

Matthew J. Vavrek

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EDUCATION

- Ph.D.** **McGILL UNIVERSITY** Department of Biology, *expected* 2010.
THESIS: 'Palaeomacroecology: Large Scale Patterns in Species Diversity Through the Fossil Record'
- B.Sc.** **UNIVERSITY OF ALBERTA**, Palaeontology (Honours), 2004.
THESIS: 'Palaeobotany and Palaeoecology of the Munce's Hill locality near Red Deer, Alberta'

RESEARCH INTERESTS

My research can be broadly summarised as a study of large scale ecology in the fossil record, or palaeomacroecology. I use fossil data to answer questions we have of ecology today, such as why there are more species at the equator than the poles, how local and regional biodiversity is distributed, and how biodiversity reacts to changes in the environment.

PUBLICATIONS AND PRESENTATIONS

Publications in Refereed Journals

- Vavrek, M.J.** and H.C.E. Larsson. Low beta diversity of Maastrichtian dinosaurs of North America. Proceedings of the National Academy of Sciences, in press.
- Vavrek, M.J.**, H.C.E. Larsson and N. Rybczynski. 2007. A Late Triassic flora from east-central Axel Heiberg Island, Nunavut, Canada. *Canadian Journal of Earth Sciences*, 44: 1653-1659.
- Vavrek, M.J.**, R.A. Stockey, and G.W. Rothwell. 2006. *Osmunda vancouverensis* sp. nov. (Osmundaceae), permineralized fertile frond segments from the Lower Cretaceous of British Columbia, Canada. *International Journal of Plant Sciences* 167: 631-637.

Scientific Software

- Vavrek, M.J.** 2008 – 2010. fossil, Palaeoecological and Palaeogeographical Analysis Tools (R statistical package). <http://cran.r-project.org/web/packages/fossil/index.html>.
- Vavrek, M.J.** 2008. PostGPS, A plugin for the Quantum GIS program to convert between data formats. <http://pyqgis.org/repo/contributed/>.

Conference Presentations

- Vavrek, M.J.** 2009. New methods of network paleobiogeography with an empirical example from Miocene mammals. *Journal of Vertebrate Paleontology*, 29(3) suppl., pg. 195A.
- Vavrek, M.J.** and H.C.E. Larsson. 2009. Dinosaurs of North America show ancient association between low beta diversity and homogeneous climates. Frenchman Formation Terrestrial Ecosystem Conference Abstracts, pg. 63.
- Vavrek, M.J.** and H.C.E. Larsson. 2007. Relationships of dinosaur assemblages during the Maastrichtian (Latest Cretaceous) of North America. 4th Interdisciplinary Graduate Student Research Symposium Abstracts Volume, pg. 29.
- Vavrek, M.J.** and H.C.E. Larsson. 2006. Analysis of dinosaur diversity and provinciality in Late Cretaceous North America. *Journal of Vertebrate Paleontology*, 26(3) suppl., pg. 135A.
- Larsson, H.C.E., M. de Boef, T.A. Dececchi, E.E. Maxwell, S.C. Tissandier, **M.J. Vavrek**. 2006. Marine Reptiles from Melville and Cameron Islands, Nunavut. *Canadian Paleontology Conference Proceedings No. 4*: pg 26.
- Vavrek, M.J.**, R.L. Church and H.C.E. Larsson. 2006. Biogeography of North and South American Triassic floras. *Canadian Paleontology Conference Proceedings No. 4*: pg 39-40.
- Vavrek, M.J.** 2006. Analysis of dinosaur endemism in Late Cretaceous North American assemblages. *Interdisciplinary Graduate Student Research Symposium 2006*.

- Vavrek, M.J.** 2005. A new Late Triassic floral assemblage from Axel Heiberg Island, Nunavut. Interdisciplinary Student Symposium 2005.
- Vavrek, M.J.**, R.A. Stockey, and G.W. Rothwell. 2004. Permineralized *Osmunda* pinnae with attached sporangia containing spores from the Lower Cretaceous of British Columbia, Canada. Botany 2004 abstracts volume.

Poster Presentations

- Vavrek, M.J.**, L. Harrison, E. Bamforth, N. Bayani, L. Baret, A. Ebn-al-Nassir, C. Erana, W. Long, E. Maxwell, J. Rousseau, R. Tahara, H.C.E. Larsson. 2007. Systematic exploration of Grasslands National Park, Saskatchewan - 2007 McGill Field Course. Canadian Paleontology Conference Proceedings No. 5.
- Vavrek, M.J.** and H.C.E. Larsson. 2006. Turnover rates in Late Cretaceous dinosaur assemblages. Canadian Society for Ecology and Evolution Inaugural Meeting (list of poster presentations - pg 89).
- Vavrek, M.J.** 2004. Palaeoenvironmental implications of fossil salamander taxa from the Upper Cretaceous (Maastrichtian) Frenchman Formation of Southwestern Saskatchewan. Journal of Vertebrate Paleontology, 24(3) suppl., pg. 125A.
- Vavrek, M.J.** 2004. Fossil salamanders from the Cretaceous (Maastrichtian) of southwestern Saskatchewan and their association with climate and environment. Alberta Palaeontological Society Eighth Annual Symposium Abstracts pg. 69-70.
- Vavrek, M.J.** 2004. Palaeoecology and the Palaeoenvironment of the Paleocene Munce's Hill locality near Red Deer, Alberta, Canada. Prairie Universities Biological Symposium pg. 79.
- Vavrek, M.J.** 2003. Late Cretaceous Salamanders of the Frenchman Formation and their palaeoenvironmental implications. Canadian Paleontology Conference Proceedings No. 1: pg 43-44.

Invited Presentations

- Vavrek, M.J.** October 24, 2006. Biodiversity in the fossil record. Invited speaker, Concordia University.
- Vavrek, M.J.** April 8, 2004. Osmundaceous sporangia from the Early Cretaceous of Vancouver Island. Invited speaker, Symposium on the Evolution of Ferns, University of Alberta.

Working Papers

- Palaeoecology and palaeobotany of the Munce's Hill locality near Red Deer, Alberta, Canada (2009).
A Paleocene Flora from the Upper Bonnet Plume Formation of northeast Yukon Territory, Canada (2009).

Work in Progress

- Integration of a full suite of Open Source software for palaeoecological analysis.
Mesozoic dinosaurian biogeography using quantitative methods.
Latitudinal biodiversity gradients through geologic time.

WORK EXPERIENCE

Palaeobotany Contract Employee, Yukon Government, June 2009 – present

Collection and identification of plant fossils from the Peel River, northern Yukon Territory, under contract to the Yukon Territorial Government.

Graduate Student Researcher, September 2004 – present

Redpath Museum, McGill University. Thesis advisors: Dr. Hans Larsson and Dr. Brian McGill

Research Assistant, Summer 2004

University of Alberta, Earth and Atmospheric Sciences. Photographic documentation of invertebrate fossils in Lebanon, under the supervision of Dr. Brian Chatterton

Research Assistant, Summer 2003

University of Alberta, Department of Biological Sciences. Excavation, collection and identification of plant fossils from the Munce's Hill locality near Red Deer, Alberta, under the supervision of Dr. Ruth Stockey.

Research Assistant, Summer 2002

University of Alberta, Laboratory for Vertebrate Palaeontology. Collection and classification of vertebrate microfossils from Chamberly Coulee, southern Saskatchewan, under the guidance of Dr. Michael Caldwell.

TEACHING EXPERIENCE

McGill University, Biology Department

Teaching Assistant, Vertebrate Palaeontology Field Course, Summer 2007 – 2009

A 2.5 week long field course in vertebrate palaeontology, with a focus on hands on learning. I helped organize transportation, meals and lodging, as well as giving lectures and preparing and marking the course exam.

Teaching Assistant, Methods in Biology of Organisms, Fall 2005 – 2007

An introductory laboratory-based class, with a focus on methods and hands on experimentation in a variety of disciplines of organismal biology. I led introductory lectures, provided one-on-one assistance to students, and marked oral presentations and written assignments and essays.

Teaching Assistant, Animal Diversity, Winter 2005 – 2007

A broad course meant as an introduction to the major phyla of animals, with a focus on their morphology, evolution and relationships to one another. I led lab sections, which included being able to identify all of the different phyla and explain their defining characteristics, and marked lab and lecture exams.

Teaching Assistant, Large Scale Ecology, Winter 2007

Ecological patterns and processes at large spatial, taxonomic and temporal scales. I led computer lab sessions doing statistical analyses using Excel, assisted on a field trip to a nearby forest preserve to identify and census tree species, and marked assignments and exams.

Teaching Assistant, Biological Oceanography, Winter 2006

An overview of plankton biology and ecology, at both small and large scales. I assisted students in experimental growth studies of various plankton species under varying environmental conditions, and marked poster presentations and lab assignments.

Guest Lecturer, Animal Diversity, Winter 2005

A broad course meant as an introduction to the major phyla of animals, with a focus on their morphology, evolution and relationships to one another. Lectured on the diversity and morphology of modern and fossil echinoderms.

Teaching Assistant, Cell and Molecular Biology, Winter 2005

An introductory course for all students in the biological sciences stream. I supervised students as they learned techniques including basic microscopy and sterile techniques, up through gel electrophoresis, and graded oral presentations, lab assignments and quizzes.

Teaching Assistant, Introduction to Ecology and Evolution, Fall 2004

An introduction to the fundamental patterns and processes of ecology and evolution. I gave review sessions on course material, led journal article discussions, and marked exams and assignments.

Concordia University, Department of Geography, Planning and Environment

Guest Lecturer, Paleobiology, Winter 2007

An overview of palaeontology, covering vertebrates, invertebrates and plants. Lectured on the history and evolution of plants, from the first land plants through to modern floras.

COMMUNITY SERVICE AND OUTREACH

Assistant Coach, 2008 – 2009

Westlock Wrestling Club, Westlock, Alberta. Led practices and taught new techniques to high school students.

Audio-visual volunteer technician, 2004 – 2006

Interdisciplinary Graduate Student Research Symposium, McGill University. Organized and set up all the audio-visual equipment for the conference, and helped troubleshoot problems with presentations.

Executive member, 2004 – 2006

Biology Graduate Students Association, McGill University. Helped in the organization of events for the graduate student community in biology.

Assistant Coach, 2005 – 2006

McGill University Wrestling Club. Led practices, taught new techniques and organized trips for tournaments.

Student volunteer, 2004 – 2006

'Let's Talk Science' science education outreach, McGill University. Gave guided tours to school groups with a focus on the different types of science research being conducted at the university, and judged science fair competitions.

Student Representative, 2003 – 2004

Student member of the Systematics and Evolution Research Interest Group at the University of Alberta.

Volunteer interpreter, 2003 – 2004

University of Alberta Museums. Gave museum tours and presentations to school and community groups of various ages.

Secretary, 2002 – 2004

University of Alberta Palaeontological Society

Assistant Coach, 2003

Special Olympics Edmonton Softball Team.

PROFESSIONAL MEMBERSHIPS

Society of Vertebrate Paleontology	2003–04, 2007–08
Arctic Institute of North America	2006–07
Canadian Society of Ecology and Evolution	2006–07

HONORS & AWARDS*Fellowships*

Northern Scientific Training Program grant	2005 – 2008 (declined 2005 and 2007)
FQRNT Doctoral Research Scholarship	2008–2009
NSERC CGS-D Graduate Student Award	2006–2008
NSERC PGS-D Graduate Student Award	2005 (declined)
NSERC CGS-M Graduate Student Award	2004 – 2006
NSERC Undergraduate Summer Research Award	2002 – 2004

Awards

Dean's Honour Roll, University of Alberta	2000–2004
CIS Academic All-Canadian	2000–2002; 2004–2006
German Government Book Prize	2003
Jason Lang Scholarship	2002–2004
Canada Millenium Bursary	2002–2004
PS Warren Prize in Geology	2001
St Josephs College Scholarship	2001
Jimmie Condon Award	2000–2001
Faculty of Science Entance Scholarship	2000
Willis Teskey Scholarship	2000
Alexander Rutherford Scholarship	2000
U of A Entrance Scholarship	2000
Gulf Canada Resources Science Award	2000
Shell Canada Award	2000

Honorary Societies

Golden Key International Honour Society	2002
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FIELD EXPERIENCE

Yukon palaeobotany consultant

Location: Peel River Basin, Yukon Territory, Canada
Date: July 20–29, 2009
Role: consultant
Activities: logistical assistance, plant identification, report preparation

Vertebrate Palaeontology Field Course (Biol 573)

Location: Eastend and Grasslands National Park, Saskatchewan and Dinosaur Provincial Park, Alberta, Canada
Date: May 17–June 4, 2009
Role: teaching assistant
Activities: logistical assistance, student management, exam preparation

Yukon fossil reconnaissance expedition

Location: Peel River Basin, Yukon Territory, Canada
Date: August 1–14, 2008
Role: research partner
Activities: logistical assistance, plant identification, report preparation

Vertebrate Palaeontology Field Course (Biol 573)

Location: Eastend and Grasslands National Park, Saskatchewan, Canada
Date: May 1–19, 2008
Role: teaching assistant
Activities: logistical assistance, student management

Panama collaborative work

Location: Smithsonian Tropical Research Institute, Panama City, Panama
Date: January 15 – April 15, 2008
Role: visiting researcher
Activities: collaborative research, fossil prospecting

Vertebrate Palaeontology Field Course (Biol 573)

Location: Eastend and Grasslands National Park, Saskatchewan, Canada
Date: May 1–19, 2007
Role: co-leader
Activities: logistical assistance, student management

Missinaibi River expedition

Location: Missinaibi River, northern Ontario, Canada
Date: September 14–21, 2006
Role: expedition leader/coordinator
Activities: logistical coordination, permit applications, trip leader

High Arctic palaeontological exploration

Location: Ellesmere and Melville Islands, Nunavut, Canada
Date: July 1–30, 2006
Role: student
Activities: logistical assistance, fossil prospecting/excavation

Vertebrate Palaeontology Field Course (Biol 573)

Location: Dry Island Buffalo Jump Provincial Park, Alberta, Canada
Date: July 15–30, 2005
Role: student
Activities: logistical assistance, fossil prospecting/excavation, stratigraphic mapping

Lebanon fossil invertebrate exploratory trip

Location: Byblos, Lebanon

Date: June 5–15, 2004

Role: student

Activities: fossil inventorying, stratigraphic mapping

British Columbia Cretaceous plant collecting

Location: Vancouver Island, British Columbia, Canada

Date: July 15–30, 2003

Role: student

Activities: fossil prospecting/excavation

Munce's Hill plant locality survey

Location: Red Deer, Alberta, Canada

Date: August 2–4, 2003

Role: student

Activities: excavation coordination, stratigraphic mapping

"Scotty" the *T. rex* quarrying

Location: Eastend, Saskatchewan, Canada

Date: July 10–30, 2002

Role: student

Activities: quarry excavation, microsite collection, stratigraphic mapping

Saskatchewan marine vertebrate prospecting

Location: Lake Diefenbaker, southern Saskatchewan, Canada

Date: June 15–30, 2002

Role: student

Activities: fossil prospecting

Geology field school (EAS 234)

Location: Jasper, Alberta, Canada

Date: May 1–8, 2002

Role: student

Activities: stratigraphic mapping

RELEVANT SKILLS AND TRAINING

Languages

English: fluent

French: intermediate

Spanish: basic

German: basic

Computer Skills

GIS, Python, Qt, Linux, R, SQL, \LaTeX .

Certifications

Firearms Acquisition Certificate

Wilderness First Aid Certification

Class 5 drivers license

PADI Open Water Diver

REFERENCES

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Brian McGill, Associate Professor
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Michael Caldwell, Department Chair
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