

# **18th OpenFOAM Conference**

## **2023**

IOP Conference Series: Materials Science and Engineering  
Volume 1312

**Genoa, Italy**  
**11-14 July 2023**

ISBN: 979-8-3313-0268-9  
ISSN: 1757-8981

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571

**Some format issues inherent in the e-media version may also appear in this print version.**

This work is licensed under a Creative Commons Attribution 3.0 International Licence.  
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact the Institute of Physics  
at the address below.

Institute of Physics  
Dirac House, Temple Back  
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481  
Fax: 44 1 17 920 0979

[techtracking@iop.org](mailto:techtracking@iop.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## TABLE OF CONTENTS

Preface

Peer Review Statement

On the Comparison Between Topological and Surface Sensitivities for Bio-Fluid Dynamics Applications.....	1
<i>Eric Segalerba, Emanuele Gallorini, Maurizio Quadrio, Jan Pralits</i>	
Aerospike: Mission Simulation and Optimal Design Using Openfoam and Dakota.....	7
<i>Roberto Carbone, Joel Enrique Guerrero Rivas, Eric Segalerba, Jan Oscar Pralits</i>	
Evaluation of a Carbon Dioxide Fish Barrier with OpenFOAM.....	17
<i>M Politano, A Cupp, D Smith, A Schemmel, P R Jackson, J Zuercher</i>	
1D and 2D Porous Media Fixed Bed Reactor Simulations with DUO: Steam Methane Reforming (SMR) Validation Test .....	35
<i>E. Daymo, A. Tonkovich, M. Hettel, A. Shirshath</i>	
OpenFOAM Simulations for Development of a Mist Flow Diverter in Aerosol Jet Printing.....	43
<i>James Q Feng</i>	
A Convergence Study Simulating Regular Waves Using the K- $\omega$ SST Turbulence Model in OpenFOAM®.....	50
<i>Xihang Xu, Md Salauddin, Jennifer Keenanah</i>	
Backward Facing Step: From Fluid Flow to Conjugate Heat Transfer with the Coupling Library preCICE.....	61
<i>C G Caccia, M Corti, A Della Torre, P Masarati</i>	
Fluid-Structure Interaction Modeling of Dry Wire Drawing by Coupling OpenFOAM Models of Lubricant Film and Metal Wire .....	70
<i>M Vervaecke, D Fauconnier, J Degroote</i>	
Understanding Superlinear Speedup in Current HPC Architectures .....	95
<i>Flavio Cesar Cunha Galeazzo, R. Gregor Weiß, Sergey Lesnik, Henrik Rusche, Andreas Ruopp</i>	
Vertical Axis Turbine Simulations Based on Sliding and Overset Meshes.....	105
<i>Asmelash Haftu Amaha, Shivasubramanian Gopalakrishnan, Prabhu Ramachandran, Joel Guerrero</i>	
Lagrangian Properties of the Blood Flow Through Human and Murine Aortic Arches: Towards Improved Customised Therapies and Diagnostic Techniques .....	124
<i>Simone Ghiglia, Marco Mazzuoli, Joel Guerrero</i>	
Computational Fluid Dynamics Study on the Influence of Variable Cant Angle Winglets on Total Drag Reduction.....	133
<i>Giulia Innocenti, Eric Segalerba, Joel Guerrero</i>	
Open Source Tools for OpenFOAM - Adaptive Mesh Refinement and Convergence Detection .....	140
<i>Wouter Remmerie, Nikola Majksner</i>	

**Author Index**