# Fotis Sotiropoulos

Provost and Senior Vice President for Academic Affairs
Virginia Commonwealth University
Richmond, VA
Email: sotiropoulosf@vcu.edu; Web: https://provost.vcu.edu; Twitter: @Fotis_Sot

## EDUCATION

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| PhD | 1991 | University of Cincinnati | Aerospace Engineering |
| MS | 1989 | The Penn State University | Aerospace Engineering |
| Diploma | 1986 | National Tech. Univ. of Athens, Greece | Mechanical Engineering |

## RESEARCH CONTRIBUTIONS

Sotiropoulos has made seminal contributions in fluid mechanics, spanning a broad range of topics in turbulence, vortex dynamics, flow-structure interactions, and chaotic dynamics. His work has been inherently interdisciplinary and impacted numerous fields in civil engineering, mechanical engineering, biomedical engineering, and aquatic biology. He has done pioneering work advancing the use of computer simulation as a powerful tool for tackling real-life problems of major societal relevance in areas such as wind and tidal energy systems, river hydromechanics and morphodynamics, fish swimming, vortex dynamics and aerosol transport during human respiration, and hemodynamics of native and prosthetic heart valves. The hallmark of his work is his ability to integrate cutting-edge numerical simulation coupled with laboratory and field experiments to solve real-life problems while making insightful contributions into the fundamental physics of the underlying phenomena. His computational tools are used by industry to optimize wind farms and in-stream and tidal turbine arrays, restore rivers and streams, and assess and mitigate the risk of extreme river flooding.

## ACADEMIC & AMDINISTRATIVE LEADERSHIP POSITIONS

### VIRGINIA COMMONWEALTH UNIVERSITY (2021 – present)

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| August 2021 – present | Provost and Senior Vice President for Academic Affairs |
| | Professor, Department of Mechanical and Nuclear Engineering |

### STONY BROOK UNIVERSITY (2015 – 2021)

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| October 2015 – July 2021 | Dean, College of Engineering and Applied Sciences |
| | SUNY Distinguished Professor, Department of Civil Engineering & Department of Mechanical Engineering |
| October 2020 – March 2021 | Interim Provost and Senior Vice President for Academic Affairs |

### UNIVERSITY OF MINNESOTA (2006 – 2015)

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| November 2015 – present | Adjunct professor, Department of Civil Environmental and Geo-Engineering & Department of Mechanical Engineering |
| January 2010 – October 2015 | Founding director, University of Minnesota EOLOS Wind Energy Research Consortium (funded by the US DOE) |
| October 2008 – October 2015 | James L. Record Professor of Civil, Envir. & Geophysical Eng. |
| December 2007 – October 2015 | Professor of Biomedical Engineering (graduate appointment) |
| February 2006 – October 2015 | Professor of Mechanical Engineering (graduate appointment) |
| January 2006 – October 2015 | Professor, Civil, Environmental & Geophysical Engineering |

January 2006 – October 2015        Director, St. Anthony Falls Laboratory

### GEORGIA INSTITUTE OF TECHNOLOGY (1995 – 2005)
May 2005 – December 2005   Professor, School of Civil and Environmental Engineering and
                           G. W. Woodruff School of Mechanical Engineering (joint appt.)
January 2002 – April 2005   Associate Professor, G. W. Woodruff School of Mechanical
                           Engineering (joint appointment)
May 2000 – April 2005       Associate Professor (with tenure), School of Civil and Environmental
                           Engineering
August 1995 – April 2000    Assistant Professor, School of Civil and Environmental Engineering

### THE UNIVERSITY OF IOWA (1991 – 1995)
January 1995 – July 1995    Assistant Research Scientist, Iowa Institute of Hydraulic Research
June 1991 – December 1994   Postdoctoral Associate, Iowa Institute of Hydraulic Research

# CONTRIBUTIONS TO ACADEMIC LEADERSHIP AND SERVICE

**Provost and Senior Vice President for Academic Affairs, Virginia Commonwealth University (VCU)**
*August 2021 – present*: As Provost and Senior Vice President for academic affairs, Sotiropoulos serves as the university's chief academic officer. Provost Sotiropoulos' leadership team encompasses academic, faculty and student affairs, strategic enrollment management and student success, life sciences, institutional research and decision support, global education, VCU Online and the Institute for Contemporary Art. He also oversees the colleges and the schools on the Monroe Park Campus, which include College of Engineering, College of Humanities and Sciences, University College, Honors College, and the schools of the Arts, Business, Education, and Social Work, as well as the Graduate School and VCU Libraries.

**Dean of the College of Engineering and Applied Sciences (CEAS), Stony Brook University**
*October 2015 – July 2021*: As Dean of CEAS at Stony Brook University (SBU), Dr. Sotiropoulos oversaw the academic mission of the college consisting of 9 departments, approximately 160 tenured/tenured-track faculty, 4000 undergraduate students and 1500 graduate students. CEAS is the home of several centers of excellence and company incubators and its annual research expenditures are in excess of $47M. Dean Sotiropoulos was responsible for managing an annual budget of over $40M and overseeing the undergraduate education, graduate education, outreach and research missions of the College. He spearheaded the development of a new vision for the college aimed at tackling the major societal grand challenges of our time by advancing convergence science initiatives with the School of Medicine, the School of Marine and Atmospheric Sciences, the College of Arts and Sciences, and Brookhaven National Laboratory. He led new SBU-wide initiatives in Engineering-Driven Medicine, Sustainable Energy, and Artificial Intelligence and was at the forefront of the CEAS efforts and strategic commitment to expand diversity and invent the future of engineering education in the era of exponential technologies. Under his leadership CEAS 4-year graduation rates rose from 49% to 66%, research expenditures grew by 57%, the position of the CEAS in *US News and World Report* rankings rose steadily, from 69 to 62, peer assessment score has increased from 2.7 to 2.9, and recruiter assessment score has increased from 3.0 to 3.3. Per *Academic Analytics* the CEAS Scholarly Research Index (SRI) rose from 15% percentile to the 59% percentile of AAU public institutions.

**Interim Provost and Senior Vice President for Academic Affairs, Stony Brook University (SBU)**
*October 2020 – March 2021*: As Interim Provost and Chief Academic Officer for Stony Brook University (SBU), Dr. Sotiropoulos oversaw the academic mission of SBU's campuses at Stony Brook and Southampton, providing direct supervision for all academic units, support services and operations, and coordinating all academic programs. He was responsible for strategically stewarding a budget of over

$300M to sustain academic excellence, expand student success, and grow diversity, equity and inclusion across the range of programs in SBU's colleges, schools, research centers, and interdisciplinary institutes. He worked closely with the President, the Dean of the Medical School/Vice President of the Health Sciences Center and the Vice President for Research to advance the university's strategic budget initiative.

# HONORS AND AWARDS

- Borland Lecture in Hydraulics Award, *American Geophysical Union Hydrology Days*, 2019

- Elected Fellow of the *American Society of Mechanical Engineers*, 2018.

- State University of New York (SUNY) Distinguished Professor, 2017.

- American Society of Civil Engineers *Hunter-Rouse Hydraulic Engineering Prize* (2017): "*For generating a quantum leap forward in the development and application of computational fluid dynamics for waterways.*"

- Elected Fellow of the *American Physical Society* (2009): "*For seminal contributions in vortex dynamics, flow-structure interactions, and chaotic dynamics in civil, mechanical and biomedical applications.*"

- Sackler Distinguished Lecturer, *The Mortimer and Raymond Sackler Institute of Advanced Studies*, Tel Aviv University, Israel (2013-2014).

- *Kavli Institute for Theoretical Physics Invited Lecturer*, Program on *Geophysical Fluid-Particle Flows (GEOFLOWS13)*, Santa Barbara, CA (October 2013).

- Member of the *High-Fidelity Modeling* national panel convened by the Energy Efficiency and Renewable Energy office of the Department of Energy to develop and implement the strategic vision for DOE's A2E (Atmosphere to Electrons) Wind Energy Research center (2013-2015).

- *Journal cover pages and research highlights*: My research results have been featured 8 times on the cover of the most prestigious journals in my field and also included in special research highlights.

  Cover page of *Physics of Fluids*, Volume: 33, Issue: 6, June 2021. The image shows results of direct numerical simulation of expiratory aerosol transport during normal breathing with and without face masks.

  Paper published in *Physics of Fluids* (32, 011904, 2020), entitled "*Water exit dynamics of jumping archer fish: Integrating two-phase flow large- eddy simulation with experimental measurements,*" featured in American Institute of Physics [Scilight](#).

  Cover page of *Nature Energy*, October 2018 issue. The image shows experimental results of a hydrokinetic turbine array interacting with migrating bedforms in a mobile open channel.

  Cover page of *Water Resources Research*, October 2016 issue. The image shows results of large eddy simulation of turbulent flow past a real-life rock structure used in stream restoration.

Cover page of *Physics of Fluids*, Volume: 28, Issue: 3, March 2016. The image shows results of direct numerical simulation of turbulent flow past anatomically realistic sharkskin denticles.

Cover page of *Physics of Fluids*, Volume: 28, Issue: 2, February 2016. The image shows quasi-equilibrium barchan dunes simulated via coupled hydro-morphodynamic LES.

Cover page of the *ASME Journal of Biomechanical Engineering*, Volume 132 (1), 2010. The image shows numerical simulations of blood flow patterns on the leaflets of the aortic valve.

Work on aquatic swimming featured in *Inside the Journal of Experimental Biology*, a section of the *Journal of Experimental Biology* that highlights in lay language key developments in biology: *Simulated Fish Races Suggest that Water Shaped Fish*, *J. Exp. Biol*. 2010 213.

Cover page of the *Journal of Experimental Biology,* volume 212, issue 4, 2009. The image shows numerical simulations of anguilliform swimming.

Cover page of the *ASCE Journal of Hydraulic Engineering*, January 2004-2015. The image shows numerical simulations of 3D, unsteady turbulent flow past complex bridge piers.

- *Twice winner of the APS-DFD Gallery of Fluid Motion competitio*n: Every year, the APS Division of Fluid Dynamics hosts a Gallery of Fluid Motion competition at its annual meeting. The most outstanding entries are selected by a panel of referees for artistic content and honored for their originality and ability to convey information. Winning entries are published in the journal *Physics of Fluids*.

    2011 Gallery of Fluid Motion Contest Winner (with T. Le, D. Coffey, and D. Keefe), American Physical Society, 64st APS/DFD meeting, Baltimore, Maryland. Video entry: "*Vortex formation and instability in the left ventricle*"

    2009 Gallery of Fluid Motion Contest Winner (with I. Borazjani), American Physical Society, 61st APS/DFD meeting, San Antonio, Texas. Video entry: "*Why don't mackerels swim like eels? The role of form and kinematics on the hydrodynamics of undulatory swimming*"

- Associate editor and board member of peer reviewed journals:
    *ASME Journal of Biomechanical Engineering*: Associate editor (2011 – 2013)
    *Computers & Fluids*: Editorial board (2011 – present)
    *ASCE Journal of Hydraulic Engineering*: Guest editor of special issue "River Flow Hydrodynamics: Physical and Ecological Aspects," 2010.
    *International Journal of Heat and Fluid Flow*: Editorial board (2006 – present)
    *ASCE Journal of Hydraulic Engineering*: Associate editor (2002 – 2015)

- Invited participant, National Academy of Engineering 2005 German-American Frontiers of Engineering, Potsdam, Germany, May 4-7, 2005

- Invited Participant, National Academy of Engineering 8th Annual Symposium on Frontiers of Engineering, Irvine, CA, Sept. 19-21, 2002

- Early Career Development (CAREER) award, National Science Foundation (1999-2003)

- Authored 10 invited journal papers, including vision and review papers and original research papers in special issues with best papers from conferences:

    *Annual Review of Fluid Mechanics*, entitled "Fluid Mechanics of Heart Valves and Their Replacements." (2016).
    > The Annual Review of Fluid Mechanics is the most prestigious review journal in fluid mechanics. Paper submissions are strictly by invitation from the editors.

    *IAHR Journal of Hydraulic Research,* vision paper invited by editor *(2015)*

    *Physics of Fluids*, vision paper invited by editors (2015)

    *Progress in Aerospace Science*, Review paper on "*Immersed Boundary Methods for Fluid Structure Interactions*," invited by the editor (2013).
    > *Progress in Aerospace Science* is a prestigious review journal. Paper submissions are strictly by invitation from the editors.

    *International Journal of Heat and Fluid Flow*, invited for special issue with best papers from the 6$^{rd}$ Turbulence and Shear Flow Phenomena Meeting (Seoul, S. Korea, June 2009) (2010).

    *Medical and Biological Engineering and Computing*, review paper invited by editor (2009).

    *Journal of Flow Turbulence and Combustion*, invited for special issue with best papers from the IUTAM Symposium on "Unsteady Separated Flows and their Control," (Corfu, Greece, June 20, 2007) (2011).

    *International Journal of Heat and Fluid Flow*, invited for special issue with best papers from the 3$^{rd}$ Turbulence and Shear Flow Phenomena Meeting (Sendai, Japan, June 2003) (2003).

    1998 Paper presented at the 11$^{th}$ Turbulent Shear Flows Meeting (Grenoble, Sept. 1997) was selected by the Editors-in-Chief (B. E. Launder, N. Kasagi, and F. W. Schmidt) of the *International Journal of Heat and Fluid Flow* and included in a special issue containing the best papers from the meeting.

- James L. Record Professorship, Department of Civil Engineering, University of Minnesota (2008-2015)

# PEER REVIEWED JOURNAL PAPERS & BOOK CHAPTERS

[Google Scholar](#) citations >13200, H-index 67

## A. BOOKS CHAPTERS

1. Gilmanov, A., Stolarski, H., and Sotiropoulos, F., "Coupling the Curvilinear Immersed Boundary Method with Rotation-Free Finite Elements for Simulating Fluid–Structure Interaction: Concepts and Applications," *Immersed Boundary Method* (edited by Roy, Somnath, De, Ashoke, Balaras, Elias), Springer Singapore, pp. 107-138, 2020.
2. Kang, S., Khosronejad, A., and Sotiropoulos, F., "Numerical simulation of turbulent flow and sediment transport processes in arbitrarily complex waterways," *Environmental Fluid Mechanics*, *Memorial Volume in Honor of Prof. Gerhard H. Jirka*, Eds. W. Rodi & M Uhlmann, CRC Press (Taylor and Francis group), pp. 123-151, 2012.
3. Sotiropoulos, F., Diplas, P., Khosronejad, A. "Scour around hydraulic structures," in the *Handbook of Environmental Fluid Dynamics* (edited by H. J. S. Fernando), Taylor and Francis, ISBN: 9781439816691, 2012.
4. Sotiropoulos, F., Aidun, C., Borazjani, I., and MacMeccan, R., "Computational Techniques for Biological Flows: From Blood-Vessel Scale Hemodynamics to Blood-Cells," *Image-Based Computational Modeling in the Human Circulatory System* (edited by Chandran, Udaykumar, and Reinhardt), *Springer Verlag*, Pages: 105-155   DOI: 10.1007/978-1-4419-7350-4_3 , 2011.
5. Sotiropoulos, F., "Experimental Visualization of Lagrangian Coherent structures Using Eulerian Averaging," *Analysis and Control of Mixing with Application to Micro and Macro Flow Processes*, Book Series: CISM Courses and Lectures, Issue: 510   Pages: 275-290   Published: 2009.
6. Sotiropoulos, F., "Turbulence Modeling for Environmental Flows," in *Computational Fluid Mechanics: Applications in Environmental Hydraulics*, John Willey, 2005.
7. Sotiropoulos, F., "Progress in Modeling 3-D Shear Flows Using RANS Equations and Advanced Turbulence Closures," Chapter 6 in *Calculation of Complex Turbulent Flows*, *Advances in Fluid Mechanics Series*, WIT Press, Southampton, UK (2000), pp. 209-248.

## B. REFEREED ARCHIVAL JOURNALS

1. Khosronejad, A., Kang, S., Wermelinger, F., Koumoutsakos, P. and Sotiropoulos, F., "A computational study of expiratory particle transport and vortex dynamics during breathing with and without face masks," *Physics of Fluids*, Volume 33, Issue 6, June 2021.
2. Yang, X., Milliren, C., Kistner, M., Hogge, C., Marr, J., Shen, L., and Sotiropoulos, F., "High-fidelity simulations and field measurements for characterizing wind fields in a utility-scale wind farm," *Applied Energy*, Volume 281, 116115, 2021.
3. Khosronejad, A., Herb, W., Sotiropoulos, F., Kang, S., and Yang, X., "Assessment of Parshall flumes for discharge measurement of open-channel flows: A comparative numerical and field case study," *Measurement*, Vol. 167, 108292, 2021.
4. Hill, C., Neary, V. S., Guala, M., and Sotiropoulos, F., "Performance and Wake Characterization of a Model Hydrokinetic Turbine: The Reference Model 1 (RM1) Dual Rotor Tidal Energy Converter," *Energies*, 13(19), 5145, 2020.
5. Yang, Y., Foti, D., Kelley, C., Maniaci, D., and Sotiropoulos, F., "Wake Statistics of Different-Scale Wind Turbines under Turbulent Boundary Layer Inflow, *Energies* 13(11), 3004, 2020.
6. Khosronejad, A., Santoni, C., Flora, K., Zhang, X., Kang, S., Payabvash, S., and Sotiropoulos, F., "Fluid dynamics simulations show that facial masks can suppress the spread of COVID-19 in indoor environments," *AIP Advances* 10, 125109, 2020.

7.  Khosronejad, A., and Sotiropoulos, F., "A short note on the simulation of turbulent stratified flow and mobile bed interaction using the continuum coupled flow and morphodynamics model," *Environmental Fluid Mechanics*, 20, pages1511–1525, 2020.

8.  Le, T., Christenson, A., Calderer, A., Stolarski, H., and Sotiropoulos, F., "A thin-walled composite beam model for light-weighted structures interacting with fluids," *J. Fluids and Structures*, 95, 102968, 2020.

9.  Kang. S., Khosronejad, A., Hill, G., and Sotiropoulos, F., "Mean Flow and Turbulence Characteristics around Multiple-Arm Instream Structures and Comparison with Single-Arm Structures," *ASCE Journal of Hydraulic Engineering* 146 (5), 04020030, 2020.

10. Kang. S., Khosronejad, A., Hill, G., and Sotiropoulos, F., "Mean flow and turbulence characteristics around single-arm instream structures," *Journal of Hydraulic Research,* DOI: 10.1080/00221686.2020.1780494, 2020.

11. Khosronejad, A., Kang., S., Farhadzadeh, A., and Sotiropoulos, F., "On the genesis and evolution of barchan dunes: Hydrodynamics," *Physics of Fluids* 32, 086602, 2020.

12. Khosronejad, A., Mendelson, L., Techet, A., Kang., S., Angelidis, D., and Sotiropoulos, F., "Water exit dynamics of jumping archer fish: Integrating two-phase flow large- eddy simulation with experimental measurements," *Physics of Fluids* 32, 011904, 2020—**featured paper**.

13. Khosronejad, A., Diplas, P., Angelidis, D., Zhang, Z., Heydari, N., and Sotiropoulos, F., "Scour depth prediction at the base of longitudinal walls: a combined experimental, numerical, and field study," *Environmental Fluid Mechanics*, 20:459–478, 2020.

14. Gilmanov, A., Barker, A., Stolarski, H., and Sotiropoulos, F., "Image-Guided Fluid-Structure Interaction Simulation of Transvalvular Hemodynamics: Quantifying the Effects of Varying Aortic Valve Leaflet Thickness," *Fluids*, 4(3), 119, 2019.

15. Yang, X., and Sotiropoulos, F., "On the dispersion of contaminants released far upwind of a cubical building for different turbulent inflows," *Building and the Environment*, Volume 154, Pages 324-335, 2019.

16. Sotiropoulos, F., "Hydraulic Engineering in the Era of Big Data and Extreme Computing:  Can Computers Simulate River Turbulence?" ASCE *Journal of Hydraulic Engineering* 145 (6), 02519002, 2019 - **invited forum paper**.

17. Mohammadi, M. J., Sotiropoulos, F., and Brinkerhoff, J., "Moving least squares reconstruction for sharp interface immersed boundary methods," *International Journal for Numerical Methods in Fluids*, 90(2), pp. 57-80, 2019.

18. Mohammadi, M. J., Sotiropoulos, F., and Brinkerhoff, J., "Eulerian-Eulerian large eddy simulation of two-phase dilute bubbly flows," *Chemical Engineering Science*, Volume 208, 23 November 2019.

19. Foti, D., Yang, X., Shen, L., and Sotiropoulos, F., "Effect of wind turbine nacelle on turbine wake dynamics in large wind farms," *Journal of Fluid Mechanics*, 869, 1-26, 2019.

20. Yang, X., and Sotiropoulos, F., "Wake characteristics of a utility-scale wind turbine under different operating conditions," *Physical Reviews Fluids*, 4 (2), 024604, 2019.

21. Yang, Z, Calderer, A., He, S., Sotiropoulos, F., et al., "Measurement-Based Numerical Study of the Effects of Realistic Land Topography and Stratification on the Coastal Marine Atmospheric Surface Layer," *Boundary Layer Meteorology*, Volume 171, Issue 2, pp 289–314, 2019.

22. Le, T., Elbaz, M.S.M., Van Der Geest, R.J., Sotiropoulos, F., "High Resolution Simulation of Diastolic Left Ventricular Hemodynamics Guided by Four-Dimensional Flow Magnetic Resonance Imaging Data," *Flow Turbulence and Combustion*, Volume 102, Issue 1, pp 3–26, 2019.

23. Le, T. Khosronejad, A., Sotiropoulos, F. et al., "Large-eddy simulation of the Mississippi River under base-flow condition: hydrodynamics of a natural diffluence-confluence region," *IAHR Journal of Hydraulic Research*, https://doi.org/10.1080/00221686.2018.1534282, 2018.

24. Yang, X., Pakula, M, and Sotiropoulos, F., "Large-eddy simulation of a utility-scale wind farm in complex terrain," *Applied Energy*, Volume 229, Pages 767-777, 1 November 2018.

25. Musa, M., Hill, G., Sotiropoulos, F., and Guala, M., "Performance and resilience of hydrokinetic turbine arrays under large migrating fluvial bedforms," *Nature Energy*, July 18, 2018.

26. Daniel Foti, D., Yang, X., Campagnolo, F., Maniaci, D., and Sotiropoulos, F. "Wake meandering of a model wind turbine operating in two different regimes," *Physical Review Fluids* 3 (5), 054607, 2018.

27. Foti, D., Xiaolei, Y., and Sotiropoulos, F., "Similarity of wake meandering for different wind turbines designs for different scales," *Journal of Fluid Mechanics*, 842, 5-25, 2018.

28. Yang, Z., Calderer, A., He, S., Sotiropoulos, F., Doyle, J., Flagg, D., MacMahan, J., Wang, Q., Haus, B., Shen, L., "Numerical study on the effect of air--sea—land interaction on the atmospheric boundary layer in coastal area," *Atmosphere*, 9 (2), 51, 2018.

29. Chawdhary, S., Angelidis, D., Colby. J., Corren, D., Shen, L., and Sotiropoulos, F., "Multiresolution Large-Eddy Simulation of an Array of Hydrokinetic Turbines in a Field-Scale River: The Roosevelt Island Tidal Energy Project in New York City," *Water Resources Research*, 54 (12), 10,188-10,204, 2018.

30. Yang, X., and Sotiropoulos, F., "A new class of actuator surface models for wind turbines," *Wind Energy*, Volume: 21, Issue: 5, Pages: 285-302, 2018.

31. Chawdhary, S., Khosronejad, A., Christodoulou, G., and Sotiropoulos, F., "Large eddy simulation of density current on sloping bed," *Int. J. of Heat & Mass Transfer*, 120, 1374-1385, 2018.

32. Calderer, A., Shen, L., and Sotiropoulos, F., "Fluid-structure interaction simulation of floating structures interacting with complex, large-scale ocean waves and atmospheric turbulence," *J. Comp. Physics*, 355, 144-175, 2018.

33. Gilmanov, A., Stolarski, H, and Sotiropoulos, F., "Flow–Structure Interaction Simulations of the Aortic Heart Valve at Physiologic Conditions: The Role of Tissue Constitutive Model," *J. of Biomechanical Engineering*, 140 (4), 041003, 2018.

34. Khosronejad, A., Kozarek, JL, Diplas, P., Hill, H., Jha, R., Chatanantavet, P., Heydari, N., and Sotiropoulos, F., "Simulation-based optimization of in-stream structures design: rock vanes," Environmental Fluid Mechanics, 1-44, 2018.

35. Yang, X. Khosronejad, A., and Sotiropoulos, F., "Large-eddy simulation of a hydrokinetic turbine mounted on an erodible bed," *Renewable Energy*, 113, 1419-1433, 2017.

36. Chawdhary, S., Hill, G., Yang, X., Guala, M., Sotiropoulos, F., "Wake Characteristics of a Tri-frame of Axial-flow Hydrokinetic Turbines," *Renewable Energy*, 109, 332-345, 2017.

37. Foti, D., Yang, X., Campagnolo, F., Maniaci, D., and Sotiropoulos, F., "On the use of spires for generating inflow conditions with energetic coherent structures in large eddy simulation," *Journal of Turbulence*, 18 (7), 611-633, 2017.

38. Foti, D., Yang X., and Sotiropoulos F., "Uncertainty quantification of infinite aligned wind farm performance using non-intrusive polynomial chaos and a distributed roughness model," *Wind Energy*, 20 (6), 945-958, 2017.

39. Khosronejad, A., Feist, C., Marr, J., and Sotiropoulos, F., "Experimental and computational study of a high-Reynolds jet flow," *Canadian J. Civil Eng.*, 44(7), 569-578, 2017.

40. Khosronejad, A., and Sotiropoulos, F., "On the genesis and evolution of barchan dunes: Morphodynamics," *J. Fluid Mechanics*, 815, 117-148 2017.

41. Gilmanov, A., Stolarski, H., and Sotiropoulos, F., "Non-linear rotation-free shell finite-element models for aortic heart valves," *Journal of Biomechanics*, 50, 56-62, 2017.

42. Khosronejad, A., Le, T., DeWall, P., Bartelt, N., Woldeamlak, S., Yang, X., and Sotiropoulos, F., "High fidelity numerical modeling of Upper Mississippi River under extreme flood condition," *Adv. Water Resources*, 98, 97-113, 2016.

43. Kang, S., Hill, C., and Sotiropoulos, F., "On the turbulent flow structure around an instream structure with realistic geometry," (DOI: 10.1002/2016WR018688), *Water Resources Research*, 2016.

44. Angelidis, D., Chawdhary, S., and Sotiropoulos, F., "Unstructured Cartesian refinement with sharp interface immersed boundary method for 3D unsteady incompressible flows, *J. Computational Physics*, 325, 272-300, 2016.

45. Yang X.; Hong J.; Barone M., Sotiropoulos F., "Coherent dynamics in the rotor tip shear layer of utility scale wind turbines," *Journal of Fluid Mechanics*, 804, pp. 90-115, 2016.

46. Behara, S., and Sotiropoulos, F., "Vortex-induced vibrations of an elastically mounted sphere: The effects of Reynolds number and reduced velocity," *J. of Fluids and Structures*, 66, 54-68, 2016.

47. Foti D., Yang, X., Guala M., and Sotiropoulos F., "Wake meandering statistics of a model wind turbine: Insights gained by large eddy simulation," *Phys. Review Fluids*, 1 (4), 044407, 2016.

48. Boomsma, A., and Sotiropoulos, F., "Direct Numerical Simulation of Sharkskin Denticles in Turbulent Channel Flow," *Physics of Flui*ds, Volume: 28, Issue: 3, Article Number: 035106 2016.

49. Hill, C., Kozarek, J., Sotiropoulos, F., and Guala, M., "Hydrodynamics and sediment transport in a meandering channel with a model axial hydrokinetic turbine," *Water Resources Research*, Volume: 52, Issue: 2, Pages: 860-879, 2016.

50. Khosronejad, A., Kozarek, J. L., Hansen, A. T., Guentzel, K., Hondzo, M., Wilcock, P., Guala, M., and Sotiropoulos, F., "Large-Eddy Simulation of Turbulence and Solute Transport in a Forested Headwater Stream," *J. of Geophysical Research – Earth Surface*, Volume: 121, Issue: 1, Pages: 146-167, 2016.

51. Yang, X., and Sotiropoulos, F., "Analytical model for predicting the performance of arbitrary size and layout wind farms," *Wind Energy*, Volume: 19  Issue: 7  Pages: 1239-1248, 2016.

52. Sotiropoulos F., Le, T., and Gilmanov, A., "Fluid Mechanics of Heart Valves and Their Replacements," *Annual Reviews of Fluid Mechanics*, Volume: 48, Pages: 259-283, 2016 **- invited paper**.

53. Sotiropoulos, F., and Khosronejad, A., "Sand Waves in Environmental Flows: Insights gained by coupling LES with morphodynamics," *Physics of Fluids*, Volume: 28, Issue: 2, Article Number: 021301, 2016 - **invited vision paper**.

54. Sotiropoulos, F., "Hydraulics in the era of exponentially growing computing power," by the editor, *IAHR Journal of Hydraulic Research*, Volume: 53, Issue: 5, Pages: 547-560, 2015 - **invited vision paper**

55. Boomsma, A., and Sotiropoulos, F., "Riblet Drag Reduction in Mild Adverse Pressure Gradients: A Numerical Investigation," *International Journal of Heat and Fluid Flow*, Volume: 56  Pages: 251-260, 2015.

56. Chamorro, L., Hill, C., Neary, V. S., Gunawan, B., Arndt, R.E.A., and Sotiropoulos, F., "Effects of energetic coherent motions on the power and wake of an axial flow turbine," *Physics of Flui*ds, 27 (5), art. no. 055104, 2015.

57. Gilmanov, A., and Sotiropoulos, F., "Comparative Hemodynamics in an Aorta with Bicuspid and Trileaflet Valves," *J. of Theoretical and Computational Fluid Dynamics*, Volume: 30  Issue: 1-2 Pages: 67-85, 2016 - **invited for special issue** on *Recent Advances in Computational Modeling of Physiological Flows*.

58. Gilmanov, A., Le, T., and Sotiropoulos, F., "A Numerical Approach for Simulating Fluid Structure Interaction of Flexible Thin Shells Undergoing Arbitrarily Large Deformations in Complex Domains," *J. of Computational Physics*, 300, 814–843, 2015.

59. Khosronejad, A., Kozarek, J. L., Hill, C., Diplas, P., Jha, R., and Sotiropoulos, F., "Simulation-based approach for stream restoration structure design: J-hook vanes," IAHR *Journal of Hydraulic Research,* 53  Issue: 5  Pages: 588-608, 2015.

60. Yang, X., and Sotiropoulos, F., "Analytical model for predicting the performance of arbitrary size and layout wind farms," *Wind Energy*, DOI: 10.1002/we.1894, 2015.

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# CONFERENCE KEYNOTE AND MAJOR INVITED LECTURES

1. "On the structure of turbulence in wind turbine wakes: Insights gained by numerical simulations and experiments," Distinguished Wind Energy Seminar, Dept. of Mechanical Engineering, UT Dallas, July 9, 2021.

2. "Numerical Modeling in Hydro-Environment Research: Current Capabilities and Avenues for Advancements," Keynote Lecture, 1st Online IAHR Forum, Fluid Mechanics of Hydro-Environment: Focus for the Next Decade, July 2, 2021.

3. *"Coupled Problems in Control Co-design of Large Wind Farms,"* Keynote Lecture, Coupled 2021, Chia Laguna, Sardinia, South Sardinia, Italy, June 15 2021.

4. "*High Fidelity Computational Framework for Control Co-Design of Utility Scale Wind Farms: Reducing the Levelized Cost of Energy via Advanced Turbine Controls*," Keynote Lecture, Thematic Session on Computational Fluid Dynamics, 25th International Congress of Theoretical and Applied Mechanics, 23-28 August 2020, Milano, Italy (canceled due to COVID-19).

5. "*Tackling Complex Flow Problems via Numerical Simulation: From Heart Valves to Wind Energy and River Flooding*," New York University Tandon School of Engineering Dean's Lecture, New York, NY, November 22, 2019.

6. "*On the structure of turbulence in wind turbine wakes: Novel insights gained by numerical simulations and field experiments*," Distinguished Lecture, University of Utah, Salt Lake City, March 29, 2019.

7. "*Hydraulic Engineering in the Era of Big Data & Extreme-Scale Computing*," Borland Hydraulics Lecture, AGU Hydrology Days meeting, Colorado State University, Fort Collins, Colorado, March 27, 2019.

8. "*On the Hemodynamics of Aortic Valves: Insights Gained by Image-Guided FSI Simulations*," Keynote Lecture, Cardiac Hemodynamics Symposium, 55th Annual Meeting of the Society of Engineering Science, Madrid, Spain, October 2018.

9. "*Simulating Turbulence and Sediment Transport in Real-Life Waterways*," Keynote Lecture, ASCE-EWRI Hydraulic Measurement & Experimental Methods Conference, Durham, New Hampshire, July 2-7, 2017.

10. "*Sustainability challenges in the water-energy-climate nexus: The Role of Computational Science*," Tiscornia Lecture, University of Genova, Genova, Italy, September 30, 2016.

11. "*Numerical Simulation of Sand Waves in Turbulent Flows: From Sediment Grains to Mega-Dunes*," Keynote Lecture, International Conference on Model Integration across Disparate Scales in Complex Turbulent Flows, Penn State University, June 15-17, 2015.

12. "*Simulation-Based Approach for Site-Specific Optimization of Marine and Hydrokinetic Energy Conversion Systems*," keynote lecture, special session on Marine & Renewable Energy, 36th IAHR World Congress, 28 June – 3 July, 2015, The Hague, The Netherlands.

13. "*Sand waves in environmental flows: Insights gained by LES*," keynote lecture, 67th Annual American Physical Society DFD Meeting, San Francisco, Nov. 23-25, 2014.

14. "*Computational Studies of Fluid Structure Interaction in Biological Flows*," invited lecture, Workshop on the Fluid Mechanics of Collective Behavior Across Scales, organized by ETH Zurich, Castasegna, Switzerland, Sept. 22-26 2014.

15. "*Sharp-interface immersed boundary methods for simulating fluid-structure interaction problems in energy, environment and human health applications: State of the art and future ventures*," Keynote Lecture, CFD2014, Trondheim, Norway, June 17-19, 2014.

16. "*Numerical Simulation of Sand Waves in Turbulent Open Channel Flows*," Sackler Institute for Advanced Studies Distinguished Lecture, Tel Aviv University, Tel Aviv, Israel, May 21, 2014.

17. "*On the structure of Turbulence in Wind Turbine Wakes*," Sackler Institute for Advanced Studies Distinguished Lecture, Tel Aviv University, Tel Aviv, Israel, May 19, 2014.

18. "*Complex Flows in Wind Plants*," invited lecture, AWEA Wind Power 2014, Las Vegas, Nevada, May 6, 2014.

19. "*On the Mechanisms of Wake Meandering in Axial Flow Turbines: Insights Gained by Large-Eddy Simulation*," Keynote talk, International Conference on Future Technologies for Wind Energy," Laramie, Wyoming, Oct. 7-9, 2013.

20. "*Large-eddy simulation of hydro-morphodynamics: From ripples in scour holes to mega-dunes in large rivers*," invited lecture, Kavli Institute for Theoretical Physics, October 1, 2013.

21. "*Wake Meandering in Axial Flow Turbines; New Insights from multi-resolution LES and implications for modeling wind-farm/atmosphere interactions*," invited lecture, Argonne National Laboratory Workshop on Atmospheric Modeling at LES Scales: Opportunities and Challenges, Argonne, IL, Sept. 4-5, 2013.

22. "*Fluid mechanics challenges in energy, environment and health: Insights Gained via Numerical Simulation*," Distinguished Cash Lecture, Edward E. Whitacre Jr. College of Engineering, Texas Tech University, March 25, 2013.

23. "*Numerical simulation of bed morphodynamics in natural waterways: From ripples to dunes*," invited lecture, AGU Fall meeting, Earth Processes – Modeling Developments for Sediment Transport and Other Multiphase Flows, San Francisco, CA, Dec. 7, 2012

24. "*Science-Based Approach for Advancing Marine and Hydrokinetic Energy: Integrating Numerical Simulations with Experiments*," AGU Fall meeting, Ocean Sciences – Marine & Renewable Energy, San Francisco, CA, Dec. 9, 2011

25. "*Hydraulic & Environmental Engineering in the 21st Century*," Centennial Celebration Lecture, Hydraulic & Environmental Engineering Department, Catholic University of Santiago, Santiago, Chile, Nov. 8, 2011

26. "*Tackling environmental challenges in hydropower facilities with CFD modeling Recent Advances and Future Challenges*," Keynote Lecture, Jacques Cartier International Symposium on the Future of Hydroelectric Power, Montreal, Canada, October 4, 2011

27. "*Patient-Specific Simulation of Cardiac Devices: Recent advances and future challenges*," Keynote Lecture, High Performance Computing Symposium (HPCS – 2011): HPC in Medical Science, Montreal, Canada, June 14, 2011
28. "*Turbulent Flow and Sediment Transport Phenomena in Natural Waterways Insights gained by Large-Eddy Simulation*," Keynote Lecture, Gerhard Jirka Memorial Colloquium, Institute for Hydromechanics, Karlsruhe Institute of Technology, Karlsruhe, Germany, June 3-4, 2011.
29. "*The Curvilinear Immersed Boundary Method Applications to Engineering, Environmental & Biological Flows*," Keynote Lecture, International Symposium on Computational Fluid Engineering, Yonsei University, Seoul, Korea, April 11, 2011
30. "*Advanced Computational Fluid Dynamics Modeling for Real-Life Hydraulic Engineering Flows: Toward the Virtual StreamLab*," Keynote Lecture, Chilean Congress of Hydraulic Engineering, October 19-22, 2009.
31. "*Visualizing Coherent Vortices in Simulated Engineering and Biological Flows: From Rings and Hairpins to Horseshoes and Worms*," Keynote Lecture, 9th Asian Symposium on Visualization (9ASV), Hong Kong, China, June 4-8, 2007.
32. "*Modeling 3D Flows in Arbitrarily Complex Domains with Deformable Immersed Boundaries: From Hydrodynamics to Biofluids*," Keynote Lecture, ASME/WSEAS Int. Conference on FLUID MECHANICS, Corfu Island, Greece, August 17-19, 2004.
33. "*Toward Quantitatively Accurate CFD Predictions of Hydroturbine Flows*," Keynote Lecture, 20th IAHR Symposium on Hydraulic Machinery and Systems, Charlotte, NC, August 2000.

# INVITED LECTURES AT ACADEMIC INSTITUTIONS

UT Dallas, University of Southern California, Department of Aerospace and Mechanical Engineering, April 22, 2020; MIT, Department of Mechanical Engineering, March 31, 2020; George Washington University, Mechanical and Aerospace Engineering Department, Washington DC, October 10, 2019; Imperial College London, Department of Aeronautics, London, UK, March 19, 2019; Stanford University Fluid Mechanics Lecture, Stanford, CA, February 2018; Environmental Fluid Dynamics Lecture, Department of Civil Engineering, Notre Dame University, South Bend, IN, October 2017; Department of Civil Engineering, Louisiana State University, February 2016; Fluid Dynamics Research Consortium Seminar, Penn State University, May 2015; Department of Mechanical and Aerospace Engineering, Princeton University, April 10, 2015; Department of Mechanical Engineering, UC Santa Barbara, Santa Barbara, CA, October 20, 2014; Inst. For Water Management, Hydrology & Hydraulic Engineering, BOKU University, Vienna, Austria, September 29, 2014; School of Mechanical Engineering, Purdue University, West Lafayette, IN, September 10, 2014; Department of Mechanical Engineering, Utah State University, Logan, UT—March 28, 2014; Department of Mechanical and Process Engineering, ETH-Z, Zurich, Switzerland—April 18, 2013; Institute of Mechanical Engineering, EPFL, Lausanne, Switzerland—April 16, 2013; Mayo Clinic Bioengineering Lecture, Dept. of Physiology and Biomedical Engineering, Rochester MN—March 8, 2013; Bruce Podwal Seminar Series, Dept. of Civil Engineering, City College of New York, New York, NY—April 17, 2012; School of Mechanical Engineering, Tel Aviv University, Tel Aviv, Israel—April 2, 2012; Argonne National Laboratory, Argonne, IL – February 10, 2012; Dept. of Mechanical & Material Engineering, Portland State University, Portland Oregon - Nov. 2011; Dept. of Civil and Environmental Engineering, University of Texas at Austin, Austin, TX - Sept. 2011; Dept. of Mechanical and Industrial Engineering, University of Iowa, Iowa City, IA - February 10, 2011; Civil & Environmental Engineering Seminar Series, École Polytechnique Fédérale Lausanne (EPFL), Switzerland - Nov. 4, 2010; Dept. of Mechanical Engineering, University of Houston - August 12, 2010; George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology (Feb. 11, 2010); Dept. of Mechanical Engineering, Columbia University - Jan. 29, 2010; Ocean Engineering Seminar, Massachusetts Institute of Technology – May 1, 2009; Applied Mathematics Colloquium, Brown University - April 30, 2009; Department of Civil Engineering, Yonsei University, South Korea - April 13, 2009; GALCIT colloquium, California Institute of Technology - February 8, 2008; Dept. of

Civil and Environmental Engineering, University of Michigan - April 6, 2007; Center for Environmental and Applied Fluid Mechanics, Johns Hopkins University - March 2, 2007; Environmental Fluid Mechanics Laboratory, Dept. of Civil Engineering, Stanford University - February 13, 2007; ETH Zurich Computational Laboratory, Zurich, Switzerland - April 19, 2006; Saint Anthony Falls Laboratory, University of Minnesota, Minneapolis, MN - Nov. 9, 2005; Laboratory for Hydraulic Machines, Ecole Polytechnic Federal de Lausanne (EPFL), Lausanne, Switzerland - May 3 2005; Department of Building, Civil & Environmental Engineering, Concordia University, Montreal, Canada - May 20, 2005; Boeing Corporation, Renton, WA - September 23, 2003; Battelle Seattle Research Center, Seattle, WA - September 22, 2003; Oak Ridge National Laboratory, Oak Ridge, TN - April 23, 2003; Department of Mathematics and Computer Science, Emory University, Atlanta, Georgia -  October 11, 2002; US Army Corps of Engineers, Portland, Oregon - July 2002; Department of Civil and Environmental Engineering, The University of Iowa, Iowa City, IA - April 12, 2002; University of Ottawa, Canada - February 15, 2002; MW       HARZA, Chicago, Illinois - December 18, 2001; *Applied Mechanics Colloquium*, Division of Engineering and Applied Science, Harvard University - February 28, 2001; Department of Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ - February 15, 2000; Laboratory of Geophysical and Industrial Flows, Grenoble National Polytechnic Institute, Grenoble, France - October 27, 1999; Department of Civil and Environmental Engineering, Virginia Tech - October 20, 1999; US Army Corps of Engineers, Portland, Oregon - July 1997; US Army Corps of Engineers, Waterways Experimental Station,  Vicksburg, Mississippi - April 1997; Centre for Research on Computation and its Application (CERCA), University of Montreal, Montreal - March 27, 1997; Department of Mechanical Engineering, Florida State University - March 26, 1996;  Ecole Central de Nantes, Fluid Mechanics Laboratory, Division of Numerical Modeling, Nantes, France - April 29-30, 1996; Department of Mechanical Engineering, University of Manchester, Manchester, UK - June 10, 1996; Hydrosystems Group," Oak Ridge National Laboratory, Oak Ridge, TN - November 13, 1995; Dept. of Mech. and Aerospace Eng., Arizona State University - October 5, 1994.

# INVITED SYMPOSIA, WORKSHOPS, & PANEL TALKS

*Minisymposium: Flying Fish and Diving Birds,* 70th Annual APS-DFD Meeting, Denver, CO, Nov. 19-21, 2017; Sandia National Laboratories *Wind Turbine Blade Workshop*, Albuquerque, NM, August 26, 2014; Mathematical Biosciences Institute (Ohio State Univ.) workshop on "*Mathematics Guiding Bioartificial Heart Valve Design*," Columbus, OH, Oct. 28-Nov. 1, 2013; NSF workshop on "*Environmental and Extreme Multiphase Flows*," Gainesville, FL, March 14-16, 2012; DOE workshop on "*Complex wind energy flows*," Boulder, CO, Jan. 17-19, 2012; Cornell University Workshop on wind energy, Ithaca, NY, December 6-7; Special session on "Lagrangian Coherent Structures and Invariant Manifolds," *8th AIMS Conference on Dynamical Systems, Differential Equations and Applications*, Dresden, Germany, May 25 - 28, 2010; VCU/NHLBI *Workshop on Modeling the Heart in 3D* (sponsored by NIH) Virginia Commonwealth University, Richmond, VA, October 14-16; Computational Hydraulics for Transportation Workshop, Argonne Lab, West Chicago, IL, September 23-24; FDA/ NHLBI/ NSF Workshop on Computer Methods for Cardiovascular Devices, Rockville, MD, June 1-2; *International Symposium on River Restoration*, hosted by the EcoRiver21 Research Center, Yonsei University, Seoul, Korea, April 14; FDA/NIH/NSF panel on computational modeling for cardiovascular device design, invited to represent academia in the area of heart valves, Rockville, MD, 10/29/08; Mini-symposium on *Flow Control in Aquatic Systems and its Application to Bio-inspired Autonomous Underwater Systems* at 3rd International Conference "Smart Materials, Structures and Systems," Sicily, Italy, June 8 to 13, 2008; Session on *Computer-Aided design of Medical Devices* at the *Design of Medical Devices Conference*, April 15 – 17, 2008, Minneapolis, MN; *5th Int. Bio-Fluid Symposium and Workshop*, California Institute of Technology, Pasadena, California, March 28 – 30; VCU/NHLBI *Workshop on Computational Modeling and Simulation of Cardiovascular and Cardiopulmonary Dynamics* (sponsored by NIH) Virginia Commonwealth University, Richmond, VA, February 25; Mini-Symposium on

*Biomimetics and Fluid Mechanics* at the 2006 ECCOMAS; Conference on Computational Fluid Dynamics, Egmond aan Ze, The Netherlands.; Mini-symposium on *Advances in Turbulence Modeling* at 2006 International Conference on Hydroscience and Engineering (ICHE 2006), Philadelphia; Advanced course and workshop on "*Analysis and Control of Mixing with Application to Micro and Macro Flow Processes*" at the International Center for Mechanical Science (CISM) Udine (Italy), June 27-July 1; Panelist for session "Symposium III: Eco-Power: Using Modeling Tools for Environmental Gains," Waterpower XIV Conference in Austin, Texas, July 18-22; Symposium on "Advances in Modeling of the Cardiovascular System" at the 12th International Conference on Biomedical Engineering, Singapore Dec 7-10; Mini-symposium on *Advances in Turbulence Modeling at 2004 International  Conference on Hydroscience and Engineering*, Brisbane, Australia, May 30 – June 3; NSF/NIH Workshop on Transport Processes in Biomedical Systems, Bethesda, MA, May 6-7; *International Bio-Fluid Mechanics Workshop and Symposium* California Institute of Technology, Pasadena, California, Dec. 13-15; Mini-Symposium on *Dynamical Systems and Control of Mixing*, *International Conference on Industrial and Applied Mathematics*, Sydney, Australia; Mini-Symposium on *Three-Dimensional Mixing*, *2003 SIAM Conference on Applications of Dynamical Systems*, Snowbird, Utah; Forum on the *Fluid Mechanics of Mixing Phenomena II: Fundamentals and Industrial Applications*, 2002 ASME FED Summer Meeting, Montreal, Canada.

# GRANTS AND CONTRACTS

## Active grants at Stony Brook University

*High-fidelity simulations and data-driven models with turbine controls for the design of bottom-fixed offshore wind farm layouts*
**DOE/NYSERDA National Offshore Wind Research & Development Consortium**
July 2020 – May 2023
Role: Principal investigator (Partners: Univ. of Minnesota, Sandia National Labs)        $1,100,000

## Completed grants

*Virtual Wind Simulator with Advanced Control & Aeroelastic Model for Improving the Operation of Wind Farms*
**XCEL Energy, Renewable Development Fund**
June 2015 – June 2020
Role: Principal Investigator; Co-PIs: Pete Seiler & Jiarong Hong, Univ. of Minnesota        $1,400,000

*Collaborative Research: Crossing the boundary: motion of solid objects across air-liquid interfaces*
**National Science Foundation**
June 2015 – December 2019
Role: Principal investigator        $200,000

*Scour at the Base of Retaining Walls and Other Longitudinal Structures*
**Transportation Research Board of the National Academies** (May 1, 2012 – Dec. 30, 2016)
Role: Principal Investigator (co-PI: Panos Diplas, Virginia Tech)        $500,000

*The Roosevelt Island Tidal Energy Project: Optimizing Novel Hydro-Kinetic Renewable Energy Systems via State-of-the-Art Computational Fluid Dynamics Research.*
**National Science Foundation** (Partnership for Innovation: Building Innovation Capacity).
June 2013 – May 2016
Role: Principal Investigator (co-PIs: Michele Guala, UMN; Verdant Power Inc.)        $600,000

*High-fidelity computational modeling of wind farms*
**Sandia National Laboratories** (April 2013 – March 2016)
Role: Principal Investigator        $450,000

*Scour at the Base of Retaining Walls and Other Longitudinal Structures*
**Transportation Research Board of the National Academies** (May 1, 2012 – Nov. 1, 2016)
Role: Principal Investigator (co-PI: Panos Diplas, Virginia Tech)        $500,000

*High Fidelity Simulation of Bridge Foundation Scour at the Mississippi River Bridge No. 9321*

**Minnesota Department of Transportation Contract No. 99008 Work Order No. 160** (May 2014-April 2015)
Role: Principal Investigator                                                            $100,000

*High-resolution computational algorithms for simulating offshore wind turbines and farms: Model development and validation.*
**US Department of Energy** (Jan. 1, 2012 - Dec. 31, 2015).
Role: Principal Investigator (co-PIs: Michele Guala, UMN; Sandia National Labs)        $1,200,000

*High-resolution computational algorithms for simulating offshore wind turbines and farms: Model development and validation.*

**University of Minnesota Initiative for Renewable Energy and the Environment (IREE)**
Matching grant for the DOE offshore modeling grant (Jan. 1, 2012 - Dec. 31, 2015)
Role: Principal Investigator                                                            $120,000

*CFD Simulation of MCES Metering Stations to Improve Meter Performance*
**Metropolitan Council Environmental Services** (March 2014 – February 2015)           $48,000
Role: Principal Investigator

*Image-Guided Simulation Based Approach For Native and Prosthetic Aortic Valves in Patient-Specific Anatomies*
**Lillehei Heart Institute High Risk High Reward grant** (March 2014 – February 2016)
Role: Principal Investigator (co-PI Paul Iaizzo, Univ. of Minnesota)                   $100,000

*Fluid dynamics and circulatory efficiency in Fontan palliation*
**UMN Viking Research Grant (**April 2013 – March 2015**)**
Role: Co-PI; PI: Dr. Lazaros Kochilas, MD, Division of Pediatric Cardiology            $50,000

*Turbine aeration design software for mitigating adverse environmental impacts resulting from conventional hydropower turbines.*
**US Department of Energy and Alstom Power** (Jan. 1, 2012 – May 2015).
Role: co-PI (33%) with John Gulliver & Roger Arndt, Univ. of Minnesota
Total budget: $500,000                                                                 $167,000

*Renovation of the St. Anthony Falls Laboratory-University of Minnesota, for research and training in energy and environmental sustainability*
**NSF ARI-R2** (Oct. 1, 2010 – Dec. 30, 2014)
Role: Principal Investigator                                                           $7,100,000

*Renovation of the St. Anthony Falls Laboratory-University of Minnesota, for research and training in energy and environmental sustainability*
**Matching grant for the NSF ARI-R2 grant by the State of Minnesota** (Oct. 1, 2010 – Dec. 30, 2014)
Role: Principal Investigator                                                           $7,100,000

*Advancing marine and hydrokinetic energy through cutting-edge research: Hydrodynamic performance and environmental impacts.*
**University of Minnesota Initiative for Renewable Energy and the Environment (IREE)**
Special opportunity grant (Jan. 1, 2012 – Dec. 31, 2013)
Role: Principal Investigator                                                           $225,000

*Computational optimization of medical devices for stroke prevention*
**Funded by the UMN Division of Clinical Cardiology** (April-March 2014)
Role: Principal Investigator $30,000

*Effects of Chest Wall and Spinal Deformation on Cardiac Energetics and Cardiac Blood Flow*
University of Minnesota **Institute for Engineering in Medicine** (Jan. 1 2012 – Dec. 31 2013)
Role: Co-PI with Dr. Daniel Saltzman, Univ. of Minnesota $40,000

*Laboratory testing of marine hydrokinetic reference turbines*
**Oak Ridge National Laboratory** (Oct. 1, 2011 – May 30, 2013).
Role: Principal Investigator $100,000

*An Industry/Academe Consortium for Achieving 20% wind by 2030 through Cutting-Edge Research and Workforce Training.*
**US Department of Energy** (Jan. 25, 2010 – Aug. 30, 2013).
Role: Principal Investigator (Co-PIs: Roger Arndt, F. Porte-Angel, M. Kaveh, H. Stolarsky, Univ. of Minnesota; Marc Glauser, Syracuse Univ.) $8,000,000

*An Industry/Academe Consortium for Achieving 20% wind by 2030 through Cutting-Edge Research and Workforce Training.*
**University of Minnesota Initiative for Renewable Energy and the Environment (IREE)**
Matching grant for the DOE consortium grant (Jan. 25, 2010 - Aug. 30, 2013)
Role: Principal Investigator $400,000

*Development of a High-Resolution Virtual Wind Simulator for Optimal Design of Wind Energy Projects*
**XCEL Energy** (October 1, 2008 to July 30, 2013)
Role: Principal Investigator (Co-PI: F. Porte-Angel, Univ. of Minnesota) $1,000,000

*Development of a High-Resolution Virtual Wind Simulator for Optimal Design of Wind Energy Projects*
**University of Minnesota Initiative for Renewable Energy and the Environment (IREE)**
Matching funds for the XCEL Energy grant (October 1, 2008 to May 30, 2013)
Role: Principal Investigator $252,000

*Computational Modeling of Mechanical Heart Valves*
**National Institutes of Health** (July 1, 2008 – June 30, 2013)
Role: Principal Investigator with John Oshinski and Ajit Yoganathan (Georgia Tech)
Total budget: $1,500,000 $750,000

*Science and Technology Center: National Center for Earth Surface Dynamics.*
*Turbulence-resolving simulations of flow and sediment transport processes in natural waterways*
**National Science Foundation** (August 1, 2007- July 30, 2013).
Role: co-PI (2.5%) with 19 other PIs
Total budget: $20,000,000 $500,000

*Collaborative Research—Physics Based Modeling of Bridge foundation Scour*
**National Science Foundation** (May 1, 2008 to April 30, 2013)
Role: Principal Investigator $300,000

*NCHRP Project 24-33. Development of Design Methods for In-Stream Flow Control Structures*
**Transportation Research Board of the National Academies** (August 1, 2008 to January 30, 2012)

Role: Principal Investigator                                                                 $600,000


*Improved Structure and Fabrication of Large, High-Power Kinetic Hydropower Systems (KHPS) Rotors.*
**Advanced Water Power Projects, US Department of Energy** (March 1, 2009 – May 30, 2012)
Role: co-PI (20%), member of the team led by Verdant Power Inc.
Total budget: $2,000,000                                                          $360,000


*NSF workshop on basic research at the intersection of marine/hydrokinetic energy and the aquatic environment*
**National Science Foundation** (May 2011 – October 2011)
Role: Co-PI with Efi Foufoula-Georgiou & Michele Guala                    $40,000


*Experimental investigation of hydrokinetic turbines*
**Oak Ridge National Laboratory** (March 22, 2011 – Oct. 31, 2011).
Role: Principal Investigator                                                                  $50,000


*High-resolution numerical simulations of physiologic pulsatile flow in intracranial aneurysms*
**Mayo Clinic, Rochester, MN** (Jan. 1, 2010 – Dec. 31, 2010)
Role: Principal Investigator                                                                  $15,000


*Fish Micro-Habitat Dynamics around In-Stream Flow Control Structures*
**Industry Academe Cooperation Foundation, Yonsei University**, South Korea (Nov. 2008 – Dec. 2010)
Role: Principal Investigator                                                                 $ 90,000


*Collaborative Research—Biologically-Generated Flow by Plankton: Simulations & Experiments.* **National Science Foundation** (August 1, 2006- July 30, 2009)
Role: Principal Investigator                                                                $150,000


*Bioengineering Research Partnership: The Hemodynamics of Fontan Surgeries*
**National Institutes of Health** (2004-2007)
Sub-contract to UMN. PI: A. P. Yoganathan (Biomedical Eng., Georgia Tech)          $60,000


*Computational Modeling of Flows in Mechanical Heart Valves*
**National Institutes of Health** (2003-2007), Co-PI with A. P. Yoganathan (Georgia Tech)
Total budget: $1,400,000                                                          $660,000


*Unsteady Numerical Modeling of Draft-Tube and Tailrace Flows in Hydropower Plants*
**U.S. Department of Energy** and Oak Ridge National Laboratory (2001-2005)
Role: Principal Investigator                                                                $800,000


*Laboratory and 3D Numerical Modeling with Field Monitoring of Regional Bridge Scour in Georgia*
**Georgia DOT** (2000-2005), Co-PI with T. W. Sturm (Georgia Tech) & M. Landers (USGS)
Total budget: $673,360                                                          $200,000


*Physical and Numerical Modeling of Mixing in Water Storage Tanks*
**AWWA Research Foundatio**n (2002-2005), with P. Roberts (Georgia Tech)
Total budget: $150,000                                                          $55,000


*Advanced Numerical Modeling of Bridge Foundation Scour*
National Science Foundation **CAREER** award (1999-2004)

Role: Principal Investigator$310,000

*Large-eddy simulation of turbulent circular jet flows*
**U.S. Department of Energy** and Oak Ridge National Laboratory (1999-2001)
Role: Principal Investigator$124,000

*Two-Dimensional Hydrodynamic Model for the ACT and ACF River Basins*
**Georgia Water Resources Institute** (2000-2001)
Role: Principal Investigator$17,000

*A Lagrangian/Eulerian Method for Predicting DO Transfer in Autoventing Hydroturbines*
**Tennessee Valley Authority and Voith hydro Inc.** (1997-1990)
Role: PI$60,000

*A Numerical Model for Estimating Fish Passage through Hydraulic Powerplants*
**Voith Hydro Inc.** (1997-1999)
Role: Principal Investigator$220,000

*Conceptual Designs for Advanced Hydroturbines*
**U.S. Department of Energy and Voith Hydro Inc.** (1995-1998)
Role: Principal Investigator$128,500

# STUDENT/POSTOCTORAL SUPERVISION

## Ph.D. STUDENTS

**Graduated** (while at the University of Minnesota)

Saurabh Chawdhary - 2017
Research: Multi-Resolution Modeling and Simulation of Marine Hydrokinetic Turbine Arrays
Department of Mechanical Engineering, University of Minnesota
Current position: *Postdoctoral Fellow* at Argonne National Laboratory and University of Chicago.

Daniel Foti - 2016
Research: Quantification and reduction of uncertainty of model predictions of wind turbines and plants via high-fidelity simulations
Department of Mechanical Engineering, University of Minnesota
Current position: *Assistant Professor*, Department of Mechanical Engineering, University of Memphis.

Antoni Calderer (co-advised with Lian Shen) - 2015
Research: Fluid-Structure Interaction Simulation of Complex Floating Structures and Waves
Department of Civil, Environmental and Geo-Engineering, University of Minnesota
Current position: *Senior Research Engineer*, Simulia.

Craig Hill (co-advised with Michele Guala) - 2015
Research: Interactions Between Channel Topography and Hydrokinetic Turbines: Sediment Transport, Turbine Performance, and Wake Characteristics
Department of Civil, Environmental and Geo-Engineering, University of Minnesota
Current position: *Assistant Professor*, Department of Mechanical & Industrial Engineering, University of Minnesota - Duluth.

Aaron Boomsma - 2015
Research: Drag Reduction by Riblets & Sharkskin Denticles:  A Numerical Study
Department of Mechanical Engineering, University of Minnesota
Current position: *Research engineer*, TSI Inc., Minneapolis, MN

Trung Le - 2011
Research: A computational framework for simulating cardiovascular flows in patient-specific anatomies
Department of Civil Engineering, University of Minnesota
Current position: *Assistant Professor*, Department of Civil Engineering, North Dakota State University.

Seokkoo Kang -2010
Research: Numerical simulation of turbulence in streams with complex hydraulic structures
Department of Civil Engineering, University of Minnesota
Current position: *Associate Professor*, Civil and Environmental Engineering, Hanyang University, Seoul, South Korea

Diane de Zelicourt (Co-advisor with A. Yoganathan) – 2010
Thesis Title: Pulsatile Fontan Hemodynamics and Patient-Specific Surgical Planning: A Numerical Investigation
School of Chemical Engineering, Georgia Tech
Current position: *Senior Associate Scientist*, Institute of Physiology, University of Zurich, Switzerland.

Helen Simon (Co-advisor with A. Yoganathan) – 2009
Thesis Title: Numerical Simulations of the Micro Flowfield in the Hinge Region of Bileaflet Mechanical Heart Valves
Current position: *Research Engineer*, Intel Labs, Seattle, WA

Iman Borazjani – 2008
Thesis title: Numerical Simulation of Fluid Structure Interaction Problems in Biological Flows.
Current position: *Associate Professor* (tenured), Department of Mechanical Engineering, Texas A&M University

Cristian Escauriaza – 2008
Thesis title: 3D Unsteady numerical Modeling of Clear Water Scour past Hydraulic Structures: Lagrangian and Eulerian Perspectives
Current position: *Associate Professor* (tenured), Civil Engineering, Catholic University, Santiago, Chile

**Graduated** (while at Georgia Tech)

Tahirih C. Lackey (1999 – 2004)
Thesis title: Numerical Investigation of Chaotic Advection in Three-Dimensional Experimentally Realizable Rotating Flows
Current position:     *Senior Hydraulic Engineer*, Waterways Experiment Station, USACOE, Vicksburg, MS.

Liang Ge (2000 – 2004)
*Thesis title*: Numerical Simulation of 3D, Complex, Turbulent Flows with Unsteady Coherent Structures: From Hydraulics to Cardiovascular Fluid Mechanics
Current position: *Assistant Professor*, Department of Surgery, University of California San Francisco

Hansong Tang (1998 – 2001)
*Thesis*: Numerical Simulation of 3D Unsteady Incompressible Flows in Complex Geometries
Current position: *Associate Professor* (tenured), Civil Engineering, City University of New York.

S. Casey Jones (1995 – 1999)
Co-advisor with A. Amirtharajah
*Thesis*: Static Mixers in Water Treatment: A Computational Fluid Dynamics Model

**Graduated** (at the Iowa Institute of Hydraulic Research, Univ. of Iowa)

V. Neary (1992 – 1995)
Co-advisor with A. J. Odgaard
*Research*:                Numerical Modeling of Diversion Flows
Current Position:        *Marine and Hydrokinetic Technologies Lead*, R&D Mechanical Engineer at
                Sandia National Laboratories

S. K. Sinha (1992 – 1995)
Co-advisor with A. J. Odgaard
*Research*: 3-D Numerical Model for Turbulent Flows through Natural River Reaches
Current Position: *Senior Vice President*, Environmental Consulting & Technology, Inc., Detroit, MI.

F. B. Lin (1992 – 1996)
Co-advisor with A. J. Odgaard and V. C. Patel
*Research*: Development of a Numerical Method for 3-D Incompressible Flow with Multigrid
Acceleration and Near-Wall Turbulence Closures
Current Position: *Senior Hydraulic Engineer*, Northwest Hydraulic Consultants, Seattle, WA.


## POST DOCTORAL ASSOCIATES

**Current – Stony Brook University**

Christian Santoni (August 2019 – present)
*Research*: Large-eddy simulation of wind and hydrokinetic turbine arrays

**Past**

Xialoei Yang (June 2016 – July 2019)
*Research*: Large-eddy simulation of wind and hydrokinetic turbine arrays
Current Position: *Professor*, Institute of Mechanics, Chinese Academy of Sciences, Beijing, China

Dennis Angelidis (December 2016 – February 2019)
*Research*: Multi-resolution large-eddy simulation of offshore wind turbines and wave energy
converters

Ali Khosronejad (May 2009 – July 2016)
*Research*: LES modeling of river morphodynamics and scour
Current Position: *Assistant Professor*, Department of Civil Engineering, Stony Brook University.

Leonardo Chamorro (May 2010 – June 2013)
*Research*: Experimental investigation of wind and hydrokinetic turbines and farms
Current position: *Associate Professor* (tenure), Department of Mechanical Engineering, University of
Illinois at Urbana Champaign, Champaign, IL

Seokkoo Kang (September 2010 – January 2012)
*Research*: Large-eddy simulation of wind and hydrokinetic turbines
Current position: *Associate Professor*, Civil and Environmental Engineering, Hanyang University,
Seoul, South Korea

Iman Borazjani (July 2008 – October 2010)
*Research*: Fluid-structure interaction algorithms for aquatic swimming and cardiovascular flows
Current position: *Associate Professor* with tenure, Department of Mechanical Engineering, Texas A&M University

Ganesh Natarajan (May 2009 – May 2010)
*Research*: Adaptive mesh refinement algorithms for engineering and biological flows
Current position: *Assistant professor*, Department of Mechanical Engineering, IIT Guwahati, India

Suresh Behara (September 2008 – May 2010)
*Research*: Fluid-structure interaction algorithms for wind and hydrokinetic turbine flows
Current position: *Project scientist*, IIT Kanpur, India

Joongcheol Paik (2001 – 2008)
*Research*: Hybrid URANS/LES Modeling of Complex Turbulent Shear Flows
Current position: *Associate Professor*, Dept. of Civil Engineering, Gangneung-Wonju National University, South Korea.

Mehran Parsheh (2007 – 2008)
*Research*:  Experimental investigation of stream restoration flows
Current position: *Senior Research Engineer*, Aurora Biofuels, Alameda, CA

Seo Yoon Jung (2007 – 2008)
Supervised jointly with J. Gulliver
*Started*: Fall 2007
*Research*: Level Set Methods for Free-Surface Flows
Current position: *Research associate*, Imperial College, London, UK

Liang Ge (2005 – 2007)
*Research*: Numerical Simulation of Cardiovascular Flows
Current position: *Assistant Professor*, Department of Surgery, University of California San Francisco

Anvar Gilmanov (2002 – 2005)
*Research*: Numerical Simulation of Fluid/Structure Interaction in Biofluids Applications
*Current position*: Research Associate, St. Anthony Falls Laboratory, University of Minnesota.

S. Casey Jones (2000 – 2003)
*Research*:  Computational Modeling of Environmental Flows; LES of free shear flows; Parallel Computing.
*Current position*: Independent consultant.

Yiannis Ventikos (1996 – 1999)
*Research*:  Computational studies of swirling flows; Chaotic advection; Computational modeling of hydropower flows
Current position: *Professor and Head*, Department of Mechanical Engineering, University College London.

# TEACHING

## UNIVERSITY OF MINNESOTA

*CE 3052*: Fluid Mechanics (Spring 2009)

*CE 8572*: Computational Environmental Fluid Dynamics (Fall 2006, Spring 2008, 2011, 2012, 2013, 2015).

*EE 5940*: Wind Energy Essentials (Fall 2010, 2011, 2012).

## GEORGIA INSTITUTE OF TECHNOLOGY

CE 3053, 3063, and 3040: Introduction to Fluid Mechanics (taught this class at least once a year in the period 1996-2005).

CE 8113, CE/ME 8802: Computational Fluid Dynamics (developed and taught this class on average once a year 1996-2005).

CE 6251:  Intermediate Fluid Mechanics (Fall 2000 and 2002).

CE 8802C:  Introduction to Turbulence Modeling for CFD (Spring 2002)

# PROFESSIONAL SERVICE

**Membership in Professional Societies**

- American Geophysical Union (AGU)
- American Physical Society (APS), Division of Fluid Dynamics (DFD)
- American Society of Civil Engineers (ASCE)
- American Society of Mechanical Engineers (ASME)

**Organization and Chairmanship of Conferences, Technical Sessions, and Workshops**

1. Co-organizer of mini-symposium "Computational Strategies for the Simulation of Turbulent Transport and Mixing in the Natural Environment," ECOMASS 2016 Congress on European Congress on Computational Methods in Applied Sciences and Engineering, island of Crete, Greece, June 5-10, 2016.
2. Advisory/scientific board, *2nd International Conference on CFD in Medicine & Biology* - Algarve, Portugal August 29-Sept 4, 2015.

3. Co-organizer of invited session in "*Coupled Problems in Free Surface Flows*," VI International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED 2015), Venice, Italy, May 18-25, 2015.
4. Scientific committee, VI International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED 2015), Venice, Italy, May 18-25, 2015.
5. Advisory/scientific board, 8th International Bio-Fluid Symposium and Workshop, Caltech, Pasadena, CA, March 20-22, 2015.
6. Organizing committee, Dept. of Energy Workshop on *Wind Plant Physics and Modeling*, Washington DC, Feb. 24-25, 2015.
7. Scientific committee, V International Conference on Computational Methods for *Coupled Problems in Science and Engineering* (COUPLED 2013), Ibiza, Spain, June 17- 19, 2013.
8. Co-organizer of the 5th Biennial Conference on Heart Valve Biology and Tissue Engineering, Mykonos Island, Greece, May 18-20, 2012.
9. Co-organizer of NSF workshop on "*Basic research at the intersection of marine/hydrokinetic energy and the aquatic environment,*" SAFL, University of Minnesota, October 2011.
10. Organizer of mini-symposium on the *Coupled Problems in Biomimetics*, ECCOMAS IV International Conference on Coupled Problems in Science and Engineering, Kos island, Greece, June 2011.
11. Organizer of a one-day symposium on *Wind Energy Research* as part of the E3 conference organized by the University of Minnesota Initiative for Renewable Energy and the Environment, Dec. 1, 2010.
12. Organizer of mini-symposium on the *Importance of Turbulence for Fish Habitats*, *8th International Symposium on Eco-Hydraulics*, Seoul, S. Korea, September 12-16 2010.
13. Local organizing committee of the 62st APS/DFD meeting (11/09), Minneapolis, MN.
14. Coordinator of the Gallery of Fluid Motion, 62st APS/DFD meeting (11/09), Minneapolis, MN.
15. Organizer of session on *Cardiovascular Fluid Mechanics*, *Inaugural Conference of ASCE Institute on Engineering Mechanics (EM-08),* Minneapolis, MN, May 18-21, 2008.
16. Local organizing committee, *Inaugural Conference of ASCE Institute on Engineering Mechanics (EM-08),* Minneapolis, MN, May 18-21, 2008.
17. Advisory committee member, 5th *International Symposium on Turbulence and Shear Flow Phenomena* (TSFP-5), 2007.
18. Advisory committee member, 4rd *International Symposium on Turbulence and Shear Flow Phenomena* (TSFP-4), Williamsburg, Virginia, June 2005.
19. Session co-chair, Multi-scale Modeling in the Cardiovascular Systems, BMES 2004, Cardiovascular Engineering Track, Philadelphia, Pennsylvania, October 2004.
20. Session chair, IAHR Symposium on Hydraulic Machinery and Systems, Stockholm, Sweden, June 2004.
21. Session co-chairman, *3rd International Symposium on Turbulence and Shear Flow Phenomena* (TSFP-3), Session: Turbulence Control I, Sendai, Japan, June 2003.
22. Session chairman, *55th Annual Meeting of the APS Division of Fluid Dynamics*, Session Title: Biofluids II, Dallas, TX, November 2002.
23. Session chairman and co-organizer, *4th Bio-Engineering Symposium*, American Fisheries Society, Session Title: CFD Modeling for Fish Friendly Hydraulic Structures, Baltimore, August 2002.
24. Session co-chairman, *6th Annual Hilton Head Workshop on Prosthetic Heart Valves*, Session title: *Computational Modeling I*, Hilton Head Island, SC, March 6-10, 2002.
25. Advisory committee member, 3rd *International Symposium on Turbulence and Shear Flow Phenomena* (TSFP-3), Sendai, Japan, June 2003.
26. Advisory committee member, *2nd International Symposium on Turbulence and Shear Flow Phenomena* (TSFP-2), Stockholm, Sweden, June 2001.
27. Organizing committee co-chairman, *20th IAHR Symposium on Hydraulic Machinery and Systems*, Charlotte, North Carolina, August 2000.
28. Session chairman, *ASCE Waterpower 97*, Session: CFD for Turbine Rehabilitation and Design, Atlanta, Georgia, August 1997.

29. Session chairman, *1996 ASME Fluids Engineering Division Summer Meeting*, Session: Numerical Developments in CFD III, San Diego, CA 1996.

## Technical Committee Activities

- Founder and Chair of a new ASCE-EWRI task committee on *Advanced Environmental Hydraulics Modeling* – 2000-2005.

- Member of the ASCE-EWRI technical committee on *Eco-hydraulics (*2003 – 2006).

## External Examiner/Reader for Ph.D. Thesis Exams

- Jury member for the Ph.D. thesis of M. Reclari, Department of Mechanical Engineering, EPFL, Switzerland, April 16, 2013.
- Co-referee of the Ph.D. thesis of M. Gazzola, Department of Mechanical and Process Engineering, ETH-Zurich, Zurich, Switzerland, September 10, 2012.
- Examiner of the Ph.D. thesis of M. G. Doyle, Department of Mechanical Engineering, University of Ottawa, Ottawa, Canada, August 2011.
- Reader of the thesis of Dr. Wonjung Yang, Dept. of Civil Engineering, Yonsei University, Seoul, south Korea, January 2009.
- Examiner in Dr. Alexander Perrig's defense, Laboratory for Hydraulic Machinery, École Polytechnique Fédéral de Lausanne, Lausanne, Switzerland, Dec. 12, 2006.
- Examiner in Dr. J. Qu's defense, Dept. of Building, Civil & Environmental Engineering, Concordia University, Montreal, Canada, May 20, 2005.
- Reader of the thesis of Dr. I. Avrahami, Dept. of Biomedical Engineering, Tel Aviv University, Tel Aviv, Israel, 2004.

## Technical Journal Referee

Proceedings of the Royal Society (since 2010); Annals of Biomedical Engineering (since 2005); American Institute of Aeronautics and Astronautics (AIAA) Journal (since 1992); ASCE Journal of Hydraulic Engineering (since 1995); ASCE Journal of Engineering Mechanics (since 2002); ASME Journal of Biomechanical Engineering (since 2003); ASME Journal of Fluids Engineering (since 1993); Computers and Fluids (since 1991); International Journal of Heat and Fluid Flow (since 1997); International Journal of Numerical Methods in Fluids (since 1992); Journal of Fluid Mechanics (since 1998); Journal of Computational Physics (since 1999); Paleobiology (since 2003); Physics of Fluids (since 2002); Water Resources Research (since 2007)

## Proposal Reviewer And Review Panels

National Science Foundation, National Institutes of Health, US Department of Energy, ARPA-E, NSERC, Austrian Science Foundation, Switzerland National Science Foundation

## Consulting

- *Oppenheinmer, Wolff & Donnelly LLP*, expert witness consulting, 2014.
- *HDR Engineering Inc*., consultant for computational modeling of hydraulic structures, 2014.
- *WREM International*, 1D and 2D hydrodynamic modeling of the Lake Victoria basin, 2003 – 2007.
- *Battelle Seattle Research Center* Numerical Modeling of Selective Withdrawal in the lake Billy Chinook Reservoir, 2003 - 2006.

- *MW Harza*, Numerical modeling of selective withdrawal in the intakes of the Jardine water treatment plant, Chicago, IL (2000 – 2004).