Dr. Bernat Font

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Research interests

Computational fluid dynamics, turbulence modelling, deep learning and data-driven models, high-performance computing.

Education

Ph.D. Computational Fluid Dynamics, *University of Southampton* (UK) 2015-2020
Thesis: Modelling of Flow Past Long Cylindrical Structures
Supervisors: A. Prof. G.D. Weymouth, Prof. O.R. Tutty, Dr. V.-T. Nguyen
Visiting Researcher: IHPC, A*STAR, Singapore. Research attachment funded by the ARAP mobility scheme

M.Sc. Computational Fluid Dynamics, *Cranfield University* (UK) 2014-2015
Thesis: High-order Shock-capturing Schemes for Micro Shock Tubes. [Download]
Supervisor: Dr. L. Könözsy
Double Degree with Ingeniería Superior in Aeronautical Engineering

Ingeniería Superior Aeronautical Engineering, *Universitat Politècnica de Catalunya* (Spain) 2012-2015
Mentor: Prof. C.-D. Pérez-Segarra
Equivalent to Master of Engineering

Ingeniería Técnica Aeronautical Engineering, *Universitat Politècnica de Catalunya* (Spain) 2009-2012
Equivalent to Bachelor of Engineering

Experience

Visiting Researcher, Institute of High-Performance Computing, A*STAR (Singapore) 2017-2020
Doctoral Researcher, University of Southampton (UK) 2015-2020

Publications

Peer-reviewed journal articles

[2] Font, B., Weymouth, G.D., Nguyen, V.-T. & Tutty, O.R. 2020 (submitted) Deep-learning the spanwise-averaged Navier–Stokes equations. [arXiv]

[1] Font, B., Weymouth, G.D., Nguyen, V.-T. & Tutty, O.R. 2019 Span effect on the turbulence nature of flow past a circular cylinder. *Journal of Fluid Mechanics* 878, 306–323. [DOI] [arXiv]

Peer-reviewed symposium proceedings

[1] Font, B., Weymouth, G.D., Nguyen, V.-T. & Tutty, O.R. 2020 Turbulent wake prediction using deep convolutional neural networks *Accepted for the Symposium on Naval Hydrodynamics, Osaka, Japan.*

Conference proceedings

[1] Font, B., Weymouth, G.D. & Tutty, O.R. 2017 Analysis of two-dimensional and three-dimensional wakes of long circular cylinders. *OCEANS MTS/IEEE*, Aberdeen, UK. [DOI]

Published abstracts

[3] Font, B., Weymouth, G.D. & Tutty, O.R. 2019 Deep learning the spanwise-averaged wake of a circular cylinder. 72nd Meeting of the APS Division of Fluid Dynamics, Seattle, US. [Abstract] [Presentation]

[2] Font, B., Castells, I., Weymouth, G.D., Nguyen, V.-T. & Tutty, O.R. 2019 Turbulence dynamics transition of flow past a circular cylinder and the prediction of vortex-induced forces. *European Turbulence Conference 17*, Torino, Italy. [Abstract]

[1] Font, B., Weymouth, G.D. & Tutty, O.R. 2016 A two-dimensional model for three-dimensional symmetric flows. *UK Fluids Conference*, London, UK. [Abstract]

Invited Talks

Deep-learning the spanwise-averaged Navier–Stokes equations, *Boldrewood Lunchtime Seminar series*, University of Southampton, July 2020, UK.

On two-dimensional and three-dimensional turbulence of wake flows, *Fluid Structure Interactions Group Seminar series*, University of Southampton, May 2017, UK.

Funded Research

University of Southampton FEE Education Hub PhD grant (2015) GBP 28,353
A*STAR ARAP Research Mobility Programme grant (2015) SGD 74,500

Teaching and supervision

Supervisor of MSc projects, University of Southampton 2019-
Machine Learning Wall Model for Bluff Bodies Forces Calculation
Accurate Flow Interpolation using Optimal Transport Theory

Demonstrator, University of Southampton 2015-2017
Aerodynamics: Nozzle lab
Propulsion: Ramjet, turbojet and rocket engine labs
Aerothermodynamics: Marking of lab reports

Private tutor 2011-2014
Mathematics, physics and programming tutor to High School and Undergraduate students

Software skills

Programming languages: Fortran, Python (inlcuding Keras and Tensorflow), Julia, C, Java, Matlab

Tools: Git, LaTeX, Inkscape

Others: MySQL, HTML, Qt

References

Gabriel D. Weymouth, Associate Professor, Fluid and Structure Interactions Group
University of Southampton, UK
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F. Xavier Trias, Associate Professor, Heat and Mass Transfer Technological Center
Universitat Politècnica de Catalunya, Spain
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Carles-David Pérez-Segarra, Professor, Heat and Mass Transfer Technological Center
Universitat Politècnica de Catalunya, Spain
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Vinh-Tan Nguyen, Senior Scientist, Institute of High Performance Computing
A*STAR, Singapore
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Owen R. Tutty, Professor, Aerodynamics and Flight Mechanics Group
University of Southampton, UK
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