MATTHEW S. RAND: CURRICULUM VITAE

Carleton College
Department of Biology

PERSONAL INFORMATION

Mailing Address: Department of Biology
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EDUCATION

Ph.D. 1991 University of Colorado, Boulder, CO
Department of Environmental, Population, and Organismic Biology, dissertation directed by Richard E. Jones and David Chiszar, entitled Behavioral Function and Hormonal Control of Polymorphic Sexual Coloration in the Lizard *Sceloporus undulatus erythrocheilus*.

M.S. 1986 Wichita State University, Wichita, KS
Department of Biological Sciences, thesis directed by Louis J. Guillette, Jr., entitled Histological, Hormonal and Chromatic Correlates of Sexual Maturation in the Male Lizard, *Crotaphytus collaris.*

B.S. 1982. Oregon State University, Corvallis, OR
Department of Zoology

HONORS AND RECOGNITION

1994 Nominated for the Texas Excellence in Teaching Award in the College of Natural Sciences, University of Texas at Austin (while teaching *Ecology, Evolution, and Society*).

1990 Received the Graduate Student Research and Creative Work Award from the Graduate School, University of Colorado.

RESEARCH INTERESTS

Evolution and reproductive biology of vertebrates. Development, endocrinology, function, and evolution of sexually dimorphic traits (in the broad sense). Specifically, I am interested in the proximate (physiological mechanisms) and ultimate causes (selective pressures) of naturally and sexually selected dimorphic characters. I am currently involved in research concerning the neural mechanisms underlying the differences in male and female reproductive behavior.

PROFESSIONAL EXPERIENCE

1995-present **Assistant Professor of Biology** Carleton College, Northfield, MN
Responsible for lectures and labs in: Animal Physiology (enrollment=53), Animal Behavior (30), Vertebrate Morphology (30), and part of Introductory Biology (72-96). I also teach seminars in Reproductive Biology, Behavioral Endocrinology, Behavioral Genetics (with Stephan Zweifel), and Sexed Bodies, Sexed Science (with Jennifer Manion in Philosophy). Seminar enrollments=15.

1993-95 **Lecturer in Biology and Zoology** University of Texas, Austin
Developed and instructed courses entitled: "*Ecology, Evolution and Society*" for first year, non-science majors, enrollment 135-197 students, Fall '93 & '94; "*Structure and Function of Organisms*" an introductory level course for science majors, two sections, combined enrollment 200 students, Spring '94; "*Vertebrate Physiology*" an upper division course, enrollment 80 students, Summer '94; "*Molecules to Organisms*" for first year, non-science majors, two sections, combined enrollment ~400 students, Spring '95.

1991-92 **Postdoctoral Fellow** University of Texas at Austin
N.I.M.H. Institutional N.R.S.A., Institute of Reproductive Biology, Department of Zoology.

1991 **Research Assistant** University of Colorado, Boulder

N.I.H. funded study, entitled Control of Ovarian Alternation: Brain Studies. Dr. R. E. Jones, P.I.

1989-90 **Summer Professor** University of Colorado, Boulder, Denver, and the Health Sciences Center. Developed and instructed course on Functional Human Anatomy for the Pre-Collegiate Development Program.

1987-90 **Graduate T.A.** University of Colorado, Boulder
Recitation and laboratory instructor for Genetics, Comparative Vertebrate Anatomy, and Human Anatomy.

1986-87 **Research Assistant** University of Colorado, Boulder
N.S.F. funded study, entitled Form and function of ovarian follicular contractions. Dr. R. E. Jones, P. I.

1985 & 87 **Graduate T.A.** University of Colorado, Boulder
Laboratory Coordinator for Human Anatomy.

1984 **Research Assistant** Wichita State University, Kansas
National Geographic funded study, entitled Evolutionary Ecology of the Reproductively bimodal lizard, *Sceloporus aeneus.* Field work in Mexico. Drs. L. J. Guillette, Jr. and K. L. Brown, P. I.

1983-85 **Graduate T.A.** Wichita State University, Kansas
Lab instructor for Introduction to the Human Organism and General Biology for majors.

1982-83 **Undergraduate T.A.** Oregon State University, Corvallis
Instructed laboratories in Human Anatomy and Comparative Vertebrate Anatomy.

1978 **Research Assistant** University of Arizona, Tucson
U. S. Bureau of Reclamation contracted study entitled Identification of impacts of the Salt-Gila Aqueduct, Central Arizona Project, and proposed mitigation plan for the Gila Monster, *Heloderma suspectum*. J. K. Cross, P. I.

PRESENTATIONS AT SCIENTIFIC MEETINGS AND SYMPOSIA

Contributed Papers and Published Abstracts:

Klemenhagen, K.C., V. Fran ois-Bongar on, S. Clark, and M.S. Rand (2000). Western Regional Conference on Comparative Endocrinology, Corvallis, OR. Sand-shoving frequency is correlated with female receptivity during courtship and mounting in the lizard, *Cnemidophorus velox*.

Singer, S.R., M.S. Rand, R.O. Elveton, K.M. Galotti, and L.K. Komatsu (1999). Science as one of the liberal arts: linking introductory courses for science literacy. Developmental Biology 210:183.

Chu, J., M. S. Rand, and W. Wilczynski (1995). Society for Neuroscience, San Diego, CA. Distribution of immunoreactive tyrosine hydroxylase in the fore- and midbrain of *Rana pipiens* using whole mount immunohistochemistry.

Rand, M. S. and R. E. Jones (1992). Southwestern Regional Conference on Comparative Endocrinology, Austin, TX. Androgen-dependent reproductive coloration in male and female red-lipped plateau lizards.

Rand, M. S. (1991). Western Regional Conference on Comparative Endocrinology, Tempe, AZ. Seasonal and experimental activation of sexually dimorphic tail musculature.

Rand, M. S. (1990). Western Regional Conference on Comparative Endocrinology, Berkeley, CA. Behavioral function of androgen-dependent coloration in male lizards.

Propper, C. R., Jones, R. E., Lopez, K., Austin, H., Rand, M. S. (1989). American Society of Zoologists, Boston, MA. Distribution of arginine vasotocin (AVT) cells and fibers in the brain of the lizard *Anolis carolinensis.* Amer. Zool., **29**, 94A.

Rand, M. S. (1989). American Society of Zoologists, Boston, MA. Androgen organization and activation of three sexually dimorphic characters in a species of lizard. Amer. Zool., **29**, 19A.

Rand, M. S. (1988). American Society of Zoologists, San Francisco, CA. Courtship and aggressive behavior in male lizards exhibiting two different sexual colorations. Amer. Zool., **28**, 153A.

Rand, M. S. (1988). Western Regional Conference on Comparative Endocrinology. Seattle, WA. Steroid-induced morphological color change in a lizard: organization versus activation.

Rand, M. S. (1987). American Society of Zoologists. New Orleans, LA. The distribution of two color morphs of the male saxicolous lizard, *Sceloporus undulatus erythrocheilus* , and its relationship with habitat in two different Colorado populations. Amer. Zool., **27**, 45A.

Invited Papers:

1994 Rand, M. S., L. J. Young, D. Crews. Neural correlates of sexual behavior in lizards. Symposium on Field and Behavioral Endocrinology, Society for the Study of Amphibians and Reptiles/Herpetologists' League meetings, Athens, GA.

1993 Rand, M. S. Reproductive and behavioral ecology of the lizard *Sceloporus undulatus erythrocheilus* with particular reference to polymorphic sexual coloration. Reptilian Behavioral Ecology: A Symposium in Honor of Charles C. Carpenter. Society for the Study of Amphibians and Reptiles meetings, Bloomington, IN.

1993 Rand, M. S. Sexual selection, sexual dimorphism and territoriality revisited: Does *Sceloporus undulatus erythrocheilus* meet the predictions? *Sceloporus* Symposium, American Society of Ichthyologists and Herpetologists/Herpetologists' League meetings, Austin, TX.

1984 Rand, M. S., R. M. Storm, J. J. Beatty. A population of parthenogenetic *Cnemidophorus* in central Oregon: in support of the weed hypothesis. Biology of *Cnemidophorus* Symposium. American Society of Ichthyologists and Herpetologists, Herpetologists' League, and the Society for the Study of Amphibians and Reptiles combined annual meeting, Norman, OK.

PUBLICATIONS

Rand, M.S. K.C. Klemenhagen, S.M. Clark, and V.N. Fran ois-Bongar on. Displacement activity and estrogen-induced receptivity in the Lizard *Cnemidophorus velox*. Under review in Ethology.

Elveton, R.O., K.M. Galotti, L.K. Komatsu, M.S. Rand, and S.R. Singer. (2000) Origins and mind: an integrated academic experience for new students. Liberal Education 86:32-39.

Kendrick, A. M., M. S. Rand and D. Crews. (1995) Electrolytic lesions to the ventromedial hypothalamus abolish receptivity in female whiptail lizards, *Cnemidophorus uniparens*. Brain Research 680: 226-228.

Morrison, R. L., M. S. Rand and S. K. Frost-Mason. (1995) The cellular and ultrastructural basis of color differences in three morphs of the lizard *Sceloporus undulatus erythrocheilus*. Copeia 1995:2, 397-408.

Rand, M. S. and D. Crews (1994) The bisexual brain: Sex differences and sex behavior differences in sexual and parthenogenetic lizards. Brain Research 663: 163-167.

Rand, M. S. (1992) Hormonal control of polymorphic and sexually dimorphic coloration in the lizard, *Sceloporus undulatus erythrocheilus*. General and Comparative Endocrinology 88, 461-468.

Lopez, K. H., R. E. Jones, D. Seufert, M. S. Rand, and R. Dores. (1992) Catecholaminergic cells and fibers in the brain of a lizard (*Anolis carolinensis*), identified by traditional as well as whole-mount immunohistochemistry. Cell Tissue Research 270: 319-337.

Jones, R. E., C. R. Propper, M. S. Rand, and H. B. Austin (1991). Loss of nesting behavior and the evolution of viviparity in reptiles. Ethology 88: 331-341.

Propper, C. R., R. E. Jones, M. S. Rand, and H. B. Austin (1991). Nesting behavior of the lizard *Anolis carolinensis*. Journal of Herpetology 25: 484-486.

Smith, H. M., M. S. Rand, J. D. Drew, B. D. Smith, D. Chiszar, and C. M. Dwyer (1991). Relictual intergrades between the northern prairie lizard (*Sceloporus undulatus garmani*) and the red-lipped plateau lizard (*S. u. erythrocheilus*) in Colorado. Northwestern Naturalist 72: 1-11.

Rand, M.S. (1990). Polymorphic sexual coloration in the lizard *Sceloporus undulatus erythrocheilus*. American Midland Naturalist 124: 352-359.

Jones, R. E., D. Orlicke, H. B. Austin, M. S. Rand, and K. H. Lopez. (1990) Indomethocin inhibits ovarian PGE secretion and gonadotropin-induced ovulation in a reptile (*Anolis carolinensis*). Journal of Experimental Zoology 255: 57-62.

Jones, R. E., H. B. Austin, K. H. Lopez, M. S. Rand, and C. H. Summers. (1988) Gonadotropin-induced ovulation in a reptile (*Anolis carolinensis*): histological observations. General and Comparative Endocrinology 72: 312-322.

Guillette, L. G., Jr., M. S. Rand, V. DeMarco, and K. Etheridge. (1988) Fixatives and alcohol-induced weight change in eggs from the lizard, *Sceloporus undulatus*. Journal of Herpetology 22: 115-118.

Jones, R. E., K. H. Lopez, C. H. Summers, H. B. Austin, and M. S. Rand (1987). Development of an avascular region (the stigma) in ovarian follicles of lizards (*Anolis*). Journal of Morphology 194: 311-322.

Cross, J. K. and M. S. Rand (1979). Climbing activity in wild-ranging Gila monsters, *Heloderma suspectum* (Helodermatidae). Southwestern Naturalist 24: 703-705.

MANUSCRIPTS IN PREPARATION

Rand, M.S., K.C. Klemenhagen, K.J. Lee, and M.J. Ireland. Sexually dimorphic home range size is not related to hippocampal volume in the lizard, *Sceloporus undulatus erythrocheilus*. For Proceedings of the Royal Society of London B.

RESEARCH IN PROGRESS

- Influence of opioids on the reproductive behavior of *Cnemidophorus velox.*
- Distribution of AVT-ir neurons in the brains of *Cnemidophorus velox* and *Anolis carolinensis*.
- Sex steroid-induced changes in AVT-ir neurons in *Cnemidophorus velox*.
- Sex steroid-induced changes in distribution of tyrosine hydroxylase-ir neurons in a sexual and an asexual species of *Cnemidophorus*.

MEMBERSHIPS AND AFFILIATIONS

American Association for the Advancement of Science, International Tortoise Trust, Project Kaleidoscope (Faculty for the 21st Century), Society for Behavioral Neuroendocrinology, Society for Comparative and Integrative Biology — Sponsor of the Western Regional Conference on Comparative Endocrinology, Society for the Advancement of Chicanos and Native Americans in Science.

UNDERGRADUATE RESEARCH ADVISING (Carleton College only)

2000 Ms. Vanessa Fran ois-Bongar on, Dept. of Biology, Carleton College, Changes in nitric oxide synthase-immunoreactivity in the hypothalamus of lizards with testosterone-mediated mating behavior. Supported by the Beckman Foundation.

1999 (summer) Ms. Vanessa Fran ois-Bongar on (Beckman), Susan Clark (Kresge), Kristen C. Klemenhagen (HHMI), Zach Handler (HHMI). Development of an immonocytochemical staining procedure for nitric oxide synthase, behavioral analysis of steroid-induced female receptivity in lizards.

1998 (summer) Ms. Vanessa Fran ois-Bongar on, Ms. Kim Lee, and Ms. Jennifer Huck (San Antonio High School student), all supported by HHMI. Mr. Emerson Perez (McNair Foundation), Mr. Alexander Primus (Kresge Foundation), Immunocytochemistry of AVT in the brains of lizards treated with different sex steroids. Dept. of Biology, Carleton College.

1997 (summer) Mr. Kevin Long and Mr. Brian Schroeder, Dept. of Biology, Carleton College, Development of an immunocytochemical procedure for identifying arginine vasotocin in the hypothalamus of lizards. Supported by HHMI summer research stipend.

1996 (summer) Ms. Malia Ireland and Mr. Ronald Kim, Dept. of Biology, Carleton College, Effect of testosterone on the volume of the dorso-medial cortex in *Anolis carolinensis*. Supported by HHMI summer research stipend.