

ROGER H. SAWYER

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PROFESSIONAL PREPARATION

University of California-Davis	Genetics	Postdoctoral	1970 – 1973
University of Massachusetts	Zoology	Ph.D.	1970
University of Maine	Zoology	B.A.	1965

Postdoctoral Advisor: Dr. Ursula K. Abbott

Graduate Advisor: Dr. Yoshihiro Kato

ACADEMIC/PROFESSIONAL APPOINTMENTS

July 2016 – Present	Executive Associate Dean, College of Arts & Sciences, University of South Carolina
July 2015 – July 2016	Interim Dean, College of Arts & Sciences, University of South Carolina
2010 – 2015	Executive Dean, Senior Associate Dean for Graduate Studies College of Arts & Sciences, University of South Carolina
2008 – Present	Carolina Trustee Professorship
2005 – 2010	Senior Associate Dean for Natural Sciences College of Arts & Sciences, University of South Carolina
2004 – 2005	Interim Dean College of Science & Mathematics, University of South Carolina
1998 – 2004	Associate Dean for Operations College of Science & Mathematics, University of South Carolina
1997 – 1998	Interim Dean College of Science & Mathematics, University of South Carolina
1996 – 1997	Associate Dean for Research and Graduate Studies College of Science & Mathematics, University of South Carolina
1995 – 2000	Carolina Distinguished Professor Department of Biological Sciences, University of South Carolina
1990 – Present	Elected as Fellow of the American Associate for the Advancement

	of Science
1986 – 1996	Chair, Department of Biological Sciences University of South Carolina
1986 – 1994	Carolina Distinguished Research Professor University of South Carolina
1975 – Present	Assistant, Associate, Full Professor Department of Biological Sciences, University of South Carolina
1973 – 1975	Research Anatomist, California Primate Research Center UC-Davis

RESEARCH INTERESTS

Developmental Biology
Evolution
Comparative Genomics

SYNERGISTIC ACTIVITIES

P.I. and Project Director of the USC Undergraduate Research Program funded by the Howard Hughes Medical Institute:

Original Project Director of the USC's Undergraduate Research Program funded by the Howard Hughes Medical Institute. He oversees the continuation of this program, now funded (\$100,000/yr.) by the University and in its 12th year. This innovative program established four new courses in the biology curriculum: Introduction to Biological Research, Biotechnology, Neurobiology and advanced Cell Biology. Each year, the Hughes program provides 10-12 fellowships for undergraduate research in the laboratory of a faculty mentor. An outreach program for K-12 students involves the establishment of the Biology Department's Belser Arboretum as an outdoor laboratory.

Co-P.I. NSF GK-12 Program at USC

Director, Workforce and Education Board of NSF EPSCoR Tissue Biofabrication Project

Development of a State-wide Curriculum in collaboration with Dr. Robert Ogilvie, developed an online Histology course (The study of human tissues)

P.I. of GAANN Projects

In partnership with EdVenture, provided the histological images of numerous tissues for their new facility near South Carolina State Museum.

Served as the College of Science and Mathematics Consortium Representative for the College of Educations PT3 Grant from the U.S. Dept. of Education. In collaboration with faculty and students in the College of Education, integrated technology into the introductory course (BIOL 101 & 101L) for Biological Sciences.

Organized a major symposium, in collaboration with Rich Showman (Biological Sciences, USC) in 1984, honoring Ernest Everett Just, who was born in Charleston, S.C., educated at the University of Chicago, and spent many years doing pioneering research at the Marine Biological Laboratory in Woods Hole, MA. The symposium was published as Volume 12 in The Belle W. Baruch Library in Marine Sciences, USC Press, 1985.

Organized Symposia at the national meetings of the American Society of Zoologists and The Gordon Conferences.

As Director of Workforce and Education Board of the EPSCoR NSF Tissue Biofabrication Statewide Project, I worked with South Carolina State University faculty to establish a Master's Degree in area of Bioengineering. I wrote curricula for a Cell Biology Course, and my online Histology course serves as a Core Course in the Curriculum. I wrote a MOU between SC State and USC for mentoring of graduate students. I also wrote a MOU for Clemson University.

PUBLICATIONS

REFEREED PUBLICATIONS (Since 2003)

Bao, W. Greenwold, M.J. and Sawyer, R.H. Expressed miRNA target feather related mRNAs involved in cell signaling, cell adhesion and structure during chicken epidermal development. *Gene* 591:393-402; **2016**

Zhang, G., et al., Comparative genomics reveals insights into avian genome evolution and Adaptation. *Science* 346:1311; **2014**.

Greenwold, M.J., Bao, W., Jarvis, E., Hu, H., Li, C., Gilbert, M.T.P., Zhang, G. and Sawyer, R.H. Dynamic evolution of the alpha (α) and beta (β) keratins has accompanied integument diversification and the adaptation of birds into novel lifestyles. *BMC Evolutionary Biology*. 14:249; **2014**.

Greenwold, M.J., Sawyer, R.H. Molecular Evolution and Expression of Archosaurian β -keratins: Diversification and Expansion of Archosaurian β -keratins and the Origin of Feather β -Keratins. *J. Exp. Zool. (Mol. Dev. Evol.)* 320 (6) 393-405; **2013**.

St. John, J.A., et al. Sequencing three crocodylian genomes to illuminate the evolution of archosaurs and amniotes. *Genome Biology*. 13: 415; **2012**.

Greenwold, M.J. and Sawyer, R.H. Linking the Molecular Evolution of Avian Beta (β) Keratins to the Evolution of Feathers. *J. Exp. Zool. (Mol. Dev. Evol.)* 314B; **2011**.

Greenwold, M.J., Sawyer, R.H. Genomic organization and molecular phylogenies of the beta (β) keratin multigene family in the chicken (*Gallus gallus*) and zebra finch (*Taeniopygia guttata*): Implications for feather evolution. *BMC Evolutionary Biology*. 10: 148; **2010**.

Glenn, T.C., French, J.O., Heincelman, T.J., Jones, K.L., Sawyer, R.H. Evolutionary

- relationships among copies of feather beta (β) keratin genes from several avian orders. *Integrative and Comparative Biology*. 48(4): 463-475; **2008**.
- Alibardi, L. and Sawyer, R.H. Cell structure of developing down feathers in the zebra finch with emphasis on barb ridge morphogenesis. *J. Anat.* 208, 621-642; **2006**.
- Alibardi, L., Knapp, L.W., Sawyer, R.H. Beta-keratin localization in developing alligator scales and feathers in relation to the development and evolution of feathers. *J. Submicrosc. Cytol. Pathol.* 38 (2-3), 175-192; **2006**.
- Sawyer, R.H., Rogers, L., Washington, L., Glenn, T.C., and Knapp, L.W. The Evolutionary Origin of the Feather Epidermis. *Developmental Dynamics*. 232: 256-267; **2005**.
- Sawyer, R.H. and Knapp, L.W. Avian Skin Development and the Evolutionary origin of feathers. *J. Exp. Zool. (Mol. Dev. Evol.)* 298B: 57-72; **2003**.
- Sawyer, R.H. Washington, L.D. Salvatore, B.A. Glenn, T.C. and Knapp, L.W. Origin of Archosaurian Integumentary Appendages: The Bristles of the Wild Turkey Beard Express Feather-Type β Keratins. *J. Exp. Zool. (Mol. Dev. Evol.)* 1-8; **2003**.
- Sawyer, R.H., Salvatore, B.A., Potylicki, T-T. F., French, J.O., Glenn, T.C., and Knapp, L.W. Origin of Feathers: Feather Beta (β) Keratins are expressed in Discrete Epidermal Cell Populations of Embryonic Scutate Scales. *J. Exp. Zool. (Mol. Dev. Evol.)* 295B: 12-24; **2003**.

REFEREED PUBLICATIONS (2002 – 1987)

- Glenn, T.C., Staton, J.L., Vu, A.T., Davis, L.M., Bremer, J.R., Rhodes, W.E., Brisbin, I.L., and **Sawyer, R.H.** Low mitochondrial DNA variation among American Alligators and a novel non-coding region in crocodylians. *J. Exp. Zool.* 294: 312-324; **2002**.
- Alibardi, L. and **Sawyer, R.H.** Immunocytochemical analysis of beta (β) keratins in the epidermis of chelonians, lepidosaurians, and archosaurians. *J. Exp. Zool.* 293: 27-38; **2002**.
- Davis, L.M., Glenn, T.C., Strickland, D.C., Guillette, L.J., Elsey, R.M., Rhodes, W.E., Dessauer, H.C., and **Sawyer, R.H.** Microsatellite DNA analyses support an east-west phylogeographic split of American Alligator populations. *J. Exp. Zool.* 294: 352-372; **2002**.
- Davis, L.M., Glenn, T.C., Elsey, R.M., Dessauer, H.C. and **Sawyer, R.H.** Multiple paternity and mating patterns in the American alligator, *Alligator mississippiensis*. *Mol. Ecology*. 10: 1011-1024; **2001**.
- Homer, B.L., Li, C., Berry, K.H., Denslow, N.D., Jacobson, E.R., **Sawyer, R.H.**, and Williams, J.E. Soluble scute proteins of healthy and ill desert tortoises (*Gopherus agassizii*). *Am. J. Vet. Res.* 62: 104-110; **2001**.
- Davis, L.M., Glenn, T.C., Elsey, R.M., Brisbin, I.L., Rhodes, W.E., Dessauer, H.C., and **Sawyer, R.H.** Genetic Structure of Six Populations of American Alligators: a Microsatellite Analysis. *Crocodylian Biology and Evolution*. Ch. 4: 38-50. Ed G.C. Grigg, F. Seebacher, and C.E. Franklin, Surrey Beatty & Sons, Chipping Norton; **2000**.

- Sawyer, R.H.**, Glenn, T.C., French, J.O., Mays, B., Shames, R.B., Barnes, G.L., Rhodes, W. and Ishikawa, Y. The Expression of Beta (β) Keratins in the Epidermal Appendages of Reptiles and Birds. *American Zool.* 40: 530-539; **2000**.
- Song, H.K., and **Sawyer, R.H.** Dorsal dermis of the scaleless (sc/sc) embryo directs normal feather pattern formation until day 8 of development. *Dev. Dynamics.* 205: 82-91; **1996**.
- Barnes, G.L., and **Sawyer, R.H.** Histidine-rich protein B of embryonic feathers is present in the transient embryonic layers of scutate scales. *J. Exp. Zool.* 271: 307-314; **1995**.
- Sing, H.K., W.E. Carver, and **Sawyer, R.H.** Pattern formation in chick feather development: Distribution of beta1-integrin in normal and scaleless embryos. *Dev. Dynamics.* 200: 129-143; **1994**.
- Shames, R.B., Bade, B.C. and **Sawyer, R.H.** Role of epidermal-dermal tissue interactions in regulating tenascin expression during development of the chick scutate scale. *J. Exp. Zool.* 269-366; **1994**.
- Knapp, L.W., Shames, R.B., Barnes, G.L. and **Sawyer, R.H.** Region-specific patterns of beta keratin expression during avian skin development. *Dev. Dynamics.* 196: 283-290; **1993**.
- Zeltinger, J.K. and **Sawyer, R.H.** Avian Scale Development XVI. Epidermal commitment to terminal differentiation is prior to definitive scale ridge formation. *Dev. Biol.* 149: 55-65; **1992**.
- Zeltinger, J.K. and **Sawyer, R.H.** Avian scale development XVII. The epidermis of the scaleless (sc/sc) anterior metatarsal skin is determined, but the dermis lacks permissive cues for the patterned expression of the determined state. *Dev. Dynamics.* 193: 58-69; **1992**.
- Shames, R.B., Jennings, A.F. and **Sawyer, R.H.** Expression of the cell adhesion molecules, L-CAM and N-CAM, during avian scale development. *J. Exp. Zool.* 257: 195-207; **1991**.
- Knapp, L.W., Linser, P., Carver, W.E., and **Sawyer, R.H.** Biochemical identification and immunological localization of two non-keratin polypeptides associated with the terminal differentiation of avian scales. *Cell and Tissue Res.* 265: 535-545; **1991**.
- Zeltinger, J.K. and **Sawyer, R.H.** Avian scale development. XIII. Epidermal germinative cells are committed to appendage-specific differentiation and respond to patterned cues in the dermis. *Dev. Biol.* 144: 335-352; **1991**.
- Shames, R.B., Knapp, L.W., Carver, W.E. and **Sawyer, R.H.** Region specific expression of scutate scale type b-keratins in the developing check beak. *J. Exp. Zool.* 260: 258-266; **1991**.
- Zeltinger, J.K. and **Sawyer, R.H.** Avian scale development XVII: The epidermis of the scaleless (sc/sc) anterior metatarsal skin is determined, but the dermis lacks permissive cues for the patterned expression of the determined state. *Dev. Dynamics.* 193: 58-69; **1992**.
- Shames, R.B., Jennings, M.A., and **Sawyer, R.H.** The initial expression and patterned appearance of tenascin in scutate scales is absent from the dermis of the scaleless (sc/sc) mutant. *Dev. Biol.* 147: 174-186; **1991**.
- Sawyer, R.H.** Avian Scale Development XIV: A study of cell proliferation in the epidermis of the scaleless, sc/sc, mutant. *Dev. Growth and Diff.* 32(2):217-222; **1990**.

- Carver, W.E., L.W. Knapp and **Sawyer, R.H.** Beta-keratin expression in avian tongue cell aggregates. *J. Exp. Zool.* 256: 333-338; **1990.**
- Shames, R.B., Knapp, L.W., Carver, W.E., Washington, L.D. and Sawyer, R.H. Keratinization of the outer surface of the avian scutate scale: Interrelationship of alpha and beta keratin filaments in a cornifying tissue. *Cell and Tissue Res.* 257: 85-92; **1989.**
- Hilenski, L. L., Terracio, L., **Sawyer, R.H.** and Borg, T.K. Effects of extracellular matrix on cytoskeletal and myofibril organization in vitro. *Scanning Microscopy.* Vol. 3, No. 2, 535-548; **1989.**
- Fisher, C.J., Knapp, L.W. and **Sawyer, R.H.** Retinoic acid induction of feather-like structures from reticulate scales. *Teratology.* 38: 321-328; **1988.**
- Carver, W. and **Sawyer, R.H.** Avian scale development XI: Immuno-electron microscopic localization of alpha and beta keratins in the scutate scale. *J. Morphol.* 195:31-43; **1988.**
- Shames, R.B., L. W. Knapp, Carver, W.E. and **Sawyer, R.H.** Identification, expression and localization of beta keratin gene products during development of avian scutate scales. *Differentiation.* 38:1125-123; **1988.**
- Krey, A.K., Moshell, A.N., Dayton, D.H., **Sawyer, R.H.** and Holbrook, K.A. Morphogenesis and Malformations of the Skin. *J. Invest. Dermatol.* 88:464-473; **1987.**
- Carver, W.E. and **Sawyer, R.H.** Development and keratinization of the epidermis in the common lizard. *J. Exp. Zool.* 243: 435-443; **1987.**

REFEREED PUBLICATIONS (1986 – 1972)

- Haake, A.R. and **Sawyer, R.H.** Differences in the histogenesis and keratin expression of avian extraembryonic ectoderm and endoderm recombined with dermis. *Dev. Biol.* 113: 295-304; **1986.**
- Shames, R.B. and **Sawyer, R.H.** Expression of beta-keratin genes during skin development in normal and (sc/sc) chick embryos. *Dev. Biol.* 116:15-22; **1986.**
- Fisher, C.J. and **Sawyer, R.H.** Comparison of hydrocortisone and triamcinolone inhibition of scale and feather development. *Teratology.* 33:37-45; **1986.**
- Knapp, L.W., O'Guin, W.M., **Sawyer, R.H.**, Mitchell, D. and Bunn, C.L. Clonal variations in keratin. Intermediate filament expression by human somatic cell hybrids. *Exp. Cell Res.* 156: 359-366; **1985.**
- Koenig, G. and **Sawyer, R.H.** Analysis of morphogenesis and keratinization in trans-filter recombinants of feather-forming skin. *Dev. Biol.* 109: 381-392; **1985.**
- Knapp, L.W., O'Guin, W.M. and **Sawyer, R.H.** Dependence of keratin intermediate filament organization on microtubules, microfilaments and membrane association sites. *Annals of the New York Academy of Sciences.* 455: 758-761; **1985.**
- Bunn, C.L., White, F.A., O'Guin, W.M., **Sawyer, R.H.** and Knapp, L.W. Intermediate filament expression and lifespan potential in human somatic cell hybrids. *In Vitro Cellular and Developmental Biol.* 21(12) 716-720; **1985.**

- Sawyer, R.H.**, W.M. O'Guin, and Knapp, L.W. Avian Scale development. X. Dermal induction of tissue-specific keratins in extraembryonic ectoderm. *Dev. Biol.* 101: 8-18; **1984**.
- Haake, A.R., Koenig, G. and **Sawyer, R.H.** Avian feather development: Relationships between morphogenesis and keratinization. *Dev. Biol.* 106: 406-413; **1984**.
- Fisher, C.J., O'Guin, W.M. and **Sawyer, R.H.** Altered keratin biosynthesis follows inhibition of scale morphogenesis by hydrocortisone. *Dev. Biol.* 106: 45-52; **1984**.
- Dhouailly, D. and **Sawyer, R.H.** Avian scale development. XI. Initial appearance of the dermal defect in scaleless skin. *Dev. Biol.* 105: 343-350; **1984**.
- Sawyer, R.H.** The role of epithelial-mesenchymal interactions in regulating gene expression during avian scale morphogenesis. *Epithelial-Mesenchymal Interactions in Development*. Sawyer, R.H. and Fallon, J.R., eds., Praeger Press, New York. pp. 115-146; **1983**.
- Knapp, L.W. and **Sawyer, R.H.** Immunohistochemical localization of alpha-keratin and fibronectin in skin cell aggregates. *Trans. Am. Microsc. Soc.* 102 (1): 60-67; **1983**.
- Knapp, L.W., O'Guin, W.M. and **Sawyer, R.H.** Rearrangement of the keratin cytoskeleton after combined treatment with microtubule and microfilament inhibitors. *J. Cell Biol.* 97: 1788-1794; **1983**.
- Smoak, K.D. and **Sawyer, R.H.** Avian spur development: Abnormal morphogenesis and keratinization in the scaleless (sc/sc) mutant. *Bioscience* 33 (8): 514; **1983**.
- Liverman, S.A. and **Sawyer, R.H.** Glycosaminoglycans of solid and ascites forms of the P1798 murine lymphosarcoma. *Biochem. Biophys. Res. Comm.* 114 (3): 976-984; **1983**.
- Knapp, L.W., O'Guin, W.M. and **Sawyer, R.H.** Drug-induced alterations of cytokeratin organization in cultured epithelial cells. *Science* 219: 501-503; **1983**.
- O'Guin, W.M. and **Sawyer, R.H.** Avian scale development. VIII. Relationships between morphogenetic and biosynthetic differentiation. *Dev. Biol.* 89: 485-492; **1982**.
- McAleese, S.R. and **Sawyer, R.H.** Avian scale development. IX. Scale formation by scaleless (sc/sc) epidermis under the influence of normal scale dermis. *Dev. Biol.* 89: 493-502; **1982**.
- O'Guin, W.M., Knapp, L.W. and **Sawyer, R.H.** Biochemical and immuno- histochemical localization of alpha and beta keratin in avian scutate scales. *J. Exp. Zool.* 220: 371-376; **1982**.
- Haake, A.R. and **Sawyer, R.H.** Avian feather morphogenesis: Fibronectin-containing anchor filaments. *J. Exp. Zool.* 221: 119-123; **1982**.
- Knapp, L.W. and **Sawyer, R.H.** Differences between normal and scaleless (sc/sc) chicken epidermal cell surfaces detected with wheat germ agglutinin. *Exp. Cell Res.* 139: 443-447; **1982**.
- Blanck, C.E. and **Sawyer, R.H.** Hatchery practices in relation to early embryology of the loggerhead sea turtle. (*Caretta caretta*) *J. Exp. Mar. Biol. Ecol.* 49: 163-177; **1981**.
- Blanck, C.E., McAleese, S.R. and **Sawyer, R.H.** Morphogenesis of conjunctival papillae from normal and scaleless chick embryos. *Anatomical Rec.* 199: 249-257; **1981**.

- McAleese, S.R. and **Sawyer, R.H.** Correcting the phenotype of the epidermis from chick embryos homozygous for the gene scaleless (sc/sc). *Science* 214: 1033-1034; **1981**.
- Sawyer, R.H.** and Borg, T.K. Avian scale development. VII. Normal keratinization follows abnormal morphogenesis of reticulate scales from the "scaleless" mutant. *J. Morphology*. 166: 197-202; **1980**.
- Thompson, Jr., E.A., Moore, Jr., W.M. and **Sawyer, R.H.** Glucocorticoid effects of lymphosarcoma P1798 on DNA replication and growth of subcutaneous tumors in mice. *J. Natl. Can. Inst.* 65 (2): 477-483; **1980**.
- Fisher, C.J. and **Sawyer, R.H.** The effect of triamcinolone on the development of the bursa of fabricius in chick embryos. *Teratology* 22: 7-12; **1980**.
- Sawyer, R.H.** Avian scale development: Effect of the scaleless gene on morphogenesis and histogenesis. *Dev. Biol.* 68: 1-15; **1979**.
- Fisher, C. and **Sawyer, R.H.** Response of the avian chorionic epithelium to presumptive scale-forming dermis. *J. Exp. Zool.* 207 (3): 505-512; **1979**.
- Mirkes, P.E. and **Sawyer, R.H.** Abnormal scale morphogenesis: Relationship of polypeptide patterns to action of the scaleless gene. *J. Exp. Zool.* 208 (2): 195-200; **1979**.
- Sawyer, R.H.** and Borg, T.K. Avian scale development. VI. Ultrastructure of the keratinizing cells of reticulate scales. *J. Morphology* 161(1): 111-122; **1979**.
- Sawyer, R.H.** Keratogenic metaplasia of the avian chorionic epithelium: Absence of the beta stratum which characterizes the epidermis of the avian scutellate scale. *J. Exp. Zool.* 205 (2): 225-242; **1978**.
- Hendrickx, A.G. and **Sawyer, R.H.** Developmental staging and thalidomide teratogenicity in the Green Monkey (*Cercopithecus aethiops*). *Teratology* 18 (3): 393-404; **1978**.
- Hendrickx, A.G., Terrell, T.G., Andersen, A.C., Osburn, B.I., **Sawyer, R.H.** and Steffek, A.J. Induction of abnormal intrauterine development with triamcinolone, vitamin A and X-irradiation in non-human primates. *Use of Non-Human Primates in Biomedical Research*. M.R.N. Prasad and T.C. Anand Kumar, eds., Indian National Science Academy, New Delhi, India. pp. 149-169; **1977**.
- Sawyer, R.H.**, Hendrickx, A.G., Osburn, B.I., Terrell, T.G., and Anderson, J. Abnormal morphology of the fetal monkey (*Macaca mulatta*) thymus exposed to a corticosteroid. *J. Med. Primatology* 6: 145-150; **1977**.
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- Hendrickx, A.G., **Sawyer, R.H.**, Terrell, T.G., Osburn, B.I., Hendrickson, R.V. and Steffek, A.J. Teratogenic effects of triamcinolone on the skeletal and lymphoid systems in nonhuman primates. *Federation Proceedings*. 34 (8): 1661-1665; **1975**.
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- Sawyer, R.H.**, U.K. Abbott, and G.N. Fry. Avian Scale Development. IV. Ultrastructure of the anterior shank skin of the scaleless mutant. *J. Exp. Zool.* 190 (1): 71-78; **1974**.
- Sawyer, R.H.** Avian scale development. I. Histogenesis and morphogenesis of the epidermis and dermis during formation of the scale ridge. *J. Exp. Zool.* 181: 365-384; **1972**.
- Sawyer, R.H.** Avian scale development. II. A study of cell proliferation. *J. Exp. Zool.* 181: 385-408; **1972**.
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BOOKS EDITED

Memorial Volume of Development, Growth and Differentiation (Volume editor, R.H. Sawyer), **1990**.

Current Topics in Developmental Biology, Volume 22, "The Molecular and Developmental Biology of Keratins". A.A. Moscona and A. Monroy, eds., R.H. Sawyer, Volume editor, Academic Press, New York, **1987**.

The Cellular and Molecular Biology of Invertebrate Development. Volume 12 of The Belle W. Baruch Library in Marine Sciences, Univ. of South Carolina Press, Columbia, SC (eds. R.H. Sawyer and R. Showman), **1985**.

"Epithelial-Mesenchymal Interactions in Development". Praeger Press, New York (eds. R.H. Sawyer and J.F. Fallon), **1983**.

BOOK CHAPTERS

Sawyer, R.H., Glenn, T.C., French, J.O. and Knapp, L.W. "Developing antibodies to synthetic peptides based on comparative DNA sequencing of multigene families". *Methods in Enzymology*, Vol. 395: Molecular Evolution: Producing the Biochemical Data, Part B. Zimmer, E.A. and Roalson, E.H. (eds.), Academic Press, San Diego. pp. 636-652; **2005**.

Sawyer, R.H. and Knapp, L.W. "Embryonic Induction". Harvard Press; **2005**.

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Sawyer, R.H., Knapp, L.W. and O'Guin, W.M. "Avian Skin". *Biology of the Integument*, Vol. II: Vertebrates. (eds. J. Bereiter-Hahn, A.G. Matoltsky, K.S. Richards), Springer-Verlag, New York; **1986**.

Sawyer, R.H. and Haake, A.R. "Regulation of Keratinization in the Avian Integument". *Coordinated Regulation of Gene Expression* (eds. Clayton, R.M. and D.E.S. Truman), Plenum Press, New York; **1986**.

Sawyer, R.H. "The Role of Epithelial-Mesenchymal Interactions in Regulating Gene Expression during Avian Scale Morphogenesis". *Epithelial Mesenchymal Interactions in Development*. (eds. R.H. Sawyer and J.F. Fallon), Praeger Press, New York; **1983**.

Hendrickx, A. and **Sawyer, R.H.** "Embryology of the Rhesus Monkey". *The Rhesus Monkey II* (ed. G.H. Bourne), Academic Press, New York; **1978**.

Hendrickx, A.G., Terrell, T.G., Anderson, A.C., Osburn, B.I., **Sawyer, R.H.** and Teffek, A.J. "Induction of abnormal intrauterine development with triamcinolone, vitamin A and X-irradiation in non-human primates" *Use of Non-Human Primates in Biomedical Research*.

(eds. M.R.N. Prasad and T.C. Anand Kumar), pp. 149-169. Indian National Science Academy, New Delhi, India; **1977**.

ARTICLES/ PAPERS ABOUT AVIAN GENOMES

Avian Genome Collection; **2015**. <http://www.biomedcentral.com/series/avian>

Powell, S. “What Makes the Feather Soar”, University of South Carolina; **2014**.
http://www.sc.edu/uofsc/stories/2015/02_sawyer_greenwold_bao_feather.php#.VQGunlKH6UI

Chi, K.R. The “Big Bang” of Bird Evolution (Part 2), Duke University; **2014**.
<http://research.duke.edu/stories/big-bang-bird-evolution-part-2>

Zhang, G., Jarvis, E.D., and M.T, Gilbert. “A Flock of Genomes”, *Science*, 346: 1308-1309; **2014**. <http://www.sciencemag.org/content/346/6215/1308.full>

Pennisi, E. “Bird Genomes give new perches to old friends”, *Science*, 346: 1275-1276; **2014**.
<http://www.sciencemag.org/content/346/6215/1275.full>

“When did the Feather take Flight?” University of South Carolina; **2012**.
<http://www.sc.edu/news/newsarticle.php?nid=2855#.VQGr21KH6UI>

ABSTRACTS AND UNREFEREED PUBLICATIONS

Ogilvie, R., **Sawyer, R.H.**, Greenwold, M.J., Bao, W., and Thompson, J. Evolution of a cross-institutional asynchronous online 500 level college histology course with interactive lectures and virtual lab component. *The FASEB Journal*, **28**:530.1; **2014**.

Ogilvie, R., **Sawyer R.H.**, Greenwold, M.J., Bao, W., Thompson, J. Evolution of a cross-institutional asynchronous online 500 level college histology course with interactive lectures and virtual lab component. *The FASEB Journal*, **28**:530.1; **2014**.

Davis, L.M., Glenn, T.C., Dessauer, H.C., Brisbin, I.L. and **Sawyer, R.H.** Demonstration of multiple paternity in the American alligator, *Alligator mississippiensis*. Proc. SC Research Conference, Wild Dunes, SC; **1998**.

French, J., Diebold, E., Long, J., Seibels, B., **Sawyer, R.H.** and Glenn, T.C. Mitochondrial DNA variation of cinereous vultures. In prep for Proc. Conservation Research Consortium, Riverbanks Zoological Park, Columbia, SC; June 4-6, **1998**.

Davis, L.M., Glenn, T.C. and **Sawyer, R.H.**, et al. Mitochondrial and microsatellite DNA variation in American alligators. In prep for Proc. Conservation Research Consortium, Riverbanks Zoological Park, Columbia, SC; June 4-6, **1998**.

Glenn, T.C., **Sawyer, R.H.**, Davis, L.M., Alvarado-Bremer, J., Vu, A. and Dessauer, H.C. Characterization of mitochondrial and microsatellite DNA for studies of American alligators. Proc. SC Research Conference, Wild Dunes, SC; **1997**.

- Glenn, T., Stephan, W., Dessauer, H.C. and Brawn, M.R. [under supervision of **Sawyer, R.H.**]. Characterization of alligator microsatellites. In: *Crocodylian DNA Research: A Report on a Workshop on the Genetics of the Crocodylians* (J. H. Dantzler, ed), Riverbanks Zoological Park, Columbia, SC; **1996**.
- Alvarado-Bremer, J.F., Vu, A., Ely, B., Rhodes, W. and **Sawyer, R.H.** Sequence analysis of the mitochondrial cytochrome b-12 mRNA region of the American alligator (*Alligator mississippiensis*). In: *Crocodylian DNA Research: A Report on a Workshop on the Genetics of the Crocodylians* (J. H. Dantzler, ed), Riverbanks Zoological Park, Columbia, SC; **1996**.
- Sawyer, R.H.**, Shames, R.B. and Vu, A. The keratins in the skin appendages of birds and alligators. In: *Crocodylian DNA Research: A Report on a Workshop on the Genetics of the Crocodylians* (J. H. Dantzler, ed), Riverbanks Zoological Park, Columbia, SC; **1996**.
- Barnes, G.L. and **Sawyer, R.H.** Identification of a Feather Beta Keratin and Localization in the Developing Scale Region of the Chick. *Mol. Biol. of the Cell*. Vol. 3, p. 352a; **1992**.
- Barnes, G.L. and **Sawyer, R.H.** Localization of a Histidine Rich Protein in the Embryonic Layers of the Avian Scutate Scale. *J. Cell Biol.* Vol. 115, No. 3, p. 453a; **1991**.
- Knapp, L.W., Hilenski, L., **Sawyer, R.H.** and Borg, T.K. Modulation of Cell Surface Morphology Associated with Drug-Induced Alterations in Keratin Cytoskeletal Organization Cell Biology Meetings *J. Cell Biol* (abs); **1988**.
- Haake, A.R., Knapp, L.W. and **Sawyer, R.H.** 2-Dimensional Gel Analysis of Beta Keratin Polypeptides in Normal and Scaleless Mutant Skin. *South Carolina Academy of Science*; **1985**.
- Carver, W. and **Sawyer, R.H.** Epidermal Keratinization of *Anolis carolinensis*. 27th Annual Southeastern Developmental Biology Conference; **1985**.
- Haake, A.R., Knapp, L.W. and **Sawyer, R.H.** 2-D Gel Analysis of Avian Scale Beta Keratins. 27th Annual Southeastern Developmental Biology Conference; **1985**.
- Krey, A.K., Moshell, A.N. and **Sawyer, R.H.** NICHD/NIADDK Research Workshop: Morphogenesis and Malformations of the skin. A report; **1984**.
- Fisher, C.J. and **Sawyer, R.H.** Altered Keratinization Follows Scale Inhibition by Glucocorticoids. ESCSB, Grenoble, France; **1984**.
- Sawyer, R.H.** Regulation of Keratin Expression during Development of the Avian Integument. ESCSB, Grenoble, France; **1984**.
- Fisher, C.J. and **Sawyer, R.H.** Mechanism of Action of Hydrocortisone on Scale Keratinization. *American Society of Zoologists*; **1984**.
- Haake, A.R. and **Sawyer, R.H.** Different Responses of Avian Extra-Embryonic Ectoderm and Endoderm to Dermal Induction. *South Carolina Academy of Science*. Awarded. **1984**.
- O'Guin, W.M., Knapp, L.W. and **Sawyer, R.H.** Cytoskeletal Organization in Cultured Epithelial Cells. *American Zoologists* 23 (4):997; **1983**.
- Haake, A.R. and **Sawyer, R.H.** Different Responses of Avian Extra-Embryonic Ectoderm and Endoderm to Dermal Induction. 25th Annual Southeastern Developmental Biology Conference. Awarded best paper. **1983**.

- Knapp, L.W., O'Guin, W.M., White, F.A., **Sawyer, R.H.** and Bunn, C.L. Differences in Keratin Cytoskeletal Organization among Cloned Human Somatic Cell Hybrids. ASZ meeting. Amer. Zool. 23(4): 997; **1983**.
- Smoak, K.D. and **Sawyer, R.H.** Avian spur development. Bioscience 33:514 [a condensation of a previous article]. **1983**.
- Knapp, L.W., O'Guin, W.M. and **Sawyer, R.H.** Drug Induced Alteration in Cytokeratin Organization of Neoplastic and Fetal Epithelial Cells. ASZ meeting. Amer. Zool, 22(4): 900; **1982**.
- Sawyer, R.H.**, O'Guin, W.M. and Knapp, L.W. Induction of Specific Keratin Genes in Avian Chorionic Epithelium. ASZ meeting. Amer. Zool, 22(4): 918; **1982**.
- Knapp, L.W. and **Sawyer, R.H.** Morphogenetic cell aggregation and keratinization of dissociated skin cells. 21st Annual Meeting of the Southern Society of Anatomists. Anatomical Record, 202 (1):145; **1982**.
- Haake, A.R. and **Sawyer, R.H.** Distribution of fibronectin during normal and abnormal feather morphogenesis. 21st Annual Meeting of the Southern Society of Anatomists. Anatomical Record, 202 (1):145; **1982**.
- O'Guin, W.M. and **Sawyer, R.H.** Determination of alpha and beta type keratin distribution in avian scutate scales. 21st Annual Meeting of the Southern Society of Anatomists. Anatomical Record, 202 (1):150; **1982**.
- Sawyer, R.H.** Epithelial-Mesenchymal Interactions in Avian Scale Development. In Vitro 17 (3):214; **1981**.
- Haake, A.R. and **Sawyer, R.H.** Distribution of fibronectin during feather and scale morphogenesis in normal and scaleless chick embryos. 23rd Annual Southeastern Developmental Biology Conference; **1981**.
- Knapp, L.W., O'Guin, W.M. and **Sawyer, R.H.** Immunofluorescent localization of alpha and beta keratins in avian epidermis. 23rd Annual South-eastern Developmental Biology Conference; **1981**.
- O'Guin, W.M. and **Sawyer, R.H.** Biochemical and immunological localization of alpha and beta keratin in avian scutate scales. In: American Zoologist, 21 (4):952; **1981**.
- Haake, A.R. and **Sawyer, R.H.** Localization of fibronectin during normal feather morphogenesis. In: American Zoologist, 21 (4):952; **1981**.
- Knapp, L.W. and **Sawyer, R.H.** Keratinization in aggregates of dissociated normal and scaleless embryonic skin. In: American Zoologist, 21 (4):953; **1981**.
- Fisher, C.J. and **Sawyer, R.H.** Effect of vitamin A (retinoic acid) on chick scale development in ovum. In: American Zoologist, 21 (4):954; **1981**.
- O'Guin, W.M. and **Sawyer, R.H.** Scale-specific keratins in normal and scaleless mutant chicken embryos. 23rd Annual Southeastern Developmental Biology Conference; **1981**.
- Liverman, S. and **Sawyer, R.H.** Glycosaminoglycan content of solid and ascites forms of P1798 murine lymphosarcoma. 23rd Annual Southeastern Developmental Biology Conference; **1981**.

McAleese, S.R., Sullivan, P.F. and **Sawyer, R.H.** Induction of scales in the scaleless epidermis by normal scale dermis. 23rd Annual Southeastern Developmental Biology Conference; **1981.**

Sawyer, R.H. and Abbott, U.K. Avian Ichthyosis: Altered cell proliferation. Poultry Sci., 53:1898; **1974.**

Sawyer, R.H. and Abbott, U.K. Avian Ichthyosis: The Consequences of Rescuing a lethal condition. Poultry Sci., 53:1897; **1974.**

Sawyer, R.H. and Abbott, U.K. Defective histogenesis and morphogenesis in the anterior shank skin of the scaleless mutant. Am. Zoologist 11: 678; **1971.**

Sawyer, R.H. Alterations in the cell cycle during avian scale morphogenesis. Am. Zoologist. 10:323; **1970.**

PAPERS PRESENTED AT PROFESSIONAL MEETINGS

CONTRIBUTED PAPERS

Davis, L.M., Glenn, T.C., Dessauer, H.C., Brisbin, I.L. and **Sawyer, R.H.** Demonstration of multiple paternity in the American alligator, *Alligator mississippiensis*. Poster: SC Research Conference, Wild Dunes, SC, **1998.**

Glenn, T.C., **Sawyer, R.H.**, Davis, L.M., Alvarado-Bremer, J., Vu., A. and Dessauer, H.C. Characterization of mitochondrial and microsatellite DNA for studies of American alligators. Poster: SC Research Conference, Wild Dunes, SC, **1997.**

Haake, A.R., Knapp, L.W. and **Sawyer, R.H.** 2-D Gel Analysis of Avian Scale Beta Keratins. 27th Annual Southeastern Developmental Biology Conference Poster Session, **1985.**

Carver, W. and **Sawyer, R.H.** Epidermal Keratinization of *Anolis carolinensis*. 27th Annual Southeastern Developmental Biology Conference Poster Session, **1985.**

Several papers and posters with students Carver, Haake, Song, Barnes, Bade and Zeltinger, **1985-present.**

Bunn, C.L., White, F.A., O'Guin, W.M., **Sawyer, R.H.** and Knapp, L.W. Correlation of Keratin Intermediate Filament Expression with Transformation in Human Somatic Cell Hybrids. Cell Biology Meetings, Kansas City, **1984.**

Knapp, L.W., O'Guin, W.M. and **Sawyer, R.H.** Dependence of Keratin Intermediate Filament Organization on Microtubules, Microfilaments and Membrane Association sites. Annals of N.Y. Academy of Science Poster Session, **1984.**

O'Guin, W.M., Knapp, L.W. and **Sawyer, R.H.** Cytoskeletal Organization in Cultured Epithelial Cell. ASZ, Philadelphia, **1983.**

Knapp, L.W., O'Guin, W.M. and **Sawyer, R.H.** Drug induced alterations of cytokeratin organization in neoplastic and fetal epithelial cells. Annual Meeting of the American Society of Zoologists, **1982.**

- O'Guin, W.M. and **Sawyer, R.H.** The role of dermal organization in regulating keratin gene expression. Annual Meeting of the American Society of Zoologists, **1982**.
- Sawyer, R.H.**, O'Guin, W.M. and Knapp, L.W. Expression of keratin genes during keratogenic metaplasia of the avian chorionic epithelium. Annual Meeting of the American Society of Zoologists, **1982**.
- Knapp, L.W. and **Sawyer, R.H.** Morphogenetic cell aggregation and keratinization of dissociated skin cells. 21st Annual Meeting of the Southern Society of Anatomists, **1981**.
- Knapp, L.W., O'Guin, W.M. and **Sawyer, R.H.** Immunofluorescent localization of alpha and beta keratins in avian epidermis. 23rd Annual Southeastern Developmental Biology Conference, **1981**.
- O'Guin, W.M. and **Sawyer, R.H.** Biochemical and immunological localization of alpha and beta keratin in avian scutate scales. Annual Meeting of the American Society of Zoologists, **1981**.
- Haake, A.R. and **Sawyer, R.H.** Localization of fibronectin during normal feather morphogenesis. Annual Meeting of the American Society of Zoologists, **1981**.
- Knapp, L.W. and **Sawyer, R.H.** Keratinization in aggregates of dissociated normal and scaleless embryonic skin. Annual Meeting of the American Society of Zoologists, **1981**.
- Fisher, C.J. and **Sawyer, R.H.** Effect of vitamin A (retinoic acid) on chick scale development in ovum. Annual Meeting of the American Society of Zoologists, **1981**.
- O'Guin, W.M. and **Sawyer, R.H.** Determination of alpha and beta type keratin distribution in avian scutate scales. 21st Annual Meeting of the Southern Society of Anatomists, **1981**.
- O'Guin, W.M. and **Sawyer, R.H.** Scale-specific keratins in normal and scaleless mutant chicken embryos. 23rd Annual Southeastern Developmental Biology Conference, **1981**.
- Liverman, S. and **Sawyer, R.H.** Glycosaminoglycan content of solid and ascites forms of P1793 murine lymphosarcoma. 23rd Annual Southeastern Developmental Biology Conference, **1981**.
- McAleese, S.R., Sullivan, P.F. and **Sawyer, R.H.** Induction of scales in the scaleless epidermis by normal scale dermis. 23rd Annual Southeastern Developmental Biology Conference, **1981**.
- Blanck, C.E. and **Sawyer, R.H.** Cell surface alterations during morphogenesis of conjunctival papillae. Southeastern Developmental Biology Conference, Palm Coast, FL, **1980**.
- Smoak, K.D. and **Sawyer, R.H.** Dermal organization directs specific gene expression in avian scale. Southeastern Developmental Biology Conference, Palm Coast, FL, **1980**.
- O'Guin, W.M. and **Sawyer, R.H.** Dermal organization directs specific gene expression for keratin in avian scale epidermis. 22nd Annual Southeastern Developmental Biology Conference, **1980**.
- O'Guin, W.M. and **Sawyer, R.H.** Morphogenesis and scale-specific keratins in normal and scaleless chicken embryos. 39th Annual Symposium of the Society for Developmental Biology, **1980**.

- Fisher, C.J. and **Sawyer, R.H.** Effect of TAC on the Development of the Bursa of Fabricius in the Chick Embryo. Northeastern Developmental Biology Conference, Woods Hole, MA, **1980**.
- Maderson, P.F.A. and **R.H. Sawyer.** Scale embryogenesis in birds and reptiles. American Association of Anatomists, **1979**.
- Howard, J. and **Sawyer, R.H.** Proliferation studies of mouse hepatoma, H06. 21st Southeastern Developmental Biology Conference, **1979**.
- Blanck, C. and **Sawyer, R.H.** Developmental biology of the loggerhead sea turtle *Caretta caretta*. 21st Southeastern Developmental Biology Conference, **1979**.
- Sawyer, R.H.** and Mirkes, P.E. Polypeptide patterns of scutate and reticulate scale epidermis from 12-day normal and scaleless chick embryos. Developmental Biology Society, Vancouver, Canada, **1979**.
- Blanck, C.E., McAleese, S.R. and **Sawyer, R.H.** Cell surface alterations during morphogenesis of avian conjunctival papillae. Developmental Biology Society, Vancouver, Canada, **1979**.
- Blanck, C.E. and **Sawyer, R.H.** Developmental biology of the loggerhead sea turtle. American Society of Zoologists, **1979**.
- Sawyer, R.H.** Scale morphogenesis in birds and reptila: "Epidermal placodes" and the horizontal arrangement of fibrous proteins. 20th Southeastern Developmental Biology Conference, **1978**.
- Fisher, C. and **Sawyer, R.H.** Inductive tissue interactions during avian scale development. 39th Annual Meeting of the Association of Southeastern Biologists, **1978**.
- Sawyer, R.H.** Tissue interactions in the mutant scaleless. 47th Annual Meeting of Genetics Society of America.
- Davis, J.M., **Sawyer, R.H.** and Thompson, A. Developmental origin of glucocorticoid resistance in malignant lymphocytes in vivo. 37th International Conference on Differentiation, **1978**.
- Sawyer, R.H.** and P. Mirkes. Differences in polypeptide patterns of scutate and reticulate scale epidermis from normal and scaleless chicks. American Society of Zoologists, **1978**.
- Sawyer, R.H.** Ultrastructure of the keratinizing squamous metaplasia of the avian chorionic epithelium exposed to air. South Carolina Academy of Science, **1977**.
- Sawyer, R.H.** Abnormal morphogenesis of the footpads of the scaleless mutant. 18th Southeastern Developmental Biology Conference, **1976**.
- Sawyer, R.H.,** Schwartz, L., Osburn, B., Henrickson, R.V. and Hendrickx, A.G. Effects of triamcinolone acetonide on thymus development in the rhesus monkey (*M. mulatta*). 14th Annual Meeting of the Teratology Society, July **1974**.
- Abbott, U.K. and **Sawyer, R.H.** Avian ichthyosis: The consequences of rescuing a lethal condition. Poultry Science Meeting, **1974**.
- Sawyer, R.H.,** and Abbott, U.K. Avian ichthyosis: Altered cell proliferation. Poultry Science Meeting, **1974**.

Sawyer, R.H. International Genetics Meeting at University of California, Berkley & Davis Campuses, Poster Session, Title: Tissue Interaction in the Scaleless Mutant, **1973**.

Sawyer, R.H. and Abbott, U.K. Abnormal histogenesis in the scaleless mutant. Am. Soc. Zoology, **1972**.

Sawyer, R.H. Alterations in the cell cycle during avian scale morphogenesis. Am. Soc. Zoology, **1970**.

ORAL PRESENTATIONS (presenter in Italics)

Greenwold, Matthew J.; Bao, W.; Sawyer, R.H. “Molecular evolution and expression of alpha (α) and beta (β) keratins in feathers”. The Society for Integrative and Comparative Biology (SICB) Annual Meeting. 2014. Austin, TX, January **2014**.

Sawyer, Roger H.; Ogilvie, Robert W.; Greenwold, Matthew J.; Bao, Weier; Clardy, Kathleen. “Development of an Online Histology Course”. Southeast Regional Society for Developmental Biology Meeting 2013. Nashville, TN, May **2013**.

Greenwold, Matthew J.; Ogilvie, Robert W.; Sawyer, Roger H. “A Distributed Histology Course using Virtual Microscope and Virtual Slides”. College of Arts and Sciences Celebration Event. University of South Carolina, Columbia, SC, March **2012**.

Greenwold, Matthew J., Sawyer, Roger H. “Characterization and expression profiles of beta (β)-keratins in the American alligator (*Alligator mississippiensis*) and their molecular evolution in archosaurians”. The Society for Integrative and Comparative Biology (SICB) Annual Meeting 2011. Charleston, SC, January **2012**.

Ogilvie, Robert W.; Sawyer, Roger H.; Greenwold, Matthew J.; and Adams, Steve. “Implementation of Virtual Lectures and Laboratories in a Histology Course Offered via Distance Education. Oktoberbest: A Celebration of Teaching 2010, University of South Carolina, Columbia, SC, October **2010**.

Greenwold, Matthew J.; and Sawyer, Roger H. “Identification and Phylogenetic Analyses of a Large Array of Feather β -keratin Genes in the Genome of the Chicken, *Gallus gallus*: Evidence for Accelerated Rates of Recombination?” Evolution **2010**, Society of Systematic Biologists (SSB) Symposium: “Ernst Mayr Symposium”.

Glenn, Travis C.; Jones, Kenneth L.; Sawyer, Roger H.; Greenwold, Matthew J.; Crawford, Nicholas G. “Challenges and opportunities in comparative reptilian genomics”. The Society for Integrative and Comparative Biology (SICB) Annual Meeting **2008**, Symposium: “Reptile genomics and evolutionary genetics”.

POSTER PRESENTATIONS

Bao, W., Greenwold, M.J., R.H. Sawyer. Gene co-Expression Network Analysis of Chicken Epidermal Structures. Evolution Meeting

Ogilvie, R., Sawyer, R.H., Greenwold, M.J., Bao, W., Thompson, J. “Evolution of a cross-institutional asynchronous online 500 level college histology course with interactive lectures and virtual lab component”. Experimental Biology 2014, San Diego, CA, April **2014**.

Greenwold, M.J., Bao, W., Sawyer, R.H. “Molecular Evolution of Beta (β)-Keratins and Their Role in Feather Evolution”. Southeast Regional Society for Developmental Biology Meeting 2013. Nashville, TN, May **2013**.

Greenwold, M.J., Ebalunode, J.O., Sawyer, R.H. “Diversification and Expansion of the beta (β)-keratins in Archosaurs”. SC INBRE Scientific Symposium. Columbia, SC, February **2012**.

Bricker, E., Greenwold, M.J., Sawyer, R.H. “The molecular evolution of alpha keratins in birds and reptiles”. The Society for Integrative and Comparative Biology (SICB) Annual Meeting 2011. Charleston, SC, January **2012**.

Greenwold, M.J., Ebalunode, J.O., Sawyer, R.H. “CPU-GPU Optimization of the Bayesian Molecular Dating Method for the Analysis of Archosaurian β -keratins”. TN-SC EPSCoR RII Track-2 Workshop: “A Desktop to TeraGrid EcoSystem”; Building Capabilities and Collaborations for Cyber-Enabled Discovery. Knoxville, TN, October **2011**.

Greenwold, M.J.; Ebalunode, J.O.; Sawyer, R.H. “Optimization of the Bayesian Molecular Dating Method for the Analysis of Archosaurian β -keratins”. Modeling Advanced Materials and Systems Biology: Building Capabilities and Collaborations for Cyber-Enabled Discovery. Clemson University, Clemson, SC, September **2010**.

Huth, T.J.; Greenwold, M.J.; Sawyer, R.H. “Identification and Location of the Beta-keratin Family in *Gallus gallus*”. Delivering Value from Avian Genomes. Mississippi State University, Stark, MS, May **2008**.

INVITED SYMPOSIA

Presentation to Navy

South Carolina State Museum, **2009**.

Tate Museum, **2006**.

Evolutionary Origin of Feathers: Meeting of the Society for Integrative and Comparative Biology, Denver, CO, December **1998**.

3rd South Carolina Statewide Research Conference, Isle of Palms, SC January 2 – 4, **1995**.

34th Annual Southeast Regional Developmental Biology Conference, Clemson, SC, May 22-24, **1992**.

Teratology Meeting, Victoria, BC, **1990**.

Northwestern Developmental Biology Conference, Seattle, WA, **1990**.

Select Conference on Advances in Biotechnology and Materials Science, Washington, D.C., **1987**.

Symposium on Hair Development, Upjohn Company, Kalamazoo, MI, **1986**.

College of Science and Mathematics Faculty/Junior Science and Humanities Symposium, USC, **1985**.

Gordon Conference, Tilton, NH, **1985**.

2nd Edinburgh Workshop, Edinburgh, Scotland, **1984**.

American Society of Zoologists, Neural Crest Symposium, Baltimore, MD, **1985**.

International Society of Developmental Biologists, 10th Congress, Los Angeles, CA, **1985**.

European Society for Comparative Skin Biology, 4th Conference, Grenoble, France, **1984**.

“The Role of Epithelial-Mesenchymal Interactions in Regulating Gene Expression during Avian Scale Morphogenesis”, Annual Meeting of the American Society of Zoologists (*now the Society for Integrative and Comparative Biology*), Louisville, KY, **1982**.

“Epithelial-Mesenchymal Interactions in Avian Scale Development”, 32nd Annual Meeting of the Tissue Culture Association, Washington, D.C., **1981**.

INVITED SEMINARS

Invited to speak at the Duke University, **1987**.

Invited to speak at the University of Michigan, **1986**.

Invited to speak at East Carolina University, **1986**.

Invited to speak at the Rockefeller University, **1986**.

Developmental and Molecular Studies on Avian Keratinization, presented to Developmental Biology Graduate Program at University of Wisconsin, **1985**.

Invited to speak to the Department of Anatomy and Cell Biology, University of Wisconsin, **1985**.

Developmental Regulation of Keratinization. Presented to the Department of Biology, University of Chicago, Illinois, **1984**.

Invited to speak to Developmental Biology Graduate Program at the University of Wisconsin, February **1983**.

Invited to speak to Department of Anatomy, School of Medicine, University of Wisconsin, February **1983**.

Invited to speak at the NIH by Dr. H. Reddi, fall **1982**.

Seminar at Clemson University, **1981**.

Tissue Interactions Seminar at University of Tennessee, **1980**.

Seminar at Texas Tech Medical Center, **1980**.

Tissue Interactions and the "Scaleless Mutant," University of Connecticut Health Center, **1979**.

Teratology and Mutations in Embryogenesis, Pharmacology College, USC, **1979**.

Tissue Interactions in Development, Benedict College, **1979**.
Seminar at SUNY, New York, **1979**.

Use of the "Scaleless" Mutant in Studies of Developmental, Tissue-Interaction, Clemson University, **1978**.

The Avian Chorionic Epithelium as a Responding Tissue, presented to Biochemistry Group, USC, spring **1977**.

Fine Structural Studies on the Scaleless Mutant, presented to Biochemistry Group, USC, spring **1977**.

HONORS AND AWARDS

National Defense Predoctoral Fellowship, University of Massachusetts Amherst

NSF Predoctoral Fellowship, University of Massachusetts Amherst

NIH Postdoctoral Fellowship, University of California Davis

Elected to the American Association for the Advancement of Science (Rosette received 1990)

The New York Academy of Sciences

The Linnean Society of London

Phi Kappa Phi

Sigma Xi

USC Mortar Board “Excellence in Teaching” Award

USC Educational Foundation Research Award in Science and Engineering

Nominated for Treasurer of the American Society of Zoologists

Nominated for President of the Cell and Developmental Biology Division of the American Society of Zoologists

National Science Foundation Highlight

PROFESSIONAL AND LEARNED SOCIETIES

American Microscopical Society

American Institute of Biological Sciences

American Society of Cell Biology

American Society of Zoologists

Association of Southeastern Biologists

Society of Developmental Biologists

Society of Southeastern Developmental Biologists

South Carolina Academy of Science

GRANTS

AS PRINCIPAL INVESTIGATOR

Savannah River Ecology Laboratory, University of Georgia. Use of Microsatellites to Evaluate Alligator Genetics. \$10,000 per year; **1996 – 2000**.

Howard Hughes, Undergraduate Education in Biological Sciences. \$1,100,000; **1992 – 1996**.

NSF EPSCoR for Department of Biology. \$310,000; **1989**.

NSF, Epithelial-Mesenchymal Interactions. \$40,000; **1986**.

NSF, Acquisition of an Ultracentrifuge and Oligonucleotide Synthesizer. \$59,895; **1985 – 1986**.

HHS, New Methods for Studying Cell Proliferation in Vertebrate embryogenesis. \$6,349; **1984 – 1986.**

NSF, Southeastern Developmental Conference. \$10,000; **1983 – 1984.**

NIH, Morphological and Biochemical Defects in Development. \$358,943; **1983 – 1986.**

NSF, Epithelial-Mesenchymal Interactions. \$105,000; 1983 – 1985.

Research and Productive Scholarship - Regulation of gene expression in embryogenesis. \$2,000; **1982.**

NIH, Support of 25th Southeastern Developmental Biology Conference; **1982.**

NSF, Support of 25th Southeastern Developmental Biology Conference; **1982.**

NSF, Supplement for Dr. Danielle Dhouailly, France; **1982.**

NIH, for Symposium. \$2,075; **1981.**

NSF, for Symposium. \$1,200; **1981.**

NIH, Biomedical - Molecular Basis of Abnormal Cell Adhesion (with Knapp). \$5,000; **1981.**
American Cancer Society, Embryonic Dermal Induction of Squamous Carcinoma. (With Knapp, O'Guin). \$6,600; **1981.**

NSF, Epithelial-Mesenchymal Interactions. \$195,000; **1980 – 1983.**

American Cancer Society, Extracellular Matrix in Sensitive and Resistant Forms of the Mouse Lymphoma P1798. \$2,000; **1980.**

NIH, Hormonal Effects upon Proliferation of Malignant Thymocytes. 3 years (Co-PI with Dr. A. Thompson, Biology). \$133,826; **1979.**

NSF, Epithelial-Mesenchymal Interactions. \$90,000; **1978 – 1980.**

MULTI – INVESTIGATOR GRANT ACTIVITY

ASPIRE: 13010-14-36155. From Genome to Novel Materials: Developing the Beta (β) Keratin Monomer as a Nanofiber for Fabrication of new Products with new Properties. \$99,633; **2014 – 2015.**

SC INBRE. Bioinformatics Pilot Program: Expression of a Multigene Family During Development. Roger H. Sawyer P.I. \$10,000; September **2012** – September **2013.**

PGM: F40240: NSF-EPSCoR: (01.01.13 – 08.31.13). Biolucida Image Software (MBF) Biosciences. Roger H. Sawyer P.I. \$32,990; **2013**.

PGM: F40200CM: NSF-EPSCoR: (07.15.12 – 06.20.13). Virtual Server. Roger H. Sawyer P.I. \$6,000; **2012 – 2013**.

PGM: F40267CM: GAANN: 08.15.09 – 08.14.14. Program in the Department of Biological Sciences. Roger H. Sawyer P.I. \$525,128; **2009 – 2014**.

NSF. “Graduate Teaching Fellows Enhancing STEM Education in South Carolina Schools”. Roger H. Sawyer Co-P.I., Jed Lyons P.I. \$1,622,563; **2005 – 2009**.

SC EPSCoR Program/IDeA Program/NSF. “Interdisciplinary Team for the Study of the Evolutionary Origin of Flight in Birds”. Roger H. Sawyer Co- P.I. \$10,000; **2005 – 2006**.

U.S. Department of Education. “Recruiting Talented Minority Students and Women into Geological Sciences”. Roger H. Sawyer P.I. \$500,000; **2004 – 2007**

U.S. Department of Education. “Recruiting Talented Minority Students into Physics and Astronomy”. Roger H. Sawyer P.I. \$693,432; **2003 – 2008**.

Eisenhower Foundation, South Carolina Commission on Higher Education. “Establishing a Learning Community for Middle School Science and Math Teachers”. Roger H. Sawyer P.I. \$185,000; **2003 – 2005**.

S.C. Department of Education. “Workshop to establish a Middle School Science Teachers Summer Institute”. Roger H. Sawyer P.I. \$12,000; **2003**.

Eisenhower Professional Development Program, S.C. Commission of Higher Education. “Mathematics and Science Coaches Program”. Roger H. Sawyer Co-P.I. \$8,000; **2003**.

U.S. Department of Education PT3, Jon Singer, PI. \$466, 866; **2000 – 2004**.

DOE, Savannah River Site. Center for Water Research, (Tom Temples, P.I.). \$3.4 million: Task 10 (R. H. Sawyer, PI): A Quantitative Approach to Risk Assessment: Analysis of Genetic Changes in Organisms Inhabiting Contaminated Environments. **1997 – 2002**.

DOD/ONR of University Research Initiative Program for Combat Readiness [19 projects, 40 senior investigators]. Acting P.I. \$9.3 million; **1997 – 2001**.

NOT FUNDED

Sloan Foundation, U. Centers of Exemplary Mentoring. \$480,000; **2014 – 2017**.

EPA/EPSCoR, Quantitative Risk Assessment: Analysis of Microsatellite DNA Loci in Organisms Inhabiting Contaminated Environments. \$400,000; **1998 – 2001**.

Howard Hughes Medical Institute, Undergraduate Biological Sciences Education Program. \$1,995,993; **1998 – 2002**.

NIH/ NIGMS Initiative for Minority Students: Midlands Bridge to Biomedical Research. \$123,666; **1997 – 1999**.

DOE/ OER, An Integrated Approach to the Assessment of Genetic Changes in the Genome of the American Alligator, *Alligator Mississippiensis*, Inhabiting Contaminated Environments. \$1,308,306; **1997 – 2000**.

DOE/ Savannah River Site: Water Center Program — A Multidisciplinary Approach to Risk Assessment [8 investigators]. \$900,000; **1996 – 1999**.

NSF, Epidermal – Dermal Tissue Interaction and the Expression of Tenascin during Avian Scale Development. \$433,978; **1992**.

U.S. Department, Renovation of Academic Facilities for Emerging Technologies in Environmental Studies. \$7,122,790; **1992**.

International Human Frontiers, Proliferation in Scale Placode/interplacode Morphogenesis of Education, Resubmitted. \$406,622; **1992**.

NSF EPSCoR renewal. \$540,000; **1992 – 1995**.

Science and Technology Center Planning Grant to NSF. \$35,000; **1988**.

Equipment Grant to NIH. \$114,000; **1987**.

Small Center Proposal submitted to NSF. \$500,000; **1987**.

United States Army's University Research Initiative Program, Proposal submitted to establish a Center of Excellence in Biosystems and Biotechnology. \$10,099,672; **1986**.

NIH, Morphological and Biochemical Defects in Development. \$583,066; **1986 – 1991**.

TEACHING

COURSES TAUGHT AT UNIVERSITY OF SOUTH CAROLINA

Biological Principles I – BIOL 101 & 101L

Biological Principles II – BIOL 102 & 102L

Histology – BIOL 530
 Anatomy – BIOL 232
 Ultramicroscopy – BIOL 690
 Senior Honors Thesis – SCCC 499
 Honors Histology – SCCC 530
 Honors Proseminar – SCCC 302
 Dissertation Preparation – BIOL 899
 Thesis Preparation – BIOL 799
 Independent Study – BIOL 399
 Online Histology Course – BIOLJ530:

In 2009, I began using WebMic, a virtual slide software to teach the Histology Laboratory on computers. In 2010, with the assistance of a colleague at MUSC, online lectures were developed and Faculty Senate approved for a fully online course in Histology. The course was offered for the first time in spring 2011 and attracted 121 students. The course is now offered every semester as well as during the summer sessions and attracts students from USC regional campuses and other institutions throughout the state, including Historically Black Colleges and Universities (HBCU's). The summer course serves students in the Certificate Program at MUSC. (Course reviewed by Blackboard.)

COURSES TAUGHT AT UNIVERSITY OF CALIFORNIA, DAVIS

Developed a Comparative Histology Class for the Avian Sciences Department

COURSES TAUGHT AT UNIVERSITY OF MASSACHUSETTS

Introductory Zoology and Histology Laboratories

STUDENT SUPERVISION

PH.D. STUDENTS

Present	Weier Bao		
Present	Habeeb Alsudani		
2011	Matthew Greenwold	Postdoctoral Fellow	University of South Carolina
2001	William Hopkins	Professor	Virginia Tech
2004	Susanne Hauswaldt	Teacher	Germany
2000	Lisa Davis	Developmental Specialist	Promega Corporation

1998	Linda Bade	Unknown	
1993	Heekyung Song	Faculty Member	Korean University
1993	George Barnes	Principal Scientist	Smith & Nephew
1991	Joan Zeltinger	Vice President	REVA Medical
1998	Wayne E. Carver	Professor	USC School of Medicine
1985	Anne Haake	Associate Professor	U. of Rochester School of Medicine
1985	Cynthia Blanck	Research Scientist	Herrington Cancer Center
1984	Michael O'Guin	Assistant Professor	NYU Langone Medical Center

M.S. STUDENTS

2011	Troy Huth
2000	Jeffrey French
1998	Brooks Mays
1988	Iralane Lambros
1985	Wayne Carver
1984	Elizabeth Free
1984	Gerd König
1982	Samuel Brown
1981	Anne Haake
1981	Steve Liverman
1981	Susan McAleese
1980	Dale Smoak
1978	Chris Fisher

POSTDOCTORAL FELLOWS

2012 – Present	Matthew Greenwold	University of South Carolina
1996 – 1998	Travis Glenn	Associate Professor, University of Georgia
1988 – 1990	Lula Helinski	Unknown
1984 – 1985	Louise Silver	Unknown
1983 – 1996	Rose Shames	Unknown
1980 – 1990	Loren Knapp	Assistant Dean for Academic Affairs, College of Arts & Sciences, USC
1978 – 1982 (summers)	Cynthia Fisher	Retired

PH.D. & M.S. STUDENT COMMITTEES SERVED ON

Frank Niagro	John Benson	Floyd Bell
Brian Leeth	Chip Hogue	Grant Wagener
Kathy Hinnant	Tom Barger	Mark Danielsen
Cynthia Aulbach	Nancy Nousek	David McAleese
Mohamed Aev	Reginal Harrell	Bill Haake
Walter McAlhaney	Mohamed Sughi	Jackie Shaffer
Sufian El-Assouli	Jerry Davis	Richard Behringer
Dan Zurosky	Paul Eldridge	Daniel Flisser
Amelia Smith	Julie Donachy	Jimmy Williams
Alexander Smythe II	Vasiliki Abadju	Mike Luce
Todd Dickson	Jeffrey Patrick	Shrikanth Reddy
Shaily Menon	Vicky Hallowell	Alison Moyer (NC State, 2015)
Alex Almasan	Susan Mitchell	Priyasma Bhoumik (Present)
Karen Craig	Mike McDonald	Mohammad Alqahtani (Present)
		Michael Arendt (Present)

UNDERGRADUATE STUDENTS

<i>Name</i>	<i>Date</i>	<i>Research/ Status</i>
Anthony Davis	2014	
Howard Mufuka	2012	
Emily Bricker	2011	
Alex Vu	1997	Howard Hughes student (now at MUSC)
	1996	EPSCoR student
	1992 – 94 summers	High School student
Michelle Tamosaitis	1994 summer	EPSCoR student
Laura Wieland	1993 summer	
Joseph Boyd	1992 summer	Howard Hughes student
Windy Lilly	1992 summer	EPSCoR student
Mike Hoenig	1992 summer	EPSCoR student
Kirk Bass	1992 – 94 summers	
Joanne Hoppenhauer	1987	Study of the hairless mouse
Robert Sanders	1986	Culture of epidemical cells
Chip McKwen	1985	Indirect immunofluorescence of keratins
Carl Sciacchitano	1985	Keratins in the development of chicken esophagus
Chris Flemming	1982	Messenger RNA isolation from embryonic skin

Osvaldo Lumpuy	1981 – 82	Avian histology
Pam Norman	1981 – 82	Immunohistochemistry of skin cell aggregates (honors student)
Sharon Brown	1981 – 82	Avian histology
Don Cantu	1981	Histology of skin cell aggregates
Jim Valentine	1980 – 81	Chorioallantoic membrane metaplasia (honors student)
Joyce Strothers	1979	Two-dimensional electrophoresis of mouse lymphoma proteins
Brent Humphries	1978 – 79	Two-dimensional electrophoresis of mouse lymphoma proteins
Gregory Branham	1978	Histology of the avian bursa of fabricius
William Moore	1978	Cell proliferation of mouse thymic lymphoma
Mark Smith	1978	Care of loggerhead hatchlings
Steve Pritchard	1976 – 77	Histology of avian scales
Mary Alice Kohan	1976 – 77	Starch gel electrophoresis of avian CAM
Michael Sullivan	1976 – 77	Starch gel electrophoresis of avian CAM
Kent Glover	1976 – 77	Histology of the avian skin
Yvonne Reynolds	1976 – 77	Histology of the avian skin

SERVICE

DEPARTMENTAL SERVICE (Biological Sciences)

Chair, Howard Hughes Steering Committee, **1992 – 2009.**

Advisory Committee, Baruch Institute, **1991 – 1996.**

Budget Committee, **1990 – 1996.**

Instructional Committee, **1990 – 1996.**

Scholarship Committee, **1986 – 1996.**

Chair, Department of Biological Sciences, **1986 – 1996.**

Peer Review Committee, **1986.**

Search Committee for Geneticist, **1985.**

Search Committee for Chairman of Chemistry, **1985.**

Peer Review Committee, **1984.**

Committee to Re-write Tenure & Promotion Criteria, **1984.**

Search Committee for Cell Biologist, **1984.**

Ad hoc Committee to Re-organize Biology Curriculum, **1982**.
Chairman, Developmental Biology Group, **1981**.
Seminar Committee, **1981**.
Advisory Committee, **1981**.
Departmental Advisory Committee, **1980**.
Chairman, Search Committee, **1980**.
Molecular Biology Search Committee, **1979**.
Developmental Biology Search Committee, **1979**.
Curriculum Advisement Committee, Biology 101 & 102, **1979**.
Subcommittee Chairman, Graduate Studies Committee, **1979**.
Search Committee (2), **1979**.
Subcommittee Chairman, Graduate Studies Committee, **1978**.
Animal Care Committee, **1978**.
Chairman, Graduate Studies Committee, **1977**.
Search Committee for Chairman, **1977**.
Curriculum Advisement Committee, Biology 101 & 102, **1976**.
Graduate Studies Committee, **1976**.
Chairman, Curriculum Advisement Committee, Biology 101 & 102, **1976**.
Graduate Studies Committee, **1975**.

COLLEGE SERVICE (Science and Mathematics)

Interim Dean for College of Science & Mathematics, **2004 – 2005**.
Associate Dean for Operations, College of Science & Mathematics, **1998 – 2004**.
Interim Dean for College of Science & Mathematics, **1997 – 1998**.
Associate Dean for Research and Graduate Studies, College of Science & Mathematics, **1996 – 1997**.
Ad hoc Committee on Institutes, **1990 – 1996**.
Wrote proposal to establish the Biotechnology Institute, **1990 – 1996**.
College Space Committee, **1986 – 1996**.
Faculty Grievance Committee, **1985**.
Academic Responsibilities Committee, **1984**.
Chair, Academic Responsibilities Committee, **1981 – 1982**.
Academic Responsibilities Committee, **1979 – 1980**.
Animal Care Committee, **1978 – 1979**.
Biomedical Graduate Studies Committee, **1977**.
Animal Care Committee, **1977**.

COLLEGE SERVICE (Arts & Sciences)

Represent College of Arts & Sciences at ROTC events.
Nominated Faculty as AAAS Fellows.
Liaison for the Office of Equal Opportunity Programs.
Liaison for the Division of Law Enforcement and Safety.
Liaison for the Office of Student Disability Services.
Liaison for the Division of Human Resources (Faculty Issues).
Chair, Economic Excellence in Neurotherapeutics (COEE) (Search Committee Chair, 2011).
Attended Center for the Integration of Research, Teaching and Learning (CIRTL) at the University of Wisconsin.
All Board Celebration – Presented station on Health programs in the College, which included Cancer, Mental Health, Physical Activity, Medical Anthropology, etc. Also assisted my graduate student in presenting a station on the teaching of Online Histology using Virtual slides (2012).

UNIVERSITY SERVICE

EAB Committee.
University Diversity Committee.
EPSCoR: Chair of Workforce Development Committee, **2009 – Present**.
Omics Research Leadership Committee, **2012 – Present**.
Childhood Neurotherapeutics Center, P.I. along with John Henderson (Psychology, USC), and Inderjit Singh (Biochemistry and Molecular Biology, MUSC), \$5,000,000; **2006**.
Leadership Development Committee, **2001**.
Scholarship Committee, **2000**.
Water Center Advisory Board, Savannah River Site, **1999**.
Research Advisory Committee, **1998**.
President's Economic Development Council, **1997**.
Animal Use Committee at Riverbanks Zoological Garden, Columbia, SC, **1996**.
Search Committee for Director of Cancer Research Institute, **1994 – 1995**.
Outside Professional Activities Policy Committee, **1992 – 1995**.
Taskforce on Animal Research, **1992 – 1993**.
FIPSE Assessment Project, **1992 – 1993**.
Marketing Committee, Enrollment Management Sub-Committee, **1992 – 1993**.
Cancer Research Institute Advisory Committee, **1992 – 1994**.
Faculty Advisory Committee, Member, **1993 – 1994**.
Faculty Advisory Committee, Chairman, **1992 – 1993**.
Faculty Senate Steering Committee, **1992 – 1994**.
Academic Affairs & Faculty Liaison Committee, **1992 – 1994**.
Faculty Advisory Committee, **1991 – 1994**.
Faculty Budget Advisory Committee, **1991 – 1994**.

Distinguished Scientist (SCUREF), **1990**.
Cancer Institute Board, **1990 – 1995**.
President’s Advisory Board for NSF, **1989 – 1987**.
Selection Committee for Russell Award and Educational Foundation Award, **1988, 1986**.
Affirmative Action Committee, **1988**.
NIH Biomedical Review Committee, **1987 – 1986**.
National Research Council’s Graduate Fellowship, **1986**.
Evaluation Panel in Biological Sciences, **1986**.
Steering Committee for Biotechnology Phase II, **1986**.
Chair, University Admissions Committee, **1985**.
Faculty Senate Steering Committee, **1985**.
NIEHS Organizing Committee for Program Project Grant, **1985**.
University Admissions Committee, **1984**.
Select Committee on Graduate Library, **1984**.
NIH Biomedical Review Committee, **1984**.
Search Committee in College of Public Health, **1984**.
Forward Planning Committee, **1983**.
Alternate Member of Tenure and Promotions Committee for Department of Environmental Health Sciences, **1982**.
Chair, Athletic Advisory Committee, **1981**.
Search Committee for Athletic Director, **1981**.
Graduate Council (Subcommittee on New Programs), **1981 – 1978**.
NIH Biomedical Grants Committee, **1981 – 1980**.
Athletic Advisory Committee, **1980 – 1979**.
Self-Study Committee on the Research Standard, **1980**.
Search Committee for Chairman of Physical Education, **1979**.
Health Professions Advisement Committee, **1979 – 1975**.
University Research Committee, **1978 – 1977**.

COMMUNITY SERVICE

Chair of Education Board, Shandon Presbyterian Church Day Care/ Kindergarten Judge.
Interviews with news media on research.
Poster demonstrations for State Science Fairs.
Worked with several high school students doing science projects.
Lectures to Irmo Middle School science classes.
Reading volunteer at A.C. Moore Elementary School.
Co-President elect of A.C. Moore Elementary School PTA.
Church Elder, Shandon Presbyterian Church.
Habitat for Humanity Volunteer.

United Way Representative at the University of South Carolina.

OTHER SERVICE

Reviewed Biology Program at North Greenville University.

Search Committee for a SmartState Chair at USC School of Medicine, Greenville, SC, **2011 – 2014.**

Articulation Agreement between GSSM and USC, **2006.**

Member of Legislative Liaison Committee, **1995 – Present.**

Academic Recruiter for Student Athletes interested in the Sciences, **1983 – Present.**

Presentation on Biotechnology at USC to the Board of the Drug Science Foundation at MUSC, **1986.**

Chairman of Organizing Committee and Program Committee for 26th Southeastern Developmental Biology Conference and Symposium honoring E.E. Just, Belle W. Baruch Facility, Georgetown, SC.

Chairman of Organizing Committee and Program Committee for 25th Southeastern Developmental Biology Conference sponsored by Department of Biological Sciences, USC, **1984.**

Organized Symposium for the National Meeting of the American Society of Zoologists on Epithelial-Mesenchymal Interactions in Development, **1982.**

Chaired session at the 47th Annual Meeting of the Genetics Society of America, **1978.**

Program Committee for 47th Annual Meeting of the Genetics Society of America held at USC, June **1978.**

NIH, Upward Bound Program (6 week summer program), **1978 – 1976.**

Participated in the Allied Chemical Summer Scholarship Program for 2 summers.

Served as Educational Foundation Fund Representative.

BOOKS REVIEWED

Reviewed Biology Textbook, Ramdon House, Inc., Wessells and Hopson, ed.

Reviewed Biology Textbook, Saunder College Publishing, Arms and Camp, ed.

Reviewed Embryology Laboratory Manual, **1981.**

Prepared Study Guide for Histology Laboratory (with C. Blanck), **1981.**

Served on review panel for a new Undergraduate Biology textbook which was being put together by Stanford University faculty, **1980.**

Reviewed Anatomy textbook for Benjamin/Cummings Publishing Company, **1979.**

Wrote one of the Laboratory Exercises for Laboratory Manual in Biology 102.

Reviewed Laboratory Manual for Holt, Rinehart and Winston, **spring 1978.**

Reviewed Textbook for Holt, Rinehart and Winston, **fall 1977, spring 1978.**

MANUSCRIPTS REVIEWED

Continuous Review of Manuscripts each year.
Genome Biology and Evolution, Evolution and Development, **2014**.
The Anatomical Record, **1994**.
Developmental Dynamics, **1994**.
The Journal of Experimental Zoology, **1994, 1993**.
Developmental Dynamics (6), **1993**.
Journal Investigative Dermatology, **1992**.
Developmental Dynamics, **1992**.
John Sealy Memorial Endowment Fund, **1992**.
Southern Association of Colleges and Schools, **1992**.
BioEssays, **1992**.
Developmental Biology, **1991 – 1990**.
The Anatomical Record, **1991 – 1990**.
Developmental Dynamics, **1991**.
PNAS, **1990**.
Journal of Morphology, **1990**.
Development, Growth and Differentiation, **1990**.
Diabetes, **1987**.
Developmental Biology, **1986**.
Cancer Research **1986**.
Journal of Cell Biology, **1985**.
Journal of Morphology, **1985**.
Journal of Experimental Zoology, **1984**.
Experimental Cell Research, **1984**.
Developmental Biology, **1984**.
Proceedings National Academy of Sciences, **1984**.
Developmental Biology, **1981 – 1980**.
Quarterly Review of Biology, **1981**.
Reviewed Embryology Manual for Saunders Company, **1980**.
Evolution, **1980**.
Science, **1980 – 1979**.
Roux Archives, **1978**.

OTHER CONSULTING, REVIEW PANELS, ETC.

Reviewed faculty member for Tenure and Promotion at University of California Riverside, **1990**.
Federal Fisheries in Charleston, SC, **1990**.

Center for Skin Biology, Harvard Medical School, **1990**.
IBIS, **1990 – 1989**.
Milliken Company, **1989 – 1988**.
Savannah River Site, **1989 – 1988**.
Division of Hair Growth, Upjohn Company, **1986**.
Biotechnology – Animal Growth and Development for Competitive Research Grants Office,
USDA, **1985**.
Special Reviewer of the Cell Biology Study Section for the Department of Health and Human
Services, **1985**.
Idaho EPSCoR, **1985**.

PROPOSALS REVIEWED

Served on Grant Review Panel for Department of Agriculture.
National Science Foundation (NSF), **1994**.
American Institute of Biological Sciences, **1994**.
NSF (5), **1992**.
Research Council of Canada (NSERC) (1), **1991**.
NSF (2), **1991**.
NIH (1), **1991**.
Reviewed NSF Young Scholars Proposal for USC – Salkahatchie, **1990**.
Reviewed 10 proposals for symposium at the ASZ Meeting, **1990**.
NSERC (Canada), **1990**.
NSF (1), **1990**.
NIH (30), **1990 – 1989**.
NIH (20), **1988 – 1987**.
NIH Special Study Section on Morphogenesis and Malformations of the Skin (20), **1988 – 1987**.
Invited to serve on special NIH committee which generated request for proposals (RPF) to study
the development and malformations of the human skin. Ideas that came from committee
work were published in Journal of Investigative Dermatology, **1987**.
NSF (2), **1986**.
NIH Cell Biology Study Section (27), **1987 – 1986**.
NIH Cell Biology and Study Section (20), **1986 – 1985**.
USDA, **1985**.
American Cancer Society (1), **1984**.
Private Foundations (2), **1984**.
NIH (1), **1984**.
NSF, Panel Member (25), **1981**.
NSF, Panel Member (20), **1980**.
NSF (2), **1980**.

NSF (5), **1978**.

National Foundation March of Dimes (1), **1977**.