

CURRICULUM VITAE

Pennilyn Higgins

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Education:

1995 -2000

University of Wyoming
Laramie, WY 82071
M.S. Chemistry (December 1999)
Ph.D. Geology (May 2000)

1990 - 1995

Fort Lewis College
Durango, CO 81301
B.S. Geology and B.S. General Biology (April 1995)

Professional:

Instructor, Department of Earth and Environmental Sciences, University of Rochester, Rochester, NY,
1/1/2007–current

Research Associate, Department of Earth and Environmental Sciences, University of Rochester, Rochester,
NY, *1/1/2005–current*

Manager/Technician, Stable Isotope Ratios in the Environment, Analytical Laboratory (SIREAL), *1/1/2005–
current*

Postdoctoral Research Fellow, Florida Museum of Natural History, University of Florida, Gainesville, FL,
6/1/2000–4/31/2004

Manager, Florida Laboratory for Isotopic and Environmental Research (FLIER), *Fall 2001–April 2004*

Instructor, University of Florida, Department of Geology and Geophysics, *Fall term, 2001*

NSF Graduate Research Fellow, University of Wyoming Department of Geology and Geophysics, Laramie,
WY, *9/1996 – 8/1999*

Teaching Assistant, University of Wyoming, Department of Geology and Geophysics, Laramie, WY, *8/1995 –
4/1996*

Field Assistant, U.S. Bureau of Mines, IFOC, Denver, CO, *6/1995 – 8/1995*

Field Assistant, U.S. Bureau of Mines, IFOC, Denver, CO, *7/1994 – 8/1994*

Tutor, Program for Academic Advancement, Fort Lewis College, Durango, CO, *6/1994, 8/1994 – 12/1994*

President, Fort Lewis College Geology Club (Academic year), *1993/1994*

Field Assistant for Robyn Wright-Dunbar, William Marsh Rice University, Houston, TX, *5/(16–29)/1993*

Captain, Fort Lewis College Women's Cross-Country Team, *1992*

Research interests:

Stable isotope geochemistry of biogenic apatite and of carbonate minerals and interpretation of ancient climatic conditions; vertebrate paleontology and biostratigraphy; annual-scale studies of ancient climate and dietary sources of fossil vertebrates using stable isotopes of tooth and bone apatite; annual-scale studies of ancient climate using stable isotopes of fossil mollusk shell aragonite; uranium hydrogeochemistry and its relation to uranium ore deposition and fossil preservation; vertebrate taphonomy; paleomagnetism in biostratigraphy and global correlation; application of GIS to problems in paleontology; the conflict between evolution and creationism (including Intelligent Design).

Courses taught

- Principles of Paleontology (EES 207)**, University of Rochester, Department of Earth and Environmental Sciences, *Spring term, 2008*
- Invertebrate Paleontology (EES 207)**, University of Rochester, Department of Earth and Environmental Sciences, *Spring term, 2007*
- Introduction to Earth Science**, University of Florida, Department of Geology and Geophysics, *Fall term, 2001*
- Research Mentor**, Upward Bound/Math Science Initiative Project, *6/21/1999 – 7/23/1999*
- Historical Geology Laboratory**, University of Wyoming, Department of Geology and Geophysics, *Fall term, 1995, Spring term, 1996*

Academic Honors, Awards:

- Who's Who in Science and Engineering**, *2000/2001*
- Outstanding Woman Geoscientist Student Award**, University of Wyoming, Association for Women Geoscientists - Denver Chapter, *4/1999*
- Outstanding Ph.D. Student Award**, University of Wyoming Department of Geology and Geophysics, Laramie, WY (Academic year), *1997/1998*
- Eugene M. Shoemaker Outstanding Senior Award**, Geology Department, Fort Lewis College, Durango, CO, *4/1995*
- Outstanding Woman Geoscientist Student Award**, Fort Lewis College, Association for Women Geoscientists - Denver Chapter, *4/1995*
- Who's Who Among Students in America's Universities and Colleges**, *1995*
- National Dean's List** (Academic years) *1992/1993, 1993/1994, 1994/1995, 1997/1998*

Other Honors, Awards, Scholarships:

- Who's Who of American Women**, *2002/2003*
- World Who's Who of Women**, *1995*
- Athletic Scholarship: Women's Cross-Country**, Fort Lewis College (Academic years), *1990/1991, 1992/1993*
- MVP, Women's Cross-Country**, Fort Lewis College, *1990*
- Two Honorable Mentions, Utah State High School Art Show**, University of Utah Fine Arts Museum, *1989*
- Juror's Award, Utah State High School Art Show**, University of Utah Fine Arts Museum, *1987*

Funding:

- NSF Graduate Research Fellowship**, University of Wyoming Department of Geology and Geophysics, Laramie, WY, (\$72,000), *9/1996 – 8/1999*
- Assistantship for Women and Minorities who are U.S. Citizens**, University of Wyoming Graduate School, Laramie, WY, *8/1995 – 5/1996*
- Barry M. Goldwater Scholarship and Excellence in Education Foundation Scholar**, *8/1993 – 4/1995*
- Western Undergraduate Exchange Award**, *8/1990 – 4/1994*
- Frank O. Bowman Scholarship**, Geology Department, Fort Lewis College (Academic years), *1991/1992, 1993/1994*
- Mark S. Welter Scholarship**, Geology Department, Fort Lewis College (Academic year), *1992/1993*
- Ridgeway Scholarship**, Geology Department, Fort Lewis College (Academic year), *1991/1992*

Professional Organizations:

- Society of Vertebrate Paleontology
- Geological Society of America
- American Chemical Society
- Geochemical Society
- Paleontological Society
- American Society for Mass Spectrometry
- The Honor Society of Phi Kappa Phi
- Sigma Xi, the Scientific Research Society
- Beta Beta Beta Biological Honor Society

Professional Service:

Society of Vertebrate Paleontology First North American Summer Field Conference: The Importance of Field-based Geological Documentation to Paleobiological Research. *Co-lead with Jason Lillegraven, Jaelyn Eberle, and Mark Clementz. A conference based out of Medicine Bow, Wyoming, August 4 – 7, 2008.*

Florida Science Standards Committee, *sponsored by the Center For Inquiry (CFI) – Florida. A committee set up to help improve science education in the state of Florida, 8/2005–8/2006.*

Isotopes in Fossils and Paleosols: Records of Late Cenozoic Environmental Change, *with Yang Wang, Florida State University. A technical session for the Geological Society of America annual meeting, November 7–10, 2004.*

From Cusps to Quarries to Continental Catastrophes: Visualizing Spatial and Temporal Paleontological Elements in a Digital Environment. *A symposium for the Society of Vertebrate Paleontology annual meeting, November 3–6, 2004*

Convene a monthly meeting of researchers of stable isotopes at the University of Florida, *9/2001–4/2004*

Auction Committee Member, Society of Vertebrate Paleontology, *1/2001–current*

Naturalist, “Tusks!” exhibit at Florida Museum of Natural History, *6/2002; 9/2002*

Volunteer paleontologist, Pony Express dig at Thomas Farm, FL, *weekends in 4/2001, 4/2002, 4/2003*

Reviewer, four papers for special volume on incremental sampling and stable isotopes for publication in *Palaeogeography, Palaeoclimatology, Palaeoecology*

Reviewer, paper for special volume honoring S. David Webb.

Reviewer, Thompson and Turk, *Earth Science and the Environment*, 2nd edition, *3/2002*

Reviewer, NSF Grant proposal, Division of Earth Sciences, *3/2002*

Naturalist, “A T-rex Named Sue” exhibit at Florida Museum of Natural History, *3/2001; 5/2001*

Synergistic Activities:

Hosted two high-school interns, completed a project involving isotopic analysis of Paleocene organic matter. *July 7 – 11, 2008*

Supported one senior undergraduate, Julia Voronov, to do field research in Wyoming. *August 18 – September 4, 2007. The results of this research became Julia’s senior thesis.*

Talks, Seminars, and Workshops:

5/14/2008, Rochester Section Inc. of the American Chemical Society, Rochester, NY

“The chemical influence of making mountains: What the geochemistry of fossil bones and teeth can tell us about the uplift of the Bolivian Andes”

6/27/2007, 13th Annual Workshop on Continuous Flow Isotope Ratio Mass Spectrometry, Fredricton, NB

“A Workshop for LIMS for Light Stable Isotopes”

1/17/2007, Central New York Skeptics, Syracuse NY

“What’s Wrong with Creation Science?”

4/26/2006, Central New York Skeptics, Syracuse NY

“Use and Abuse of the Fossil Record: The Matter of Transitional Forms”

4/26/2006, University of Rochester, Department of Earth and Environmental Sciences

“Insights into the Biology of Large, Extinct South American Mammals”

3/25/2006, Center For Inquiry (CFI) – Florida, Annual Conference

“From Apathy to Activism”

3/7/2006, Rochester Fossil Club, Rochester NY

“Better Living Through Chemistry –or– What Old Bones Can Tell Us”

2/16/2006, American Society of Mechanical Engineers (ASME), Rochester Section

A discussion of the engineering and applications of isotope ratio mass spectrometry

4/20/2005, SUNY Stony Brook, Department of Anatomy

“Visualizing Annual-Scale Environmental Changes in the Remote Past with Stable Isotopes”

9/7/2000, University of Florida, Department of Geology and Geophysics

“Uranium ore geochemistry and its relationship to vertebrate fossil preservation”

8/11/1998, Camp Quest, Scottsbluff, NE (presented at Veedauwoo Recreation Area near Laramie, Wyoming)

A discussion of basic principles of geology and paleontology geared toward middle-school-aged children

Internet Articles:

- Higgins, P.**, 2008, Expelled. Creation and Intelligent Design Watch, hosted by the Committee for the Scientific Investigation of Claims of the Paranormal.
<http://www.csicop.com/intelligentdesignwatch/expelled.html>
- Higgins, P.**, 2007., On Creation Science. Creation and Intelligent Design Watch, hosted by the Committee for the Scientific Investigation of Claims of the Paranormal.
<http://www.csicop.org/intelligentdesignwatch/higgins2.html>
- Higgins, P.**, 2006., Use and Abuse of the Fossil Record: The Case of the ‘Fish-ibian.’ Creation and Intelligent Design Watch, hosted by the Committee for the Scientific Investigation of Claims of the Paranormal.
<http://www.csicop.org/intelligentdesignwatch/fishibian.html>
- Higgins, P.**, 2006., Use and Abuse of the Fossil Record: Defining Terms. Creation and Intelligent Design Watch, hosted by the Committee for the Scientific Investigation of Claims of the Paranormal.
<http://www.csicop.org/intelligentdesignwatch/fossil-record.html>
- Higgins, P.**, 2006., Why “Intelligent Design” (ID) is not science. Creation and Intelligent Design Watch, hosted by the Committee for the Scientific Investigation of Claims of the Paranormal.
<http://www.csicop.org/intelligentdesignwatch/not-science.html>

Published papers:

- Higgins, P.**, 2007, Fossils to fertilizer: taphonomic implications of uranium roll-fronts. *Palaios*, 2007, v. 22, p. 577–582.
- MacFadden, B. J. and **Higgins, P.**, 2004., Ancient ecology of 15 million-year-old browsing mammals within C3 plant communities from Panama. *Oecologia*, v.140, p. 169–182.
- Higgins P.** and MacFadden, B. J., 2004, “Amount Effect” recorded in oxygen isotopes of Late Glacial horse (*Equus*) and bison (*Bison*) teeth from the Sonoran and Chihuahuan deserts, southwestern United States: *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 206, p. 337–353.
- MacFadden, B. J., **Higgins, P.**, Clementz, M. T., Jones, D. S., 2004, Diets, habitat preferences, and niche differentiation of Cenozoic sirenians from Florida: Evidence from stable isotopes. *Paleobiology*, v.30, p. 297-324.
- Higgins, P.**, 2003, A Wyoming succession of Paleocene mammal-bearing localities bracketing the boundary between the Torrejonian and Tiffanian North American Land Mammal “Ages.” *Rocky Mountain Geology*, v.38, p. 247–280.
- Higgins, P.**, 2003, A new fossil multituberculate from the Paleocene of the Hanna Basin, Wyoming: *Journal of Vertebrate Paleontology*, v. 23, p. 468–470.
- Higgins, P.**, 1998, North American Land Mammal “Ages” and Cretaceous mammalian biostratigraphy, *in* Tate ‘98, Life in the late Cretaceous field conference, Tate Museum Guidebook no. 3, p. 81–90.
- Higgins, P.**, 1994, Structure and tectonic evolution of Uncompahgre Canyon, San Juan Mountains, Colorado, *in* Westervelt, T.N., and Sheriff, W.M., eds., *Geology and mines of Uncompahgre Canyon, western San Juan Mountains, Colorado: Geological Society of America Rocky Mountain Section Meeting Field Trip Guidebook*, p. 6–13.

Papers in review:

- Higgins, P.** and MacFadden, B. J., *submitted*, Seasonal and geographic climate variability during the Last Glacial Maximum in North America: applying isotopic analysis and macrophysical climate models: submitted to *Palaeogeography, Palaeoclimatology, Palaeoecology*, 31 ms. pg.

Higgins, P., and Voronov, J., *submitted*, A New Record of Environmental Change during the Paleocene-Eocene Thermal Maximum from the Hanna Basin in South-Central Wyoming: Submitted to Rocky Mountain Geology, 21 ms. pg.

Papers in preparation:

Bershaw, J., Garzione, C. N., **Higgins, P.**, MacFadden, B. J., Anaya, F., Alvarenga, H. M. F., *in prep.*, High altitude dentistry: Understanding Altiplano paleoclimate and paleoelevation through stable isotopes ($\delta^{18}\text{O}$) of mammal teeth.

Higgins, P. and Coplen, T. B., *in prep.*, LIMS for light stable isotopes: A guide for implementation. This will likely become a US Geological Survey open-file report. 81 ms pgs.

Higgins, P., *in prep.*, LAME Lagomorph Analytical Measurement Emporium — A tutorial for LIMS for Light Stable Isotopes. This will likely become a US Geological Survey open-file report. 88 ms pgs.

Abstracts:

Higgins, P., and MacFadden, B.J., 2008, Use of Macrophysical Climate Modeling or Serial Isotopic Analysis of Hypsodont Teeth to Understand Past Climate: Two Methods, One Story? [abstract]: Journal of Vertebrate Paleontology, v. 28, supplement of number 3, p. 90A–91A.

Higgins, P. and Voronov, J., 2008, Isotope Sclerochronology of Freshwater Mollusks: A New Look at Terrestrial Environmental Change during the Paleocene-Eocene Thermal Maximum in Wyoming: Geological Society of America Annual Meeting, Houston, Texas.

Rosario, J.J., Jordan, T.E., Garzione, C., Hernández, J.I., Hernández, R.M., and **Higgins, P.**, 2008, Paleosol Stratigraphy and Its Paleoclimatic Implications In Northwestern Argentina: Geological Society of America Annual Meeting, Houston, Texas.

Higgins, P., Bershaw, J., Garzione, C., MacFadden, B.J., Anaya, F., Alvarenga, H.M.F., 2008, Oxygen isotopic composition of modern mammal teeth associated with longitude, altitude, and humidity in South America: Geological Society of America Northeastern Section meeting, Buffalo, New York.

Voronov, J., and **Higgins, P.**, 2008, A new record of environmental change during the Paleocene-Eocene thermal maximum: Geological Society of America Northeastern Section meeting, Buffalo, New York.

Higgins, P., 2007, Managing Data in the Laboratory: an Introduction to LIMS for Light Stable Isotopes [abstract]: 13th Canadian CF-IRMS Workshop, Fredericton, New Brunswick, Canada, June 24 – 27, 2007.

Bershaw, J., Garzione, C. N., **Higgins, P.**, MacFadden, B. J., Anaya, F., Alvarenga, H. M., 2006, The isotopic composition of mammal teeth across South America: A proxy for paleoclimate and paleoelevation of the Altiplano: Eos Transactions, AGU, v. 87 n. 52, Fall Meeting Supplement Abstract T33C-0519.

Higgins, P., 2006, Insights into the biology of large, extinct South American ungulates [abstract]: Journal of Vertebrate Paleontology, v. 26, supplement to number 3, p. 75A.

Higgins, P., 2005, Standardizing isotopic analysis of bioapatites [abstract]: Is the Geochemical Record of Ecological and Biological Signals in Skeletal Remains Reliable Enough? First International Workshop on Taphonomy and Biochemistry Applied to Human and Environmental Sciences, Paris, France, May 30 – 31 and June 1, 2005

Higgins, P., 2004, Modeling climate, atmospheric, and vegetational change since the Last Glacial Maximum [abstract]: Journal of Vertebrate Paleontology, v. 24, supplement to number 3, p. 70A.

- Higgins, P.** and MacFadden, B. J., 2004, Stable isotopes from tooth enamel: Interpreting diet and climate from ancient and modern mammal teeth [abstract]: Inorganic Mass Spectrometry: Elemental and Isotopic Analysis. 16th Sanibel Conference on Mass Spectrometry, sponsored by the American Society for Mass Spectrometry, Sanibel Island, FL, January 23–26, 2004.
- Higgins, P.** and MacFadden, B. J., 2003, Investigating ancient climate through analysis of stable isotopes from fossil tooth enamel [abstract]: 225th American Chemical Society National Meeting, New Orleans, LA, March 23-27, 2003.
- Higgins, P.** and MacFadden, B. J., 2002, Straight from the horse's mouth: stable isotopes and inferences about Pleistocene climate change in the southwestern United States [abstract]: Journal of Vertebrate Paleontology, v. 20, supplement to number 3, p. 64A.
- MacFadden, B. J., **Higgins, P.**, Clementz, M. T., Jones, D. S., 2002, Ancient diets and ecology of Cenozoic sirenians from Florida: evidence from stable isotopes [abstract]: Journal of Vertebrate Paleontology, v. 20, supplement to number 3, p. 81A.
- Higgins, P.**, 2001, New applications of geographic information systems to vertebrate paleontology [abstract]: Journal of Vertebrate Paleontology, v. 19, supplement to number 3, p. 61A.
- Higgins, P.**, 1999, Destruction of vertebrate fossils by uranium roll-fronts: Geological Society of America Abstracts with Programs, v. 31, n. 7, p. A-170.
- Higgins, P.**, 1999, Biostratigraphy of the boundary between Torrejonian and Tiffanian North American Land Mammal “Ages” [abstract]: Journal of Vertebrate Paleontology, v. 19, supplement to number 3, p. 51A.
- Higgins, P.**, 1998, Taphonomy of Paleocene vertebrates, Hanna Formation, Hanna Basin, south-central Wyoming [abstract]: Journal of Vertebrate Paleontology, v. 18, supplement to no. 3, p. 50A–51A.

Dissertation, Theses:

- Higgins, P.**, 2000, Re-evaluation of the boundary between the Torrejonian and Tiffanian North American Land Mammal “Ages,” with description of a new fauna from the Hanna Basin, south-central Wyoming [Ph.D. dissert.]: University of Wyoming, Laramie, Wyoming, 222 p.
- Higgins, P.**, 1999, Uranium roll-fronts as vertebrate taphonomic agents in the Hanna Basin, south-central Wyoming [M.S. thesis]: University of Wyoming, Laramie, Wyoming, 98 p.
- Higgins, P.**, 1995, Reversals of the Earth’s magnetic field and extinction of animal species [B.S. thesis]: Fort Lewis College Biology Department, Durango, Colorado.
- Higgins, P.**, 1995, Vertebrate fossil locality on “Moving Mountain,” Durango, Colorado [B.S. thesis]: Fort Lewis College Geology Department, Durango, Colorado.