

Dear all

This week we have two items:

- PhD opportunities in open ocean aquaculture at the University of Otago (see PDF attached)
- ECMI Webinar *Math for Industry 4.0 – Models, Methods and Big Data*, December 2 – 3, 2020 (details below)

If you would like something included in this digest please email it to office@mssanz.org.au

kind regards, Karen

ECMI Webinar *Math for Industry 4.0 – Models, Methods and Big Data*, December 2 – 3, 2020

In a joint activity of the Special Interest Groups Mathematics for Big Data and Math for the Digital Factory of the European Consortium for Mathematics in Industry (ECMI) this workshop strives to bring together data scientists, mathematicians, and engineers from academia and industry to discuss recent developments in digital manufacturing. The webinar consists of a combination of plenary and contributed scientific talks.

There will be a session on digital twin technology with presentations highlighting theoretical concepts and practitioners from industry showing state of the art digital twin realizations. Another topic will be machine learning and artificial intelligence applications in automated manufacturing.

In addition, we plan a session with representatives of the MANUFUTURE technology platform and the EU Industrial Technologies Programme (NMP) about challenges in manufacturing research and funding opportunities in the new Horizon Europe framework program.

Further information about confirmed plenary speakers, submission of abstracts and pre-registration can be found on the event webpage, <http://www.wias-berlin.de/workshops/MA4DIFA/>.

Looking forward to meeting you at this exciting event in industrial mathematics,

Dietmar Hömberg, Nataša Krejić, Joachim Linn, Alessandra Micheletti



PhD opportunities in open ocean aquaculture

The New Zealand government has an ambition of reaching \$1 billion of sales from aquaculture by 2025, meaning that the \$500 million revenue earned in 2018 must be doubled over a relatively short space of time in a country that has limited inshore licenses for aquaculture. To facilitate the government's goal for major expansion, finfish aquaculture in New Zealand must extend into the open-ocean where production is both limitless and sustainable long term. Growing fish offshore in high energy sites has been attempted in other countries such as Norway but off-shore structures are usually always heavily engineered and fixed to set locations that grow fish under sub-optimal conditions for extended periods of the year. New innovative developments in New Zealand are proposing to maintain fish in novel enclosures that have the capacity to move and maintain fish under optimal conditions year round. A key part of the development is the design of the enclosures, which provides optimal growing conditions for the fish, within engineering constraints.

This requires both CFD and laboratory modelling to tailor net speed and net ventilation of oxygen and wastes to the needs of a range of fish species, in order to maximise their growth and health.

We are looking for two PhDs student to work on the following projects, which are part of a large multidisciplinary well-resourced program, which spans fluid mechanics, fish physiology, marine engineering and design:

Optimal design of semi-rigid fish farming structures

Candidates should have a Masters degree or equivalent in maths, physics or engineering, with excellent grades, plus some research experience in fluid mechanics. The two projects have a common aim to use fluid modelling to understand flows, ventilation and loads on semi-rigid towed net structures. The modelling will investigate a number of types of overall net design, with a range of proportions. It also includes modelling the effects of flow control through modelling the size and shape of the net where fluid exits the net. One project will focus on CFD modelling of the nets, the other complimentary project will focus on laboratory and field test modelling of the net designs. Applicants should have backgrounds and experience in CFD (eg. Fluent) and/or fluids laboratory modelling.

The information derived from this PhD is ultimately intended to inform the design process of the mobile fish enclosure systems and thus requires a high level of self-motivation, pragmatism, good communication skills and a willingness to work within a dedicated team environment.

Two three year scholarships are available. These includes an annual stipend and annual tuition fees. Students will register at the University of Otago and split their time between Dunedin and Nelson (Plant and Food Research and Cawthron Institute), with the CFD project being mainly based in Dunedin, the other mainly in Nelson.

For more information feel free to contact Assoc. Prof. Sarah Wakes <sarah.wakes@otago.ac.nz>

To apply please send a cover letter, CV and academic transcript to Sarah Wakes. Please include the names and contact details of 2 academic referees. Interviews for the PhD positions will probably take place in October/November 2020 for an expected start no later than March 2021. Ideally both students would start with 3 months of each other.