

CURRICULUM VITAE

KAREN L. STEUDEL

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Birth date: 9/25/46
Citizenship: U.S.A.

PRESENT POSITION

Professor of Zoology, University of Wisconsin-Madison, Wisconsin 53706
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EDUCATION

Ph.D. University of Wisconsin-Madison	June 1974
M.S. University of Wisconsin-Milwaukee	Jan. 1971
B.S. University of Wisconsin-Milwaukee	Jan. 1969

ACADEMIC POSITIONS

July 1995 - Present	Professor of Zoology (U.W. Madison)
Sept. 1983 - June 1995	Associate Professor of Zoology (U.W. Madison)
Sept. 1976 - May 1983	Assistant Professor of Zoology (U.W. Madison)
Aug. 1974 - May 1976	Lecturer in Zoology (U.W.-Madison)

PUBLICATIONS

- Stuedel-Numbers, K., T. Weaver and C.M. Wall-Scheffler. 2007. The Evolution of Human Running: Effects of Changes in Lower Limb Length on Locomotor Economy. *J. Hum. Evol.* 53:191-6.
- Tilkens, M. C., Wall-Scheffler, T.D. Weaver and K. Stuedel-Numbers. (in press) The effects of body proportions on thermoregulation: An experimental approach. *J. Hum. Evol.*
- Wall-Scheffler, C.M., Geiger, K., and Stuedel-Numbers, K. 2007. Infant Carrying: The role of increased locomotory costs in early tool development. *American Journal of Physical Anthropology* 133(2): 841-846.

- Studel-Numbers, K. 2006. Energetics in *Homo erectus* and other early hominins: the consequences of increased lower limb length. *J. Hum Evol.* 51:445-453.
- Wall-Scheffler, C.M., Myers, M.J. and Studel-Numbers, K. 2006. The application to bipeds of a geometric model of lower-limb-segment inertial properties. *J. Hum. Evol.* 51(3): 320-326.
- Studel-Numbers, K. and Weaver, T.D. 2006. Froude Number Corrections in Anthropological Studies. *Am. J. Phys. Anthropol.* 131(1): 27-32.
- Weaver, T. and K. Studel-Numbers 2005. Does climate or mobility explain the differences in body proportions between Neandertals and their Upper Paleolithic successors? *Evol. Anthropol.* 14: 218-223.
- Studel-Numbers, K. and M. Tilkens. 2004. The effect of lower limb length on the energetic cost of locomotion: Implications for fossil hominids. *J. Hum. Evol.* 47: 95-109.
- Studel-Numbers, K. 2003. The energetic cost of locomotion: humans and primates compared to generalized endotherms. *J. Hum. Evol.* 44: 255-262.
- Harris, M. and K. Studel. 2002. The relationship between maximum jumping performance and hindlimb morphology/physiology in domestic cats (*Felis silvestris catus*). *J. exp. Biol.* 205: 3877-3889.
- Studel-Numbers, K. 2001. Role of locomotor economy in the origin of bipedal posture and gait. *Am. J. Phys. Anthropol.* 116: 171-173.
- Studel, K. 2000. The physiology and energetics of movement: effects on individuals and groups. In: S. Boinski and P. Garber (eds.) *On the Move: How and why animals travel in groups.* pp 9-23. University of Chicago Press, Chicago.
- Myers, M.J. and K. Studel. 1997. Morphological conservation of limb natural pendular period in the domestic dog (*Canis familiaris*): Implications for locomotor energetics.. *J. Morphol.* 234: 183-196.
- Harris, M. and K. Studel. 1997. The selection of hind limb length in the Carnivora: the influence of daily movement distance, home range area, prey size, latitude, and prey capture method. *J. Zool., Lond.* 241: 381-408.
- Studel, K. 1996. Limb morphology, bipedal gait and the energetics of hominid locomotion. *Am J. Phys. Anthropol.* 99: 345-355.
- Studel, K., and J. Beattie. 1995. Does limb length predict the energetic cost of locomotion in mammals? *J. Zool., Lond.* 235: 501-514.

- Steudel, K. 1994. Locomotor energetics and hominid evolution. *Evolutionary Anthropology* 3: 42-48.
- Steudel, K., Porter, W.P. and D. Sher 1994. The biophysics of Bergman's Rule: A comparison of the effects of pelage and body size variation on metabolic rate. *Can. J. Zool.* 72: 70-77.
- Myers, M. J., K. Steudel and S.C. White 1993. Uncoupling of correlates of locomotor costs: A factorial approach. *J. exp. Zool.* 265: 211-223.
- Steudel, K. and J. Beattie 1993. The Scaling of Cursoriality in Mammals. *J. Morphol.* 217: 55-63
- Strang, K.T. and K. Steudel 1990. Explaining the scaling of transport costs: The role of stride frequency and stride length. *J. Zool. Lond.* 221: 343-358.
- Steudel, K. 1990. *The work and energetic cost of locomotion 1. The effects of limb mass distribution in quadrupeds.* *J. exp. Biol.* 154: 273-286.
- Steudel, K. 1990. The work and energetic cost of locomotion 2. Partitioning the cost of internal and external work within a species. *J. exp. Zool.* 144: 287-304.
- Myers, M and K. Steudel. 1985. Effect of limb mass distribution on the energetic cost of running. *J. exp. Biol.* 16: 363-373.
- Steudel, K. 1984. Allometric Perspectives on Fossil Catarrhine Morphology. In: W. L. Jungers (ed.) *Size and Scaling in Primate Biology.* Plenum Press.
- Steudel, K. 1984. Limb Bone Allometry in Primates: A Test of the Elastic Similarity Model. *Am. J. Phys. Anthrop.* 65: 323-328.
- Steudel, K. 1982. Allometry and Adaptation in the Catarrhine Postcranial Skeleton. *Am. J. Phys. Anthrop.* 59: 419-430.
- Steudel, K. 1982. Patterns of Intraspecific and Interspecific Allometry in Old World Primates. *Am. J. Phys. Anthrop.* 59: 431-441.
- Steudel, K. 1981. Functional Aspects of Prime Pelvis Structure: A Multivariate Approach. *Am. J. Phys. Anthrop.* 55: 399-410.
- Steudel, K. 1981. Sexual Dimorphism and Allometry in Primate Ossa Coxae. *Am. J. Phys. Anthrop.* 55: 209-215.

- Steudel, K. 1981. Body Size Estimators in Primate Skeletal Material. *Int. J. Primatol.* 2: 81-90.
- Steudel, K. 1980. New Estimates of Early Hominid Body Size. *Am. J. Phys. Anthropol.* 52, 63-70.
- Steudel, K. 1978. A Multivariate Analysis of the Pelvis of Early Hominids. *Journal of Human Evolution* 7, 583-595.
- Robinson, J. T. and K. Steudel. 1976. Allometry, Diet and the Early Hominids. *Les plus anciens Hominides*. P.V. Tobias and Y. Coppens (ed.) IX Congres UISPP, Nice.
- Robinson, J.T. and K. Steudel. 1973. Multivariate Discriminant Analysis of Dental Data Bearing on Early Hominid Affinities. *Journal of Human Evolution* 2, 509-527.

MANUSCRIPTS IN PROGRESS

- Steudel-Numbers, K. and C. Wall-Scheffler (submitted) Optimal running speed and the evolution of hominin hunting strategies. *Science*
- Tilkens, M. and K. Steudel-Numbers (submitted) Are there gender differences in the energetic cost of human walking? A regression approach. *Eur. J. Appl. Physiol.*

BOOK REVIEWS

- Ronald L. Numbers and Karen Steudel Numbers. (2003) *Religion Red in Tooth and Claw*, review of Darwin's Cathedral: Evolution, Religion, and the Nature of Society. David Sloan Wilson. vii + 268 pp. University of Chicago Press, 2002. *Am. Scientist* 91: 174-176.
- Steudel, K. 1982. *Man, the Promising Primate: The Conditions of Human Evolution*. *Bioscience* 32: 212.
- Steudel, K. 1975-6. *Uniqueness and Diversity in Human Evolution: Morphometric Studies of Australopithecines*. *Primate Record*. 6(2): 12-13.

ABSTRACTS

- Myers, M.J., C.M. Wall-Scheffler, T.D. Weaver and K. Steudel-Numbers. 2007. Complex effects of Limb Length on Cost of Transport in Running Humans.

- Studel-Numbers, K.L. Daily energy expenditure in fossil hominins: the contribution from locomotor costs reevaluated. American Association of Physical Anthropologists, March 2006.
- Tilkens, JM, C.M. Wall, T.D. Weaver and K. Studel-Numbers. The effects of body proportions on thermoregulation: an experimental approach. American Association of Physical Anthropologists, March 2006.
- Studel-Numbers, K. and T. Weaver. Did the short hindlimbs of many ancestral hominids result in lower energetic efficiency in running? American Association of Physical Anthropologists, April 2005.
- Tilkens, M.C. and K. Studel-Numbers. A regression analysis of sex differences in the cost of human walking. American Association of Physical Anthropologists, April 2005.
- Studel-Numbers, K. and M.C. Tilkens. Energetics in Australopithecus: The effect of their relatively short hindlimbs. American Association of Physical Anthropologists, April 2003.
- Studel-Numbers, Karen & Tilkens, Michael. The energetic consequences of early hominid limb proportions. International Union of Anthropological and Ethnological Sciences, July 2003.
- Studel, K. and M.C. Tilkens. The energetic costs of the relatively short legs characteristic of Australopithecus and Neanderthals. Paleoanthropology Society, Montreal, March 2004.
- Harris, M.A. and K. Studel. 1998. The relationship between maximal jumping performance and hindlimb morphology in domestic cats (*Felis sylvestris catus*). *Am. Zool.* 38: 35A.
- Myers, M.J., A.J. Walker and K. Studel. 1996. Comparison of three methods of determining lower limb natural pendular periods. *Med. Sci. Sports Exer.* 28: S46.
- Studel, K. 1996. Was locomotor efficiency important in the origin of bipedality? *Am J. Phys. Anthropol.*
- Studel, K. and J. Beattie. 1994. Was locomotor efficiency an important adaptive constraint in the evolution of the hominid lower limb? *Am. J. Phys. Anthropol.* Supplement 18: 187.
- Studel, K. and J. Beattie. 1993. Does limb length predict the energetic cost of locomotion in terrestrial mammals? *Am. Zool.* 33: 75A.

- Harris, M. and K. Steudel. 1993. Hindlimb length correlates in the Carnivora. *Am. Zool.* 33: 74A.
- Steudel, K. 1989. The energetic cost of increasing internal work in dogs. *Am. Zool.* 29: 149A.
- Strang, K. and K. Steudel. 1989. Explaining the scaling of transport costs: The role of stride frequency and stride length. *Am. Zool.* 29: 149A.
- Steudel, K. and K. Strang. 1987. A simple explanation for the allometry of cost of locomotion. *Am. Zool.* 27: 125A.
- Steudel, K. and M. Myers. 1986. Effect of limb mass and its distribution on the energetic cost of running. *Am. Zool.* 26: 63A.
- Steudel, K. and M. Myers. 1984. Can energetic cost of locomotion be an important constraint in primate limb design and structural evolution. *Am. J. Phys. Anthrop.* 63: 221.
- Steudel, K. 1983. How Reliable Are Size Estimates on Fossils? *Am. J. Phys. Anthrop.* 60: 257.
- Steudel, K. 1982. Allometric Constraints on Limb Characteristics: Evidence From Some Old World Primates. *Int. J. Primatol.* 3: 337.
- Steudel, K. 1981. The Pelves of Anthropoid Primates: Sexual Dimorphism and Allometry. *Am. J. Phys. Anthrop.* 54: 280-281.
- Steudel, K. 1980. Functional Aspects of Primate Pelvis Structure. *Am. J. Phys. Anthrop.* 52, 283-284.
- Steudel, K. 1979. Early Hominid Body Size. *Am. J. Phys. Anthrop.* 50, 484.

INVITED TALKS

Locomotor energetics in human evolution. Anthropology departmental colloquium, University of Wisconsin. March 2005.

How energetically efficient was early hominid locomotion? Anthropology and Primatology Departmental Colloquium. University of Calgary. April 2003

Recent studies on early hominid body size and locomotor energetics. Festschrift for John T. Robinson, University of Wisconsin Zoological Museum. October 1994.

Limb structure and locomotor performance in mammals and the evolution of bipedality in early hominids. Committee on Evolutionary Biology, University of Chicago. May 1994.

Limb structure and locomotor performance in mammals and the evolution of bipedality in early hominids. Department of Zoology, University of Wisconsin. April 1994.

Limb design and cursoriality in mammals: the relationship between structure and performance. Program in Ecology and Evolutionary Biology, Brown University. March 1994.

Limb morphology, bipedal gait and the energetics of hominid locomotion. Paleobiology Seminar, Department of Anatomical Sciences, State University of New York-Stony Brook. November 1993.

Problems in the allometric analysis of fossil vertebrates. Vertebrate Paleontology Group, Department of Geology, University of Wisconsin. Spring 1989.

Effect of limb mass distribution on the energetic cost of locomotion. Concord Field Station Seminar, Harvard University. August, 1984.

Biometry of the pelvis in primates. XIth International Congress of Anthropological and Ethnological Sciences. Vancouver, Canada, August 1983.

AWARDS AND GRANTS

Energetic consequences of lower limb length in hominins LSB Leakey Foundation 2004-5

Correlates of leaping behavior in domestic cats. University of Wisconsin Graduate School research committee Award. 1998-9.

Pendular mechanics, prostheses and the efficiency of human locomotion. Vilas Associate Award. 1996-8.

Environmental Education. Department of Natural Resources Undergraduate Internship for E. Skewes. Summer, 1995.

Bringing the Process of Science into Introductory Biology Laboratories. Center for Biology Education. 1993-4.

Design Constraints on Animal Limbs: Energetic Considerations. University of Wisconsin Graduate School. 1987.

Factorial Analysis of Locomotor Variables Influencing the Cost of Locomotion. University of Wisconsin Graduate School. 1985.

Influences of Limb Morphology and Gait on the Efficiency of Locomotion II. University of Wisconsin Graduate School. 1984.

Influences of Limb Morphology and Gait on the Efficiency of Locomotion. University of Wisconsin Graduate School. 1982.

Locomotor Adaptations in the Pelves of Prosimian Primates. University of Wisconsin Graduate School. 1981.

An Investigation of Allometry in Living Primates and Early Hominid Fossils. National Science Foundation. 1974-5.

A Canonical Analysis of the Primate Pelvis. National Science Foundation Doctoral Dissertation Research Grant. 1972-3.

PROFESSIONAL AFFILIATIONS

American Association of Physical Anthropologists
Society for Comparative and Integrative Biology
Sigma Xi
Society for the Study of Evolution
American Women in Science

TEACHING EXPERIENCE

Conferences and Workshops Attended

June, 1993. Attend LABSHOP, a one week conference on teaching the process of science in biology laboratories. Organizers were Joe Armstrong (Illinois State University - Normal) and Marshall Sundberg (Louisiana State University - Baton Rouge).

February, 1993. Attended a 4 day conference on "Strategies for teaching the life sciences to undergraduates" sponsored by the Coalition for Education in the Life Sciences (CELS).

Courses Taught

Zoology 101, Animal Biology 3 credits, Enrollment - approximately 900.

This is the main introductory lecture course offered by the zoology department, consisting of three lectures per week plus an optional discussion section. The course is taught in two lecture sections per semester.

Other Introductory Biology Experience.

I have taught small guest segments in both our non-majors introductory course, Zoology 120, and in the two semester sequence for majors, Zoology 151-2.

Zoology 102, Animal Biology Laboratory, 2 credits, Enrollment - approximately 700. I have been instrumental in revising the laboratories and the associated laboratory manual (which we publish) in collaboration with Jim Bruins and Fred Petillo. The old lab manual was nearly 20 years old. Many of the procedures were out of date. We have focused the new laboratories on teaching the process of science to a majors/nonmajors audience and on retaining the very useful parts of existing laboratories in which students have hands-on experiences with animals and experiments.

Zoology 525, Animal Structural Design, 3 credits, Enrollment - about 30.

This is an advanced course analyzing animal structure in terms of the design constraints imposed by natural selection, ontogeny, and phylogeny. While these issues are treated in a comprehensive manner, many of the examples involve animal locomotion.

Zoology 410, Organic Evolution, 3 credits, Enrollment - about 90.

An intermediate level course open to non-majors but intended to give biology majors a comprehensive understanding of the processes of natural selection, adaptation and evolution.

Biocore 313, Biological Diversity, 3 credits, Enrollment - about 80.

The second course in the Biocore sequence. This was intended as the first introduction to the diversity of biological organisms and to the evolutionary processes that have led to that diversity.

Biocore 314, Biological Diversity Laboratory, 2 credits, Enrollment - about 40.

The laboratory (taught in 2 sections) associated with Biocore 313. One 3.5 hour lab or field trip per week plus two weekend field trips.

Graduate Student Training

Susan Reynard, MS 1982 Now Senior Editor at Joiner Associates, Inc.

Kevin Strang, MS 1988 Now Assistant Researcher/Lecturer, Department of Physiology, Medical School, University of Wisconsin-Madison.

Dean Faber, Ph.D. 1992. Now Lecturer in Zoology, University of Wisconsin - Rock County.

Marcella Myers, Ph.D. 1995 Now Associate Professor, Department of Biology, College of St. Catharine, St. Paul, MN 55105.

Yishai Wise MS June 1998. Now M.D.

Michelle Harris, Ph.D. 2000. Now Assistant faculty associate in the Biocore program,
University of Wisconsin

Jona Hull, MS 2000

Michael Tilkens, MS 2005

Lisa Powers

COMMITTEES AND UNIVERSITY SERVICE

Department of Zoology

I currently serve as Associate Chair for the Integrated Zoology group. Historically, in addition to the usual contribution to two to three departmental committees annually, I have taken on a few special projects. 1. When it became clear that the team teaching approach was not working particularly well in Zoology 101, the chair at that time, Jack Hailman, asked me to review our introductory teaching and develop a plan that would allow us to adequately staff our introductory courses. Options included changing the nature of our introductory offerings. With the cooperation of many zoology faculty, I was able to arrange staffing for all of our introductory courses. 2. As chairman of the curriculum committee, I put together a report for Dean Crawford, based on data developed by Jeff Baylis, documenting the extremely effective use we make of our TAs in the zoology department. In subsequent bouts of budget cutting, zoology has maintained or increased its TA FTEs while many other departments have suffered cuts.

College of Letters and Science

Dean's Ad Hoc committee to review the Psychology department 1999-2000
 Search for Dean for Honors program 1998
 Faculty Honors Committee 1995-8
 Co-Chair, L&S Curriculum Committee, 1995-6
 L&S Curriculum Committee, 1989-1995, (Chair of Science subcommittee, 1992-3)
 Chair of L&S Curriculum Subcommittee to review the L&S Breath requirement, 1994-5
 Honors Fellow, 1994-1997
 Minority Student Mentor Program, 1993-Present
 Dean's Ad Hoc Committee to Review the Anthropology Department, 1993-4
 Undergraduate Biology Education Committee (UBEC), 1992-3
 Academic Misconduct Appeals Committee, 1992-3
 L&S Sabbatical and Faculty Development Grant Review Committee, 1991-2
 Undergraduate Awards and Research Committee, 1990-2
 L&S Student Appeals Committee, 1988-92
 Center for Biology Education Steering Committee, 1989-91

University of Wisconsin Madison campus

Campus Undergraduate Education Committee 1996-2000, Chair 1998-2000
 Diversity 2008 Steering Committee, co-chair of curriculum subgroup 1998-9
 Chair, University Bookstore Awards Committee, 1995-present
 Undergraduate Research Awards Committee, 1995-6
 Eli Lily Teaching Awards Committee, 1992-Present
 University Bookstore Awards Committee, Chair of Biology group, 1992-5
 2nd Annual Biology Chairs and Faculty Conference April 22, 1994

COMMUNITY SERVICE

Madison Art Center
 Capitol Neighborhoods