

## Joseph M. Szewczak, Ph.D.

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### Education

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Ph.D. 1991 Department of Biology and Medicine, Brown University, Providence, Rhode Island. Discipline: comparative physiology. Thesis: Acid-base state and control of breathing in the torpid bat, *Eptesicus fuscus*. Thesis advisor: Donald C. Jackson. Awarded Sigma Xi award for outstanding research by a graduate student at Brown University.

B.S.E. 1980 *cum laude*. Duke University, Durham, North Carolina. Major: civil engineering.

### Professional Experience

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2003-Present Assistant Professor, Humboldt State University, Arcata, California. Research interests include comparative physiology, physiological ecology i.e., the interaction of the organism and its environment, wildlife biology of bats, nonlinear analysis of biological signals, acoustic analysis of bat echolocation calls, extremes of mammalian metabolism, and acid-base regulation in small mammals. Systems studied include bats, small and large mammals, and reptiles.

1997-2003 Research Scientist, University of California White Mountain Research Station, Bishop, California. Comparative vertebrate physiology and wildlife biology of bats.

1996-Present Adjunct Associate Professor, San Francisco State University. Course instructed: The ecology and conservation of California bats. The course prepares personnel engaged in wildlife management roles in techniques for assessing bats, their habitats, and conservation strategies; training required for obtaining a permit to work with bats from California Dept of Fish and Game.

1995-1997, 2002 Subcontractor to Sapphos Environmental to survey bat distribution and collect baseline data for and write section of Owens Dry Lake dust mitigation EIR. The survey found 8 species, all species of concern, where few were anticipated. The survey also determined how bats would move into the newly created wetlands, and this has become a strategy that will be used to balance the insect populations expected to follow the flood irrigation treatment.

1990-1997 Faculty, Deep Springs College, Deep Springs, California. Responsible for the science curriculum for a small, academically intense liberal arts colleges that emphasizes a balanced program of academics, labor, and student self-governance.

1991-1997 Director's Fellow and Research Associate, University of California White Mountain Research Station. Completed and published a 6 year survey of bats of the White and Inyo Mountains. Participated in cost-share survey and monitoring projects with the Forest Service, Bureau of Land Management, and California Dept. of Fish & Game.

1986 Instructor. Human Physiology, University of Rhode Island, Providence Branch, Providence, Rhode Island.

1984-1990 Teaching assistant; research assistant. Brown University, Department of Biology and Medicine, Providence, Rhode Island. Courses assisted: introductory biology, biophysics, comparative physiology, and mammalian physiology.

1983-1984 Vice President of Engineering, Laurel Hill Paper Company, Cordova, North Carolina. Responsible for engineering design and implementation of 35 ton per day recycled paper tissue mill. Designed power, pulp process, and wastewater treatment systems.

1980-1983 Project Engineer, Richmond Machine Company, Rockingham, North Carolina. Designed and supervised construction of complete recycled paper mill systems in Latin America.

## Selected Publications

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### **papers**

Weller, T.J., J.M. Szewczak, M.M. McKenzie, P.C. Ormsbee and J.M. Zinck (2005) A Comparison of Tethered Zip-line and Hand-release for Acquiring Representative Reference Echolocation Calls from Bats. (in preparation).

Szewczak, J.M. (2004) Advanced analysis techniques for identifying bat species. Proceedings of the Bat Conservation International Echolocation Symposium, Austin, TX, April, 2002. Published by Bat Conservation International.

Huey, K.A., J.M. Szewczak, and F.L. Powell (2003) Dopaminergic mechanisms of neural plasticity in respiratory control: Transgenic approaches. *Respiration Physiology and Neurobiology*. 135:133-44.

Szewczak, J.M. and F.L. Powell (2003) Open-flow plethysmography with pressure-decay compensation. *Respiration Physiology & Neurobiology*. 134:57-67.

Hammond, K.A., J.M. Szewczak and E. Król (2001) Effects of altitude and temperature on organ phenotypic plasticity along an altitudinal gradient. *Journal of Experimental Biology*. 204(11):1991-2000.

Szewczak, J.M., S.M. Szewczak, M.L. Morrison, and L. Hall (1998) Bats of the White-Inyo Range. *Great Basin Naturalist*. 58(1):66-75.

Sullivan, S.G. and J.M. Szewczak (1998) Apneic oxygen uptake in the torpid pocket mouse, *Perognathus parvus*. *Physiological Zoology*. 71(6):624-632.

Hepple, R.T., P.J. Agey, L. Hazelwood, J.M. Szewczak, R.E. MacMillen and O. Mathieu-Costello (1998) Increased capillarity in hindlimb muscle of birds living at altitude. *Journal of Applied Physiology*. 85(5):1871-1876.

Szewczak, J. M. (1997) Matching gas exchange in the bat from flight to torpor. in: *Comparative Aspects of the Control of Arterial Blood Gases: Ventilatory and Cardiovascular Perspectives*. *American Zoologist*. 37:92-100.

Mathieu-Costello, O., P.J. Agey and J.M. Szewczak (1994) Capillary-fiber geometry in one of the smallest bats, *Pipistrellus hesperus*. *Respiration Physiology*. 95:155-169.

Szewczak, J.M. and D.C. Jackson (1992) Apneic Oxygen uptake in the torpid bat, *Eptesicus fuscus*. *Journal of Experimental Biology*. 173:217-229.

Szewczak, J.M. and D.C. Jackson (1992) Acid-base state and intermittent breathing in the torpid bat, *Eptesicus fuscus*. *Respiration Physiology*. 88:205-215.

Szewczak, J.M. and D.C. Jackson (1992) Ventilatory response to hypoxia and hypercapnia in the torpid bat, *Eptesicus fuscus*. *Respiration Physiology* 88:217-232.

### **abstracts**

Do wind turbines generate ultrasound that may attract bats? (2005) North American Symposium for Bat Research, Sacramento, CA. October 19-23, 2005.

Berry, R. D. and J.M. Szewczak (2005) A field recording technique to passively collect and time tag echolocation calls from free flying bats Western Bat Working Group Biennial Meeting, Portland, OR. March 30 – April 2, 2005.

Advances in the acoustic monitoring of bats. (2004) American Society of Mammalogists. Arcata, CA. June 16, 2004.

Bat Monitoring and Assessments. (2004) SERDP symposium, Washington, D.C., December 2, 2004, "Preserving our Critical Natural Resources."

Weller, T.J., J.M. Szewczak, and M.M. McKenzie (2004) Acquiring representative reference calls: a comparison calls recorded on zip-line and hand release. *Bat Research News* 45(4):272.

Szewczak, J.M. (2003) Variability of pH regulation among mammals. FASEB Experimental Biology Meeting, April 11-15, 2003, San Diego, CA.

Szewczak, Joseph M. (2002) Multivariate acoustic transforms for identifying bat species. *Bat Research News*. 43(4):186-187.

Szewczak, J.M. (2002) Phenostasis and patterns of growth: a framework from which to interpret adaptive capacity. American Physiological Society special Comparative Physiology Meeting.

Hill, E. M., S.J. Wickler, J.M. Szewczak, H.M. Greene, and E.A. Cogger (2001) 2,3-Diphosphoglycerate in burros (*Equus asinus*) after six weeks at altitude. *American Zoologist*, 41 (6): 1471-1472.

Szewczak, J.M. (2001) Bat torpor, hibernaculum environment, and survival. *Bat Research News*. 42(3):183.

J.M. Szewczak (2001) Advanced analysis techniques for identifying bat species. *Bat Research News*.

Berry, R.D. and J.M. Szewczak (2001) A Field Recording Technique to Passively Collect and Time Tag Echolocation Calls from Free Flying Bats Using a Time Expansion Bat Detector and a Digital 8 Video Camcorder. *Bat Research News*, (in press).

Szewczak, J.M. (2000) A tethered zip-line arrangement for reliably collecting bat echolocation reference calls. *Bat Research News*, 41:142.

Szewczak, J.M. (2000) A consistent acoustic feature to discriminate *Myotis* species. *Bat Research News*, 41:141.

Szewczak, J.M. (1999) Hypoxic hypometabolism in heterothermic mammals. *American Zoologist*, v.38, n.5, 1998.:9A.

Szewczak, J. M. (1996) A test of plasticity in ventilatory motor control. *FASEB Journal*. 10(3): 3707-3708.

Szewczak, J. M. (1994) Fractal analysis of ventilatory control in heterothermic mammals. *The Physiologist*, 37(5): A-64.

Millman, J. and J. M. Szewczak (1994) Nonlinear methods for the analysis of ventilatory control. *The Physiologist*, 37(5): A-64.

Szewczak, J. M. and F. L. Powell (1992) High altitude acclimatization in the bat, *Eptesicus fuscus*. *FASEB Journal*. 6(5): A1774.

### books

S.Parsons, and J.M. Szewczak. Detecting, Recording, and Analyzing Vocalizations of Bats. Chapter in upcoming book, Behavioural and Ecological Methods for the Study of Bats, Thomas Kunz, editor (in preparation).

Szewczak, J. M. (1994) Bats of the White Mountain Region. in: *The Crooked Creek Guidebook*. C. H. Hall, Jr. and B. Widawski, editors. University of California.

R. W. Hansen, K. H. Switak and J. M. Szewczak (1994) The black toad, *Bufo exsul*. in: Life on the Edge: a Guide to California's Endangered Natural Resources. C. G. Thelander, editor in chief. BioSystems Books.

**book review**

Szewczak, J.M. (2005) The Indiana Bat, Biology and Management of an Endangered. *Journal of Mammalogy* 86:212–212.

**software**

Developed and support SonoBat software for performing acoustical analysis of ultrasonic bat calls, currently in use by several hundred users around the world. <http://www.sonobat.com>

Developed SonoBird software for recording, cataloging, and comparative analysis of bird vocalizations. It is currently in the beta stage of development and was used successfully by my graduate students during the 2005 field season.

Created and supported software used for analyzing spectrophotometric data from flower petals; in use by Scott Hodges, UCSB, for his NSF project DEB- 9726272.

**talks and symposia**

Invited speaker, Progress in Bat Monitoring and Assessments. SERDP symposium, Washington, D.C., October 25, 2005, "Preserving our Critical Natural Resources."

Do wind turbines generate ultrasound that may attract bats? North American Symposium for Bat Research, Sacramento, CA. October 19-23, 2005.

Invited speaker, Acoustic Monitoring of Bats. The Wildlife Society Bat Ecology and Field Techniques Workshop. University of California Hastings Natural Reserve, Carmel, CA. September 9-11, 2005.

Invited speaker, Acoustic Monitoring of Bats. Bat Conservation International Acoustic Monitoring Workshop. August 8-13, 2005, Baree, PA.

Invited speaker, Acoustic Monitoring of Bats. June - July, 2005. Missoula, MT, LaGrande, OR, and Klamath Falls, OR.

Invited speaker, The Physiological Ecology of Bats; Acoustic Monitoring of Bats. May 21-23, 2005, Rapid City, SD.

Invited speaker, Mines from a bat perspective: the physiological ecology of roosting. Bat Conservation International Bats and Mines Symposium, Reno, NV. May 3, 2005.

Invited speaker, Ultrasonic Communication in Mammals. UC, Davis Road Ecology Seminar Series. February 28, 2005.

Monitoring bats in a restored montane willow meadow. The Wildlife Society, Western Section Annual Meeting, Sacramento, CA. January 20, 2005.

Invited speaker, Bat Monitoring and Assessments. SERDP symposium, Washington, D.C., December 2, 2004, "Preserving our Critical Natural Resources."

Invited speaker, Assessing Bat Populations: Challenges and Progress. HSU Wildlife Department Seminar series. October 21, 2004.

Invited speaker, Acoustic Monitoring of Bats. The Wildlife Society Bat Ecology and Field Techniques Workshop. University of California Hastings Natural Reserve. September 17-19, 2004. Carmel, CA.

Invited speaker, The physiological ecology of bats; Acoustic monitoring of bats. Bat Conservation and Forest Management Symposium, August 26-27, 2004, Spokane, WA.

Advances in the acoustic monitoring of bats. American Society of Mammalogists. Arcata, CA. June 16, 2004.

Invited speaker, Acoustic Monitoring of Bats. Bat Conservation International Acoustic Monitoring Workshop. June 2-8, 2004, Portal, AZ.

Invited speaker, The physiological ecology of bats; Acoustic monitoring of bats. Tahoe National Forest, South Lake Tahoe, CA. May 15, 2004.

Invited speaker, The physiological ecology of bats; Acoustic monitoring of bats. Bat Conservation International, Bat Conservation and Forest Management Symposium, August 26-27, 2003 Eugene, OR.

Invited speaker, Mono Basin Bird Chautauqua, June 21, 2003.

Invited speaker, Causes and Consequences of pH Variability in Vertebrates, FASEB Experimental Biology 2003, April 11-15, San Diego, California.

Invited speaker, International Bat Echolocation Symposium and Tutorial sponsored by Bat Conservation International. April 15-17, 2002 in Austin, Texas.

Invited speaker, Mono Basin Bird Chautauqua, June 21-23, 2002,  
<http://www.monolake.org/events/chautauqua/main.htm>

Invited speaker, UC, Davis Ecology Department. Physiological ecology of bats. September, 2001, 2002.

2001, UC WMRS Conservation Biology Symposium, Ecology and Conservation of California bats.

Society for Experimental Biology: Control and Coordination of Breathing Rhythms and Mechanics. August, 2000, Cambridge, UK.

Sierra Nevada Aquatic Research Laboratory, What about Bats? May, 2000.

Loma Linda University, Acid Base State in Small Mammals. December, 1999.

UC, Riverside, Acid Base State in Small Mammals. November, 1999.

WMRS Lecture series. Chaos, fractals, and you. April, 1999.

Society for Integrative and Comparative Biologists: Phenotypic and Genotypic Strategies to Chronic Hypoxia. January, 1999, Denver, CO

**collaborative investigations, 2001-present:**

Terrestrial locomotion in the New Zealand bat *Mysticina* with John Hermanson and Dan Riskin, Cornell University, and Stuart Parsons, University of Auckland, NZ.

The Pacific Northwest Bat Grid Survey. Patricia Ormsbee, US Forest Service Pacific Northwest Research Station, Eugene, OR.

Analysis of field-acquired bat echolocation calls with Ted Weller, USFS Redwood Sciences Lab.

Genetics of the cryptic bat species, *Myotis lucifugus* and *Myotis yumanensis* with Shonene Scott, Portland State University.

Riparian corridor restoration in the Lake Tahoe Basin with Michael L. Morrison, Great Basin Institute.

Passive bat activity monitor with Jon Lighton, University of Nevada Las Vegas and Sable Systems International, Las Vegas, NV.

Montane willow meadow restoration with Jim Steele, San Francisco State University.

Artificial intelligent computer algorithms for automated signal processing with Stuart Parsons, University of Auckland, New Zealand.

Hypo caloric and hypoxic metabolic depression with Dr. Kimberly Hammond, UCR.

Ventilatory and blood gas variability in equines; with Dr. Steven J. Wickler, et al., Equine Research Center, Cal Poly Pomona.

Organ size and adaptation to cold and hypoxia with Dr. Kimberly Hammond, UCR.

Mechanisms of chemo reflex adaptations to chronic hypoxia; with Frank L. Powell, Dept. of Medicine, UCSD.

Using Artificial Neural Networks to acoustically identify bats, Dr. Stuart Parsons, University of Auckland, NZ.

### **Other relevant activities**

**Bat Wildlife Biology.** I teach “Ecology and Conservation of California Bats” each year for San Francisco State University, and I frequently advise the US Forest Service and other agencies on matters pertinent to bat wildlife management. I am a member of the California Bat Working Group. I am involved with a wildlife survey and monitoring program to document the effects of a meadow restoration project in the northern Sierra Nevada mountains ([thecity.sfsu.edu/snfc/carman.htm](http://thecity.sfsu.edu/snfc/carman.htm)).

### **Recent Funded Activities**

An acoustic deterrent system to reduce bat mortality from wind turbines.	Bat Conservation International/ Bat Wind Energy Cooperative	\$70,095	2005-2006	PI, (funding shown is only for first year of the study)
Kentucky Mine big-eared bats	Tahoe National Forest	\$10,000	2004-2005	Collaborator, funding will support Kiera Freeman's graduate project
Restoration effects on Bats	EPA/San Francisco State University	\$3,500	6/2004 – 11/2004	co-investigator, continuation (Amt of award shown is for my part of the project)
Automated Acoustic Identification of Birds	CA Dept of Transportation	\$478,000	9/2004 – 6/2008	PI, funding will support 2 graduate students
Automated Acoustic Identification of Bats	SERDP (DOD, DOE, EPA)	\$673,000	8/2004 – 12/2007	PI, funding will support 3 graduate students
OR Grid Bat Survey	USDA Forest Service	\$5,000	6/2004 – 8/2004	collaborator
Echoes of the Night (dance)	HSU Emeritus & Retired Faculty Assoc.	\$200	4/2005	collaborator with Dance and Music department
Automated Acoustic Identification of Bats	Royal Society of New Zealand	\$10,000	12/2003 – 12/2004	co-PI
OR Grid Bat Survey	USDA Forest Service	\$5,000	6/2003 – 8/2003	collaborator
Bats of Hearst Castle	CA Dept of Parks and Recreation	\$5,000	3/2003 – 8/2003	PI
Methodology for Identifying Sensitive Bat Species	CA Dept of Transportation	\$485,242*	7/2002 – 8/2004	PI * contract signed by University, terminated due to a legal dispute from non-awardee
Owens Lake Bat Survey	Great Basin Unified Air Pollution Control District	\$18,859	7/2002 – 6/2003	co-investigator (Amt of award shown is for my part of the project)
OR Grid Bat Survey	USDA Forest Service	\$5,000	6/2002 – 8/2002	collaborator

Restoration effects on Bats	EPA/San Francisco State University	\$12,000	6/2000 – 11/2003	co-investigator (Amt of award shown is for my part of the project)
Student Internship Program	Berger Foundation	\$48,000	2002	co-investigator
REU	NSF	\$200,000	2002 – 2004	collaborator
Student Internship Program	Berger Foundation	\$104,000	2001 – 2003	co-investigator
SGER: Acid-base State of Small Mammals	NSF	\$61,895	8/15/2000 – 7/31/2001	PI

### **Recent Professional activities**

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Associate Editor, Journal of Wildlife Management.

Industry Liaison, American Physiological Society.

Reviewer. American Journal of Mammalogy, American Journal of Physiology, American Midland Naturalist, Comparative Biochemistry and Physiology, Great Basin Naturalist, Respiration Physiology and Neurobiology, Ostrom Symposium Volume, Physiological Zoology, Western North American Naturalist.

Proposal reviews: NSF, USDA, US Department of State, International Science and Technology Center (for funding former Soviet-block peaceful technologies to prevent proliferation of weapons technologies), and the University of California.

Vice-Chair, UC White Mountain Research Station Institutional Animal Care and Use Committee (IACUC).

Member, Western and CA Bat Working Groups.

Advise CA Department of Fish & Game on matters pertinent to scientific permitting and wildlife management issues.