

Curriculum Vitae

John Godwin

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PERSONAL DATA

Born Oct. 9, 1962 in Palo Alto, California (Citizenship: USA)

EDUCATION

B.Sc. (Zoology, with distinction) - 1986, University of Calgary, Calgary, Alberta, Canada
Ph.D. (Zoology) - 1992, University of Hawaii at Manoa, Honolulu, Hawaii

PROFESSIONAL EXPERIENCE

2015-2017 Associate Head, Department of Biological Sciences, NCSU
2014-present Professor, Department of Biological Sciences, NCSU
2008-present Coordinator, Integrative Physiology and Neuroscience Concentration in
Department of Biological Sciences, NCSU
2008-2009 Program Director, Neural Systems Cluster – Division of Integrative
Organismal Systems, Biology Directorate, National Science Foundation
(rotator position, on scholarly leave from NCSU)
2002-2014 Associate Professor, Department of Biology, NCSU
1996-2002 Assistant Professor, Department of Zoology, NCSU
1995-1996 Lecturer, Department of Biology, University of Texas at Austin
1992-1995 NIH-NINDS postdoctoral fellow, Institute of Reproductive Biology,
University of Texas at Austin
1988-1991 NIMH Predoctoral fellow, Department of Zoology and Hawaii Institute of
Marine Biology, University of Hawaii

PROFESSIONAL SOCIETIES

Society for Behavioral Neuroendocrinology, Society for Neuroscience, Society for
Integrative and Comparative Biology

PROFESSIONAL SERVICE

Reviewer for *Animal Behaviour*, *Hormones and Behavior*, *Brain*, *Behavior and
Evolution*, *Bulletin of Marine Science*, *Comparative Biochemistry and Physiology*, *Fish
Physiology*, *General and Comparative Endocrinology*, *Reproduction Nutrition and
Development*, *Neuroendocrinology*, *Neuroscience*, *Journal of Neuroscience*, *Physiology
and Behavior*, *American Naturalist*, *Quarterly Review of Biology*, *Science*, *Behavioral
Brain Research*, National Science Foundation, NOAA, National Institutes of Health

Review Editor for *Frontiers in Experimental Endocrinology*, Associate Editor for *Journal of Experimental Zoology*

HONORS

Inducted into the Academy of Outstanding Teachers at NCSU, 2000
National Academy of Sciences – Education Fellow in the Life Sciences (2009)

CURRENT SUPPORT

- ‘Kisspeptin Regulation of Reproductive Physiology in a Coral Reef Fish’, National Science Foundation NSF1257791; \$351,000 overall (\$260,000 to NCSU, Godwin is lead PI), 9/2013-8/2016.
- ‘Improving southern flounder management in the Southeastern United States through characterization of habitat effects on juvenile sex ratios’, National Oceanic and Atmospheric Administration, NA14NMF4270047, \$213,866, 7/2014-6/2016.
- ‘Ladies before gentlemen – investigating the molecular basis of female to male sex change in sequentially hermaphroditic fish’, Marsden Fund of New Zealand, \$NZ826,087, Neil Gemmell PI (Univ. Otago, Godwin is co-investigator).
- ‘A Genetic Engineering Approach to Rodent Pest Management’, NCSU Research and Innovation Seed Funding award, NCSU, \$18,679

PAST SUPPORT

- ‘Wild-derived zebrafish as models for anxiety and stress responsiveness’, National Institute of Mental Health R21MH080500; \$403,000, PI (5/2012-4/2015)
- ‘Commercial production of southern flounder: control of sex reversal and transfer of technology to industry.’, North Carolina Sea Grant College Program; \$122,698. Co-PI with Harry Daniels.
- ‘Flounder Farming in North Carolina: Developing Improved Strains and Enhancing Marketability For Economic Success’; Golden Leaf Foundation \$75,000 Co-PI with Harry Daniels
- ‘Social and Gonadal Control of Neural Gene Expression’, NSF 0416926
1/1/05-12/31/09; Amount: \$327,000; PI, Beth Hawkins Co-PI
- Behavioral Genomics Training Grant, University of North Carolina System, \$450,000, 03/10/2005 - 03/11/2009, co-PI
- Beckman Scholars Program at NCSU (Undergraduate researchers), Beckman Foundation, 06/01/2005 - 08/31/2008, co-PI
- ‘Improving production efficiency of southern flounder growout: Evaluation of monosex populations.’, North Carolina Sea Grant College Program; 2/1/04-1/31/06; \$144,337. Co-PI with Harry Daniels.
- ‘Social Influences on Central Arginine Vasotocin Actions’, NIH-MH 58271; 1/1/99-12/31/04; \$503,000. PI.
- ‘Social and Gonadal Control of Neural Gene Expression’, NSF 0212449
8/15/02-7/31/05; Amount: \$99,666. PI.
- ‘Accelerated Growth and Domestication of Yellow Perch’, North Carolina Sea Grant College Program; 5/01/03-4/30/05; \$68,465. Co-PI with Harry Daniels.

‘Temperature Effects on Sex Determination in Flounder: Timing, Latitudinal Variation, and Controlled Breeding in Mariculture’, NOAA Saltonstall-Kennedy program , 11/01/02-4/30/04; \$152,388; Russell Borski and Harry Daniels, Co-PIs
‘Flounder Sex Determination: Biotechnology for Controlled Breeding in Fishery and Mariculture.’, NOAA Saltonstall-Kennedy program, 4/01/99-3/31/01; \$116,897; Russell Borski and Harry Daniels, Co-PIs.
‘Controlling Early Development to Enhance Production of Southern Flounder’ North Carolina Sea Grant College Program (with Russell Borski), \$25,000.
‘Population Differentiation in the Neural Substrates of Courtship Behavior.’ NSF 0083105 (SGER), 09/01/00 - 02/28/02, \$37,340. Co-PI Jim Gilliam.
Sloan Foundation Pre-Tenure Leave Fellowship (2000-2001): This award paid 40% of my salary to allow more time with my new son in the year following his birth.

PUBLICATIONS (57)

- Godwin, J.R. and R.K. Kosaki. 1989. Reef fish assemblages on submerged lava flows of three different ages. *Pacific Science* 43(4):289-301
- Godwin, J.R. and D.F. Fautin. 1992. Defense of host actinians by anemonefishes. *Copeia* 1992(3): 902-908.
- Godwin, J.R. and P. Thomas (1993). Sex change and steroid profiles in the protandrous anemonefish, *Amphiprion melanopus*. (Pomacentridae, Teleostei). *General and Comparative Endocrinology* 91: 144-157.
- Godwin, J.R. (1994). Histological aspects of protandrous sex change in the anemonefish *Amphiprion melanopus*. *Journal of Zoology (Lond.)* 232: 199-213.
- Godwin, J.R. (1994). Behavioral Aspects of Protandrous Sex Change in the anemonefish *Amphiprion melanopus* and endocrine correlates. *Animal Behaviour* 48: 551-567.
- Godwin, J.R. (1995). Phylogenetic and habitat influences on mating systems in the damselfish genus *Dascyllus* (Pomacentridae, Teleostei). *Bulletin of Marine Science* 57(3): 637-652.
- Godwin, J. and D. Crews (1995). Sex differences in estrogenic regulation of estrogen and progesterone receptor messenger ribonucleic acid regulation in the brain of little striped whiptail lizards. *Neuroendocrinology* 62(3):293-300.
- Young, L.J., J. Godwin, M. Grammer, and D. Crews (1995). Reptilian sex steroid receptors: amplification, sequence analysis and tissue expression. *J. Steroid Biochem. Mol. Biol.* 55:261-269.
- Godwin, J., V. Hartman, M. Grammer, and D. Crews (1996) Progesterone inhibits female-typical receptive behavior and decreases hypothalamic estrogen and progesterone receptor messenger ribonucleic acid levels in female whiptail lizards. *Hormones and Behavior* 30:138-144.
- Crews, D., J. Godwin, V. Hartman, M. Grammer, E. Prediger, R. Shepperd. (1996) Intrasexual variation in behavioral sensitivity to progesterone in male whiptail lizards and correlations with brain steroid hormone receptor mRNA expression. *J. Neuroscience* 16(22):7347-7352.
- Godwin, J., D. Crews, R.R. Warner. (1996) Behavioral sex change in the absence of gonads in a coral reef fish. *Proceedings of the Royal Society, Series B* 263 (1377): 1683-1688.
- Godwin, J., D. Crews (1997) Sex differences in the nervous system of reptiles. *Cellular and Molecular Neurobiology* 17:649-669.

- Godwin, J., D. Crews (1999) Hormonal Regulation of Progesterone Receptor mRNA Expression in the Hypothalamus of Whiptail Lizards: Regional and Species Differences. *J. Neurobiology* 39(2):287-93.
- Godwin, J., V. Hartman, P. Nag, D. Crews (2000). Androgen Steroid Regulation of Steroid Hormone Receptor Messenger Ribonucleic Acids in the Brain of Whiptail Lizards. *J. Neuroendocrinology* 12: 599-606.
- Godwin, J., R. Sawby, R.R. Warner, D. Crews, and M.S. Grober (2000) Hypothalamic arginine vasotocin mRNA abundance variation across sexes and with sex change in a coral reef fish. *Brain Behav. Evol.* 55: 77-84.
- Salek, S.J., J. Godwin, N.E. Stacey, and C.V. Sullivan (2001) Courtship and Tank Spawning Behavior of Temperate Basses (genus *Morone*). *Trans. Am. Fisheries Soc.* 130 (5): 833-847
- Salek, S.J., C.V. Sullivan and J. Godwin (2001) Courtship Behavior of Male White Perch, *Morone americana*: Evidence for Control by Androgens. *Comparative Biochemistry and Physiology A*, 130: 731-740.
- Semsar, K., F.L.M. Kandel, and J. Godwin (2001) Manipulations of the AVT system shifts social status and related courtship and aggressive behavior in the bluehead wrasse. *Horm. Behav.* 40: 21-31.
- Salek, S.J., C.V. Sullivan and J. Godwin (2002). Arginine Vasotocin Effects on Courtship Behavior in Male White Perch (*Morone americana*). *Behav. Brain Res.* 133: 177-183.
- Godwin, J. and D. Crews. (2002) "Hormones, Brain and Behavior in Reptiles" in Hormones, Brain and Behavior (eds. D.W. Pfaff, A.P. Arnold, A.M. Etgen, S.E. Fahrbach, and R.T. Rubin). Academic Press, San Diego. Vol, 2, pp. 545-586.
- Luckenbach, J. A., Godwin, J., Daniels, H. V., and Borski, R. J. 2002. Optimization of North American flounder culture: a controlled breeding scheme. *World Aquaculture* 33: 40-45.
- Luckenbach, J.A., J. Godwin, H.V. Daniels, and R.J. Borski. (2003) Gonadal differentiation and effects of temperature on sex determination in southern flounder (*Paralichthys lethostigma*). *Aquaculture* 216: 315-327.
- Godwin, J., J.A. Luckenbach, R.J. Borski (2003) Ecology meets endocrinology: Environmental sex determination in fishes. *Evol. and Dev.* 5(1): 40-49.
- Semsar, K. and J. Godwin (2003). Social influences on the AVT system are independent of gonads in a sex-changing fish. *Journal of Neuroscience* 23(10):4386-93.
- Perreault, H.A.N., K. Semsar, and J. Godwin (2003). Fluoxetine Treatment Decreases Territorial Aggression in a Coral Reef Fish. *Physiology & Behavior* 79:719-724.
- Semsar, K. and J. Godwin (2004) Multiple mechanisms of phenotype development in the bluehead wrasse. *Hormones and Behavior* 45: 345-353.
- Luckenbach, J. A., J. Godwin, H.V. Daniels, J.M. Beasley, C.V. Sullivan, R.J. Borski (2004) Induction of diploid gynogenesis in southern flounder (*Paralichthys lethostigma*) with homologous and heterologous sperm. *Aquaculture* 237: 499-516.
- Semsar, K., H.A.N. Perreault, and J. Godwin (2004). Fluoxetine-treated male wrasses exhibit low AVT expression: Insights into mechanisms and models of depression from wild-caught animals? *Brain Research* 1029: 141-147.
- Hawkins, M.B., J. Godwin, D. Crews, and P. Thomas (2005). The distribution of the duplicate oestrogen receptors ER β a and ER β b in the forebrain of the Atlantic

- croaker (*Micropogonias undulatus*) indicates subfunctionalization after gene duplication. Proceedings of the Royal Society of London, Series B. 272(1563):633-41.
- Luckenbach, J.A., L. W. Early, A. H. Rowe, R. J. Borski, H. V. Daniels, and J. Godwin. (2005). Aromatase Cytochrome P450: Cloning, Intron variation, and ontogeny of gene expression in southern flounder (*Paralichthys lethostigma*). Journal of Experimental Zoology A Comp Exp Biol. 303(8):643-56.
- Engell M.D., J. Godwin, L.J. Young, and J.G. Vandenberg (2006). Perinatal exposure to endocrine disrupting compounds alters behavior and brain in the female pine vole. Neurotoxicology and Teratology 28(1):103-10.
- Morgan AJ, Murashige R, Woolridge CA, Luckenbach JA, Watanabe WO, Borski RJ, Godwin J, Daniels HV (2006). Effective UV dose and pressure shock for induction of meiotic gynogenesis in southern flounder (*Paralichthys lethostigma*) using black sea bass (*Centropristis striata*) sperm. Aquaculture 259 (1-4): 290-299.
- Marsh, K.E., L.M. Creutz, M.B. Hawkins, and J. Godwin (2006). Aromatase immunoreactivity in the bluehead wrasse brain, *Thalassoma bifasciatum*: Immunolocalization and co-regionalization with arginine vasotocin and tyrosine hydroxylase. *Brain Research* 1126: 91-101.
- Luckenbach, J.A., R. Murashige, H.V. Daniels, J. Godwin and R.J. Borski (2007). Temperature Affects Insulin-like Growth Factor-I and Growth of Juvenile Southern Flounder, *Paralichthys lethostigma*. *Comparative Biochemistry and Physiology A- Molec. Integr. Physiol* 146 (1): 95-104.
- Shewmon LN, Godwin JR, Murashige RS, and H.V. Daniels (2007). Environmental manipulation of growth and sexual maturation in yellow perch, *Perca flavescens*. J. World Aquaculture Soc. 38 (3): 383-394.
- Luckenbach JA, Borski RJ, Daniels HV, and J. Godwin (2009) Sex determination in flatfishes: Mechanisms and environmental influences. Sem. Cell & Dev Biol. 20(3): 256-263.
- Godwin J (2009) Social determination of sex in reef fishes. Sem. Cell & Dev. Biol 20(3): 264-270.
- Godwin, J. (2010) Neuroendocrine Regulation of Sex Change and Alternate Sexual Phenotypes in Sex-Changing Reef Fishes in "Reproduction in Marine Fishes: Evolutionary Patterns and Innovations" (edited by K. Cole). University of California Press, Berkeley, CA
- Godwin, J. (2010) Sex Change in Reef Fishes: Behavior and Physiology. *Encyclopaedia of Animal Behavior*, Elsevier (this will be an online resource primarily aimed at undergraduate and graduate students).
- Borski, RJ, JA Luckenbach, and J. Godwin (2010). Flatfish as model research animals: metamorphosis and sex determination in Practical Flatfish Culture and Stock Enhancement (HV Daniels and WO Watanabe, eds), Wiley-Blackwell, Ames, IA, pp. 286-302.
- Godwin J. (2010) Neuroendocrinology of sexual plasticity in teleost fishes, Front. Neuroendocrinol. 31(2): 203-216.
- Godwin J. (2010) Sex Change in Reef Fishes: Behavior and Physiology. In: Breed M.D. and Moore J., (eds.) Encyclopedia of Animal Behavior, volume 3, pp. 160-166 Oxford: Academic Press.

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- Godwin, J. (2011) Socially Controlled Sex Change in Fishes. In: Farrell, A. (ed.), Encyclopedia of Fish Physiology: From Genome to Environment, Elsevier.
- Scarlata, C.D., B.A. Elias, J. Godwin, R.A. Powell, D. Shepherdson, L.A. Shipley, J.L. Brown (2011) Characterizing gonadal and adrenal activity by fecal steroid analyses in pygmy rabbits (*Brachylagus idahoensis*). Gen. Comp. Endocrinology 171 (2011) 373–380.
- McCaffrey, K., M.B. Hawkins, J. Godwin (2011) Sexual phenotype differences in *zic2* mRNA abundance in the preoptic area of a protogynous teleost, *Thalassoma bifasciatum*. PLoS One 6(8): e23213.
- Godwin, J., S. Sawyer, F. Perrin, S.E. Oxendine, and Z.D. Kezios (2012) Adapting the Open Field Test to Assess Anxiety-Related Behavior in Zebrafish in Zebrafish Protocols for Neurobehavioral Research (A. Stewart and A. Kalueff, eds.). in: Zebrafish Protocols for Neurobehavioral Research, Neuromethods series, Vol. 66, Kalueff, Allan V.; Stewart, Adam Michael (Eds.). 1st Ed., Humana Press
- Scarlata, C.D., B.A. Elias, J.R. Godwin, R.A. Powell, D. Shepherdson, L.A. Shipley, J.L. Brown (2012) Negative relationship between fecal glucocorticoids and conception and litter production in captive pygmy rabbits (*Brachylagus idahoensis*). Journal of Mammalogy 93:759-770.
- Godwin, J., R. Thompson (2012) Nonapeptides and Social Behavior in Fishes, Hormones and Behavior 61: 230-238.
- Lema, Sean C., Melissa A. Slane, Kelley E. Salvesen, John Godwin (2012) Variation in gene transcript profiles of two V1a-type arginine vasotocin receptors among sexual phases of bluehead wrasse (*Thalassoma bifasciatum*). General and Comparative Endocrinology 179: 451-464.
- Wong, R., F. Perrin, S. Oxendine, Z.D. Kezios, S. Sawyer, S. Dereje, J. Godwin (2012) Comparing Behavioral Responses across Multiple Assays of Stress and Anxiety in Zebrafish (*Danio rerio*). Behavior 149: 1205–1240.
- Wong, R., S. Oxendine, J. Godwin (2013) Behavioral and neurogenomic transcriptome changes in wild-derived zebrafish with fluoxetine treatment. BMC Genomics 2013, 14: 348.
- Marsh-Hunkin, K.E., H.M. Heinz, M.B Hawkins, and J. Godwin (2013) Estrogenic control of behavioral sex change in the bluehead wrasse, *Thalassoma bifasciatum*. Integrative and Comparative Biology 53(6): 951-9.
- Scarlata, C. D., B.A. Elias, J.R. Godwin, R.A. Powell, D. Shepherdson, L.A. Shipley, and J.L. Brown (2013). Influence of environmental conditions and facility on faecal glucocorticoid concentrations in captive pygmy rabbits (*Brachylagus idahoensis*). Animal Welfare 22: 357-368.
- Mankiewicz, J., J. Godwin, B. Holler, P. Turner, R. Murashige, R. Shamey, H. Daniels, and R. Borski (2013) Tank color and stress steroids affect sex in a flatfish with temperature-dependent sex determination. Integrative and Comparative Biology 53: 755-765.
- Wong, R.Y., M.M. McLeod, and J. Godwin (2014) Limited sex-biased neural gene expression patterns across strains in Zebrafish (*Danio rerio*). BMC Genomics 15:905 (<http://www.biomedcentral.com/1471-2164/15/905>)

- Campbell K.J., J. Beek, C.T. Eason, A.S. Glen, J. Godwin, F. Gould, N.D. Holmes, G.R. Howald, F.M. Madden, J.B. Ponder, D.W. Threadgill, A. Wegmann, G.S. Baxter (2015). The next generation of rodent eradications: Innovative technologies and tools to improve species specificity and increase their feasibility on islands. *Biological Conservation* 185: 47-58.
- Wong, R.Y., M.A. Lamm, J. Godwin (2015) Neurogenomic mechanisms of alternative stress coping styles in zebrafish. *BMC Genomics* (2015) 16:425
- Lamm M.A., H. Liu, N.J. Gemmell, J. Godwin (2015) The need for speed: Neuroendocrine regulation of socially controlled sex change. *Integrative and Comparative Biology*. 55: 307-322.
- Liu H, Lamm MS, Rutherford K, Black MA, Godwin JR, Gemmell NJ (2015) Large-scale transcriptome sequencing reveals novel expression patterns for key sex-related genes in a sex-changing fish. *Biol Sex Differ*. 2015 Nov 25;6:26. doi: 10.1186/s13293-015-0044-8.
- Kern, E.M.A., D. Robinson, E. Gass, J. Godwin, R.B. Langerhans (2016) Correlated evolution of personality, morphology, and performance. *Animal Behavior* 117: 79-86.
- Liu H., Erica V. Todd, Mark P. Lokman, Melissa S. Lamm, John R. Godwin, Neil J. Gemmell (in press). Sexual plasticity: a fishy tale. *Molecular Reproduction and Development*.
- Godwin, J., Lamm, M. Socially Controlled Sex Change in Fishes. In: Pfaff, D.W and Joëls, M. (editors-in-chief), *Hormones, Brain, and Behavior* 3rd edition, Vol 2. Oxford: Academic Press; 2017. pp. 31–46.
- Leitschuh, C., D. Kanavy, G.A. Backus, R.X. Valdez, M. Serr, E. Pitts, D. Threadgill, and J. Godwin (in press) Developing gene drive technologies to eradicate invasive rodents from islands. *J. Responsible Innovation*.

Invited Research Seminars

- 2016 Invited symposium speaker, North American Ornithological Conference, Washington, DC
- 2015 Invited symposium speaker, Society for Integrative and Comparative Biology Annual Conference, West Palm Beach, Florida
- 2013 Invited speaker on International Symposium on Individual Differences (Groningen, Netherlands, November 2013)
- 2013 Society for Behavioral Neuroendocrinology conference, symposium organizer and speaker (Atlanta, June 2013)
- 2013 Invited symposium organizer and speaker, North American Society for Comparative Endocrinology, Queretaro, Mexico (May 2013)
- 2013 Center for Integrative Study of Animal Behavior Graduate Student and Postdoctoral Research Symposium invited keynote speaker, Indiana University
- 2013 Invited speaker for two symposia, Society for Integrative and Comparative Biology Annual Conference, San Francisco

2012 Invited Symposium speaker, International Behavioral Neuroscience Society Annual Meeting, Kona, HI
2010 Gordon Research Conference on Genes and Behavior, Ventura, CA
2006 Workshop on Steroid Hormones and Brain Function, Breckenridge CO, 2006:
"Determination of Sex: Gonads vs. Brain"
2005 Workshop on Steroid Hormones and Brain Function, Breckenridge CO, 2005:
"Steroids in Context: Lessons from the Real World"
Triangle Conference on Reproductive Biology, (2003, 2007)

University of Windsor, Department of Biology (2015)
College of William and Mary, Department of Biology (2013)
Fayetteville State University, Department of Natural Sciences (2012)
University of Illinois at Urbana-Champaign, Neuroscience Program (2011)
Durham Technical Community College (2011)
Lehigh University, Department of Biology (2010)
University of Utah, Dept. Biology (2009)
University of North Carolina at Wilmington, Dept. Biology and Marine Biology (2009)
University of Texas Marine Science Institute (2008). Laura Randall Schweppe Endowed
Lecture Series and a second lecture for their public scientific outreach program.
Eastern Kentucky University, Dept. Biology (2007)
University of North Carolina at Chapel Hill, Dept. Biology (2005)
Indiana University, Keynote speaker for Graduate Student Symposium in the Center for
Integrative Study of Animal Behavior (2004)
Cornell University, Department of Neurobiology and Behavior (2003)
University of New Hampshire, Department of Zoology (2003)
University of Oklahoma, Department of Zoology (2002)
University of Hawaii, Hawaii Institute of Marine Biology (2002)
Oregon State University, Department of Zoology (Graduate student invited speaker,
2001)
U. S. Environmental Protection Agency, Research Triangle Park NC (2001)
University of Texas Marine Science Institute (2000)
Duke University Marine Laboratory (2000)
College of William and Mary, Department of Biology (2000)
University of Texas Marine Science Institute (2000)
University of South Florida, Department of Biology (2000)
University of California at Santa Barbara, Department of Ecology, Evolution and Marine
Biology (1999)
Appalachian State University, Department of Biology
East Carolina University, Department of Biology
University of North Carolina at Greensboro, , Department of Biology (1999)
Duke University, Department of Zoology (1997)