CURRICULUM VITAE

Russell Benford, Ph.D.
Department of Biological Sciences
Northern Arizona University
P.O. Box 5640
Flagstaff, AZ 86011-5640
russell.benford@nau.edu
http://www4.nau.edu/acl/

EDUCATION

Doctor of Philosophy in Biology. Concentration in animal behavior and evolutionary biology. Northern Arizona University. Dec 08.

Master of Science in Biology. Concentration in cognitive science and science education. Arizona State University. May 01.

Bachelor of Science in Natural Resource Management. Concentration in wildlife ecology and management, minor in zoology. Arizona State University. May 98.

PROFESSIONAL INTERESTS

Behavioral ecology; evolutionary biology; molecular ecology; neuroethology; avian biology; wildlife management and conservation; statistics.

Science education; student-centered learning; history and philosophy of science; equity in education; science writing; assessment.

PROFESSIONAL POSITIONS HELD

Research

Research Associate	Dec 08-Present. Northern Arizona University. Molecular ecologist. Designed and performed novel ecological and evolutionary research on pinyon jays, pronghorn antelope, and Southwestern willow flycatchers using microsatellite markers. Mentored, trained, and supervised graduate and undergraduate students in molecular and field techniques.

Other Scientific & Technical Positions

Lab Manager	Nov 01-Present. Northern Arizona University, Avian Cognition Laboratory. Managed human and capital assets. Supervised regulatory compliance in occupational safety, animal care and use, and hazardous materials. Trapped, banded, and collected morphological, genetic, and behavioral data on western scrub jays, Mexican jays, pinyon jays, and Clark's nutcrackers. Initiated a captive breeding program for pinyon jays.

Teaching Evaluator	Nov 04-Apr 08. Arizona State University, Professional Development School Teacher Education Network of Excellence through Technology Program. Evaluated primary and secondary teaching techniques.
Program Evaluator	Oct 03-May 06. Coconino Community College. Designed and implemented programmatic evaluation for math, science, and social science departments. Work used as an exemplar of effective assessment by the North Central Association of Colleges and Schools.
Education Researcher	Nov 01-May 04. Northern Arizona University, Center for Science Teaching and Learning. Researched effectiveness of science, math, and business programs. Designed, implemented, and evaluated pedagogical innovations. Researched causes of student failure in science, math, and business "gateway" courses.
Textbook Reviewer	Jun 01-Aug 01. John Wiley and Sons, Inc. Human Biology textbook.
Curriculum Evaluator	Nov 98-Jul 03. Arizona State University, Arizona Collaborative for Excellence in the Preparation of Teachers. Evaluated secondary and post-secondary science teaching methods and curricula. Developed and used psychometric tests and research instruments.

Teaching

Authored all curricula. Used inquiry and student-centered techniques. Emphasized using the scientific method, and creative and critical thinking skills. Worked with ESL and traditionally underrepresented groups. Assessed courses. Reviews available on request.

BIO 100	Biology Concepts. Jun 03-Present. Coconino Community College. Taught basic scientific and biological concepts in person to 20-25 non-majors per semester.
BIO 499	Contemporary Developments in Behavioral and Conservation Science. Jun 07-Present. Northern Arizona University. Directed undergraduate seminars. Mentored research in behavioral and molecular ecology in person and via Blackboard Vista.
BIO 528	Mammalogy. Jan 09-May 09. Northern Arizona University. Co-taught functional morphology, classification, behavior, and ecology of mammals in person and via Blackboard Vista to 25 biology majors.
BIO 498	Senior Seminar. Aug 06-May 09. Northern Arizona University. Facilitated undergraduate seminars on behavioral ecology, evolutionary biology, and geographic information systems.
BIO 109	Natural History of the Southwest. Jun 04-Aug 08. Coconino Community College. Taught ecology, life history, and evolution in person to 12-15 biology majors and non-majors per semester.
BIO 485	Undergraduate Research. Jan 06-May 08. Northern Arizona University. Mentored undergraduate capstone research in behavioral and evolutionary biology.

BIO 698 Graduate Seminar. Aug 06-May 07. Northern Arizona University. Facilitated graduate seminars on evolutionary biology, molecular techniques, statistics, and science writing.

EED 598 Ecosystems, Diversity, and Adaptation. Aug 06-Dec 06. Arizona State University. Taught genetics and evolutionary concepts via Web CT with Smart Board to 15 in-service secondary science teachers.

SCI 410 Laboratory Techniques for Teaching Science. Jan 02-May 02. Northern Arizona University. Taught methods of teaching secondary and post-secondary science in person to 20 pre-service science teachers.

SWU 302 Human Biology. Jun 99-May 01. Arizona State University. Taught basic scientific and biological concepts in person to 20-24 undergraduate and Master's level social workers per semester.

Other Instructional Positions

Instructor Four Corners/Upward Bound Math and Science Program. May 03-Jul 03. Northern Arizona University.

BIO 181 The Unity of Life. Aug 01-Dec 01. Northern Arizona University. Teaching assistant.

BIO 100 The Living World. Aug 98-Jul 99. Arizona State University. Teaching assistant.

BIO 193 The Nature of Biological Sciences. Aug 98-Dec 98. Arizona State University. Teaching assistant.

ADDITIONAL EXPERIENCE AND SERVICE

Additional Experience

Field Technician May 09-Present. Arizona Game and Fish Department. Collected population and movement data via radiotelemetry on Rocky Mountain elk, pronghorn antelope, and bighorn sheep in population, dispersal, and habitat use studies.

Field Technician May 02-Aug 02. Colorado State University. Performed avian point counts and nesting surveys, collected ecological data, and live-trapped small mammals in a long-term fire ecology study.

Field Technician Jun 98-Jul 98. Arizona State University. Collected population and distribution information on small mammals (including bats) and reptiles and inventoried range plants and habitat in a long-term urban ecology study.

Field Technician Apr 97-May 99. Arizona Game and Fish Department. Collected population and distribution data on predators/furbearers in an island biogeography study.

Field Technician Apr 96-Sep 99. Phoenix Zoo Animal Observation Team. Radio-tracked coyotes in an urban ecology study.

Service

Committee Member	Dec 07-Apr08. Coconino Community College. Search committee for Microbiology Instructor.
Committee Member	Nov 06-Apr 08. Northern Arizona University. Search committee for Professor of Physiology Education.
Committee Member	Sep 04-May 05. W.L. Gore and Associates. Animal care and use committee.
Proposal Reviewer	Jan 01-Jan 02. Arizona Board of Regents. Eisenhower Mathematics and Science Program.
Instructor	Jan 99-Aug 01. Arizona State University, Southwest Center for Education and the Natural Environment "Science Connections" program.
Contributor	Nov 98-Aug 01. Arizona State University, Department of Biology "Ask a Biologist" program.

PROFESSIONAL ACHIEVEMENTS

Peer-Reviewed Publications

Benford, R., Barber, M., and Balda, R.P. In preparation. Symmetrical parental investment justifies monogamy in pinyon jays (*Gymnorhinus cyanocephalus*). Target journal: *Animal Behaviour*.

Benford, R., Kamil, A.C., and Balda, R.P. In preparation. Differential fitness for innovation and social learning skills in pinyon jays (*Gymnorhinus cyanocephalus*). Target journal: *Animal Behaviour*.

Benford, R., Nunes, C., Meneses, N., and Balda, R.P. In preparation. Population biology and social organization of pinyon jays (*Gymnorhinus cyanocephalus*). Target journal: *The Auk*.

Benford, R., Shuster, S.M., Harter, L.B., Gao, S., and Balda, R.P. In preparation. Ecologically-induced selection for phenotypic, genetic, and social characteristics of pinyon jays (*Gymnorhinus cyanocephalus*). Target journal: *Evolution*.

Busch, J.D., Benford, R., Pearson, T., Palmer, E., Balda, R.P., and Keim, P. 2008. Development of polymorphic tetranucleotide microsatellites for pinyon jays (*Gymnorhinus cyanocephalus*). *Conservation Genetics.* DOI 10.1007/s10592-008-9616-z.

Adamson, S.L., Burtch, M., Cox III, F., Judson, E., Turley, J.B., Benford, R., and Lawson, A.E. 2003. Reformed undergraduate instruction and its subsequent impact on secondary school teaching practice and student achievement. *Journal of Research in Science Teaching*, 40(10), 939-957.

Lawson, A.E., Benford, R., Bloom, I., Carlson, M.P., Falconer, K., Hestenes, D., Judson, E., Piburn, M.D., Sawada, D., Turley, J., and Wykoff, S., 2002. Evaluating college mathematics and science instruction. *Journal of College Science Teaching* 31(6), 388-393.

Sawada, D., Piburn, M.D., Judson, E., Turley, J., Falconer, K., Benford, R., Bloom, I. 2002. Measuring reform practices in science and mathematics classrooms: the reformed teaching observation protocol. *School Science and Mathematics* 102(6), 245-253.

Lawson, A.E., Alkhoury, S., Benford, R., Clark, B.R., and Falconer, K.A., 2000. What kinds of scientific concepts exist? Concept construction and intellectual development in college biology. *Journal of Research in Science Teaching*, 37(9), 996-1018.

Other Publications

Benford, R. 2008. *Molecular and Evolutionary Ecology of the Pinyon Jay*. Doctoral Dissertation, Northern Arizona University.

Benford, R., and Gess-Newsome, J. 2006. Factors affecting student academic success in gateway courses at Northern Arizona University. Flagstaff, AZ: Center for Science Teaching and Learning, Northern Arizona University. ERIC Accession Number: ED495693.

Benford, R. 2003. Assessment of introductory science courses at Coconino Community College. Flagstaff, AZ: Coconino Community College.

Benford, R. 2001. *Relationships between Effective Inquiry Use and the Development of Scientific Reasoning Skills in College Biology Labs*. MS Thesis, Arizona State University. ERIC Accession Number: ED456157.

Benford, R. and Lawson, A. E., 2000. *Biology Program Evaluation: Beginning Teachers.* ACEPT Technical Report No. PRG00-6. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Benford, R. and Lawson, A. E., 2000. *Biology 100 Course Evaluation: Elementary Education.* ACEPT Technical Report No. C00-2C. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Benford, R. and Lawson, A. E., 2000. *Impact of Reforms on Beginning Biology Teachers*. ACEPT Technical Report No. C00-3C. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Sawada, D., Piburn, M., Falconer, K., Turley, J., Benford, R., and Bloom, I., 2000. *Reformed Teaching Observation Protocol (RTOP).* ACEPT Technical Report No. IN00-1. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Sawada, D., Piburn, M., Turley, J., Falconer, K., Benford, R., Bloom, I., and Judson, E., 2000. *Reformed Teaching Observation Protocol (RTOP) Training Guide.* ACEPT Technical Report No. IN00-2. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Sawada, D., Piburn, M., Turley, J., Falconer, K., Benford, R., Bloom, I., and Judson, E., 2000. *Reformed Teaching Observation Protocol (RTOP) Reference Manual.* ACEPT Technical Report No. IN00-3. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Benford, R., 1999. A measure of student engagement in ACEPT and non-ACEPT introduction to biology classrooms. *ACEPT Evaluation: An Information Package*. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Benford, R. and Sawada, D., 1999. *ACEPT Faculty Enhancement Workshop: Biology*. ACEPT Technical Report No. SW99-3. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Sawada, D. and Benford, R., 1999. *Ways of Teaching Science Survey*. ACEPT Technical Report No. IN99-4. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Turley, J. Benford, R. and Sawada, D., 1999. *ACEPT Faculty Enhancement Workshop: Geology.* ACEPT Technical Report No. SW99-2. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Turley, J., Falconer, K., Benford, R., Judson, E. and Sawada, D., 1999. *Development of a Scoring Rubric for Concept Schema Quantification*. ACEPT Technical Report No. IN99-5. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Turley, J. Benford, R. and Sawada, D., 1999. *ACEPT Faculty Enhancement Workshop: Geology*. ACEPT Technical Report No. SW99-2. Tempe, AZ: Arizona Collaborative for Excellence in the Preparation of Teachers.

Presentations

Benford, R. Apr 2008. Cooper Ornithological Society. Climate-induced changes to the population dynamics of pinyon jays (*Gymnorhinus cyanocephalus*). Annual Meeting of the Cooper Ornithological Society. Tucson, AZ.

Benford, R. Aug 2005. Limited evidence for selection on social learning skills in pinyon jays (*Gymnorhinus cyanocephalus*). Annual Meeting of the Animal Behavior Society. Snowbird, UT.

Benford, R. Aug 2005. Invited talk. Measuring the strength of instructional reform and its impact on students. Annual Meeting of the American Association of Physics Teachers. Salt Lake City, UT.

Benford, R. Nov 2004. Invited talk. Measuring science and math education reform. Texas A&M University. College Station, TX.

Benford, R. Jun 2004. Innovation and variation in foraging behaviors in pinyon jays (*Gymnorhinus cyanocephalus*). Annual Meeting of the Animal Behavior Society. Oaxaca, MX.

Benford, R. Apr 2001. Developing and utilizing an observational instrument to assess reformed teaching in K-20 science and mathematics. Annual Meeting of the American Educational Research Association. Seattle, WA.

Benford, R. Mar 2001. Relationship between instructor reasoning skill and inquiry teaching in college biology labs. Annual Meeting of the National Association of Research in Science Teaching. St. Louis, MO.

Numerous presentations on educational assessment and the effective use of inquiry-oriented teaching techniques for Northern Arizona University's Faculty Development Program.

Posters

Gao, S., Benford, R., Shuster, S.M., and Balda, R.P. 2008. Temporal changes in population dynamics of the pinyon jay. Research Internships in Behavioral and Conservation Sciences Exposition. Northern Arizona University, Flagstaff, Arizona.

Harter, L.B., Benford, R, and Balda, R.P. 2008. Evidence of drought-induced evolution in the pinyon jay (*Gymnorhinus cyanocephalus*). 15th Annual Celebration of Undergraduate Research and Design. Northern Arizona University, Flagstaff, Arizona.

Holmes, L., Benford, R., and Balda, R.P. 2007. Unusually high variance at pinyon jay microsatellite loci. Research Experience for Undergraduates in the Neural and Behavioral Sciences Exposition. Northern Arizona University, Flagstaff, Arizona.

Benford, R., Meneses, N., Service, P.M., and Balda, R.P. 2006. Potential causes of unexpected structure in a metapopulation of pinyon jays. 24th International Ornithological Congress. Hamburg, Germany.

Harter, L., Benford, R., and Balda, R.P. 2006. Is seed handling behavior optimized for social status in pinyon jays (*Gymnorhinus cyanocephalus*)? 4th North American Ornithological Conference. Veracruz, Mexico.

Nunes, C., Benford, R., Balda, R.P. 2006. Effects of harness attached radio transmitters on pinyon jays. 13th Annual Celebration of Undergraduate Research and Design. Northern Arizona University, Flagstaff, Arizona. Winner of undergraduate achievement award.

Strasser, E.H., Benford, R., Balda, R.P. 2006. Linear hierarchy provides context for evolution of social cognition in pinyon jays. 4th North American Ornithological Conference. Veracruz, Mexico.

Barber, M., Benford, R., and Balda, R.P. 2005. Are pinyon jays (*Gymnorhinus cyanocephalus*) genetically monogamous? Annual Meeting of the Animal Behavior Society. Snowbird, UT.

Nunes, C., Benford, R., Shuster, S.M., Keim, P., and Balda, R.P. 2005. Population structure of a metapopulation of pinyon jays (*Gymnorhinus cyanocephalus*). 123rd Stated Meeting of the American Ornithologist's Union. Santa Barbara, CA.

Grants and Financial Awards

Benford, R. 2009. Science Foundation of Arizona Teacher as Investigator Program. $5,500.

Benford, R. 2008. Science Foundation of Arizona Teacher as Investigator Program. $5,500.

Benford, R. 2008. Northern Arizona University Research Experience for Undergraduates program. $3,500.

Benford, R. 2007. Science Foundation of Arizona Teacher as Investigator Program. $2,750.

Benford, R. 2007. Northern Arizona University Research Experience for Undergraduates program. $2,500.

Harter, L.B. and Benford, R. 2007. Possible drought-induced selection on pinyon jays. Northern Arizona University Integrative Graduate Education and Research Traineeship Undergraduate Program: Genes to Environment. $3,000 (total project cost $23,587).

Benford, R. 2006. Student travel grant. Northern Arizona University. $150.

Benford, R., Nunes, C.A., Barber, M.B., and Balda, R.P. 2006. Pinyon jay home range and habitat use. Northern Arizona University Hooper Undergraduate Research Award Program. $6,740 (total project cost $38,050).

Benford, R. 2005. Student travel grant. Northern Arizona University. $150.

Benford, R. 2004. Student travel grant. Northern Arizona University. $150.

Honors

2008 The Council for Graduate Schools. Described in “Making a Difference” and “Graduate Education and the Public Good” as a student who uses his graduate education to contribute significantly to society.

2001 Arizona Collaborative for Excellence in the Preparation of Teachers. President’s Medal for Team Excellence, Awarded with Distinction. Arizona State University.

ACADEMIC REFERENCES

Alcock, John. Arizona State University. Regent’s Professor, Department of Biology. Master’s committee member. (480) 965-7304. j.alcock@asu.edu

Balda, Russell. Northern Arizona University. Regent’s Professor, Department of Biological Sciences. Ph.D. committee chair. (928) 523-1355. russell.balda@nau.edu

Inigo, Maxie. Coconino Community College. Chair, Department of Mathematics and Science. Supervisor for teaching and research. (928) 226-4246. maxie.inigo@coconino.edu

Lawson, Anton. Arizona State University. Professor, Department of Biology. Master’s committee chair. (480) 965-2540. anton.lawson@asu.edu

Theimer, Tad. Northern Arizona University. Associate Professor, Department of Biological Sciences. Research collaborator. (928) 523-8374. tad.theimer@nau.edu

Shuster, Stephen. Northern Arizona University. Professor, Department of Biological Sciences. Ph.D. committee member. (928) 523-9302. stephen.shuster@nau.edu