The 3rd UCL OpenFOAM Workshop

24-26 February 2021

The UCL OpenFOAM Workshop aims to help beginners to start using OpenFOAM for their projects, as well as to create a platform for experienced users to collaborate. It is free of charge and initiated as a UCL Doctoral Skills Development Programme. The workshop provides two types of sessions: (a) cutting-edge research, and (b) hands-on tutorials. This workshop is the unique event that has won the UCL Research-led Initiative Award three times in a row (2018, 2019 and 2020).

Chair: Luofeng Huang

This year, the COVID-19 brought us as the organising committee a challenge, which is to facilitate the workshop online. We, however, saw it as an opportunity to reach and get together more people interested in OpenFOAM all over the world.

We are delighted to announce that the 3rd UCL OpenFOAM Workshop had 681 registered attendees from more than 40 countries!

Vice Chair: Daniela B.M.

You can learn first-hand how OpenFOAM works and what it can do. This includes step-by-step trainings to teach OpenFOAM functions and its engineering applications. Furtherly, you can learn how to programme in OpenFOAM to implement extended mathematical and physical models. With these new skills, you are capable of customising solvers, boundary conditions, and post-processing functions to your specific needs.

Teaching Director: Tom Smith

Organisers' words

The 3ʳᵈ UCL OpenFOAM Workshop delivered 9 keynote speeches and 14 tutorials. Also we awarded two outstanding contributors of the community. The event was extremely successful. For the three full days, the online participants were at least 150 for every session.

It was fantastic to see so many quality presentations and fruitful conversations, to feel that our community is getting stronger, and to be humbled by the impact of OpenFOAM!

Conference Director: Nicolas C.

UCL

(1) Bayesian Optimisation with OpenFOAM

- BSc from Cambridge and PhD from Oxford

- Now the professor of CFD at the University of Exeter

- One of the earliest developers of OpenFOAM, leading multiple international OpenFOAM organisations

- His group has extensive research covering optimisation (adjoint and machine learning), offshore renewable energy, and physical modelling (scour, combustion, multiphase flow, among others)

https://www.youtube.com/watch?v=jDQulXuusTU&t=1s

Gavin Tabor

(2) The finite volume method for solid mechanics

- PhD from the University College Dublin (UCD) and worked as a Postdoc at University of Texas at Austin

- Now a Lecturer of Materials Processing at UCD.

- Principal developer of Solids4foam and various finite-volume based solutions for standard and complex materials.

- His group is working on computational mechanics, materials processing, biomechanics, machine learning, and fluid-structural interactions.

https://www.youtube.com/watch?v=sNDWUABn_c4&t=766s

Philip Cardiff

(3) Large-eddy simulation and acoustics

- BSc and MSc from University of Southampton

- Then worked as a Naval Architect for BMT Group until 2018

- Now a PhD candidate at UCL, focusing on numerical modelling of fluid-induced noise from turbulent fluid flow

- A core member of the UCL OpenFOAM community, giving lectures around turbulence modelling and programming

https://www.youtube.com/watch?v=Fro5hYuWNEE&t=4s

Tom Smith

(4) The Collaborative Computational Project in Wave Structure Interaction (CCP-WSI)

- PhD degree and Research Fellow from the University of Plymouth (UK)

- The main organiser of the CCP-WSI project

- Coordinator of extensive validation studies for wave-structural interactions

- Publications in Journal of Coastal Research, Renewable Energy, and International Journal of Offshore and Polar Engineering

https://www.youtube.com/watch?v=CV0X-hTU3y0&t=22s

Edward Ransley

(5) Beyond VoF: alternative OpenFOAM solvers for numerical wave tanks

- PhD degree from the James Cook University (Australia)

- Research Fellow at the Centre of Ocean Energy Research (Ireland) and now at the Budapest University of Technology (Hungary)

- A wide coverage of research in wave modelling, wave-structural interaction, turbulence modelling and other hydrodynamic problems

- Publications in as Applied Energy, Energies and Ocean Engineering

https://www.youtube.com/watch?v=E4rxgwQ9h40&t=26s

Josh Davidson

(6) Wave-structure interaction modelling for renewable energy applications

- PhD from the Maynooth University (Ireland) and now Research Fellow at TU Braunschweig (Germany)

- Coordinator of the NuLIMAS project: Numerical modelling of LIquefaction around MArine Structures

- Dedicated in the design and optimisation of innovative wave energy devices and wind turbines

- Publications in Applied Energy, Renewable Energy, and Journal of Ocean Engineering and Marine Energy

Christian Windt

https://www.youtube.com/watch?v=x3nIyo-J5hI&t=51s

UCL

(7) Turbulence modelling beneath surface waves

- PhD degree from the University of Stavanger (Norway)

- Marie Curie Fellow at the Technical University of Denmark and Assistant Professor at the National University of Singapore

- Developer of wave-structure-seabed coupling solvers and advanced turbulence modelling schemes

- Editorial member of the OpenFOAM Journal

https://www.youtube.com/watch?v=Z9hwa4-Vfps&t=1068s

Yuzhu (Pearl) Li

(8) Numerical flow characterization around a submarine

- BSc from the ESPOL University (Ecuador) and MSc from the University of Sao Paulo (Brazil)

- PhD degree from the Stevens Institute of Technology (USA), focussing on fluid-structure interaction problems involving hydroelastic response using Smoothed-Particle Hydrodynamics

- Held a three-year Postdoc Fellowship at MIT

- Now a Lecturer of Fluid Dynamics and Ship Dynamics at ESPOL.

https://www.youtube.com/watch?v=J7PThTGISV0&t=3s

Ruben Paredes

(9) Hydroelasticity

- MSc (distinction) and PhD from UCL

- Research Associate for the EU H2020 project SEDNA: Safe maritime opErations unDer extreme conditioNs - the Arctic case

- Currently in charge of the UCL OpenFOAM Community

- Interested in ships, marine structures, ocean waves, sea ice and their interactions.

https://youtu.be/d7MBtEIpW1k

Luofeng Huang

(1) OpenFOAM Basis

- BEng (hons) from Northumbria University and MSc degree from UCL

- PhD awarded by UCL on navigation path planning and optimisation algorithms for unmanned surface vehicles

- Now Research Associate at the University of Liverpool

- One of the original organisers of the UCL OpenFOAM Community

https://www.youtube.com/watch?v=S_kJSvxUWEg

Rui Song

UCL

(2) Postprocessing and function objects

- MSc from the Chalmers University of Technology (Sweden)

- Now working as a CFD consultant for various industrial projects

- Contributed to the development of novel OpenFOAM fluid-structural interaction solvers

- Published in Marine Structures, Ocean Engineering, and Ships and Offshore Structures

https://www.youtube.com/watch?v=KkCJvlss7g0&t=22s

Minghao Li

(3) A training on Solids4foam

- PhD from the University College Dublin (UCD) and worked as a Postdoc at University of Texas at Austin

- Now a Lecturer of Materials Processing at UCD.

- Principal developer of Solids4foam and various finite-volume based solutions for standard and complex materials.

- His group is working on computational mechanics, materials processing, biomechanics, machine learning, and fluid-structural interactions.

https://www.youtube.com/watch?v=D3AyykFAW3c

Philip Cardiff

(4) Turbulence Modelling and LES

- BSc from Cambridge and PhD from Oxford

- Now the professor of CFD at the University of Exeter

- One of the earliest developer of OpenFOAM, leading multiple international OpenFOAM organisations

- His group has extensive research covering optimisation (adjoint and machine learning), offshore renewable energy, and physical modelling (scour, combustion, multiphase flow, among others)

Part1 - https://www.youtube.com/watch?v=vhQJJU7DV0c&t=2s
Part2 - https://www.youtube.com/watch?v=piaKoqpIjrE

Gavin Tabor

(5) Mesh generation procedure for underwater vehicles

- BSc from the ESPOL University (Ecuador) and MSc from the University of Sao Paulo (Brazil)

- PhD degree from the Stevens Institute of Technology (USA), focussing on fluid-structure interaction problems involving hydroelastic response using Smoothed-Particle Hydrodynamics

- Held a three-year Postdoc Fellowship at MIT (USA)

- Now a Lecturer of Fluid Dynamics and Ship Dynamics at ESPOL.

https://www.youtube.com/watch?v=aytvrNwlEuU

Ruben Paredes

(6) Multiphase gas-liquid flows

* PhD from the Polytechnic University of Milan (Italy)

* Now a Research Fellow at the University of Leeds (UK)

* Focussing on bubbly, boiling and buoyancy-driven flows for nuclear reactor thermal hydraulics and passive safety

* Published in Journal of Computational Physics, Frontiers in Energy Research, and Chemical Engineering Science

https://www.youtube.com/watch?v=oz5rpnjrDvM

Marco Colombo

(7) Wave modelling and body motion

- Naval Engineering BSc from the ESPOL university (Ecuador), and MSc from Newcastle University (UK)

- Held a lectureship in the Naval Engineering program at ESPOL and worked as a consultant for Oil & Gas projects in Ecuador

- Now a PhD candidate at UCL, focussing on wave-structural interaction of oscillating wave surge converters

- Co-founder of the UCL OpenFOAM Community

https://youtu.be/3sJFM_hAKqo

Daniela Benites-Munoz

(8) Wave interaction with thin porous structures

- Graduated as a civil and environmental engineer from the University of Innsbruck (Austria)

- Now a PhD candidate in Renewable Energy, at the University of Exeter

- Visiting Scholar at the Dalian University of Technology (China)

- Published in Journal of Ocean Engineering and Marine Energy, and Journal of Marine Science and Engineering

https://www.youtube.com/watch?v=PxFHbLqkf8s

Anna Feichtner

(9) Dynamics of a floating body

- Graduated from the Amirkabir University of Technology (Iran)

- Now a PhD candidate at University, working on ocean wave motions in both fluid and solid aspects

- A wide research interest in naval architecture of high-speed ships/boats, fluid-structural interaction in ocean/maritime industry, and wave turbulence.

- Published over 40 journal articles

https://www.youtube.com/watch?v=ln6Msb9E2SM&t=1s

Sasan Tavakoli

(10) OpenFOAM programming course

- BSc and MSc from University of Southampton

- Then worked as a Naval Architect for BMT Group until 2018

- Now a PhD candidate at UCL, focusing on numerical modelling of fluid-induced noise from turbulent fluid flow

- A core member of the UCL OpenFOAM community, giving lectures around turbulence modelling and programming

https://www.youtube.com/watch?v=KB9HhggUi_E

Tom Smith

(11) Writing a new solver with extended functions

- MSc from the Chalmers University of Technology (Sweden)

- Now working as a CFD consultant for various industrial projects

- Contributed to the development of novel OpenFOAM fluid-structural interaction solvers

- Published in Marine Structures, Ocean Engineering, and Ships and Offshore Structures

https://www.youtube.com/watch?v=hKwyCWgZoQU

Minghao Li

(12) Ship resistance prediction

- MSc (distinction) and PhD degree from UCL

- Research Associate for the EU H2020 project SEDNA: Safe maritime opErations unDer extreme conditioNs - the Arctic case

- Currently in charge of the UCL OpenFOAM Community

- Interested in ships, marine structures, ocean waves, sea ice and their interactions.

https://youtu.be/xcdq4CAw7BM

Luofeng Huang

(13) Hydrofoil cavitation

- Graduated from the Aristotle University of Thessaloniki (Greece) and Cranfield University (UK)

- Served as an Officer for the EU units of Seafarer's and Maritime Labour, Maritime Safety and Security Unit and Maritime Policy Unit

- Now an Officer in the European Maritime Safety Agency (EMSA)

- A part-time PhD candidate at UCL, looking into Fluid Mechanics

https://www.youtube.com/watch?v=0uEQ9YLFg3E

Nicolaos Charalambous

(14) High Performance Computing and Parallelisation

- Naval Engineering BSc from the ESPOL university (Ecuador), and MSc from Newcastle University (UK)

- Held a lectureship in the Naval Engineering program at ESPOL and worked as a consultant for Oil & Gas projects in Ecuador

- Now a PhD candidate at UCL, focussing on wave-structural interaction of oscillating wave surge converters

- Co-founder of the UCL OpenFOAM Community
https://youtu.be/MlTiRX92VFU

Daniela Benites-Munoz

OpenFOAM community contribution award

UCL

This award aims to acknowledge those who have made substantial contributions to the OpenFOAM community, especially considering those who constantly make contributions despite the tough time brought by COVID-19.

The selection process was:

nomination by audiences

Recommendation by UCL OpenFOAM Workshop community

Approval by International OpenFOAM Workshop Community

Awardee 1

"He has created a free OpenFOAM course at the Chalmers University of Technology. His course is totally free and open for worldwide PhD students. He spent enormous hours preparing and delivering the course, every year since 2007. The course covers deep knowledge of various CFD topics and has practically helped many junior researchers to solve their problems using OpenFOAM. He challenged his students to make a new OpenFOAM function or solver before graduate, which made some of them become pioneering young leaders who continue contributing CFD community in an opensource manner."

Håkan Nilsson

UCL
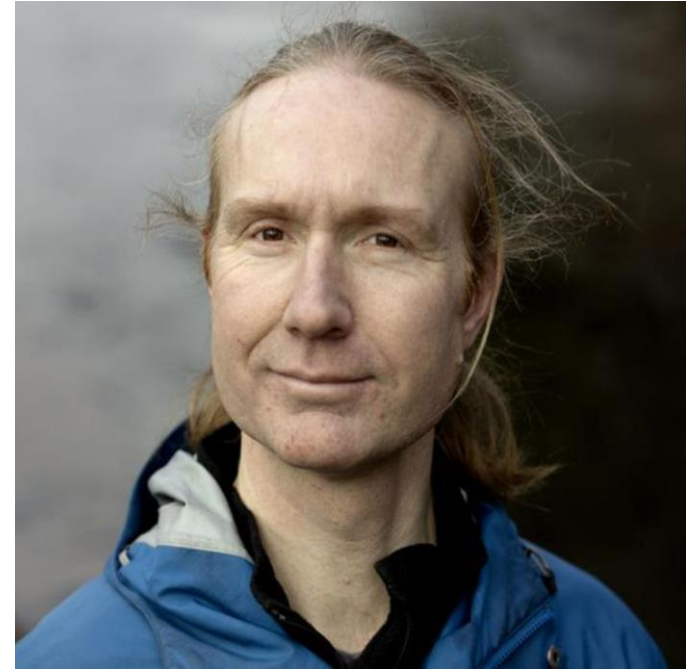
Awardee 2

"He has created an online YouTube channel to share OpenFOAM tutorials for free. He records videos covering from installing OpenFOAM to complex simulation operations. His videos are easy to follow and he explains each step, command and has prepared slides to introduce the overall architecture. His videos have been played millions of times so far. Also, he is the chair of Tutorials and Documentation in the OpenFOAM Governance System, and a principal editor of the newly launched OpenFOAM journal."

József Nagy