Georgios Deskos, MEng, MSc, PhD — *Curriculum Vitae*

Contact Info

National Wind Technology Center, National Renewable Energy Laboratory
18200 CO-128, Boulder, CO 80303, USA e-mail: georgios.deskos@nrel.gov

Areas of Expertise

- Offshore Renewable Energy (Wind and Tidal Stream Energy)
- Wind-wave interaction
- Wind turbine wake modelling
- FSI of unmanned aerial vehicle (UAV)
- Direct numerical simulation (DNS) and Large-eddy simulation (LES) of turbulent flows
- High-order numerical methods, high-performance computing

Academic / Research appointments

Postdoctoral researcher October 2019 to present

National Renewable Energy Laboratory, Boulder, USA
Project: DOE A2e High Fidelity Modeling
Role: Developing the offshore capabilities for next-generation wind-farm simulators.

Research Associate July 2018 to August 2019

Department of Aeronautics, Imperial College London
Project Title: FENGBO-WIND - Farming the ENvironment into the Grid: Big data in Offshore Wind. EPSRC Reference: EP/R007470/1

Research Assistant Oct 2014 to Oct 2015

Department of Civil and Environmental Engineering, Imperial College London
Project Title: Towards a unified approach for the hydrodynamic modelling of Wave Energy Converters: effective linkage of non-linearity and viscous damping in potential flow models. EPSRC Reference: EP MO019977/1

Education

Imperial College London, London, UK

Ph.D., Earth Science and Engineering, February 2019

- Thesis topic: *Numerical simulations of wind turbine wakes*
- Supervisors: Prof. Matthew D. Piggott and Dr. Sylvain Laizet

Virginia Tech, Blacksburg, USA

M.Sc., Civil Engineering, August 2014

- Research topic: *Incipient motion of a non-cohesive particle under Stokes flow conditions*
- Supervisor: Prof. Panayiotis Diplas

National Technical University of Athens, Athens, Greece

MEng, Civil Engineering, March 2012

- Research topic: *Buoyant turbulent jets in confined domains: A numerical approach*
- Supervisor: Assoc. Prof. Panos Papanicolaou

Awards

- ARCHER Image and Video Competition for 2018, 2019
- Third place in ERCOFTAC's Osborne Reynolds Day competition (2018)
- Energy Futures Lab, Director of Education PhD Scholarship (2015)
- Virginia Tech, Pratt Fellowship (2013)
- NTUA, Greek State Scholarships Foundation (2006)
- Eurobank award and cash prize "The Great Moment in Education" (2006)
- Bronze medal in the National Mathematical Olympiad (Archimedes) organized by the Hellenic Mathematical Society for high school students (2006)
- First place in the qualifying math competitions (Euclid) organised by the Hellenic Mathematical Society (2005, 2006)

Funding

- (2019) PI for accessing computational time on ARCHER through the UK Turbulence Consortium (2019), total 15,240 kAUs with notional cost of £8,535
- (2019) PI, UK-China ORE Flexible Fund to conduct initial feasibility study to extend modelling capabilities of PhD-developed open-source code WInc3D to floating offshore wind farms £15,000
- (2018) PI for accessing computational time on ARCHER through the UK Turbulence Consortium (2018), total 15,120 kAUs with notional cost of £8,467
- (2018) Contributor to an EU funded project (MARINET2, OFCTiTuPerf), total amount received £2,000
- (2015) PhD Scholarship from the Energy Futures Lab, Imperial College London that fully funded my doctoral studies for three years. Total amount awarded £48,456

Research Project Supervision

Period	Name	Project title	Co-supervisor
2018-19	Anastasia Fragkou	Modelling the mixing and dispersion of brine discharge from desalination plants in coastal seas **(MRes)**	M. D. Piggott
2018-19	Matthew Bennion	Application of Proper Orthogonal Decomposition to Wind Turbine Wakes **(MEng)**	S. Laizet
2017-18	Aoife Henry	Optimal control of tidal turbine wakes **(UROP)**	M.D. Piggott
2017-18	Sofia Walker-Saez	Condition-Based Maintenance of Offshore Wind Farms: The Use of SCADA Data in Normal Behaviour Modelling **(MSc)**	M.D. Piggott
2016-17	Zulkeefal Dar	uRANS-ALM Modelling of Vertical Axis Turbines **(MSc)**	M.D. Piggott
2015-16	Napat Tongmark	Unsteady loading of tidal turbine blades **(MSc)**	J. Spinneken

Teaching Experience

Period	Module	Role	Hours
2018-19	Finite Element Methods (PG) *IC-AERO*	Lecturer	12
2017-18	Advanced Programming (UG) *IC-ESE*	Tutorial Sessions	21
2015-17	Computational Methods (UG)*IC-CEE*	Tutorial Sessions	48
2015-17	Fluid Mechanics (Third year-UG) *IC-CEE*	Tutorial Sessions	28
2015-17	Fluid Mechanics (Second year-UG) *IC-CEE*	Tutorial Sessions	14
2013-14	Fluid Mechanics (UG) *VT*	Lab Instructor	120

IC-AERO = Imperial College London, Aeronautics (2018-2019),*IC-ESE* = Imperial College London, Earth Science and Engineering (2017-2018), *IC-CEE* = Imperial College London, Civil and Environmental Engineering (2014-2017), *VT* = Virginia Tech (2013-2014), *UG* = Undergraduate module, *PG* = Postgraduate module

Experience with HPC

Period	Name	Location	CPU hours used
2019-	Eagle	USA (Rank 43th)	–
2019	MareNostrum	Spain (Rank 29th)	5k
2018-19	Sunway TaihuLight	China (Rank 3rd)	120k
2018-19	Hazel Hen (HLRS)	Germany (Rank 27th)	1.5k
2018-19	ARCHER	UK (Tier1) (Rank 131th)	30k
2017-18	MARCONI (CINECA)	Italy (Rank 15th)	5k
2015-19	ICL CX2	UK (Tier2)	400k
2016-17	UCL Thomas	UK (Tier2)	5k

Professional Experience

- Private in the Hellenic Army (Corps of Signal) (May 2012-Feb 2013)
- Project management engineer for the construction of the new NATO Headquarters, HQPO NATO (Mar 2011-Sept 2011)
- Staff of the IAESTE office in NTUA, Athens, Greece
- Trainee Structural Engineer (2008-2010,2012)

Affiliations & International Profile

- American Physical Society (Graduate Member)
- Technical Chamber of Greece (Chartered Civil Engineer)
- Institute of Civil Engineers (Graduate Member)

Computer skills

- CFD Packages: Nalu, AMReX, xcompact3d, Fluidity, OpenFoam
- Programming Languages: Fortran, C, C++, Python, MatLab, LaTeX
- Visualization tools: Paraview, TecPlot, Scientific Python
- Operating systems: Unix/Linux, Mac OS, Windows
- Contributions to collaborative software development (nalu-wind, amr-wind, fluidity, xcompact3d) available at my GitHub repository

Papers under review / in preparation

1. R. A. S. Frantz, **G. Deskos**, S. Laizet, and J. H. Silvestrini. "Three-dimensional simulations of gravity currents using implicit spectral vanishing viscosity". **Under submission to Advances in Water Resources**.
2. **Deskos G.** "A novel spectral eddy viscosity model for physical space high-Reynolds-number turbulent flow simulations". **Under preparation**.
3. **Deskos G.** "Survey of wind-wave coupling models for the simulation of the marine atmospheric boundary layer and its interaction with offshore wind energy systems". **Under preparation**.

4. **Deskos G.** and L. A. Martinéz-Tossas. "On the resolving ability of actuator line models for unsteady turbine aerodynamics". **Under preparation**.
5. **Deskos G.**, S. Ananthan, G. Vijayakumar, and M. A. Sprague. "Shear-stress behaviour in three-dimensional boundary layers over idealised waves". **Under preparation**.

Journal Articles

1. P. Bartholomew, **G. Deskos**, R. A. Frantz, F. N. Schuch, E. Lamballais, and S. Laizet. "Xcompact3D: An open-source framework for solving turbulence problems on a Cartesian mesh". *SoftwareX* 12 (2020), p. 100550. DOI: https://doi.org/10.1016/j.softx.2020.100550.
2. **Deskos, G.**, A. del Carre, and R. Palacios. "Assessment of low-altitude atmospheric turbulence models for aircraft aeroelasticity". *Journal of Fluids and Structures* 95 (2020), p. 102981. DOI: 10.1016/j.jfluidstructs.2020.102981.
3. **Deskos G.**, S. Laizet, and R. Palacios. "WInc3D: A novel framework for turbulence-resolving simulations of wind farm wake interactions". *Wind Energy* 23.3 (2020), pp. 779–794. DOI: 10.1002/we.2458.
4. **Deskos, G.**, S. Laizet, and M. D. Piggott. "Turbulence-resolving simulations of wind turbine wakes". *Renewable Energy* 134 (2019), pp. 989 –1002. DOI: 10.1016/j.renene.2018.11.084.
5. **Deskos, G.** and P. Diplas. "Incipient motion of a non-cohesive particle under Stokes flow conditions". *International Journal of Multiphase Flow* 99 (2018), pp. 151 –161. DOI: 10.1016/j.ijmultiphaseflow.2017.09.015.
6. **Deskos, G.** and M. D. Piggott. "Mesh-adaptive simulations of horizontal-axis turbine arrays using the actuator line method". *Wind Energy* 21.12 (2018), pp. 1266–1281. DOI: 10.1002/we.2253.
7. **Deskos, G.**, G. Payne, B. Gaurier, and M. Graham. "On the spectral behaviour of the turbulence-driven power fluctuations of horizontal-axis turbines" (). **Accepted in the Journal of Fluid Mechanics**.

Conference Publications

1. A. D. Carre, G. Deskos, and R. Palacios. "Realistic Turbulence Effects in Low Altitude Dynamics of Very Flexible Aircraft". *AIAA Scitech 2020 Forum*. 2020. DOI: 10.2514/6.2020-1187. eprint: https://arc.aiaa.org/doi/pdf/10.2514/6.2020-1187.
2. C. Wang, A. Muñoz-Simon, **Deskos G.**, S. Laizet, R. Palacios, F. Campagnolo, and C. L. Bottasso. "Code-to-code-to-experiment validation of LES-ALM wind farm simulators". *The Science of Making Torque from Wind 2020 (TORQUE 2020)*. 2020.
3. **Deskos, G.**, S. Laizet, and M. D. Piggott. "Development and validation of the higher-order finite-difference wind farm simulator, WInc3D". *3rd International Conference on Renewable Energies Offshore (RENEW2018)*. Lisbon, Portugal, 2018.
4. **Deskos, G.**, M. A Abolghasemi, and M. D Piggott. "Wake predictions from two turbine models using mesh-optimisation techniques". *Proceedings of the Twelfth European Wave and Tidal Energy Conference*. Ed. by A. Lewis. ISSN: 2309-1983. EWTEC. University College Cork, Ireland, 2017.
5. **Deskos, G.**, P. Dimitriadis, and P. Papanicolaou. "Density stratifications in the mixed regime of a buoyand jet in confined ambient". *2nd Hellenic conference for hydraulics and water resources*. Patras, Greece, 2012.

Conference Extended Abstracts

1. P Bartholomew, **G. Deskos**, and S. Laizet. "Xcompact3d: a powerful framework to study turbulent flows with turbulence-resolving simulations". *EuroHPC Summit Week*. Poznan, Poland, 2019.
2. **Deskos, G.**, S. Laizet, and R. Palacios. "Towards a non-linear aeroelastic actuator line model for scale-resolving wind farm simulations". *Wind Energy Science Conference 2019*. Cork, Ireland, 2019.
3. **Deskos, G.** and S. Laizet. "Energy-consistent estimations of entrainment for fully-developed wind farms". *Bulletin of the American Physical Society*. Atlanta, GA, 2018.
4. **Deskos, G.**, S. Laizet, M. D. Piggott, and R. Palacios. "WInc3D: An integrated framework for multi-physics wind farm simulations". *UK Turbulence Consortium Annual Review*. London, UK, 2018.
5. **Deskos, G.**, S. Laizet, M. Piggott, and S. Sherwin. "Large eddy simulation of turbine wakes using higher-order methods". *Bulletin of the American Physical Society*. Denver, CO, 2017.
6. **Deskos, G.**, J. Spinneken, and M. Piggott. "Impact of the free surface proximity on the performance of a single Tidal Stream Turbine: A Vortex Filament Approach". *5th Oxford Tidal Energy Workshop*. 2016.
7. D. Bouziotas, **Deskos, G.**, N. Mastrantonas, D. Tsaknias, G. Vangelidis, S. M. Papalexiou, and D. Koutsoyiannis. "Long-term properties of annual maximum daily river discharge worldwide". *European Geosciences Union (EGU) General Assembly*. 2011.

Miscellanious Publications

1. **Deskos, G.** *Numerical Simulations of wind turbine wakes*. PhD thesis. London, UK, 2019.
2. **Deskos, G.** *Incipient motion of a non-cohesive particle under Stokes flow conditions*. MSc Thesis. Blacksburg, USA, 2014.
3. **Deskos, G.** *Buoyant turbulent jets in confined domains: A numerical approach*. (Greek). Diploma Thesis (MEng). Athens, Greece, 2012.

Reviewer

Journal of Fluid Mechanics (Cambridge), Renewable Energy (Elsevier), Applied Energy (Elsevier), Environmental Processes (Springer), Ocean Engineering (Elsevier), Energies (MDPI)

Invited Talks

1. UK-China Joint ORE Conference, Qingdao, China (08/07/2019)
2. Energy Futures Lab, Imperial College London, London (1/11/2018)
3. Offshore Renewable Energy Summer School, London (12/07/2018)
4. University of Colorado, Boulder, USA (10/11/2017)
5. Delft University, Delft, The Netherlands (15/3/2017)
6. Dalian University, Dalian, China (26/1/2015)