

CONTACT INFO	National Wind Technology Center, National Renewable Energy Laboratory 18200 CO-128, Boulder, Colorado 80303, USA e-mail: georgios.deskos@nrel.gov , Personal website	
ACADEMIC METRICS	h-index: 9, Google Scholar Citations: 194 Google Scholar , ResearchGate	
AREAS OF EXPERTISE	High-fidelity modelling of offshore wind energy, Air-sea interaction, Wake modelling and control, Multiphase flows, Extreme-event modeling	
RESEARCH APPOINTMENTS	Researcher III - Computational Science	May 2021 to present
	National Renewable Energy Laboratory, Boulder, USA Projects: DOE A2e High Fidelity Modeling , DOE Exawind Role: Leading the offshore wind high-fidelity modelling development in the HFM and Exawind projects.	
	Postdoctoral researcher	October 2019 to May 2021
	National Renewable Energy Laboratory, Boulder, USA Projects: DOE A2e High Fidelity Modeling Role: Developing the offshore capabilities for next-generation wind-farm simulators.	
	Postdoctoral 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	
	<ul style="list-style-type: none"> • Thesis topic: <i>Numerical simulations of wind turbine wakes</i> • Supervisors: Prof. Matthew D. Piggott and Dr. Sylvain Laizet 	
	Virginia Tech , Blacksburg, USA	
	M.Sc., Civil Engineering, August 2014	
	<ul style="list-style-type: none"> • Research topic: <i>Incipient motion of a non-cohesive particle under Stokes flow conditions</i> • Supervisor: Prof. Panayiotis Diplas 	
	National Technical University of Athens , Athens, Greece	
	BEng, Meng Civil Engineering, March 2012	
	<ul style="list-style-type: none"> • Research topic: <i>Buoyant turbulent jets in confined domains: A numerical approach</i> • Supervisor: Assoc. Prof. Panos Papanicolaou 	

AWARDS

- NREL President’s Award (2021)
- Scholarship for participating in Argonne Training Program in Extreme-scale computing (ATPESC 2020)
- 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 kAU 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 kAU 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
2019-22	Amy Hodgkin	Wind turbine tip vortices under shear and thermal stratification (PhD)	S. Laizet
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) <i>IC-AERO</i>	Lecturer	12
	2017-18	Advanced Programming (UG) <i>IC-ESE</i>	Tutorial Sessions	21
	2015-17	Computational Methods (UG) <i>IC-CEE</i>	Tutorial Sessions	48
	2015-17	Fluid Mechanics (Third year-UG) <i>IC-CEE</i>	Tutorial Sessions	28
	2015-17	Fluid Mechanics (Second year-UG) <i>IC-CEE</i>	Tutorial Sessions	14
	2013-14	Fluid Mechanics (UG) <i>VT</i>	Lecturer	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 &
PROFESSIONAL
MEMBERSHIPS
- American Physical Society (APS)
 - American Society of Mechanical Engineers (ASME)
 - Society of Industrial and Applied Mathematics (SIAM)
 - Hellenic Wind Energy Association (HWEA)
 - Technical Chamber of Greece (Chartered Civil Engineer)

- COMPUTER
SKILLS
- CFD Code development and contributions to: WInc3D, Nalu-Wind, amr-wind, AMReX, xcompact3d, Fluidity, OpenFoam, FLORIS
 - Programming Languages: C, C++, Python, Fortran, MatLab, \LaTeX
 - Visualization tools: Paraview, TecPlot, Scientific Python
 - Operating systems: Unix/Linux, Mac OS, Windows
 - Main developer and contributor to collaborative software projects (nalu-wind, amr-wind, fluidity, xcompact3d) available at my [GitHub](#) repository

- PAPERS
UNDER REVIEW
1. **Deskos G.** “A linear forcing method to model wind-wave interactions in marine atmospheric boundary layer simulations”. **In preparation for submission to the Journal of the Atmospheric Sciences.**

1. N. Bempedelis, S. Laizet, and **G. Deskos**. “Turbulent entrainment in finite-length wind farms” (2023). **Accepted for publication in the Journal of Fluid Mechanics**.
2. A. Hodgkin, S. Laizet, and **G. Deskos**. “Do ambient shear and thermal stratification impact wind turbine tip-vortex breakdown?” *Journal of Physics: Conference Series* 2265.2 (2022), p. 022061. DOI: [10.1088/1742-6596/2265/2/022061](https://doi.org/10.1088/1742-6596/2265/2/022061).
3. A. Hodgkin, S. Laizet, and **G. Deskos**. “Numerical investigation of the influence of shear and thermal stratification on the wind turbine tip-vortex stability”. *Wind Energy* (2022). DOI: [10.1002/we.2728](https://doi.org/10.1002/we.2728).
4. C. Jordan, D. Dundovic, A. Fragkou, **G. Deskos**, D. S. Coles, M. D. Piggott, and A. Angeloudis. “Combining shallow-water and analytical wake models for tidal-array micro-siting”. *Journal of Ocean Engineering and Marine Energy* (2022). DOI: [10.1007/s40722-022-00225-2](https://doi.org/10.1007/s40722-022-00225-2).
5. M. B. Kuhn, **G. Deskos**, and M. A. Sprague. “A mass-momentum consistent coupling for mesh-adaptive two-phase flow simulations”. *Computers Fluids* (2022), p. 105770. DOI: <https://doi.org/10.1016/j.compfluid.2022.105770>.
6. W. J. Shaw, L. K. Berg, M. Debnath, **G. Deskos**, C. Draxl, V. P. Ghate, C. B. Hasager, R. Kotamarthi, J. D. Mirocha, P. Muradyan, W. J. Pringle, D. D. Turner, and J. M. Wilczak. “Scientific challenges to characterizing the wind resource in the marine atmospheric boundary layer”. *Wind Energy Science* 7.6 (2022), pp. 2307–2334. DOI: [10.5194/wes-7-2307-2022](https://doi.org/10.5194/wes-7-2307-2022).
7. **Deskos G.**, S. Ananthan, and M. A. Sprague. “Direct numerical simulations of turbulent flow over misaligned traveling waves”. *International Journal of Heat and Fluid Flow* 97 (2022), p. 109029. DOI: <https://doi.org/10.1016/j.ijheatfluidflow.2022.109029>.
8. R. A. Frantz, **G. Deskos**, S. Laizet, and J. H. Silvestrini. “High-fidelity simulations of gravity currents using a high-order finite-difference spectral vanishing viscosity approach”. *Computers & Fluids* 221 (2021), p. 104902. DOI: <https://doi.org/10.1016/j.compfluid.2021.104902>.
9. **Deskos G.**, J. C. Y. Lee, C. Draxl, and M. A. Sprague. “Review of wind-wave coupling models for large-eddy simulation of the marine atmospheric boundary layer”. *Journal of the Atmospheric Sciences* (2021). DOI: [10.1175/JAS-D-21-0003.1](https://doi.org/10.1175/JAS-D-21-0003.1).
10. 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>.
11. **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](https://doi.org/10.1016/j.jfluidstructs.2020.102981).
12. **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](https://doi.org/10.1002/we.2458).
13. **Deskos, G.**, G. S. Payne, B. Gaurier, and M. Graham. “On the spectral behaviour of the turbulence-driven power fluctuations of horizontal-axis turbines”. *Journal of Fluid Mechanics* 904 (2020), A13. DOI: [10.1017/jfm.2020.681](https://doi.org/10.1017/jfm.2020.681).
14. C Wang, A Muñoz-Simon, **G Deskos**, S Laizet, R Palacios, F Campagnolo, and C. L. Bottasso. “Code-to-code-to-experiment validation of LES-ALM wind farm simulators”. *Journal of Physics: Conference Series* 1618 (2020), p. 062041. DOI: [10.1088/1742-6596/1618/6/062041](https://doi.org/10.1088/1742-6596/1618/6/062041).

15. **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](https://doi.org/10.1016/j.renene.2018.11.084).
16. **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](https://doi.org/10.1016/j.ijmultiphaseflow.2017.09.015).
17. **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](https://doi.org/10.1002/we.2253).

CONFERENCE
PUBLICATIONS

1. A. Hodgkin, S. Laizet, and **G. Deskos**. “Implications of shear and thermal stratification on wind turbine tip-vortex stability”. *12th International Symposium on Turbulence and Shear Flow Phenomena*. 2022.
2. 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](https://doi.org/10.2514/6.2020-1187). eprint: <https://arc.aiaa.org/doi/pdf/10.2514/6.2020-1187>.
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 buoyant jet in confined ambient”. *2nd Hellenic conference for hydraulics and water resources*. Patras, Greece, 2012.

CONFERENCE &
EXTENDED
ABSTRACTS

1. N. Bempedelis, **Deskos, G.**, and S. Laizet. “Turbulent entrainment in large wind plants”. *Wind Energy Science Conference*. 2021.
2. A. Hodgkin, **Deskos, G.**, S. Laizet, and N. Bempedelis. “Implications of ambient shear and thermal stratification on wind turbine near-wake dynamics”. *Wind Energy Science Conference*. 2021.
3. **Deskos, G.** and S. Ananthan. “Comparison of two interface advection schemes using a geometric volume-of-fluid (VoF) method with adaptive mesh-refinement”. *SIAM, Computational Science and Engineering (CSE21)*. (Virtual). Fort-Worth, Texas, 2021.
4. A. Fragkou, **Deskos, G.**, A. Angeloudis, and M. D. Piggott. “Modelling the mixing and dispersion of brine surface discharge from desalination plants in coastal areas”. *6th IAHR European Congress*. 2020.
5. **Deskos, G.**, G. Payne, B. Gaurier, and M. Graham. “New insights into the spectral behavior of the power fluctuations of horizontal-axis turbines”. *Bulletin of the American Physical Society*. Chicago, IL, 2020.
6. 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.
7. **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.

8. **Deskos, G.** and S. Laizet. “Energy-consistent estimations of entrainment for fully-developed wind farms”. *Bulletin of the American Physical Society*. Atlanta, GA, 2018.
 9. **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.
 10. **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.
 11. **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.
 12. 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.
- MISCELLANEOUS 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.
- ORGANIZING/ COMMITTEE ROLES
- Organizing and Leading a DOE-sponsored Workshop on “Air-Sea Interaction and Implications for Offshore Wind Energy”
 - Co-organizer of a mini-symposium in SIAM 2021 Conference on Computational Science and Engineering (CSE21) titled “Adaptive Mesh Refinement in multiphase flow modeling and engineering applications”
- REVIEWER
- Journal of Fluid Mechanics (Cambridge), Journal of the Atmospheric Sciences (AMS), Renewable Energy (Elsevier), Applied Energy (Elsevier), Journal of renewable and sustainable energy (AIP), Atmosphere (MDPI), Environmental Processes (Springer), Ocean Engineering (Elsevier), Energies (MDPI), Wind Energy (Wiley), The Journal of Solar Energy Engineering - Including Wind Energy and Building Energy Conservation (ASME)
- INVITED TALKS
1. Plenary Talk of Air-sea interactions and implications for Offshore Wind Energy, NAWEA/WindTech (22/09/2022)
 2. DOE’s Wind Energy Technologies Office (WETO) (11/12/2020)
 3. UK-China Joint ORE Conference, Qingdao, China (08/07/2019)
 4. Energy Futures Lab, Imperial College London, London (1/11/2018)
 5. Offshore Renewable Energy Summer School, London (12/07/2018)
 6. University of Colorado, Boulder, USA (10/11/2017)
 7. Delft University, Delft, The Netherlands (15/3/2017)
 8. Dalian University, Dalian, China (26/1/2015)