

4-day Master class

Fish Swimming: Physiology and Behaviour in Aquaculture and during Migration

The benefits of exercise in aquaculture are widely recognised. Swimming exercise is believed to have a range of positive effects on fish, including enhanced muscle growth and flesh quality, the reduction in aggressive interactions between fish and in stress response. Moreover, standardised swimming tests have shown to provide an integrated assessment of fish cardio-respiratory performance in aquaculture settings.

In nature, fish migrate between different habitats in order to survive. As spatial mobility serves a series of purposes (ontogenetic, refuge, feeding and spawning migrations), it is often reduced in an anthropogenically altered world. Mitigation of migration obstacles and their engineering and management solutions can only be achieved by estimating swimming capacity and behavioural responses.

Fish swimming studies are therefore central for the evaluation and solution of problems in the field of aquaculture and fish migration. Since more than forty years researchers aim to investigate the potential and mechanism of fish locomotion and derive new solutions for old problems. The combination of physiology and behaviour is necessary to study the broad field of fish swimming in all its depth. This master class will give an introduction to the background and methodology of fish swimming, by combining theoretical classes with laboratory and field trainings.

Aimed at: post-docs, PhD students as well as e.g. academic staff members and management officers interested in fish locomotion during migration and in aquaculture.

Dates: 15 – 19.06.2015

Organizers: Dr. Christian Tudorache, Institute Biology Leiden, Leiden University
Dr. Leo Nagelkerke, Aquaculture & Fisheries, Wageningen University

Venues: **Leiden University:** Sylvius Building, Sylviusweg 72, 2333 BE Leiden
IMARES Yerseke: Korringaweg 5, 4401 NT Yerseke
Field Excursions: Lauwersmeer, fish passages Spijksterpompen, De Drie Delfzijlen and Noordpolderzijl

Content: **Lectures:** interaction of behaviour and physiology; volitional vs forced swimming tests; management applications of fish migration and aquaculture; legal and policy aspects
Practical Courses: analysis and interpretation of tagging data; tagging in the field; types and construction of fish passages; swimming tests and respirometry

Lecturers: Trainers: Leo Nagelkerke (Wageningen University, NL), Arjan Palstra (IMARES Yerseke, NL), Christian Tudorache (Leiden University, NL), Erwin Winter (IMARES Ijmuiden, NL); Invited Speakers: Simon MacKenzie (Sterling University, UK), Hans Slabbekoorn (Leiden University, NL), Herman Wanningen (Wanningen Water Consult, NL)

Preliminary Programme

Day 1: Leiden University, Sylvius building

09.00-10.00 **Coffee and tea**

10.00-10.15 **Welcome and Master Class Introduction** Christian Tudorache

10.15-12.00 **Lecture 1** Fish Hearing and Noise Stress; Hans Slabbekoorn

12.00-13.00 **Lunch**

13.00-14.45 **Lecture 2** Fish Personalities in Migration and Aquaculture; Simon MacKenzie

14.45-15.15 **Tea and Coffee break**

15.15-17.00 **Lecture 3** Forced and Volitional Swimming Tests; Christian Tudorache

Day 2 Wageningen University

09.00-10.00 **Coffee and tea**

10.00-12.00 **Lecture 4** Tagging Data Analysis: Concept and Principle; Leo Nagelkerke

12.00-13.00 **Lunch**

13.00-17.00 **Practical 1** Tagging Data Analysis in Practice

Day 3 IMARES, Korringaweg 5, Yerseke

09.00-10.00 **Coffee and tea**

10.00-12.00 **Lecture 5** Swimming Respirometry and Energy Consumption; Arjan Palstra

12.00-13.00 **Lunch**

13.00-17.00 **Practical 2** Swimming Respirometry and Energy Consumption in Practice

Day 4 Field excursion (IMARES Ijmuiden)

09.00-10.00 **Coffee and tea**

10.00-12.00 **Lecture 6** Telemetry and Tagging of Migrating Fish; Erwin Winter

12.00-13.00 **Lunch**

13.00-17.00 **Practical 3** Telemetry and Tagging of Migrating Fish in the Field

Disclaimer: dates and names can be subject to changes.

Costs: The following costs are covered by the COST action:

- The reimbursement rate per day is EUR 160 maximum
- Up to EUR 300 may be attributed for the travel expenses
- A maximum amount of EUR 1 260 can be reimbursed, which can vary depending on the country of the trainee (e.g. domestic trip, near countries, far countries);

Prior the Training School, the trainees must register on e-COST. Trainees entitled to reimbursement will receive a Grant Letter, mentioning the dates and the place of the event and the fixed amount of the Grant. After the Training School, a 'Payment Request Form' mentioning the dates and the place of the event, the fixed amount of the Grant,

and the banking information of the trainees must be signed by the trainees, in order for the payment to be processed.

Information: Christian Tudorache (c.tudorache@biology.leidenuniv.nl);

Registration: Please, register by sending an e-mail containing name, affiliation, career status (PhD student, PostDoc, early stage researchers, ESR, i.e. less than 8 years after PhD) to c.tudorache@biology.leidenuniv.nl.

Trainees eligible for reimbursement:

- Trainees from COST countries;
- Trainees from approved NNC institutions;
- Trainees from approved European RTD Organisations.

Trainees not eligible for reimbursement:

- Trainees from approved IPC institutions;
- Trainees from approved International Organisation and European Commission;
- Any other trainees not specifically mentioned as being eligible.

Only a limited number of places will be available (10 max). Trainees from COST countries, approved NNC institutions or approved European RTD Organisations will be given priority. If there are still places available, trainees from IPC institutions, trainees from approved International Organisation and European Commission can also participate, but will not be reimbursed. Selection is on basis of CV, gender and country of origin. We will try to keep a balance between attendants with different backgrounds. Registration for one day is possible, but we prefer registration for the full program.

One week before the start of the course participants will receive course material, more detailed scedule and other relevant information through the e-mail.

Sponsored by COST Action FA1304 Swimming of fish and implications for migration and aquaculture (FITFISH). For more information: www.fitfish.eu