

CURRICULUM VITAE

Name: Stephen Andrew Watts
Address: Department of Biology
University of Alabama at Birmingham
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E-MAIL: sawatts@uab.edu
Birth Date: September 9, 1957 - Roanoke, VA

Education:

Postdoctoral Fellowship. 1986-1988. University of New Hampshire and The State University of Utrecht, The Netherlands. Research: "Chemical Control of Spermatogenesis in a Sea Star Model".
Ph.D. 1986. Biology. University of South Florida. Dissertation: "Metabolic Changes in the Pyloric Caeca During the Annual Reproductive Cycle of *Luidia clathrata* (Echinodermata: Asteroidea)".
M.A. 1981. Zoology. University of South Florida. Thesis: "Biochemical Response to Temperature in the Sea Star *Echinaster* sp. (Muller and Troschel) (Echinodermata: Asteroidea)".
B.S. 1979. Marine Science. Auburn University.

Professional Experience:

Research:

Faculty Appointment to Department of Surgery, UAB (2018 – present)
Associate Director of Sustainable Smart Cities (2013 – present)
Co-Director of the Zebrafish Research Facility (2011 – present)
Director of the Aquatic Animal Research Subcore of the Animal Models Core in the Nutrition and Obesity Research Center, UAB
Visiting Scientist (Fall, 2004): Texas A&M Experimental Station, Port Aransas, Texas. Nutritional requirements of aquatic biomedical research models.
Graduate Program Director (1999-): Department of Biology, University of Alabama at Birmingham
Professor (1998-present): Department of Biology, University of Alabama at Birmingham
Associate Professor (1993-98): Department of Biology, University of Alabama at Birmingham
Assistant Professor (1988-93): Department of Biology, University of Alabama at Birmingham.
Postdoctoral Fellow (1986-1988): Department of Zoology, University of New Hampshire.
Visiting Scientist (Spring, 1987): Department of Comparative Physiology, University of Utrecht, The Netherlands. Techniques in steroid chemistry.
Visiting Scientist (Summer, 1986): Department of Biology, University of Victoria, British Columbia. Techniques in monoclonal antibodies.
Associate Director SEAWATCH Program (1983-1984): Florida Institute of Oceanography. Marine organismal surveys of Tampa Bay, Florida.
Research Assistant (1981-1982): Department of Biology, University of South Florida. Funded by Department of Natural Resources. Water chemistry of Florida freshwater lakes.

Professional Experience (continued)

Research Assistant (1980): Department of Biology, University of South Florida. Biochemistry of water plants in Florida lakes.

Undergraduate Research Assistant (1979): Department of Biology, Auburn University. Studies in the biology of tardigrades. Mentor – Dr. William Mason.

Teaching:

Assistant, Associate, Full Professor (1987-): Department of Biology, University of Alabama at Birmingham. Courses: BY 105 Introductory Biology; BY 330 Cell Biology; BY 671,771 Biochemical Adaptation; BY 685, BY 785 Seminar in Cell Biology; BY 397, 398, 399 Advanced Directed Readings, Undergraduate Research and Honor's Research.

Instructor (1985): Sex, Reproduction, and Population, Department of Biology, University of South Florida.

Teaching Assistant (1979-1984): Department of Biology, University of South Florida. Courses: Fundamentals of Biology, Fundamentals of Zoology, Animal Physiology, Cell Biology.

Research Interest:

Nutrition sciences; Laboratory animal diets; Aquatic biomedical research models (sea urchins, zebrafish and killifish); Obesity; Physiology and nutrition of growth and stress in aquatic organisms; Environmental and hormonal control of growth and reproduction; Physiological ecology; Aquaculture; Sustainable technologies.

Professional Societies:

American Association Advancement Science
Society for Integrative and Comparative Biology
International Society of Invertebrate Reproduction
The Crustacean Society
American Tilapia Association
International Association Astacologists
World Aquaculture Society
Florida Academy of Sciences
Alabama Academy of Sciences
Sigma Xi
Phi Sigma Biological Honor Society
Alpha Zeta Honor Society
Golden Key Honor Society
American Society of Nutrition

Professional Awards and Activities:

1979-1985 Tuition Fellowship, University of South Florida
1983-5 Member, Department of Biology, USF, Curriculum Committee
1983-5 Member, Department of Biology, USF, Liaison Committee

Professional Awards and Activities (con't):

1985 Outstanding Graduate Student Research Award, University of South Florida Chapter of Sigma Xi
1986-8 Member, Marine Biomedical Research Group, University of New Hampshire
1998-present Member, Graduate Affairs Committee, UAB
1989 Co-organizer, National Echinoderm Workshop/Symposium, Dauphin Island
1982-present Reviewer for Numerous National and International Science Journals

1989-present Faculty Sponsor, Gamma Theta Chapter of Phi Sigma Biological Honor Society
 1991 Omicron Delta Kappa Faculty Leadership Honorary
 1991 Nominee for University Award for Excellence in Teaching, Department of Biology, UAB
 1993-5 Chairman, Alabama Academy of Science, Biological Sciences Section
 1994-5 President, Sigma Xi, UAB Chapter
 1994-present Chairman, Graduate Student Research Day, UAB
 1993-present Chairman, Environmental and Applied Aquaculture Institute (North and Central Alabama)
 1995 Recipient of the Emmett B. Carmichael Award for Outstanding Paper in the Journal of the Alabama Academy of Science
 1996 Honorary Member to Golden Key National Honor Society
 1993-1998 Elected to the UAB Faculty Senate
 1998 Nominee for University Award for Excellence in Teaching, Department of Biology, UAB
 1999-present Graduate Program Director, Department of Biology, UAB
 2000 Development of the 5th Year Master of Science in Biology Program
 2002 President, Alabama Academy of Sciences
 2003 UAB Outstanding Faculty Member, Gamma Sigma Alpha National Greek Academic Honor Society
 2003 Inducted as Honorary Distinguished Member, The National Society of Collegiate Scholars
 2004 Who's Who Among American Teachers (nominated and inducted).
 2004 Nominee for President's Award for Excellence in Teaching
 2004 Faculty Advisor, UAB Chapter Alpha Epsilon Delta, Pre-Professional Society
 2005 Outstanding Faculty Member. Recognized by Order of Omega and Gamma Sigma Alpha
 2006 Plenary Lecture, International Echinoderm Conference, 11th Conference.
 2006- Associate Editor, Journal of Experimental Marine Biology and Ecology
 2006 Alpha Omicron Pi Professor of the Month
 2006 Elected to Board of Trustees, Alabama Academy of Sciences
 2006 President's Award for Excellence in Teaching in Natural Sciences and Mathematics
 2007 Caroline P. and Charles W. Ireland Prize for Scholarly Distinction (Highest award for Research Scholarship at UAB)
 2007 Honorary Football Coach for the UAB Blazers (October)
 2009 Dean's Excellence in Mentorship Award (Awarded by the Graduate School for graduate student mentorship)
 2009 Inducted as Fellow of the Alabama Academy of Science
 2010 Stephen A. Watts Research Support Endowment (established by former student in honor of mentorship of Dr. Watts)
 2013 EMSAP Award for Outstanding Faculty (honored by EMSAP students)
 2014 Reviewing Editor, Frontiers in Nutrition
 2018 Chair, NIH ORIP, Workshop on Aquatic Animal Models and Diet
 2018 Finalist, Faculty Innovator of the Year, Bill L. Harbert Institute for Innovation and Entrepreneurship

Graduate Student Training:

Graduates:

Carl B. Massey	M.S.	1990. A Characterization of histone proteins isolated from pyloric caeca, testes and sperm of the sea star <i>Asterias vulgaris</i> .
Gene A. Hines	M.S.	1991. Sex steroids in the testes, ovaries and pyloric caeca of the sea star <i>Asterias vulgaris</i> .
Charles D. Bishop	M.S.	1991. Growth of the stomach and intestine of the regular sea urchin <i>Lytechinus variegatus</i> .

- Kara J. Lee M.S. 1992. Developmental regulation of Na⁺K⁺ATPase activity in the brine shrimp *Artemia*: The potential regulatory role of polyamines.
- Mickie L. Powell M.S. 1993. Electrophoretic identification of several proteins in commercially cultured crayfish species.
- Kenneth C. Stuck Ph.D. 1995. Biochemical responses of postlarval *Penaes vannamei* to infection by the virus *Baculovirus penai*.
- Mark E. Meade Ph.D. 1995. Effects of diet and environmental factors on growth, survival, and physiology of juvenile crayfish, *Cherax quadricarinatus*.
- Jennifer L. Kreider M.S. 1995. Behavioral responses of the Louisiana red swamp crayfish *Procambarus clarkii* to natural dietary items and components of formulated crustacean feeds.
- Gene A. Hines Ph.D. 1997. Sex steroids during early development and sex differentiation of the tilapia *Oreochromis niloticus*.
- Charles D. Bishop Ph.D. 1997. The effect of a live diet on organogenesis and functional development of the digestive system in the mouth brooding tilapia *Oreochromis niloticus*.
- Hugh S. Hammer M.S. 1998. Developmental expression of digestive enzymes in *Procambarus clarkii*.
- Kristina M. Wasson Ph.D. 1998. Reproduction and sex steroids in *Lytechinus variegatus* Lamarck.
- Craig Rowell M.S. 1999. Androgen and estrogen metabolism in mono-sex populations of the Nile tilapia *Oreochromis niloticus* during sex differentiation.
- Mickie L. Powell Ph.D. 2000. The effect of temperature and nutrient level on energy metabolism in two sympatric crayfish species.
- Brenda D. Wallace M.S. 2002. The effects of dietary protein concentration on feeding and growth of small *Lytechinus variegatus* (Echinodermata: Echinoidea).
- Scott C. Hofer M.S. 2002. The effect of temperature on feeding and growth characteristics of the sea urchin *Lytechinus variegatus*.
- Suzanne L. Croll M.S. 2002. The effect of temperature on feeding characteristics in two sympatric crayfish species.
- Victoria K. Gibbs M.S. 2005. Temperature affects biochemical composition and cell populations in the gonads of the sea urchin *Lytechinus variegatus*.
- Randall Watts M.S. 2005. Validation of dual-energy x-ray absorptiometry (DXA) to predict body composition of channel catfish, *Ictalurus punctatus*.
- Hugh S. Hammer Ph.D. 2006. Determination of dietary protein, carbohydrate, and lipid requirements for the sea urchin *Lytechinus variegatus* fed semi-purified feeds.
- Anna Morris Taylor M.S. 2006. Effect of dietary carbohydrate on weight gain and gonad production in juvenile sea urchins, *Lytechinus variegatus*.
- Adele Cunningham PhD 2007. The annual reproductive cycle of the sea urchin *Lytechinus variegatus* in the Northern Gulf of Mexico
- Heath Garris MS 2008. Feed comparison for dietary standardization of the sea urchin (*Lytechinus variegatus*) and assessment of parental dietary copper preexposure by embryological and fertilization bioassays.
- Natalie Jennings MS 2008. Acetylcholinesterase in the sea urchin *Lytechinus variegatus*: Characterization of developmental expression in larvae
- Dorothy Moseley MS 2008. Effect of monosodium glutamate on embryological development in the sea urchin
- Kim Trawick MS 2009. The effect of dietary zinc on growth and reproduction in the sea urchin *Lytechinus variegatus*
- Cristina Richardson MS 2010. Factors affecting cannibalism in intensive culture of the sea urchin *Lytechinus variegatus*: effect of size, density, and injury

Alicia Kindred	MS	2010	Effect of caffeine on growth and reproductive development of the sea urchin <i>Lytechinus variegatus</i>
Laura Heflin	MS	2010	Effect of dietary protein and carbohydrate on growth and organ production in the sea urchin <i>Lytechinus variegatus</i>
Victoria Gibbs	PhD	2011	An evaluation of dietary lipids on growth performance in the sea urchins, <i>Lytechinus variegatus</i> (Echinodermata: Echinoidea)
Warren T. Jones	PhD	2011	The effects of supplemental dietary vitamins on weight gain and organ production in the variegated sea urchin, <i>Lytechinus variegatus</i> (Echinodermata: Echinoidea)
Chris Taylor	MS	2013	Effects of light spectra and UV radiation in relation to dietary carotenoids on the sea urchin <i>Lytechinus variegatus</i>
Julie Price	PhD	2013	Plant selection, community structure, ecophysiology, and stormwater mitigation on green roofs in the southeastern US
Kate Kohlenberg	MS	2014	The direct effects and vertical transfer of carbonaceous and metal-loaded hydrochars in aquatic organisms
Michael Williams	MS`	2014	Combined effects of corexit 9500A with secondary abiotic and biotic stressors in the rotifer <i>Branchionus plicatilis</i>
Lacey Dennis	MS	2014	Effects of biological, environmental, and nutritional factors on fecal pellet size and morphology in the sea urchin <i>Lytechinus variegatus</i>
Laura Heflin	PhD	2015	Nutrient intake, nutrient targets and feed application to promote optimal production and feed efficiency in the sea urchin <i>Lytechinus variegatus</i> (Echinodermata: Echinoidea)
Karen Jensen	MS	2016	Egesta of the sea urchin <i>Lytechinus variegatus</i> promote weight gain in the shrimp <i>Litopenaeus vannamei</i> .
Khaled Almansoob	MS	2017	Dietary ration affects weight gain in the zebrafish <i>Danio rerio</i> .
Marlee Hays	MS	2018	Evaluation of the factors influencing feed intake and satiety of the variegated sea urchin <i>Lytechinus variegatus</i> .
Adele Fowler	PhD	2019	Utilization of the zebrafish model system to predict effects of dietary lipid composition in human health.
Ningxiang Zeng	MS	2019	Methods for the establishment of a DSS-induced inflammatory Bowel Disease model in adult zebrafish
Yuan Yuan	PhD	2020	Single Cell Proteins affect growth performance and body composition of pacific white shrimp <i>Litopenaeus vannamei</i>
Chris Taylor	PhD	2020	Novel methods for establishing the capacity for nociception and cognition in the zebrafish <i>Danio rerio</i>
Audrey Powers	Plan II MS	2020	

Doctoral, Research Associates, Research Professors:

Lalitha Saripalli (PD, 1993-4)
Mickie L. Powell (RA, 2002-2006)
Anthony Siccardi (PD, 2006-2009)
Mickie L. Powell (RP, 2006- 2016)
Latoya Paul (PD 2012- 2014)

Students Currently in Training:

Michael Williams PhD
Sophie Chehade MS

Jonathan Flowers MS

High School Students, Teachers, Undergraduate Research, Honor's Research:

In the last 30 years over 85 students and 5 teachers have received research training in the laboratory. Numerous students have won awards at various local, regional, national and international competitions for their efforts.

Sources and Level of Research Support:

Agency: Sigma Xi
Amount: \$200 (1981)
Title: Biochemical Adaptation to Temperature in the Sea Star *Echinaster sp.*

Agency: Sigma Xi
Amount: \$200 (1984)
Title: The Effect of 17B-Estradiol on Growth and Anabolic Synthesis in the Sea Star *Luidia clathrata*

Agency: Sigma Xi
Amount: \$100 (1985)
Title: Carbohydrate Metabolism in the Tube Feet and Pyloric Caeca of *Luidia clathrata*

Agency: NATO
Amount: \$5,500 (1986-88)
Title: Influence of Steroids on Spermatogonial Proliferation. With Drs. C. Walker, P. Voogt and M. Klauser.

Agency: NIH (Biomedical Research Support Grant (2 S07 RR07108-14)
Amount: \$2,795 (1986-1987)
Title: Mechanisms Influencing Spermatogonial Mitotic Divisions. With Dr. Charles Walker.

Agency: NSF (Regulatory Biology) Subcontract from UNH
Amount: \$33,346 (1988-89)
Title: Initiation and Maintenance of Spermatogonial Mitotic Divisions

Agency: UAB Faculty Research Grant
Amount: \$2,000 (1988)
Title: Role of Polyamine Metabolism During Osmoregulation of a Marine Invertebrate

Agency: UAB Faculty Research Grant
Amount: \$2,050 (1989)
Title: Tissue Culture of Marine Invertebrates

Agency: NSF (EPSCoR)
Amount: \$15,000 (1989)
Title: Modes and Energetics of Reproduction and Timing of Gametogenesis and Recruitment of Echinoderms in the Offshore Waters of the Gulf of Mexico. Co-PI with K. Marion, T. Hopkins. PI J. McClintock.

Agency: NSF(EPSCoR)
Amount: \$79,000 (1990-91)

Title: Modes and Energetics of Reproduction and Timing of Gametogenesis and Recruitment of Echinoderms in the Offshore Waters of the Gulf of Mexico. Co-PI with K. Marion, T. Hopkins and J. McClintock.

Agency: UAB Faculty Research Grant
Amount: \$2000 (1990)
Title: Polyamines During Early Development

Agency: NSF (EPSCoR, ROA)
Amount: \$14,500 (1990)
Title: The Role of Polyamines in the Ontogeny of Osmotic and Ionic Regulation in the Brine Shrimp *Artemia*. With Raymond Henry and Christine Sundermann (Auburn University).

Agency: NSF (EPSCoR, ROA)
Amount: \$11,200 (1991)
Title: The Role of Polyamines in the Ontogeny of Osmotic and Ionic Regulation in the Brine Shrimp *Artemia*. With Raymond Henry and Christine Sundermann (Auburn University).

Agency: Mississippi-Alabama Sea Grant
Amount: \$73,241, Sea Grant; \$87,990 State Match; Total \$161,231 (1992-93)
Title: Evaluation of Biochemical Indicators of Growth in Crustaceans. With Shiao Wang, Univ. Southern Mississippi.

Agency: NSF (Research Facilities Office)
Amount: \$506,692 (1991)
Title: Renovation and Modernization of the Marine Science Hall Dauphin Island Sea Lab, Alabama Marine Environmental Sciences Consortium. Associate Investigator (G. Crozier, T.S. Hopkins and S. Jorgensen, PI's at MESC.)

Agency: NSF (EPSCoR)
Amount: \$260,208 (1991-1994)
Title: Chemical Defenses of Larval and Adult Echinoderms from the Gulf of Mexico: Implications for Recruitment- and Trophic-Dynamics in Nearshore Benthic Communities. Co-PI with T. Hopkins, K. Marion, R. Zimmerfaust; J. McClintock PI.

Agency: Mississippi-Alabama Sea Grant
Amount: \$8,000 (1991)
Title: Evaluation of Biochemical Indicators of Growth in Crustaceans. PI with Shiao Wang, Univ. Southern Mississippi

Agency: UAB Faculty Research Grant
Amount: \$1,900 (1992)
Title: The Evaluation of Steroid Metabolism in Hormonally-Enhanced Fish Culture

Agency: Mississippi-Alabama Sea Grant
Amount: \$226,814 (\$98,425 Sea Grant; \$128,389 State Match) 1993-1994
Title: Development of a Method for Controlling the Molt Cycle of the Blue Crab, *Callinectes sapidus*. Co-PI with Douglas Watson and Asim Bej.

Agency: NSF EPSCoR
Amount: \$900 (1993)
Title: Federal Agency Visitation Proposal

Agency: AUTRC
Amount: \$30,000 (1994)
Title: The Use of Poultry Meal and Feather Meal as a Supplemental Protein Source in Crayfish and Finfish Diets.

Agency: American Proteins, Inc.
Amount: \$7,000
Title: The Use of Poultry Meal and Feather Meal as a Supplemental Protein Source in Crayfish and Finfish Diets.

Agency: Gulf Coast Research Laboratory
Amount: \$5,000 1994
Title: Polyamine Analysis of Fish Exposed to Toxicants

Agency: Mississippi-Alabama Sea Grant
Amount: \$6000 (1994)
Title: Development of an Accurate and Simplified Method for Species Identification in Pink (*Peneaus duorarum* and Brown (*P. aztecus*) Shrimp Postlarvae: A Fisheries Management Tool.
Consortium Fellowship obtained for Mickie Powell.

Agency: Mississippi-Alabama Sea Grant
Amount: \$6000 (1995, resubmission for second year)
Title: Development of an Accurate and Simplified Method for Species Identification in Pink (*Peneaus duorarum* and Brown (*P. aztecus*) Shrimp Postlarvae: A Fisheries Management Tool.
Consortium Fellowship obtained for Mickie Powell.

Agency: Tennessee Valley Authority (TVA)
Amount: \$190,000 (1995-97)
Title: Use of Formulated Diets in Crayfish Culture. PI-Watts, with Co-PI Cynthia Kittler (Gadsden State)

Agency: Mississippi-Alabama Sea Grant
Amount: \$36,996 (continuation) 1995
Title: Development of a Method for Controlling the Molt Cycle of the Blue Crab, *Callinectes sapidus*.
Co-PI with Douglas Watson (PI) and Asim Bej (Co-PI).

Agency: Mississippi Alabama Sea Grant
Amount: \$20,000 SG, \$35239 Match (1996)
Title: Development of a method for controlling the molting of blue crabs (*Callinectes sapidus*).
(Watson PI, Luo and Watts - Co-PI)

Agency: Mississippi Alabama Sea Grant
Amount: \$46,715 SG funds, \$39,555 Match, Total \$86,270 (1997)
Title: Development of a method for controlling the molting of blue crabs (*Callinectes sapidus*).
(Watson PI, Luo and Watts - Co-PI)

Agency: Mississippi Alabama Sea Grant
Amount: \$6,486 SG funds, \$9,285 Match, Total \$15,771 (1997)
Title: Assessment of *Lytechinus variegatus* as a fishery and aquaculture candidate in the Gulf of Mexico. (Watts PI; McClintock and Lawrence - Co-PI)

Agency: United States Department of Agriculture
Amount: \$133,352 (1997-98)
Title: Physiological Basis of sex determination in the tilapia *Oreochromis niloticus*. (Wibbels, Co-PI)

Agency: Mississippi Alabama Sea Grant
Amount: \$34,029 SG funds, \$17,548 Match, Total \$51,577 (1998)
Title: Development of a method for controlling the molting of blue crabs (*Callinectes sapidus*).
(Watson PI, Luo and Watts - Co-PI)

Agency: CAWACA RC&D
Amount: \$3000 (2000-01)
Title: Economic Enhancement of Rural Family Farms Through Cage Culture of Tilapia.

Agency: Mississippi Alabama Sea Grant
Amount: Total \$334,802 \$181,978 SG funds, \$152,824 Match (1998-00)
Title: Assessment of sea urchins as fishery and aquaculture candidates in the Gulf of Mexico.
(McClintock and Lawrence - Co-PI)

Agency: Education Foundation, UAB
Amount: \$24,500
Title: Proposal for a 5th Year Masters Program (Watts - PI, Co-PI - Lorden)

Agency: UAB Graduate School
Amount: \$10,000
Title: Proposal for a 5th Year Masters' Program in Biology. S.A. Watts (PI) and J. Lorden, Fall 2002-2005

Agency: CAWACO RC&D
Amount: \$2,600 (2002)
Title: Cage Culture of Tilapia in North-Central Alabama

Agency: National Science Foundation
Amount: \$97,008 (2004-05)
Title: Neuroendocrine control of salinity-mediated carbonic anhydrase expression in the gills of euryhaline crustaceans. (Watts – Co-PI, R. Henry PI, Auburn)

Agency: Mississippi-Alabama Sea Grant
Amount: \$129,756 SG funds, \$83,248 Match, Total \$213,004 (2004-05)
Title: Assessment of the sea urchin *Tripneustes ventricosus* as a candidate for aquaculture in the Gulf of Mexico region.

Agency: Texas Sea Grant
Amount: \$177,276 (2006-07)
Title: Dietary nutrient requirement determination and feed development for sea urchins for biomedical, ecotoxicological and educational models (Watts – Co-PI, A. Lawrence, PI, A&M,)

Agency: Mississippi-Alabama Sea Grant
Amount: \$227,605 (2006-07)
Title: Sea urchins are improved candidates for aquaculture and biomedical/ecotoxicological models.
(Watts – PI)

Agency: NOAA National Marine Aquaculture Program
Amount: \$2,660,934 (2007-2011) (\$660K NOAA, \$2 mil industry match)

Title: NOAA Marine Aquaculture Program: Development of a Commercial United States Sea Urchin Aquaculture Facility. (Watts – PI)

Agency: NIH supplemental

Amount: \$44,600 (2009)

Title: Development of a Zebrafish Core Facility at UAB (David Allison PI, Watts Co-I)

Agency: Alabama Water Resources Research Institute

Amount: \$25,000 (2010-2011)

Title: Experimental evaluation of plant selection in limiting stormwater discharge from vegetated roofs (Watts Co-PI with Jason Kirby (CCEE) and Robert Peters (CCEE))

Agency: UAB (Gulf Oil Spill Pilot Grant)

Amount: \$20,000 (2010-2011)

Title: High sensitivity toxicity screening of dispersants and residual oil using molecular biomarkers (M. Powell PI, Watts – Co-PI)

Agency: British Petroleum Research Fund

Amount: \$25,645 (2010-2011)

Title: Chemical Dispersants in the Marine Environment: Harnessing the Fish Acute Phase Response for Rapid and Sensitive Evaluation of Exposure (Watts PI)

Agency: ACLAM

Amount: \$26,800 (2013-2014)

Title: Development of a standardized reference diet for the zebrafish, *Danio rerio* (Watts PI)

Agency: NIH NIGMS R25

Amount: \$148,524 (9-10-2015 to 8-31-2018)

Title: Beyond textbook, yet simple statistical tools for reproducible animal research. (D. Allison, A. Brown PI, Watts Co-I)

Agency: Egg Nutrition Council

Amount: \$50,000 (1/17 to 6/18)

Title: Diets Containing Egg Products Fed During Early Life Promote Long-term Metabolic Health
The goal of this study is to evaluate egg products prior and after trauma to reduce recovery time and increase health outcomes.

Role: Top-ranked proposal, funded Sun (PI) and Watts (PI)

Agency: Berezan Shrimp Company

Amount: \$30,000 (5/17 to 9/17)

Title: Assessment of Protein Substitutes in farmed shrimp, *Litopenaeus vannamei*

The goal is to develop alternatives to fish meal protein using yeast and bacterial production

Role: PI

Agency: Meridian Biotech LLC

Amount: \$69,000 (6/17 to 12/17)

Title: Developing high protein alternative ingredients for aquaculture

The goal is to use fermentation technologies to produce sustainable protein alternatives in production and companion animals.

Role: PI

Agency: Meridian Biotech LLC

Amount: \$15,000 (6/17 to 12/17)

Title: Evaluating zebrafish phenotypes in relation to diet

The goal is to study the role of high and low-fat protein supplements in zebrafish growth and obesity.

Role: PI

Agency: BioWish Technologies

Amount: \$60,000 (6/18-12/18)

Title: Probiotics and attractability in the pacific white shrimp

The goal of this study is to evaluate probiotics in their ability to promote consumption in cultured shrimp

Role: PI

Agency: NIH NIMH (subcontract via Meridian Biotech, LLC)

Amount: \$175,000 (9/18 – 8-19)

Title: Development of Standardized Reference Diets for the zebrafish *Danio rerio*.

The goal of this study is to evaluate single cell proteins as a protein source for purified reference diets in zebrafish.

Role: PI

Agency: NIH NIDDK R01 (subcontract from Duke University with Michel Bagnet)

Amount: \$103,000 to UAB (4/19 to 3/23)

Title: Cellular and Environmental Regulation of Protein Absorption and Utilization in the Early Intestine

The goal of this study is to identify nutrients in relation to mechanisms that influence early gut development in terms of protein and lipid intracellular uptake

Role: PI at UAB

Agency: Gulf of Mexico Fisheries Commission (NOAA) (with W. Walton, Auburn)

Amount: \$59,502 (July 2019-Dec 2020)

Title: Two birds with one stone: Assessment of Sea Urchin Culture as a second crop for Oyster Farmers.

The goal is to learn to co-culture urchins and oysters.

Role: PI at UAB

Agency: NSF IOS Edge (Wessel at Brown University)

Amount: \$614,867 (9-1-19 to 8-31-23)

Title: Tools to advance genomic studies in sea urchins

The goal is to standardize husbandry for sea urchin culture for genomic research

Role: PI at UAB

Publications:

1. Watts, S.A. and J.M. Lawrence. 1982. Effect of starvation on enzyme activities and nutrient stores in the pyloric caeca of *Echinaster sp.* (Echinodermata: Asteroidea). *Comp. Biochem. Physiol.* 72B, 461-463.

2. Watts, S.A. and J.M. Lawrence. 1982. Activity and kinetic characteristics of triosephosphate isomerase from the pyloric caeca of *Echinaster sp.* (Echinodermata: Asteroidea) exposed to different temperatures. *Comp. Biochem. Physiol.* 73B, 881-885.
3. Watts, S.A., R. Scheibling, A. Marsh and J.B. McClintock. 1982. Effect of temperature and salinity on larval development of sibling species of *Echinaster* (Echinodermata: Asteroidea) and their hybrids. *Biol. Bull.* 63, 348-354.
4. Watts, S.A., R. Scheibling, A. Marsh and J.B. McClintock. 1983. Induction of aberrant ray numbers in *Echinaster sp.* (Echinodermata: Asteroidea) by high salinity. *Fla. Sci.* 46, 125-128.
5. Dawes, C., C.P. Chen, J. Jewett-Smith, A. Marsh and S.A. Watts. 1984. Effect of phosphate and ammonia levels on photosynthetic and respiratory responses of the red alga *Gracilaria verrucosa*. *Mar. Biol.* 78, 325-328.
6. Herrin, D., C. Helling and S.A. Watts. 1985. Relative levels of actin and actin gene sequences in tube feet and pyloric caeca of adult starfish *Luidia clathrata* (Echinodermata). *Comp. Biochem. Physiol.* 81B, 143-147.
7. Watts, S.A. and J.M. Lawrence. 1985. The effect of feeding and starvation on the level and content of nucleic acids in the pyloric caeca of *Luidia clathrata* (Say). In B.F. Keegan and B. O'Connor (eds.) *Echinodermata, Proceedings of the Fifth International Echinoderm Conference, Galway*. A.A. Balkema, Rotterdam. 571-576 pp.
8. Marsh, A., S.A. Watts, C. Chen and J.B. McClintock. 1986. The effect of high salinity on development, mortality, and number of *Echinaster spinulosus* (Echinodermata: Asteroidea) at different developmental stages. *Comp. Biochem. Physiol.* 83A, 229-231.
9. Watts, S.A. and J.M. Lawrence. 1986. Seasonal effects of temperature and salinity on the organismal activity of the sea star *Luidia clathrata* (Say) (Echinodermata: Asteroidea). *Mar. Behav. Physiol.* 12, 161-169.
10. Lawrence, J.M., T.S. Klinger, J.B. McClintock, S.A. Watts, C.P. Chen, A.G. Marsh and L. Smith. 1986. Allocation of nutrient resources in the regenerating asteroid *Luidia clathrata*. *J. Exp. Mar. Biol. Ecol.* 102, 47-53.
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Patents: Several trade secret applications are currently being disclosed concerning animal feed development.

Entrepreneurial Activities

President and CEO - Aquatic Agriculture, Inc. Consulting, S-Corporation, incorporated 2001. AquaAg was incorporated in 2001 as a S-Corporation. The company serves to consult industries in aquatic food production (aquaculture and hydroponics). Clients include private industries and correctional facilities.

Chief Science Officer – Humboldt Innovations, LLC. This company is developing UAB IP in mosquito abatement.