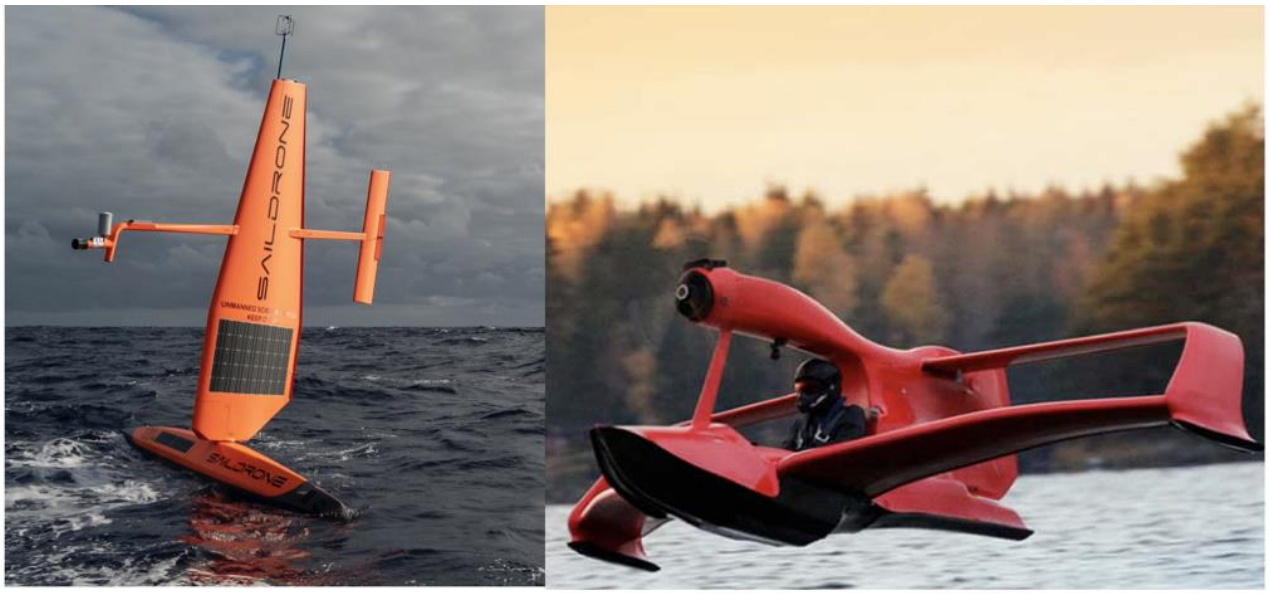
New 5-day PhD course of the J.M. Burgerscentrum:

Technological Innovation with Fluid Mechanics

On 7-11 November 2022 in Delft

Is it possible to convert knowledge of fluid mechanics into profitable technology?



Yes: engage in the innovation challenge!

Innovation challenge: be a player, not an observer!
This JMBC course is centred around technological innovation. You learn to develop a new technology, based on sound fluid mechanics principles. To succeed both technically and commercially, many challenges must be overcome.

The objective is to take a wild innovative idea (for example an ocean drone, an electric plane, or a brilliant idea for the energy transition) and convert this into a technically feasible technology concept, that must also become commercially viable.

Many interdisciplinary issues must be overcome to succeed: technical, economical, commercial, organisational, political and related to society. Close collaboration in an empowered and motivated innovation team is required to overcome blockers of progress.

Course format
Some 30% of this course is ‘lecturing style format’, where all relevant aspects of technological innovation will be covered.

Some 40% of the course is in ‘workshop format’, where teams of participants will grasp the topic just covered in a lecture, by applying it to their technological innovation concept.

Learning-by-doing requires close collaboration. The course instructor will facilitate each team such that creative and valuable ideas are included into the technology concept.

The remaining about 30% of the course is ‘interactive sessions’, where participants openly exchange views on several aspects of technological innovation. This interaction allows to make the course highly relevant for the ongoing PhD project of a participant, or for future innovation endeavours as part of an aspired industrial career.

Course focus
Technological innovation is commercially highly valuable, but very challenging to do. This course teaches what must be done to ensure that technological innovation succeeds. Innovation is interdisciplinary, collaborative and cooperative. Innovation must build competitive edge. This course has been designed and developed by Troyka Innovation and contains proprietary methodologies owned by Troyka Innovation.

Course topics
1. Introduction to technological innovation.
2. Technology maturation process - how innovation grows following a natural process.
3. Technology bet - innovation requires speculative investment.
4. Red thread exercise - innovation teams working on technical feasibility and commercial viability of a technological innovation concept.
5. Innovation opportunity framing - start by focussing on value.
6. Risk analysis and decision making in innovation - work on what matters most.
7. Conflicts of interest - when cooperation becomes competition.
8. Invention - resolving contradictions by applying inventive principles.
9. Introduction to TRIZ methodology for invention.
10. Patents - protect your intellectual property.
11. Markets and marketing - find out where the money is.
12. Pathways to commercialisation - what must be ensured to serve the first customer.
13. Benchmarking to reduce uncertainties in innovation.
14. Making a sensible business case.
15. Innovation pathway planning - find a realistic program that leads to technical feasibility and commercial viability.
16. Design a technology maturation plan - invest in prototype, qualification and pilot.
17. Innovation review - integrated and interdisciplinary review of innovation plans.

Course end result
Upon completing this course, participants have become knowledgeable on technological innovation. Specifically they have learned how to:
- design a Technology Maturation Plan;
- define a technical development track that leads to technical feasibility;
- define a commercial development track that leads to commercial viability;
- assess opportunities and risks that impact technical feasibility and commercial viability aspects of a new technology concept;
- perform risk analysis to make wise decisions;
- review innovation project activities;
- ensure that investment in innovation will deliver tangible and valuable results.

Who should join this course?
The various skills acquired in this course will be highly valuable for:
- PhD students that are working on an experimental topic in fluid mechanics (which requires to be innovative to develop the best possible experimental set-up);

- PhD students that have an ambition for an industrial career based on fluid mechanics and innovation;
- Industry participants that want to develop professionalism in technological innovation.

Course materials
- A booklet that summarises the essentials of the course (this serves after the course as a quick reference manual for technological innovation).
- A binder with the red thread exercise (this serves after the course as the 'innovation recipe' to be followed for your own innovation endeavours).

Internal collaboration, not internal competition!
Innovation is highly dynamic and paradoxical. When done right, it can be a lot of fun. When done wrong, it can become challenging and exhausting. The course also prepares participants for the 'soft issues' of innovation: working in a high performance team, aiming at getting good results fast.

The course instructor is dr. ir. Edwin Poorte. He is an Applied Physicist with a PhD in Fluid Mechanics obtained in 1998 on experimental work on turbulence in multiphase flows, which was part of the J.M. Burgerscentrum research program at the time.
He has acquired 25 years of technological innovation experience in The Netherlands, Norway, UK, USA and Canada by performing in large innovation projects (often as technological cooperation of several companies).
Edwin Poorte knows technological innovation inside-out, and teaches innovation techniques from his own company, Troyka Innovation, see www.troyka-innovation.com

Venue
Delft University of Technology, The Netherlands.

Course date
Monday 7 - Friday 11 November 2022

Registration
Via the J.M.Burgerscentre for Fluid Mechanics website:
https://jmburgerscentrum.nl/contact-registration/

This course is open for
- PhD and PD students of the J.M.Burgerscentre for Fluid Mechanics.
- PhD and PD students of other research schools.
- Participants working in industry.

(each category has a different participant fee).

The maximum number of participants for this course is 30 (the limitation is due to the group work on the technology challenges).

Prepare for the future - learn to innovate!