Yang Wang

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Research Interests

- Computational Aided Engineering (CAE)
- Computational Fluid Dynamics (CFD) in multi-disciplinary applications
- Computational Aero-Acoustics (CAA)
- CAD/Node-based shape deformation and gradient-based optimisation
- Numerical modeling and optimization

Skills

- Finite Volume Method and Spectral Element Method
- Numerical methods for Partial Differential Equations: algorithms, discretisation schemes and linear solvers
- Fortran, MATLAB/Octave and C++ programming
- Tools/software: SolidWorks, ProE, GMSH, ICEM, ParaView, OpenFOAM, Fluent
- Automatic Differentiation (AD) tool TAPENADE
- Linux operation systems, Vim, Meld, Make, Git, Doxygen, Gprof, and HYPRE open source libraries

Education

- 2012. 9 - 2017. 1   PhD in Mechanical Engineering, Queen Mary, University of London, United Kingdom
- 2009. 9 - 2012. 6   MSc in Power Engineering and Thermophysics, Xi'an Jiaotong University, China
- 2005. 9 - 2009. 7   BEng in Energy and Power Engineering, Xi'an Jiaotong University, China

Academic experience

- 2017. 11 - present   Parenting and working from home during relocation, Cambridge, USA
  - ➢ Multiphysics modeling and computation coupled with CFD & CAD tools
  - ➢ Journal papers writing and revision; paper reviewing work invited by journal editors
- 2017. 3 - 2017. 10   Research fellow on projects funded by Engineering and Physical Science Research Council (EPSRC), School of Engineering, University of Warwick, Coventry, United Kingdom
  - ➢ Next Generation Grid Scale Thermal Energy Storage Technologies: Novel system design for Compressed Air Energy Storage (CAES) coupled with Reverse Osmosis (RO) water producing process
  - ➢ Ultra-Supercritical (USC) steam power generation technology with Circulating Fluidized Bed (CFB): Combustion, Materials and Modelling: Heat transfer numerical model of CFB boiler integrated with water-wall heat exchange
- 2012. 9 - 2017. 1   PhD candidate working on the project *About Flow* funded by the European commission
  - ➢ Development of integrated CFD and adjoint sensitivity solvers
  - ➢ Solver development on cell-centered/face-based and node-centered/edge-based data structure
  - ➢ SIMPLE-like algorithms vs. Pressure Schur Complement (PSC) method theatrical derivation
  - ➢ Automatic Differentiation (AD) for CFD code based on source transformation (TAPENADE)
  - ➢ CAD-based (NURBS surfaces) shape optimization with mesh deformation based on linear elasticity theory
  - ➢ Fluid dynamics analysis on air duct cases in Volkswagen Golf vehicle
  - ➢ Membrane process modeling and governing equations implementation
  - ➢ Fluid dynamics combined with filaments surface sensitivity analysis on spacers design in membrane channel

- 2009. 9 - 2012. 6 Master Thesis: Study of spectral element method for acoustic propagation problem in non-uniform flows
  - ➢ The numerical model of acoustic propagation derivation for non-uniform flow
  - ➢ Implementation of group velocity method with high accuracy on the absorbing boundary conditions
- 2008. 9 - 2009. 6 Bachelor thesis: The design of vortex blower working on high flow rate
  - ➢ High flow rate vortex blower design and 3D model via software ProE

Selected Publications

1. Y. Wang and J.-D. Müller. Re-visit SIMPLE-like algorithms via Pressure Schur Complement for stabilisation of discrete adjoint solver with industrial incompressible flow application. In preparation

2. Y. Wang, W. He, and J.-D. Müller. Sensitivity analysis of feed spacer shape in reverse osmosis membrane process using discrete adjoint approach. *Desalination*, 2018. Accepted

3. Y. Wang, W. He, and J. Wang. Pumped seawater combined with Compressed Air Energy Storage: an integrated co-storing/producing energy/water system. *Applied Energy*. Under revision

4. Y. Wang, W. He, and H. Zhu. Computational fluid dynamics (CFD) based modelling of osmotic energy generation using pressure retarded osmosis (PRO). *Desalination*, 389:98–107, 2016

5. X. Zhang, Y. Wang, M. Gugala, and J.-D. Müller. Geometric continuity constraints for adjacent nurbs patches in shape optimisation. *ECCOMAS-2016*, 2016

6. W. He, Y. Wang, V. Elyasigomari, and M. H. Shaheed. Evaluation of the detrimental effects in osmotic power assisted reverse osmosis (RO) desalination. *Renewable Energy*, 93:608–619, 2016

7. Y. Geng, G. Qin, Y. Wang, and W. He. The research of space-time coupled spectral element method for acoustic wave equationsthe research of space-time coupled spectral element method for acoustic wave equations. *Chinese Journal of Acoustics*, 35(01):31–49, 2016

8. S. Akbarzadeh, Y. Wang, and J.-D. Müller. Fixed point discrete adjoint of SIMPLE-like solvers. In *22nd AIAA Computational Fluid Dynamics Conference*, page 2750, 2015

9. Y. Wang, S. Akbarzadeh, and J.-D. Müller. Stabilisation of discrete adjoint solvers for incompressible flow. In *22nd AIAA Computational Fluid Dynamics Conference*, page 2749, 2015

10. W. He, Y. Wang, and M. H. Shaheed. Maximum power point tracking (MPPT) of a scale-up pressure retarded osmosis (PRO) osmotic power plant. *Applied Energy*, 158:584–596, 2015

11. W. He, Y. Wang, and M. H. Shaheed. Stand-alone seawater RO (reverse osmosis) desalination powered by pv (photovoltaic) and PRO (pressure retarded osmosis). *Energy*, 86:423–435, 2015

Awards and grants

- 2015 Postgraduate Research Fund from QMUL
- 2014 Student grant from SEMS
- 2012 Best Graduates (Top 10%)
- 2010 Outstanding Postgraduate Student Award (Top 15%)
- 2009 Postgraduate Innovation Fund Scholarship (1st Class, 2/46)
- 2009 Best Graduates (Top 10%)
- 2008 *Fusheng* Scholarship (1st Class, Top 15%)

Teaching and supervising experiences

- 2012 - 2015 Demonstrating in modules:
  - ➢ Heat transfer and Fluid Mechanics: teaching assistant
  - ➢ Mechanics of Fluids: experiment demonstration and report marking
  - ➢ Computer Aided Engineering in Fluids and Solids: OpenFOAM tutorial
- 2009 - 2012 Instructor of Class 2009 in Department of Fluid Machinery