

# JENNIFER L. ROACH

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## EDUCATION

**Master of Science, Zoology**, Colorado State University. 1999.

Thesis: Genetic structure of a black-tailed prairie dog (*Cynomys ludovicianus*) metapopulation in shortgrass steppe. Advisors: Dr. Mike Antolin, Dr. Beatrice Van Horne.

**Bachelor of Science, Zoology**, University of California, Davis. 1995.

Independent research project: Foraging behavior of the great blue heron (*Ardea herodias*). Advisor: Dr. Donald Strong. Bodega Marine Laboratory.

## PROFESSIONAL EXPERIENCE

**Research Associate, Department of Biological Sciences, Louisiana State University.** 2005-present. Supervisor: Dr. A. Whitehead

- Manage laboratory, supervise and train undergraduate and graduate students
- Continue the study of the genetics underlying acclimation and adaptation in natural populations of killifish (*Fundulus* sp.) using microarray technology and mitochondrial genome sequencing

**Senior Research Associate, Marine Genomics Laboratory, Rosenstiel School of Marine and Atmospheric Science, University of Miami.** 2003-2005. Supervisor: Dr. D. Crawford.

- Managed genomics center funded by two large national grants (NIH, NSF).
- Studied the genetics underlying acclimation and adaptation in natural populations of killifish (*Fundulus* sp.) using microarray technology.

**Research Associate, Department of Animal Science, University of California, Davis.** 2000-2003. Supervisor: Dr. B. May.

- Managed large conservation genetics laboratory (~20 personnel), and supervised and trained undergraduates, graduate students, and post-docs.
- Contributed to research of the population and conservation genetics of threatened and endangered California golden trout (*Oncorhynchus mykiss aguabonita*), fall-run Chinook salmon (*Oncorhynchus tshawytscha*), and Sacramento sucker (*Catostomus occidentalis*).
- Collaborated with MJ Research on beta-testing of a new automated genotyping instrument.

**Team Leader, Custom Genotyping Group, Celera AgGen Co.** 1999-2000. Supervisor: M. Hutton.

- Supervised and trained technicians on genetic projects related to agricultural systems.
- Determined microsatellite genotypes for use in breeding studies in agricultural systems.

**M.S. Student, Department of Biology, Colorado State University.** 1996-99. Advisors: Dr. M. Antolin and Dr. B. Van Horne.

- Examined the genetic structure of a black-tailed prairie dog (*Cynomys ludovicianus*) metapopulation using microsatellite markers.
- Live-trapped prairie dogs and collected tissue samples for DNA analysis.
- Examined habitat quality and burrow density of black-tailed prairie dog colonies.

**Post Graduate Researcher, Department of Biology, Colorado State University.** 1997-98. Advisor: Dr. M. Antolin.

- Analyzed population data on genetic variation in Townsend's ground squirrels (*Spermophilus*

*townsendii*) on the Snake River Birds of Prey Area in southern Idaho.

**Post Graduate Researcher, Life Sciences Division, Los Alamos National Laboratory, NM.** 1995-96. Supervisor: Dr. J. Longmire.

- Managed project examining maternal and paternal relationships and brood parasitism in the brown-headed cowbird (*Molothrus ater*).

**Post Graduate Researcher, Human Genome Project, Los Alamos National Laboratory, NM.** 1995-96. Supervisors: Dr. L. Deavens and J. Fawcett

- Isolated human chromosomes by flow cytometry for use in the production of human chromosome-specific recombinant DNA libraries.

**Undergraduate Independent Study, Department of Evolution and Ecology, University of California, Davis.** 1994. Supervisor: Dr. R. Grosberg.

- Analyzed genetic composition of chimeric colonies of marine hydroids using RAPD-PCR.

**Undergraduate Research Assistant, Life Sciences Division, Los Alamos National Laboratory, NM.** 1994. Supervisor: Dr. J. Longmire.

- Investigated genetic diversity within global populations of peregrine falcons (*Falco peregrinus*) using DNA fingerprinting techniques.

**Undergraduate Independent Study, Department of Evolution and Ecology, Bodega Marine Laboratory, University of California, Davis.** 1994. Advisor: Dr. D. Strong.

- Studied the foraging behavior of the great blue heron (*Ardea herodias*) in marine and terrestrial environments.

## SKILLS AND RESPONSIBILITIES

### Management Experience:

- Interviewed, hired, trained, and supervised undergraduates and technicians on lab techniques and independent projects at Colorado State University, UC Davis, and University of Miami, and Louisiana State University.
- Responsible in overseeing daily laboratory operations including purchasing, inventory, preparation of stock solutions, and lab safety at three universities. Have managed laboratories ranging from six to 20 individuals.
- Designed webpage for the University of Miami's Marine Genomics Laboratory.
- Trained and supervised field technicians for genetic study of black-tailed prairie dog populations during my Master's thesis. Trained technicians to live-trap and safely handle prairie dogs while eartags were applied, tissue samples were taken, and animals were sexed, aged, and weighed.

### Research Experience:

- Have written peer-reviewed manuscripts and reports for clients and granting agencies.
- Presented project data and results at national academic meetings and annual project meetings.
- Proficient with molecular genetic techniques including DNA and RNA extraction, DNA sequencing, microsatellite analysis, primer design, Polymerase Chain Reaction (PCR), RT-PCR, Restriction Fragment Length Polymorphism (RFLP), Southern blotting, DNA cloning, and microarray hybridization. Experienced with population genetic software and statistical software.
- Collaborated with MJ Research on beta-testing of their automated genotyper. Proficient with Perkin Elmer Evolution and Multiprobe robotics and with ABI 3730 capillary sequencer.

### **Teaching Experience:**

- Completed volunteer training for public outreach and educational activities at the Miami Museum of Science, 2004.
- **Guest Lecturer**, 2002. Conservation Genetics Graduate Seminar, UC Davis.
- Participated in course on teaching natural sciences at the college-level, 2001. UC Davis.
- **Public Outreach**, 2000. “The Human Genome Project”, McKinley High School, CA.
- **Laboratory Instructor**, 1996-99. Laboratory in Population Genetics (graduate course), Biology of Organisms (*3 semesters*), and Introductory Biology, Colorado State University (CSU).
- **Teaching Assistant**, 1996-99. Evolution (*2 semesters*) and Behavioral Genetics, CSU.
- **Guest Lecturer**, 1999. Introductory Zoology, and Comparative Genetics, CSU.
- **Guest Lecturer**, 1998. Mammalogy, University of Northern Colorado, Greeley, CO.

### **Field Experience:**

- Proficient in live-trapping and handling small mammals and prairie dogs.
- Experienced in collection of plant coverage and distribution data using line-transect and point-method techniques.
- Proficient in identification of mammals, birds, and herps of the shortgrass steppe.
- Used GPS technology to record prairie-dog colony location and area perimeter.
- Assisted in other small mammal surveys using live-trapping and terrestrial invertebrate studies using pit-fall traps.
- Assisted in collection of fish specimens by backpack electroshocker and seine net.
- Assisted in collection of killifish using minnow-traps and dissection of various tissues.

### **Related Field Experience:**

- **Volunteer**, New Mexico Wildlife Center, Espanola, NM, 1994. Assisted in maintenance and care of mammals, birds, and their facilities.
- **Volunteer**, California Raptor Center, Davis, CA, 1992-94. Responsible for daily care of the resident raptors and orphaned chicks. Exercised and released injured raptors as a member of the Rehabilitation Team.
- **Zookeeper Assistant**, Sacramento Zoo, CA, 1993-94. Fed animals and monitored health, maintained facilities, and assisted with numerous medical procedures and first-aid.

## **HONORS AND AWARDS**

- Award of Excellence, Knowledge, and Presentation, MJ Research Annual Sales Meeting. 2000.
- Best Graduate Research Presentation, 78<sup>th</sup> Annual Meeting of the American Society of Mammalogists, Virginia Tech, Blacksburg, VA. 1998.
- Best Graduate Research, Poster Presentation, Front Range Student Ecology Symposium, Colorado State University. 1998.

## **GRANTS**

- Graduate Travel Award, Department of Biology, Colorado State University. 1999.
- Graduate Travel Award, Department of Biology, Colorado State University. 1998.
- Grant-in-Aid of Research, Sigma Xi, The Scientific Research Society, National Academy of Sciences. 1997.

## PUBLICATIONS

### Peer-Reviewed Publications:

- Oleksiak, M.F., **J.L. Roach**, and D.L. Crawford. 2005. Natural variation in cardiac metabolism and gene expression in *Fundulus heteroclitus*. *Nature Genetics* 37: 67-72.
- Whitehead, A, S.L. Anderson, K. Kuivila, **J.L. Roach**, and B.P. May. 2003. Genetic variation among interconnected populations of *Catostomus occidentalis*: implications for distinguishing impacts of contaminants from biogeographic structuring. *Molecular Ecology* 12: 2817-2833.
- **Roach, J.L.**, P. Stapp, B. Van Horne, and M.F. Antolin. 2001. Genetic structure of a black-tailed prairie dog metapopulation. *Journal of Mammalogy* 82: 946-959.
- Longmire, J.L., **J.L. Roach**, M. Maltbie, P.S. White, O.L. Tatum, K.D. Makova, and D.C. Hahn. 2001. Tetranucleotide microsatellite markers for the brown-headed cowbird (*Molothrus ater*). *Journal of Avian Biology* 32: 76-78.
- Antolin, M.F., B. Van Horne, M.D. Berger Jr., A.K. Holloway, **J.L. Roach**, and R.D. Weeks Jr. 2001. Effective size and genetic structure of a Piute ground squirrel population (*Spermophilus mollis*). *Canadian Journal of Zoology* 79: 26-34.
- Longmire, J.L., D.C. Hahn, and **J.L. Roach**. 1999. Low abundance of microsatellite repeats in the genome of the brown-headed cowbird (*Molothrus ater*). *Journal of Heredity* 90: 574-578.

### Other Publications:

- **Roach, J.L.**, R. Colayco, C. To, D. Batey, and B. May. 2003. Microsatellite genotyping using the MJ Research BaseStation DNA Fragment Analyzer. MJ Research Application Note Vol.2, No.7.
- **Roach, J.L.** Foraging behavior of the great blue heron (*Ardea herodias*). 1994. Bodega Marine Laboratory Undergraduate Research Studies.

## PRESENTATIONS

### Oral:

- Crawford, D., M. Oleksiak, J. Paschall, J. VanWye, and **J.L. Roach**. 2004. "Evolutionary genomics to better understand cardiac function". National Institute of Environmental Health Sciences and Marine and Freshwater Biomedical Sciences Center Symposium.
- Whitehead, A., S.L. Anderson, K. Kuivila, **J.L. Roach**, and B.P. May. 2003. "Examining long-term impacts of pesticide contamination: Change in gene pools of exposed native fish populations". Joint European-South African International Conference: Pesticides in non-target agricultural environments: Environmental and economic implications. Cape Town, South Africa.
- Whitehead, A., S.L. Anderson, K. Kuivila, **J.L. Roach**, and B.P. May. 2002. "Change in Gene Pools of Native Fish Populations Exposed to Long-Term Pesticide Contamination". 23<sup>rd</sup> Annual Meeting of the Society of Environmental Toxicology and Chemistry.
- Whitehead, A., B.P. May, K. Kuivila, **J.L. Roach**, and S.L. Anderson. 2002. "Microsatellite and AFLP analysis of geographically proximate fish populations: Distinguishing contaminant-induced genetic change from biogeographic structuring of genetic variation". 83<sup>rd</sup> Annual Meeting of the Western Society of Naturalists.
- Cordes, J.F., M.A. Blumberg, **J.L. Roach**, G.A.E. Gall, and B. May. 2001. "Genetic status of California golden trout populations in the headwaters of Golden Trout Creek, California". Annual Meeting of the American Fisheries Society.
- **Roach, J.L.** and B. May. 2000. "Application of MJ Research BaseStation in Population Genetic Research". **Invited speaker**, MJ Research Annual National Sales Meeting.

- **Roach, J.L.**, B. Van Horne, P. Stapp, and M.F. Antolin. 2000. "Genetic patterns of a black-tailed prairie dog metapopulation". **Invited speaker**, Prairie-dog Management Workshop, National Wildlife Federation and Arizona Game and Fish Department.
- **Roach, J.L.**, M.F. Antolin, B. Van Horne, and P. Stapp. 1999. "Evidence of genetic structure within a black-tailed prairie dog metapopulation". American Society of Mammalogists.
- **Roach, J.L.**, B. Van Horne, and M.F. Antolin. 1999. "Population genetics of black-tailed prairie dogs (*Cynomys ludovicianus*): structure of a recently fragmented metapopulation". Habitat Fragmentation Symposium, University of Helsinki, Finland.

**Poster:**

- **Roach, J.L.**, M.F. Oleksiak, and D. Crawford. 2005. "Natural variation in cardiac metabolism and gene expression in *Fundulus*". Society of Molecular Biology and Evolution.
- Cordes, J.F., M.A. Blumberg, **J.L. Roach**, G.A.E. Gall, and B. May. 2001. "Genetic status of California golden trout (*Oncorhynchus mykiss aguabonita*) in the Golden Trout Creek watershed". Coastwide Salmonid Genetics Meeting.
- **Roach, J.L.** and M.F. Antolin. 2001. "Population genetics of black-tailed prairie dogs (*Cynomys ludovicianus*): structure of a recently fragmented metapopulation". Conservation Genetics in the Age of Genomics. Symposium co-sponsored by the American Museum of Natural History's Center for Biodiversity and Conservation and the Wildlife Conservation Society.
- **Roach, J.L.** and M.F. Antolin. 1999. "Population genetic structure of a recently fragmented black-tailed prairie dog metapopulation". Society of Conservation Biology.
- **Roach, J.L.**, B. Van Horne, M.F. Antolin, and P. Stapp. 1998. "Genetic structure of black-tailed prairie dog (*Cynomys ludovicianus*) populations in shortgrass steppe". American Society of Mammalogists.
- **Roach, J.L.**, M.F. Antolin, B. Van Horne, and P. Stapp. 1998. "Patterns of genetic structure in a black-tailed prairie dog metapopulation". Front Range Ecology Symposium, Fort Collins, CO.
- Stapp, P., M.D. Lindquist, and **J.L. Roach**. 1998. "Ecological effects of prairie dogs on the fauna of shortgrass steppe". Shortgrass Steppe Research Symposium, Fort Collins, CO.

### **SERVICE ACTIVITIES**

- Grants-in-Aid of Research Committee, American Society of Mammalogists, 2001.
- Resolution Committee, American Society of Mammalogists, 1999-2001.
- Judge, Sixth Annual Department of Biology Graduate and Undergraduate Student Symposium, Colorado State University. 1999-2000.
- President, Department of Biology Graduate Student Association, Colorado State University. 1996-98.
- Co-coordinator, Fourth and Fifth Annual Department of Biology Graduate and Undergraduate Student Symposium, Colorado State University. 1997-98.

### **PROFESSIONAL AFFILIATIONS**

- American Society of Mammalogists
- Society of Conservation Biology
- Society of Molecular Biology and Evolution
- Sigma Xi, The Scientific Research Society