

Devin S. Fitzgerald:

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Environmental Studies Department, University of California Santa Cruz, 95064

Employment:

Assistant Specialist: (June 2019 -- present)

University of California - Environmental Studies Department, Santa Cruz, CA

Research Assistant III (Jan.y 2018 – June 2019) -- Research Assistant II (June 2016 – Jan. 2018)

Dartmouth College - Environmental Studies Department, Hanover, NH.

- Maintained and managed two fully functioning lab spaces at Dartmouth College which included training and ensuring training compliance for technicians, tracking and updating inventory, the general upkeep of equipment, and the assimilation of new methods.
- Designed RAS operation protocols for tilapia care and maintenance schedule for our 200 gallon lab-scale recirculating systems. Created standard emergency procedures for operating backup life support for fish in RAS.
- Cultured 200-800 live Nile tilapia (3.0-400.0g) leading up to and during experiments at the Dartmouth RAS laboratory. Tasks included feeding, weight sampling, data recording, daily and weekly water chemistry, weekend fish care, and 24/7 emergency “on-call” status.
- Conducted digestibility experiments and feed trials using *Nannochloropsis oculata*, and *Schizochytrium* sp. in novel formulations to assess fish growth and diet apparent digestibility.
- Established a two-step pH Stat method to test for the degree of protein hydrolysis. This included an in-depth literature search, cooperation from visiting scholars and industry technicians, the ordering and operation of new instruments, and the utilization of new methods.
- Developed an agglutination assay to detect anti-nutritional proteins (lectins) present in microalgae, and terrestrial plant ingredients used in diets.
- Aided in culturing *Nannochloropsis granulata/oceania/oculata* using wastewater from regional breweries and assessed growth using ash free dry weights and fluorescence.
- Prepared samples for phosphorus, nitrogen, carbon, enzyme content, and DNA analysis by numerous methods including, tissue homogenization, acid digestion, lyophilizing, and vacuum filtration.
- Managed daily activities and gave methods training to three undergraduate Women in Science Program interns and many other undergraduate students from various backgrounds working on independent research projects (usually 2-4 per 10-week term).
- Assisted principal investigators to prepare grant proposals for the USDA and FFAR organizations. Organized all documents, prepared forms, and formatted the references cited list for the grants prior to proposal submission.

- Assisted with literature searches for numerous methods, and subjects including microalgae culture and processing, extrusion processing for fish diets, macroalgae diet ingredients, and, aquaponics and agriculture integration.

Lead Field Technician: (2015-2016 field seasons)

Trout Unlimited. Brattleboro, VT.

Recirculating Aquaculture System Tech/Supervisor: (2011- 2014)

Australis Aquaculture LLC. Turners Falls, MA

Skills and research methods:

- Microsoft Excel, Word, PowerPoint, and Outlook and Google Sheets, Docs, and Gmail
- Hemagglutinin assays for the detection of the anti-nutrient lectin
- Sample preparation for nitrogen, and, heavy metal and mineral analysis
- Acid digestion methods for solids, sludges and sediments for phosphorus analysis
- Preparation of crude enzyme extract using tilapia organ tissue
- Enzyme assays used to quantify pepsin, trypsin, chymotrypsin, amylase, and total protease activity.
- pH Stat method for the determination of in-vitro protein and phosphorus digestibility
- A fluorometric method to determine the chlorophyll-a content of water samples.
- Ash-free dry weight to determine microalgae growth and total microalgae ash content.

Publications - accepted or in preparation:

Sarker P.K., Kapuscinski A.R., Ashley B., Donaldson E., Sitek A., **Fitzgerald D.S.**, Edelson, O.F. (2018).

Towards sustainable aquafeeds: Evaluating substitution of fishmeal with lipid-extracted microalgal co-product (*Nannochloropsis oculata*) in the diets of juvenile Nile tilapia (*Oreochromis niloticus*). PLOS One 13(7): e0201315. Available at: <https://doi.org/10.1371/journal.pone.0201315>.

McKuinn, B., Sarker, P., **Fitzgerald, D.S.**, Bae, A., Campbell, J.E., Sabarsky, M., and Kapuscinski, A. (2019). Towards sustainable fish-free aquafeeds: Environmental benefits of complete substitution of fishmeal and fish oil with marine microalgae, Environmental Science and Technology: in preparation.

Sarker, P.K., Kapuscinski, A.R., **Fitzgerald, D.S.**, Nash, H.M., Tsukui, T., DeSouza, A.V.B., Chen, E., Schelling, B.M., 2019. Towards sustainable aquafeeds: Creating a fish-free feed for Nile tilapia (*Oreochromis niloticus*) using microalgae and co-products. Manuscript in preparation to submit “Scientific Report”.

Nash H.M., Sarker, P.K., Kapuscinski, A.R., **Fitzgerald, D.S.**, 2019. Towards sustainable aquafeeds: Phosphorus eutrophication potential of a fish-free feed for Nile tilapia (*Oreochromis niloticus*) using microalgae and co-products. Manuscript in preparation to submit “Elementa” Opens Sustainability Transitions Section.

Conference Abstracts

Gao A., Grimes C., Sarker P.K., Kapuscinski A.R., **Fitzgerald D.S.** 2018. Towards Sustainable aquaculture feeds: Anti-nutrients in competing microalgae and terrestrial crop protein sources. Wetterhahan Science Symposium. Dartmouth (poster)

Schelling B., Souza, A., Sarker P.K., **Fitzgerald D.S.** , Takayuki T., Kapuscinski A. 2018. Towards Sustainable Aquafeeds: Can enzyme additions improve digestibility? Wetterhahan Science Symposium. Dartmouth (poster).

Edelson, O.F., Bang, S., Gao, A., Sarker, P.K., Kapuscinski, A.R., **D.S., Fitzgerald.** 2017. Making aquaculture feeds less fishy: marine microalgae replacing fishmeal. Wetterhahan Science Symposium. Dartmouth (poster).

Gao, A., Sarker, P.K., Kapuscinski, A.R., **D.S., Fitzgerald.** 2017. Determining anti-nutrient content in microalgae-based aquaculture feeds. Wetterhahan Science Symposium. Dartmouth (poster).