AQUACULTURAL ENGINEERING SOCIETY NEWSLETTER

VOLUME 23, ISSUE 1 — SPRING 2023

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2024 RASTECH Conference and Trade Fair

June 5-6, 2024 Charlotte, NC

AES Session:

Airlift and Aeration - June 6th

President's Message

by **Marc Sorenson, P.E.**

I would like to start by thanking the membership for your continued support. We are in a transition period, where new board members and volunteers are required to help continue the society and finding and organizing them is proving difficult. Our membership has reduced to 80 paid this year. I understand why, it's been quiet from the society these past 2 years.

As I mentioned in my previous President's letter, over the years of my membership I've found the network of the society valuable. Knowing members and the types of projects they were working on simplified finding a good resource for a new challenge.

To reinvigorate the newsletters and increase membership engagement, I would appreciate members writing a short description for one (or more) of their current projects. Perhaps just a paragraph. This will give others in the society some insight into how each member is practicing within the industry and will strengthen our network.

For example, over the past couple of years we have engineered solutions for the precipitation and capture of iron from well water because the iron was believed to be impacting broodstock egg quality. For one application we used ozone, for its fast reaction time, and bag filters because we didn't have anywhere to discharge backwash to. For another application, we are using oxygen and retention time for precipitation and sand filters for filtration. In this application there is an unused settlement pond we can utilize for sedimentation of the back-wash.

The practice of engineering within the aquaculture industry has diversified from the fish rearing systems themselves. More complex new water and effluent treatment systems are being used to enable project site feasibilities. AI is being used to help manage water quality and feeding. The list goes on. It would be good to better understand which members are working in these areas and can offer support.

It's an exciting time in aquaculture for engineers. Projects are getting larger and more complex. Our greatest challenge is keeping everything 'fish farmer friendly'.

Thanks again for your continued support,

Marc

PAST PRESIDENT SPOTLIGHT—DR. GERMAN MERINO

What are you working at the present?.
I am currently an associate professor at the Department of Aquaculture in the Faculty of Marine Sciences at the Universidad Católica del Norte in Chile. In this capacity, I perform standard academic functions such as undergraduate and graduate teaching, research, university administration, and environmental involvement.

At the beginning of 2012, and after training many generations of aquaculture engineers since 1995, I suddenly wondered what I would tell those students if they asked me, "If aquaculture is as good as you say, what is stopping you from starting your own fish farming business?". Then, in November 2012, I decided to launch a family-scale aquaponics venture. My experience in this area was clearly in aquaculture, but in hydroponics I was a complete newbie at the time. And in this way, just as I decided in 1998 to pursue my doctoral studies in applied engineering in biological systems, with a focus on water recirculation, another challenge began in 2012: to be the first in Chile to address aquaponics, with the novelty of using rainbow trout instead of tilapia.

Today, I am both an academic and an entrepreneur. And I believe I am favorably impacting the next generation of aquaculture engineers in my home country.

How is RAS technology applied for any scale of production in your country, what is your perspective regarding RAS potential and profitability? RAS technology was first tentatively tested in Chile in the early 2000s at commercial scale by one of the country's major salmon farming enterprises. Following the positive results, it immediately gained support among all enterprises that raise salmon in land-based systems. Nowadays, confronted with freshwater scarcity and the threat of calligus in seawater, RAS technology is touted as the most viable option for salmon production by reducing make-up water and allowing reaching larger fish sizes before their deployment in marine cages.

RAS now accounts for slightly more than half of all smolts produced in Chile. And the trend in RAS is to increase postsmolts to slightly over 300g. Culture tanks have grown in volume from 500 m3 to slightly over 1500 m3, with densities typically exceeding 50 kg/m3.

Even my aquaponics enterprise is entirely dependent on RAS. This has helped me to grow nearly 6 tons of rainbow trout every year and 1200 pounds of veggies per week in an area where I only get fresh water once a week from an agricultural irrigation canal for an hour. The site of this enterprise also has a wide diurnal thermal range in winter from 8 to 30 °C and in summer from 18 to 40 °C, making it difficult to preserve the water at no more than 23 °C for the trout's health.

What can be done to enhance the engineering sector of the aquaculture industry? RAS creates issues that may be similar or dissimilar depending on which stage of a species' production is addressed. For the United States, salmon farming under RAS is planned until the fattening stage is complete. In Chile, RAS are used to incubate salmon eggs throughout post-molts, while fattening to commercial size is done on rafts-cages in the fjord. For Chile, the typical off-flavor scenario is not a concern, as it is in the United States, and thus does not yet pose a challenge to our sector.
All of the equipment utilized at RAS is designed to provide the optimal habitat for the farmed animals at a fair cost, allowing the aquaculture firm to generate profits. However, these economically feasible methods emit carbon dioxide, solids, and a variety of nutrients (as shown in aquaponics) into the environment in addition to nitrogen and phosphorus.

RAS definitely uses energy to operate their water treatment components. Developing more efficient physical, chemical, and biological processes is one of the ongoing problems. Similarly, hydraulic designs for water and air movement must include how the fluid and solids collected from the culture tanks will be transported efficiently. And solids pose a significant hazard if they settle inside the RAS because REDOX activities will commence, resulting in the generation of hydrogen sulfide and catastrophic animal mortality in a matter of hours.

One of the most important issues for RAS in Chile is being able to reuse the recovered sediments rather than sending them to sanitary landfills. Solid mineralization, such as in aquaponics, can be used to provide nutrients that the hydroponic industry requires on a continuous basis. Another option is to generate compost that may be directly put in agriculture. Another focus could be on biofloc production and processing it as a high-protein powder to generate food for fattening other animals.

As an AES past president, tell us a bit about that and what does AES mean to you? AES has always been there for me. During my PhD studies at the University of California, Davis, I was tutored by Dr. Raúl Piedrahita, one of the visionaries I met there.

And, of course, I can't forget that I was the first Latin American president, which I strongly appreciate among all AES members. I interpreted it as appreciation of my efforts and an award for the university, Universidad Católica del Norte, where I teach Aquaculture Engineering.

Any final remarks? Let us continue to practice and educate engineering in aquaculture in order to improve the production of hydrobiological species in our countries and around the world for the benefit of the society in which we live.

Dr. Merino's contact information:

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Address: Larrondo 1281, Departamento de Acuicultura, Facultad de Ciencias del Mar, Universidad Catolica del Norte, Coquimbo, Chile

Call for Nominations - AES Board Officers and Directors 2024

Dear AES Members,

The time has come to request nominations for the AES Officers and Directors. This year we are inviting nominations for President-elect, three Board Officers and a Student Director. Elections to be held at the end of the year and begin their Board term in 2025, at the annual RASTech meeting.

The PRESIDENT-ELECT will serve two years as the Vice-President, then accede to the PRESIDENCY for two years, and then become the PAST-PRESIDENT for a final term.

DIRECTORS serve a four-year term.

STUDENT DIRECTOR will serve a two -year term. Student membership shall be available to any individual registered as a student at any educational institution recognized as such by the Board of Directors. Student members shall be eligible to all rights, benefits and privileges of full membership in the Society.

Members may nominate themselves or other current AES members for the above positions. NOTE: All nominees must agree to their nomination, send their photo and biographical information (max. 200 words), and answer the following questions:

1) What is your vision for AES?

2) How would you contribute to furthering the objectives of AES?

Answers to the questions should not total more than 500 words. **Nominators are responsible for obtaining the photos, biographical notes, and statements.**

Elected officers guide our Society for the next four to six years so please consider these nominations carefully. Check with anyone you wish to nominate about his/her willingness to serve. Make sure to get their consent to be nominated and that they are AES members.The working language of AES BOD is English.

Please do your part in serving the Society by submitting nominations for these important positions by **August 1, 2024**. Nominations should be sent to our current Vice–President Joseph Tetreault, jtetreault@harrisburgu.edu

Many thanks in advance for your participation!

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June 5-6, 2024

Charlotte, NC

REGISTER at https://www.ras-tech.com

First Annual Florida Shrimp Aquaculture Summit

The **Florida Shrimp Aquaculture Summit** (**FSAS**) program will feature approximately 20 presentations by top shrimp aquaculture and seafood industry experts. The Summit will facilitate mutually beneficial discussion between interested stakeholders with a goal of providing a roadmap to ecologically, and socially licensed development of shrimp aquaculture in Florida. Attendees will take away special insights and practical information covering the current and most important issues relevant to the development of shrimp aquaculture in FL.

When: May 16-17,2024

Where: Ft. Pierce, FL

https://marineaquaculturecoalition.com/florida-shrimp-aquaculture-summit/

$100 off for online registration

AES Meeting at RASTech 2024

After session

Friday, June 6th

AES Officers 2023-2025

Marc Sorenson, P. E.
President

Mr. Marc Sorensen, P.E. began practicing in the aquaculture industry in 2006, after receiving his bachelor's degree in mechanical engineering from the University of New Brunswick. Marc began his career engineering equipment for aquaculture systems with Mel Steffens of Coseco Limited, a long-time member of AES who passed away in 2011. Working and being mentored by Mel, by 2009 he was engineering complete RAS systems. Today, Marc has excellent working relationships with several large RAS system and technology suppliers, research institutions, and global producers. He enjoys applying his experience, and learning from others, to successfully execute projects. Marc joined the aquaculture engineering society in 2009 and is now seeking the opportunity to contribute to the society that helped enable his career.

Maddi Badiola, PhD
Past President

Dr. Maddi Badiola is an agronomy engineer with a M.Sci from the Institute of Aqauculture of Sterling University and a PhD from AZTI in Spain. As part of her studies, she developed an integrated methodology for RAS environmental and monetary assessment improvement. Her expertise is conducting energy audits, Life Cycle Assessments, and systems` global sustainability assessments. Recently, she has obtained her Project Management title at ESDEN Business School. Currently, she is partners with Paul Hundley, PE of a Aquaculture Engineering consultancy company called HTH Equipment & Engineering LLC after having served as the Project Leader and RAS specialist for Alpha Aqua A/S, the first RAS salmon farm built in Spain

Joesph Tetreault
Vice President

Joesph completed his M.Sc. in Agricultural Sciences from the University of New Hampshire (UNH) in Durham, NH as part of the Agricultural Engineering program. He is currently a Co-Principal Investigator of a new aquaponics-based research program in the Environmental Sciences Program at Harrisburg University of Science and Technology (HU) in Harrisburg, PA. Current research projects include the development of a nutrient mineralization and organic carbon removal treatment system to allow the re-use of RAS effluent as a hydroponic crop fertilizer, the characterization of RAS nutrient production for determining optimal crop growth, and producing a model to calculate fish and crop growth rates in aquaponic systems utilizing a RAS-based unit process design.

Tim Pfeiffer, PhD
Secretary/Treasurer

Dr. Pfeiffer obtained his degree from Louisiana State University in Engineering Science from the Department of Biological and Agricultural Engineering. Dr. Pfeiffer is currently with the USDA Agricultural Research Service Warmwater Aquaculture Research Unit in Stoneville, MS. He has worked with USDA for over 20 years. specializing in design and research of recirculating aquaculture systems, effluent management, and energy and water conservation for RAS designs. In 2012 he worked with the Foreign Agricultural Service agency of USDA as an Agricultural Advisor in Afghanistan and his focus was water resource development and conservation. Dr. Pfeiffer has been a long-time member of AES (20 yrs) and has served as its Secretary/Treasurer from 2006 until 2012 and again starting in 2016. He also serves on the editorial board of the Aquaculture Engineering journal and apparently the current newsletter editor.

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AES Newsletter

The AES newsletter is attempted to published quarterly by the society's editor. AES is looking for sponsors within the aquaculture industry to support the Society activities and newsletter in 2024. The sponsors listed above have donated generously to support AES in 2024 and we appreciated their continuous support. If you would like to become a sponsor or contribute information to the newsletter please contact the editor, Tim Pfeiffer at tjpfeif@comcast.net

AES Membership Information

- **2024 Student membership - free**
- **2024 General membership - $50**
- **2024 Sponsorship - $750**(membership, printed journal subscription, advertising in newsletter/ website; sponsor webinar or sponsor highlight in the newsletter)

Member Registration

Options (additional cost to the $50 annual membership dues):

Print subscription to Elsevier's journal Aquacultural Engineering, $135.

Online subscription to Elsevier's journal Aquacultural Engineering, $95.

PAYMENT
Please register online at www.aesweb.org.

For additional membership or subscription information email Dr. John Colt at info@aesweb.org.

USDA Announces Grants for Urban Agriculture and Innovative Production

USDA is accepting applications for grants to support urban agriculture and innovative production. The competitive grants will support the development of urban agriculture and innovative production projects through two categories, Planning Projects and Implementation.

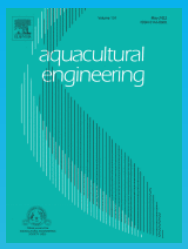
Learn more at www.usda.gov/urban. For additional resources available to producers visit

USDA National Institute of Food and Agriculture
UNITED STATES DEPARTMENT OF AGRICULTURE

Special Research Grants Program Aquaculture Research

The purpose of the Aquaculture Research program is to support the development of an environmentally and economically sustainable aquaculture industry in the U.S. and generate new science-based information and innovation to address industry constraints. Over the long term, results of projects supported by this program may help improve the profitability of the U.S. aquaculture industry, reduce the U.S. trade deficit, increase domestic food security, provide markets for U.S.-produced grain products, increase domestic aquaculture business investment opportunities, and provide more jobs for rural and coastal America. The Aquaculture Research program will fund projects that directly address major constraints to the U.S. aquaculture industry and focus on one or more of the following program priorities: (1) genetics of commercial aquaculture species; (2) critical disease issues impacting aquaculture species; (3) design of environmentally and economically sustainable aquaculture production systems; and (4) economic research for increasing aquaculture profitability.

https://www.nifa.usda.gov/grants/funding-opportunities/special-research-grants-program-aquaculture-research



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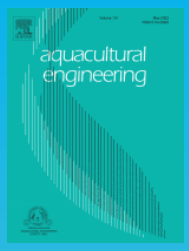
Journal homepage: www.elsevier.com/locate/aqua



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MAY 2024

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