

I am a research assistant at Imperial College London, currently working on eCSE project 'An adjoint solver for variable-density flows in the low Mach number limit' and previously completed a PhD at Imperial College London, working on the development of a fully-coupled solver for the two-fluid model of multiphase flows. In the course of my research, I have implemented a variable-density solver for Incompact3D and pressure-velocity implicit and pressure-velocity-volume fraction implicit solvers for the two-fluid model on collocated, unstructured meshes in MultiFlow. Additionally, my research interests have covered Momentum Weighted Interpolation and its application to multiphase flows, particularly the theoretical basis for, and justification of, its use. I have a broad experience of working with parallel, general purpose CFD codes developed in-house and have contributed to their development in a range of areas including: IO, automated meshing and investigating preconditioners in addition to the implementation of the aforementioned solvers.

Education

- 2013 – 2017 **PhD in Computational Fluid Dynamics**, Imperial College London.
Supervisors: B. van Wachem (Imperial College), A. Marquis (Imperial College).
- 2009 – 2013 **MEng. (First class) in Mechanical Engineering**, Imperial College London.
- 2007 – 2008 **Advanced Highers**, AAA in Chemistry, Maths and Physics.
- 2006 – 2007 **Highers**, AAAA in Chemistry, Maths, Physics and Technical Studies; B in English.
- 2004 – 2006 **Standard Grades**, Grade 1 in Art, Chemistry, French, Geography, Maths, Physics and Technical Studies; grade 2 in English.
- Academic Prizes,**
3rd year Dean's list, Mechanical Engineering
Senior Proxime Accessit, Bearsden Academy.

Professional/research experience

- 2018 – 2019 **eCSE 13-03 A something something**, Imperial College London.
Supervisor: S. Laizet, Imperial College London
Since October 2018 I have been working on
- 2017 – 2018 **eCSE 10-02 An adjoint solver for variable-density flows in the low Mach number limit**, Imperial College London.
Supervisor: S. Laizet, Imperial College London
This project was focused on the implementation of a Low Mach Number solver in the open-source CFD code Incompact3D, available at: <https://github.com/ptb0890/Quascompact3d>. In the course of this project I have gained experience programming in Fortran and using Tier-0/Tier-1 super computers. I have presented intermediate results from the project at the Incompact3D User Group 2018 meeting at Imperial college, and will present further results at the UK Fluids Conference 2018 at the University of Manchester. This work has led to the publication of a peer-reviewed journal paper (Bartholomew & Laizet 2019).
- 2012 **Undergraduate Research Opportunities Programme**, Imperial College London.
Supervisor: A. Marquis, Imperial College London
I obtained funding to join a research group in the Thermofluids division of the Mechanical Engineering department at Imperial College for the summer between the third and final year of my undergraduate MEng. degree. During my project I looked at automating analysis with Paraview using the Python API and developed a CFD code based on the SIMPLE algorithm.
- 2008 – 2009 **Year In Industry**, BAE Systems, Glasgow.
Supervisor: A. McNally
Between finishing high school and starting university I spent a year working in the operations department at the BAE Systems shipyard in Scotstoun, Glasgow. During my time there I implemented a requisition tracking system to facilitate the transfer of materials between projects and assisted in project management of the Seagull barge refit for charity.

Publications

- P. Bartholomew, S. Laizet**, *A New Highly Scalable, High-Order Accurate Framework for Variable-Density Flows: Application to Non-Boussinesq Gravity currents in Computer Physics Communications*, 2019.
- P. Bartholomew, F. Denner, M. H. Abdol-Azis, A. Marquis, B. van Wachem**, *Unified Formulation of the Momentum-Weighted Interpolation for Collocated Variable Arrangements in Journal of Computational Physics*, 2018.

Conference and seminar presentations

- May 2019 **P. Bartholomew, G. Deskos, S. Laizet**, *Xcompact3d: A Powerful Framework to Study Turbulent Flows with Turbulence-Resolving Simulations*, EuroHPC, 13-17 May 2019, Poznań, Poland.
- Sep 2018 **P. Bartholomew, S. Laizet**, *QuasIncompact3D: A Highly Scaleable Solver for Navier Stokes in the Low Mach Number Limit*, UK Fluids Conference, 4-6 September 2018, Manchester, United-Kingdom.
- Apr 2018 **P. Bartholomew, S. Laizet**, *Simulations of Variable-Density Flows in the Low Mach Number Limit*, Incompact3D User Group Meeting 2018, April 2018, London, United-Kingdom.
- Sep 2016 **P. Bartholomew, A. Marquis, B. van Wachem**, *Modelling of Turbulent Gas-Solid Flows in the Eulerian Framework*, Inaugural UK Fluids Conference 2016, 7-9 September 2016, London, United-Kingdom.
- May 2016 **P. Bartholomew, A. Marquis, F. Denner, B. van Wachem**, *Development of a Fully Coupled Solver for the Eulerian-Eulerian Approach*, 9th International Conference on Multiphase Flow (ICMF 2016), 22-27 May 2016, Florence, Italy.

Teaching activities

- 2015-2017 **CDT - Computational Fluid Dynamics**, *Teaching assistant*, Imperial College London.

Computer skills

- Languages **C, Fortran, MPI, Python, \LaTeX**
Software **Linux, Matlab, Paraview, PETSc**

Interests

- Sports **Cycling, Swimming**
Hobbies **Guitar**

Referees

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