

# Curriculum Vitae



## Personal data

Full name: Johan Rønby Pedersen  
Birth: December 11, 1979 Copenhagen, Denmark  
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## Education

- 2011-03-30 **Ph.D. in theoretical hydrodynamics, Department of Mathematics, DTU**  
Thesis: "Chaos and Integrability in Ideal Body-Fluid Interactions"  
Supervisors: Profs. [Morten Brøns](#) and [Hassan Aref](#).  
Six months research visit at Prof. [Darren Crowdy](#), Imperial College London.
- 2006-09-26 **M.Sc. in physics, Niels Bohr Institute, University of Copenhagen**  
Thesis: "Dynamics and Thermalization of Energetic Ions in Magnetically Confined Fusion Plasmas".  
Supervisor: Dr. Henrik Bindslev (Risø).  
One month research visit to Prof. [Jan Egedal](#) at MIT, Boston, USA.
- 2003-01-17 **B.Sc. in mathematics and physics, Roskilde University**  
Mathematics bachelor project about polygonal hydraulic jumps.

## Positions

- 2011 – present **Research scientist, Dept. of Ports & Offshore Technology, DHI**
- 2006 – 2007: **Research assistant, Fusion Plasma Group, Risø National Laboratory**

## Teaching and dissemination

- Co-supervision **PhD Tian Tang, MSc Dennis Arreborg and MSc Karl-Søren Geertsen**
- Spring 08 & 09 **Instructor in Mathematics 1 for engineering students**  
Teaching DTU freshmen introductory linear algebra and calculus.
- 2002 – 2004: **Student job as guide at Risø Visiting Center**  
Developing and performing shows to school classes and the general public about the energy and materials technology research at Risø.
- 2002 – 2008: **Several contributions to the Danish Science Festival**  
Presentations on fusion energy, boomerang dynamics workshops, demonstration of the polygonal hydraulic jump to the general public.

## Academic awards

- 2011            [Euromech Young Scientist Prize](#)
- 2013            [Sapere Aude DFF-Research Talent grant](#)

## Research interests

- Numerical methods for interfacial flow simulations.
- Dynamical systems theory, chaos and Hamiltonian mechanics as a mathematical framework for understanding complex physical systems.
- Computational and theoretical fluid dynamics with focus on pattern formation such as waves, vortices and hydraulic jumps.
- Hydrodynamic loads on structures and fluid-structure interaction for floating bodies.
- Soil mechanical modelling in the context of a dynamically loaded seabed beneath offshore wind turbine foundations.
- Fusion plasma physics, in particular kinetic and statistical modelling of fast ions in Tokamaks.
- The use and role of mathematical models in politics, economics, and society in general.

## Highlights of Sapere Aude project: “Breaking the Code of Breaking Waves”

- Scientific breakthrough: Invented a numerical method, IsoAdvect, for accurate and efficient advection of a sharp surface across general meshes. This is a longstanding problem within interfacial flow simulations, which we have now solved.
- Article about IsoAdvect [published](#) as [cover](#) story in Royal Society Open Science.
- IsoAdvect code library [published](#) as an open source OpenFOAM extension.
- Keynote lecture at 9th OpenFOAM Workshop at Zagreb University, Croatia, 2014.
- Junior participant during 3 weeks at “[Theory of Water Waves Programme](#)” at Isaac Newton Institute, Cambridge, UK, in 2014.
- OceanFOAM seminars in 2015 and 2016: Arranged two full-day seminars with 30-40 participants on the usage of CFD and OpenFOAM in marine engineering.
- 3x3 months research stay at DTU Wind Energy collaborating with Associate Professor Henrik Bredmose and his group.
- Hosted Professor Hrvoje Jasak during 3 visits to DK.
- 13 weeks spent abroad at conferences and research visits.
- Produced YouTube DHI Tech Talk: “[CFD – Our virtual water world](#)”.
- Co-supervised thesis work of PhD Tian Tang and MSc Karl-Søren Geertsen.