represent babies or a new species of small adults? This lecture will also discuss a gigantic new armored species from the Canadian Arctic.

6. **Saturday, February 29, 2020** – **Porolepiforms (lobe-finned vertebrates) of the Canadian Arctic**
Porolepiforms are an entirely extinct group that are closely related to modern lungfish. The site that produced *Tiktaalik roseae* is dominated by porolepiforms, including two new named species that will serve as the basis for this lecture.

7. **Saturday, March 7, 2020 - Tristichopterids (lobe-finned vertebrates) of Pennsylvania and the Canadian Arctic**

Nearly every Catskill Formation (Late Devonian) site with vertebrate fossils has a single species of tristichopterid. This lecture will explore these unique animals and will introduce the several named species unique to Pennsylvania.

8. **Saturday, March 14, 2020 - Multiple species of *Asterolepis* at a single site?**

Disarticulated *Asterolepis* armored plates from the *Tiktaalik roseae* site show enough variation to ask the question: do these fossils represent more than one species? This lecture will explore how that question is addressed.

Saturday, March 21, 2020 – make-up class (if needed)

Consider these books:

Your Inner Fish: A Journey jnto the 3.5 Billion Year History of the Human Body. 2006. Neil Shubin. ISBN: 978-0307277459

Gaining Ground: The Origin and Evolution of Tetrapods, Second Edition. 2012. Jennifer Clack. ISBN: 978-0253356758

About the Professor

Dr. Jason Downs is Assistant Professor of Biology at Delaware Valley University. He is also a Research Associate at the Academy of Natural Sciences in the Vertebrate Paleontology Group, where he has done active research since 2006. He was one of the team members who discovered the Tiktaalik roseae, a specimen that shed new light on the vertebrate transition to land. Dr. Downs has been teaching for the Wagner since 2012.