and manage large and mesocale experiments, analyze and disseminated data through professional channels, and managed four employees. Under my supervision the facility achieved the highest level of shrimp production in its history.

- Biologist, SC Dept. of Natural Resources, Waddell Mariculture Center, May 2008 – July 2009
  I assisted with various animal husbandry efforts, managed a three month-long experiment comparing two shrimp diets (a fish-free diet and a conventional fish-containing diet), and published several papers
- Research Assistant, The University of Charleston, March 2007 – May 2008
  As part of a M.S. Thesis project, I helped to plan and implement an experiment analyzing the effects of shrimp diets and various management regimens on communities of microorganisms and chemical cycling dynamics within shrimp aquaculture systems.

AWARDS:

- Top Article in the Aquaculture Advocate Magazine 2017
  - Number one ranked article for the year in this widely read magazine

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Supervised Practicum II (AFE 411) Project – Spring 2016
Ashley presented her findings at the 2016 KSU Liberal Arts Symposium
- Caitlin Mullins
Supervised Practicum I (AFE 311) Project – Spring 2016
- Scott Watts
Supervised Practicum II (AFE 411) Project – Spring 2016

x High School Students
- Ariana Billings (Research Assistant, Fall 2022 – current)
Started as H.S. Student, transitioning to a KSU Student
- Kasha Fiske (Research Assistant, Summer 2022 – current)
Started as H.S. Student, now a Morehead State University Student
- Jacob Tracy (Upward Bound Summer Program; Summer 2019)
- Ottis Jaggers (Summer Apprenticeship Student; Summer 2016)
- Keziah Thomas (Summer Apprenticeship Student; Summer 2016)
- Anne Holden (Research Assistant; Fall 2014 – Spring 2015)
- Delyia Oldham (Summer Apprenticeship Student; Summer 2015)

x Interns
- Victor Lobanov – Fall 2021 – From Sweeden
- Alexander Dubsky – Summer 2019 – From Switzerland
- Jonathan Olsen – Spring 2015 – From Lexington, KY
- Viktor Vagesjo – Fall 2017 – From Sweeden

x Other Teaching
- Collaborating with Russellville High School and Eminence Independent High School
Growing shrimp in their classrooms as a STEM learning tool
Spring 2022 - present
- Guest Lecturer at the University of Maine
Spring 2021, Spring 2022, and Spring 2023
Course Title: Advanced Aquaculture
Lecture Title: Marine Shrimp Culture in Recirculating Systems: Past, Present, and Future
- Guest Lecturer in the New Mexico State University course Food Microbiology
Fall 2019
- Guest Lecturer at the Universidade Federal Do Ceara, Fortaleza, Brazil
Fall 2019
Lecture Title: Intensive Shrimp Farming in the U.S.A.
- High Tunnel Greenhouse Experiential STEM Learning Facilities
2016 -current
Built and help manage a high tunnel at an elementary school in Versailles and a middle school in Lexington. They contain aquaculture and terrestrial agriculture production systems used to engage and teach students STEM principles.
Part of a grant-funded project that has impacted over 100 students
Collaboration with Versailles Montessori School and Providence Montessori Middle School
- Biofloc Technology Shortcourse – Kuwait Institute for Scientific Research
5-day course, taught in Kuwait City, Kuwait, November 2014

- USDA-NIFA, AFRI Foundational Program, Small Farms Program.
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- x Efficient Production of Nutritious Seafood near Consumer Markets to Complement Healthy Lifestyle Choices ($599,919)
  - o Submitted September 2020 to USDA-NIFA 1890 Capacity Building Grant Program
  - o Resubmitted October 2021, reviewers liked the research but not the extension component
- x Sustainable Seafood Security: An Exchange Program to Promote Responsible Aquaculture

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x Tierney T.W., Fleckenstein L.J., and A.J. Ray. 2021. Evaluating a low-cost salt mixture in brackish water intensive shrimp (

- Ray A.J., Seaborn G., Vinatea L., Browdy C.L., and J.W. Leffler. 2012. Effects of biofloc reduction on microbial dynamics in minimal-exchange, superintensive shrimp ( ) culture systems. Journal of the World Aquaculture Society 43(6): 790-801.
- Ray A.J., Dillon K.S., and J.M. Lotz. 2011. Water quality dynamics and shrimp ( ) production in intensive, mesohaline culture systems with two levels of biofloc management. Aquacultural Engineering 45: 127-136.
- Ray A.J., Seaborn G., Wilde S.B., Leffler J.W., Lawson A., and C.L. Browdy. 2010. Characterization of microbial communities in minimal-exchange, intensive aquaculture systems and the effects of suspended solids management. Aquaculture 310: 130-138.
- Ray A.J., B.L. Lewis, C. L. Browdy, and J.W. Leffler. 2010. Suspended solids removal to improve shrimp ( ) production and an evaluation of a plant-based feed in minimal exchange, super-intensive culture systems. Aquaculture 299: 89-98.

x

x Ray, A.J. 2018. Indoor Shrimp Farming at KSU. YouTube Video. 18,000 views as of October 31,

hydroponics. Aquaculture 2022, San Diego, California, USA
x Fleckenstein L.J., Johannemann M.E., Ray A.J. 2021 Effect of woodchips, beads, and expanded

- Tierney T.W., Fleckenstein L.J., Ray, A.J. 2019. Evaluating a low cost salt mixture in brackish water intensive shrimp ( ) production systems. Aquaculture 2019 Meeting Abstract Book, New Orleans, Louisiana, USA.
- Kring N.A., Ray A.J. 2019. The effects of stocking density and artificial substrate on Pacific white shrimp production and water quality dynamics in greenhouse-based biofloc systems. Aquaculture 2019 Meeting Abstract Book, New Orleans, Louisiana, USA.
- Fleckenstein L.J., Ray A.J. 2019. The effects of different solids and biological filters in Pacific white shrimp production systems. Aquaculture 2019 Meeting Abstract Book, New Orleans, Louisiana, USA.
- Ragaza J.A., Rossi, W., Habte-Tsion H.M., Kolimadu G.D., Yadav A.K., Ray A.J. 2019. Use of recovered biofloc material from production tanks as feed ingredient in diets of Pacific white shrimp . Aquaculture 2019 Meeting Abstract Book, New Orleans, Louisiana, USA.
- Fleckenstein, L.J. Kring, N., and Ray, A.J. 2018. The effects of vertical substrate 1 (.J)(a)1 (l fro)7 (a)

- Tierney, T.W., and Ray, A.J. 2017. A Comparison of Biofloc, Clear Water, and Hybrid Culture Systems for Intensive Shrimp (Litopenaeus vannamei) Nursery Production. Association of 1890 Research Directors Research Symposium, April 2017, Atlanta, GA, USA.
- Kring, N.A., and Ray, A.J. 2017. Polyculture of Pacific white shrimp Litopenaeus vannamei and juvenile tilapia Oreochromis niloticus in indoor biofloc aquaculture systems. Association of 1890 Research Directors Research Symposium, April 2017, Atlanta, GA, USA.
- Ray, A.J., Cecil, A., and Auberry, W.P. 2016. Indoor marine shrimp production at Kentucky State University. Aquaculture 2016 Meeting Abstract Book, Las Vegas, Nevada, USA.
- Drury, T.H., and Ray, A.J. 2016. Shrimp production in clear water and biofloc systems. Aquaculture 2016 Meeting Abstract Book, Las Vegas, Nevada, USA.
- Thompson, K.R., Allen, K.M., Bowman, B.A., Cummins, V.C., Filer, K., Tidwell, J.H., Ray, A.J., and V. Kumar. 2016. Use of algal meal, soybean meal, and decreasing levels of fish oil in practical diets without fish meal for Pacific white shrimp Aquaculture 2016 Meeting Abstract Book, Las Vegas, Nevada, USA.
- Allen, K.M., Bowman, B.A., Thompson, K.R., Cummins, V.C., Filer, K., Tidwell, J.H., Ray, A.J., and V. Kumar. 2016. Optimizing the use of algal meal as a fish oil replacer in the practical diets of Pacific white shrimp Aquaculture 2016 Meeting Abstract Book, Las Vegas, Nevada, USA.
- Ray, A.J. 2015. Applications and advancements in biofloc technology. Aquaculture America Annual Meeting Abstract Book, New Orleans, Louisiana, USA.
- Ray, A.J. 2014. Perspectives and innovations in biofloc based aquaculture. Proceedings of the 10th International Conference on Recirculating Aquaculture, Roanoke, Virginia, USA. (Invited)
- Ray, A.J., and J.M. Lotz. 2014. Clear water RAS versus biofloc technology and an evaluation of the nutritional contribution of biofloc to shrimp ( ). Proceedings of the 10th International Conference on Recirculating Aquaculture, Roanoke, Virginia, USA. (Invited)
- Ray, A.J. 2013. Perspectives and innovations in biofloc based aquaculture. Proceedings of the 15th Annual Ecuadorian Aquaculture and AquaExpo Conference, Guayaquil, Ecuador. (Invited Expert Lecturer)

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- Ray A.J., Farno C.C., Breland V.M., Dillon K.S., and J.M. Lotz. 2011. Differences in chemical dynamics between chemoautotrophic and three different heterotrophic biofloc-based shrimp ( ) culture systems. The National Shellfisheries Association Annual Meeting Abstract Book, Baltimore, Maryland, USA.
- Ray A.J., Farno C.C., Breland V.M., Duncan J.A., Nicholson C., and J.M. Lotz. 2011. Refining biofloc management in mesohaline, intensive shrimp ( ) culture systems. Aquaculture America Annual Meeting Abstract Book, New Orleans, Louisiana, USA.
- Ray A.J., and J.M. Lotz. 2011. Solids management in biofloc-based aquaculture systems. Aquaculture America Annual Meeting Abstract Book, New Orleans, Louisiana, USA.
- Ray A.J., and J.M. Lotz. 2011. Minimal-exchange, superintensive systems for sustainable shrimp

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Oral Extension Presentations:

- Ray, A.J., and Durborow, R.M. 2023. The Kentucky State University Aquaculture Program. Aquaculture America, New Orleans, Louisiana, USA.
- Ray, A.J. 2019. Cultivo de Camarao em Sistema Intensivo com Ambientes Fechados (Greenhouse and Indoor). Aquain' 19, Tecnologia em Cultivo Intesivo de Camarao, Workshop in Natal, Brazil.
- Ray, A.J. 2018. Indoor Shrimp Farming and KSU. KSU Indoor Shrimp Farming Workshop, Frankfort, Kentucky, USA.
- Ray, A.J. 2018. Indoor Shrimp Production at KSU. KSU Third Thusday Thing Extension Event. Frankfort, Kentucky, USA.
- Ray, A.J. 2017. Overview of indoor marine shrimp production systems, nutrition, and water quality. KSU Indoor Tilapia, Shrimp, and Aquaponics Workshop, Frankfort, Kentucky, USA.
- Fleckenstein, L.J., and Ray, A.J. 2017. Effects of LED light on Pacific white shrimp performance and water quality in intensive RAS. KSU Third Thusday Thing Extension Event. Frankfort, Kentucky, USA.
- Ray, A.J. 2016. Introduction and Fundamental Concepts to Recirculating Aquaculture, Biological and Chemical Processes in Recirculating Aquaculture, and Engineering and Design Concepts in Recirculating Aquaculture. The Shrimp Academy, Sherlock Shrimp Company, Ridgeway, Iowa, USA.
- Ray, A.J. 2016. Biofloc management, water quality, RAS alternative rearing. Marine Shrimp Workshop, The Indiana Aquaculture Association, Indianapolis, Indiana, USA.
- Ray, A.J. 2016. Shrimp aquaculture. The 2016 Iowa Aquaculture Conference, Des Moines, Iowa, USA.
- Ray, A.J. 2016 Indoor marine shrimp production at Kentucky State University. KSU Third Thusday Thing Extension Event. Frankfort, Kentucky, USA.
- Ray, A.J. 2015. Applications of Intensive and Semi-intensive Aquaculture Systems in Kentucky. KSU Third Thusday Thing Extension Event. Frankfort, Kentucky, USA.

Poster Presentations

- Kim Su-Kyoung, Ray A.J. 2021. Effect of water depth on production and water quality in biofloc systems. Aquaculture America, San Antonio, Texas, USA.
- Ray A.J., Fisk J.C., Fleckenstein L.J., Tierney T.W. 2019. The use of inexpensive salt mixtures for inland, intensive shrimp ( ) farming. Aquaculture Europe 2019, Berlin Germany.
- Kring N.A., and Ray A.J. 2017. Polyculture of Pacific white shrimp, , and juvenile tilapia, Oreochromis niloticus, in indoor biofloc aquaculture systems. Posters at the Capital, Frankfort, Kentucky, March 2, 2017.
- Gamez E.R., Cuevas-Uribe R., Mims S.D., and Ray A.J. 2016. Tissue concentrations of heavy metals in hybrid striped bass grown in a municipal reclaimed water aquaculture facility. Aquaculture 2016 Meeting Abstract Book, Las Vegas, Nevada, USA.
- Ray A.J., Farno C.C., and J.M. Lotz. 2011. Use of settled solids from intensive shrimp culture as a fertilizer alternative for Bitter Panicum ( ). Aquaculture America Annual Meeting Abstract Book, New Orleans, Louisiana, USA.
- Ray A.J., and J.M. Lotz. 2010. Sustainable marine shrimp aquaculture at The Gulf Coast Research Laboratory. Bays and Bayous Symposium Abstract Book, Mobile, Alabama, USA.
- Ray A.J., Venero J.A., and J.W. Leffler. 2009. An evaluation of shrimp ( ) stocking practices in minimal exchange superintensive biofloc culture systems. World Aquaculture Annual Meeting Abstract Book, Veracruz, Mexico.

- Lewis B.L., Leffler J.W., Ray A.J., Atwood H., Haveman J., Lawson A., McAbee B., Shuler A., Venero J., and C.L. Browdy. 2009. Use of settling tank clarifiers to manage the microbial biofloc community in superintensive, zero exchange shrimp production systems. Aquaculture America Annual Meeting Abstract Book, Seattle, Washington, USA.
- Ray A.J., Shuler A., McAbee B., Wilde S., Browdy C.L., and J.W. Leffler. 2008. Relationships between microbial community structure and shrimp ( ) performance in zero exchange culture systems. College of Charleston Graduate School Poster Session. Charleston, South Carolina, USA.
- Ray A.J., Shuler A., McAbee B., Wilde S., Seaborn G., Browdy C.L, and J.W. Leffler. 2008. Manipulations of microbial communities and the effects on shrimp (Litopenaeus vannamei) in zero exchange culture systems. Marine Biology Research Colloquium, College of Charleston. Charleston, South Carolina, USA.

SERVICE:

University Service:

- Faculty Search Committee Chair
  - Chair of a Search Committee for Assistant Professor of Aquaculture Technology and Management
  - Fall 2023
- Post-Doctoral Fellow Search Committee Chair
  - Chair of a Search Committee for Post-Doctoral Research Associate in Aquaculture Production
  - Fall 2023
- Research and Extension Associate Search Committee Chair
  - Fall 2023
- Research Associate Search Committee Chair
  - Fall 2023
- Research Associate Search Committee Member
  - Fall 2023
- Faculty Review Committee for the School of Aquaculture and Aquatic Sciences
  - Fall 2022
- Graduate Committee Chair of the School of Aquaculture and Aquatic Sciences

- Thorobred Express Recruiting Event – Keynote Speaker
  - Hopkinsville, Kentucky; January 31, 2015

Service to the Community

- Work with Spark Community Café (Non-Profit) in Woodford County
  - Periodically donate shrimp to their food program which provides meals for underserved community members, as part of a grant-funded partnership.
  - 2019 to present
- Work with FoodChain, Inc. (Non-Profit) in Fayette County
  - Set up a shrimp aquaculture system and made improvements to aquaponics systems as part of a grant-funded partnership. These systems are used to help educate the community about urban agriculture methods.
  - 2019 to present
- Serve as Den Leader of the Lion Den in Cub Scout Pack 32, Woodford County, KY
  - 2023 – present
- Serve as Assistant Scout Master in BSA Troop 14, Woodford County, KY
  - 2023 – present
- Gave a Presentation to the Butler County Adult Farmers Organization
  - Presentation was an overview of aquaculture and the work being done at KSU
  - February 5, 2019
- Organized and Hosted the First Ever KSU Indoor Shrimp Farming Workshop
  - September 14 and 15, 2018
  - 216 attendees from 5 countries and 28 US states. 27 of the attendees were from Kentucky
  - Focused a global aquaculture spotlight on Kentucky
  - Led over 120 people on tours of the KSU Aquaculture facilities
  - Interactive and engaging discussions with World leaders in aquaculture
  - Largest indoor shrimp farming workshop, perhaps the largest shrimp workshop of it's kind
- Extend Research to Farmers
  - Answered over 300 inquiries into shrimp farming from farmers globally
  - Currentlyworking with new shrimp farmers in Henry and Fayette Counties
    Helped design and get these farms started. They are currently producing shrimp.
- Guest Instructor for the Jefferson County Master Gardeners Class
  - October 17, 2017; two hour long course on aquaculture
- Presentation at a Former Mentor's Retirement Celebration
  - Ray, A.J. An Early Career in Ecology. Pre-Retirement Research Symposium, Dr. Stephen Wilson. April 28, 2017, University of Central Missouri, Warrensburg, MO, USA.
- Presentation to the

- Journal of Marine Science & Research Development
- Journal of the World Aquaculture Society
- Limnologica
- Marine & Freshwater Behaviour & Physiology
- North American Journal of Aquaculture
- Revista Brasileira de Zootecnia
- Water

x Grant Proposal Referee (Outside of KSU):

- USDA-NIFA
  Full Panel Member; Spring 2018, Spring 2019, Fall/Spring 2022/2023, Current Panel Member
- National Science Foundation
  Review Panel Member; Fall 2020
- University of Maryland MIPS Program
  Ad Hoc Reviewer; Summer 2019
- Maryland Industrial Partnerships Program
  Ad Hoc Reviewer; Spring 2017
- South Carolina SeaGrant Consortium
  Ad Hoc reviewer; Fall 2017
- Natural Sciences and Engineering Research Council of Canada Strategic Project Grants Program
  Ad Hoc reviewer; Fall 2017
- USDA-NIFA
  Ad Hoc reviewer; Fall 2017
- USDA-NIFA
  Ad Hoc reviewer; Fall 2016
- USDA-NIFA AFRI
  Full Panel Member; Fall 2015