

Prof. R. W. Yeung: Publications & Researchers  
*The Berkeley Marine Mechanics Laboratory – UC Berkeley*  
 (2010-2016)

***Single Cylinder W/O PTO Design (3DOF heave, sway-pitch coupling) 2010***

- Bachynski, E. E., Young, Y. L., and Yeung, R. W., "Performance of a Tethered Point Wave-Energy Absorber in Regular and Irregular Waves", *Proceedings, ASME 3rd Joint US-European Fluid Engineering Summer Meeting and 8th International Conference on Nanochannels, Microchannels, and Minichannels*, Paper # FEDSM-ICNMM2010-30545, 10 pp, 2010.
- Bachynski, E. E., Young, Y. L., and Yeung, R. W., "Analysis and Dynamic Scaling of Tethered Wave-Energy Converters in Irregular Waves," *Proceedings, ASME 30th International Conference on Offshore Mechanics and Arctic Engineering (OMAE2011)*, Paper # OMAE2011-49684, Rotterdam, The Netherlands, June 19-24, 2011.
- Bachynski, E. E., Young, Y. L., and Yeung, R. W., "Analysis and optimization of a tethered wave energy converter in irregular waves", *Journal of Renewable Energy*, 8:133-145, 2012.

***Single Cylinder with PTO Design (heave) 2008-2010: First integrated system design***

- Yeung, R. W., Peiffer, A., Tom, N., and Matlak, T., "Design, Analysis, and Evaluation of the UC-Berkeley Ocean-Wave Energy Extractor", *J. Offshore Mech. Arctic Eng.* 134(2), 021902, Dec 06, 2011, [DOI:10.1115/1.4004518]

***Hydrodynamics of Coaxial Cylinder Geometry (heave, sway-pitch coupling) -2010-13***

- Chau, F. P. and Yeung, R. W., "Inertia, Damping, and Wave Excitation of Heaving Coaxial Cylinders", *Proceedings, OMAE2012- Paper OMAE2012-83987*, Rio de Janeiro, Brazil, July 1-6, 2012.
- Cochet, C. and Yeung, R.W., "Dynamic Analysis and Configuration Design of a Two-Component Wave-Energy Absorber", *Proceedings, OMAE2012-83613*, Brazil, 2012.
- Wang, L., Son, D., and Yeung, R. W., "On the performance of a dual-cylinder wave-energy converter: Single versus two-degrees of freedom", *Proceedings, ASME 35th International Conference on Offshore Mechanics and Arctic Engineering*, Paper OMAE2016-54422, Busan, S. Korea, June 19-22, 2016.
- Wang, L., Son, D., and Yeung, R. W., "Effect of mooring-line stiffness on the performance of a dual coaxial-cylinder wave-energy converter," *Applied Ocean Research*, 2016, vol. 59, pp. 577-588. [DOI:10.1016/j.apor.2016.07.014]
- Zhong, Q. and Yeung, R. W., "Wave-body Interactions among an array of truncated vertical cylinders", *Proceedings, OMAE2016-55055*, Busan, S. Korea, June 19-22, 2016.

***PTO E-M Efficiency & Shape Design- Single Cylinder with Controller (Dr. Nathan Tom)***

- Tom, N. and Yeung, R. W., "Performance Enhancements and Validations of a Generic Ocean-Wave Energy Extractor," *ASME Journal of Offshore Mech. & Arctic Engineering*, vol. 135, issue 4, 10 pages, September, 2013 [DOI:10.1115/1.4024150]. See also: *Proceedings, ASME 31st International Conference on Offshore Mechanics and Arctic*
- Tom, N. and Yeung, R. W., "Non-Linear Model Predictive Control Applied to a Generic Ocean-Wave Energy Extractor," *Journal Offshore Mechanics and Arctic Engineering*, Vol. 136, 04190-1, November 2014. [DOI: 10.1115/1.4027651 Mr. Tom received *Subrata Chakrabarti - Young Professional (All-Conference) Award* for this work.
- Tom, N. and Yeung, R. W., "Experimental Confirmation of Nonlinear-Model- Predictive Control Applied Offline to a Permanent Magnet Linear Generator for Ocean-Wave Energy Conversion", *IEEE Journal of Oceanic Engineering*, Issue 99, pp. 1-15, 2015 [DOI: 10.1109/JOE.2015.2439871]
- Madhi, F., Sinclair, M. E., and Yeung, R. W., "The "Berkeley Wedge": an asymmetrical energy-capturing floating breakwater of high performance", *Journal of Marine Systems and Ocean Technology (MS&OT)*, 2014, vol. 9, no. 1, pp 5-16. *US Provisional Patent No. 61/883,274 (UC No. BK-2014-037-1)*. "The Berkeley Wedge, A High-performance Energy-Capturing Floating Breakwater or Wave Shield" (<http://techtransfer.universityofcalifornia.edu/NCD/23530.html>)

Tom, N., Son, D., Belissen, V., and Yeung, R. W., "Modeling of a Permanent Magnet Linear Generator For Wave-Energy Conversion", *Proceedings*, OMAE2015-42370, St John's, NL, May 31-June 5, 2015. doi:10.1115/OMAE2015-42370

### **Dual Coaxial Cylinder System: PTO Controller Design (D. Son, V. Belissen, Qian Zhong)**

Son, D. and Yeung, R. W., "Performance Prediction and Validation of a Two-Coaxial Cylinder System as a Wave-Energy Extractor," *Proceedings*, OMAE2014-24582, San Francisco, 2014.

Son, D., Belissen, V., and Yeung, R. W., "Optimizing the Performance of a Dual Coaxial-Cylinder Wave-Energy Extractor", *Proceedings*, ASME 34th International Conference on Offshore Mechanics and Arctic Engineering, Paper OMAE2015-42379, St John's, NL. May 31-June 5, 2015.

Son, D., Belissen, V., and Yeung, R. W., "Validation and Optimization of a Dual Coaxial-Cylinder Wave-Energy Extractor", *Renewable Energy*, Vol. 92, pp.192-201, July 2016. [dx.doi.org/10.1016/j.renene.2016.01.032].

Son, D. and Yeung, R. W., "Optimizing ocean-wave energy extraction of a dual coaxial-cylinder WEC using nonlinear model predictive control", *Applied Energy*, 2017. 187, pp.746-757. //dx.doi.org/10.1016/j.apenergy.2016.11.068

### **Wind / Tidal Turbines Modeling - (Bachynski, Kanner, Koukina)**

Kanner, S. and Yeung, R. W., "Consideration of a Rotary Power Take-Off Mechanism as a Wave-Energy Converter on the WindFloat Platform," *Proceedings*, ASME 32nd International Conference on Offshore Mechanics and Arctic Engineering (OMAE2013), Paper No. OMAE2013-11248, Nantes, France, June 9-14, 2013.

Fernandez, D., Moreu, J., Guzman, S., Yeung, R. W., and Moreu, M., "Numerical Simulations in the Design of a New Tension-Tethered Marine Current Turbine," *Proceedings*, ASME 33rd International Conference on Offshore Mechanics and Arctic Engineering (OMAE2014), Paper OMAE2014-24382, San Francisco, CA, June 8-13, 2014.

Kanner, S. and Yeung, R. W., "Innovation for a Reduction of the Yaw Moment on a Floating Platform with a Vertical-Axis Wind Turbine", *Proceedings*, ASME 33rd International Conference on Offshore Mechanics and Arctic Engineering (OMAE2014), Paper OMAE2014-23819, San Francisco, CA, June 8-13, 2014.

Li, J., Tang, YG, and Yeung, R. W., "Effects of Second-order Difference-Frequency Wave Forces on a New Floating Platform for Offshore Wind Turbines," *Journal of Renewable & Sustainable Energy*, Vol. 6, 033102-1, 2014. [DOI: 10.1063/1.4872360]

Koukina, E., Kanner, S., and Yeung, R. W., "Actuation of Wind-Loading Torque on Vertical Axis Turbines at Model Scale", *Proceedings*, Oceans'15, Marine Technology Society/IEEE, Paper 141206-002, May18-21, 2015, Genova, Italy.

Fagan, E., Yeung, R. W., Lean, S., B., and Goggins, J., "Structural and Hydrodynamic Modelling of Composite Tidal Turbine Blades", *Proceedings*, 11<sup>th</sup> European Wave and Tidal Energy Conference (EWTEC'15), September 6-11, Nantes, France.

Jbaily, A. and Yeung, R. W. "Piezoelectric devices for ocean energy: a brief survey", *J. Ocean Eng. & Mar. Energy*, January, 2015, 1:101-118. [DOI 10.1007/s40722-014-0008-9]

### **Computational Methodologies - (Bachynski, Y-L Young, Hariri-Nokob, Hamilton)**

Chau, F. P. and Yeung, R. W., "Inertia and Damping of Heaving Compound Cylinders", *Proceedings*, 25th Int'l Workshop on Water Waves and Floating Bodies, Harbin, China, May 9-12, 2010.

Yeung, R. W. and Jiang, Y., "Shape Effects on Viscous Damping and Motion of Heaving Cylinders," *Proceedings*, ASME 30th International Conference on Offshore Mechanics and Arctic Engineering (OMAE2011), Paper No. OMAE2011-52043. Rotterdam, The Netherlands, June 19-24, 2011.

Hamilton, J. A. and Yeung, R. W., "Viscous and Inviscid Matching of Three-dimensional Free-surface Flows Utilizing Shell Functions", *Journal of Engineering Mathematics*, July 2011, 70 (1-3): pp 43-66, [doi:10.1007/s10665-010-9438-0].

Nguyen, T. C. and Yeung, R. W., "Unsteady Three-Dimensional Sources for a Two-Layer Fluid of Finite Depths and Their Applications", *Journal of Engineering Mathematics – Special Memorial Volume of E. O. Tuck*, July 2011. 70 (1-3): 67-91. [doi:10.1007/s10665-010-9439-z]

Jiang, Y. and Yeung, R. W., "Computational Modeling of Rolling Cams for Wave-Energy Capture in a Viscous Fluid," *Proceedings*, ASME 31st International Conference on Offshore Mechanics and Arctic Engineering (OMAE2012), Paper OMAE2012-84150, Rio de Janeiro, Brazil, July 1-6, 2012.

- Yeung, R. W., Seah, R. K.M., and Imamura, J., "Lateral Force and Yaw Moment on a Slender Body in Forward Motion at a Yaw Angle", *ASME J. Offshore Mech. & Arctic Eng.*, March 2013, Vol. 135/031101-1, [DOI: 10.1115/1.4006153], See also: *Proceedings of OMAE2008*, Estoril, Portugal, Paper No. OMAE2008-57480.
- Yeung, R. W. and Hariri Nokob, M., "Hypersingular integral-equation solution for a finite-draft surface-piercing cylindrical shell at high- and low-frequency," *Proceedings, 28th Int'l Workshop on Water Waves and Floating Bodies*, L'Isle sur la Sorgue, France, April 7-10, 2013.
- Hariri Nokob, M. and Yeung, R. W., "Hypersingular Integral-Equation Method for Wave Diffraction about Arbitrary, Shell-Like Vertical Cylinders in Finite-Depth Waters", *Proceedings, 29th Int'l Workshop on Water Waves and Floating Bodies*, Osaka, Japan, March 30 – April 2, 2014.
- Hariri Nokob, M. and Yeung, R. W., "Computations of Arbitrary Thin-Shell Vertical Cylinders in a Wave Field by a Hypersingular Integral-Equation Method." OMAE2014-24544, *Proceedings, ASME 33rd International Conference on Offshore Mechanics and Arctic Engineering (OMAE2014)*, Paper OMAE2014-24582, San Francisco, CA, June 8-13, 2014.
- Lin, Q., Lu, D.Q., and Yeung, R. W., "Hydroelastic Response of a Circular Elastic Plate in Waves on a Two-Layer Fluid of Finite Depths," *China Ocean Engineering*, vol. 28, #5, pp 671-686, 2014, [DOI: 10.1007/s13344-014-0053-0]
- Lu, D. Q. and Yeung, R. W., "Hydroelastic Waves Generated by Point Loads in a Current", *International Journal of Offshore and Polar Engineering (IJOPE)*, Vol. 25, No. 1, March 2015, pp. 8–12.
- Hariri Nokob, M. and Yeung, R. W., "Diffraction and radiation loads on open cylinders of thin and arbitrary shapes," *Journal of Fluid Mechanics*, Volume 772: pp. 649-677, 2015. [DOI:10.1017/jfm.2015.165]
- Wang, L. and Yeung, R. W., "Investigation of full and partial ground effects on a flapping foil hovering above a finite-sized platform", *Physics of Fluids*, 2016, Vol. 28, 071902, [http://dx.doi.org/10.1063/1.4954656]

### **Marine Vehicles or Ship Hydrodynamics (Wan, Jiang, Wang)**

- Yeung, R. W., Makasyeyev, M., and Matte, C., "Wave Elevation under a Moving Pressure Distribution at Minimum-Resistance Conditions" *Proceedings, 26-th Int'l Workshop on Water Waves & Floating Bodies*, Athens, Greece, April 16-20, 2011.
- Yeung, R. W., Toh, W. Y. and Jiang, Y. C., "Geometrical and Viscosity Effects on the Hydrodynamic Properties of Heaving Cylinders", *Special Volume in Celebration of the 15<sup>th</sup> Anniversary of the Centre for Marine Technology and Engineering (CENTEC) at the Technical University of Lisbon, Portugal*, Taylor & Francis Publisher, 2012 pp. 779-788, 2011 [ISBN-13: 978-0415698085 ISBN-10: 0415698081]
- Wan, H. and Yeung, R. W., "Interaction of bodies in free surface with consideration of cross-flow", *Journal of Computers and Fluids*, 2012, vol. 54, p.127-142. [doi:10.1016/j.compfluid.2011.10.005]
- Lin, Y.H., Fang, M.-C., and Yeung, R. W., "The optimization of ship weather-routing algorithm based on the composite influence of multi-dynamic elements", *Applied Ocean Research*, **43**, 184–194, October 2013. [doi:10.1016/j.apor.2013.07.010]
- Aubault, A. and Yeung, R. W., "Interference resistance of multi-hull vessels in finite-depth waters" *J. Marine Systems and Ocean Technology (MS&OT)*, 2012, vol. 7, no. 2, pp 107-116. See also: *Proceedings, The 31st ASME International Conference on Ocean, Offshore and Arctic Engineering (OMAE-2012)*, Paper OMAE2012-83777, Rio de Janeiro, Brazil, July 1–6, 2012.
- Lin, Y.H., Fang, M.-C., and Yeung, R. W., "The optimization of ship weather-routing algorithm based on the composite influence of multi-dynamic elements", *Applied Ocean Research*, **43**, 184–194, October 2013. [doi:10.1016/j.apor.2013.07.010]
- Yeung, R. W. and Jiang, Y., "Bilge-Keel Influence on The Free Decay of Roll Motion of a Three-Dimensional Hull", *Proceedings, ASME 33rd International Conference on Offshore Mechanics and Arctic Engineering (OMAE2014)*, Paper OMAE2014-24542, San Francisco, CA, June 8-13, 2014.
- Jiang, Y. and Yeung, R. W., "Effects of Bilge Keels and Forward Speed on Roll Decay of Three-Dimensional Hull", *Proceedings, 30th Symposium on Naval Hydrodynamics*, Hobart, Tasmania, Australia, 2-7 November 2014, 20pp.
- Yeung, R. W. and Jiang, Y., "Shape Effects on Viscous Damping and Motion of Heaving Cylinders", *Journal Offshore Mechanics and Arctic Engineering*, Vol. 136, 04180-1, November 2014, [DOI: 10.1115/1.4027650]

- Wang, L. and Yeung, R. W., "Nonlinear waves generated by a traveling pressure distribution and the associated waveless shapes," *Journal of Engineering Mathematics*, Volume 91:1-16, 2015. [DOI 10.1007/s10665-014-9738-x]
- Jiang, Y. and Yeung, R. W., "Performance of "Salter's Cam" in 3-DOF Motion and in a Viscous Fluid", *Proceedings*, 30th Int'l Workshop on Water Waves and Floating Bodies, Bristol, U.K., April 12-15 2015.
- Jiang, Y. and Yeung, R. W., "Computational Modeling of Rolling Wave-Energy Converters in a Viscous Fluid", *Journal of Offshore Mechanics and Arctic Engineering*, 061901, (Oct 12, 2015) [DOI: 10.1115/1.4031277]
- Zhang, X. and Yeung, R. W. "On Hydrodynamic Behavior of a Cylindrical Moonpool with an Entrapped Two-Layer Fluid, *Proceedings*, 31st Int'l Workshop on Water Waves and Floating Bodies, Plymouth, MI, April 3-6. 2016,
- Jiang, Y. and Yeung, R. W., "Efficient Modeling of the Free Roll Motion of Ship Hulls with Bilge Keels", *Proceedings*, 31st Int'l Workshop on Water Waves and Floating Bodies, Plymouth, MI, April 3-6. 2016,
- Yeung, R. W., Jiang, Y., and Wang, L., "Validations of a discrete-vortex method (SS-FSRVM) for modeling nonlinear coupled vertical-plane and lateral-plane motions in head waves," in *Proceedings of the 31st Symposium on Naval Hydrodynamics*, Monterey, CA, Sept. 2016. i+17 pp.

### Papers on Related or Upcoming Issues

- Wang, L. and Yeung, R. W., "On the performance of a micro-scale Bach-type turbine as predicted by discrete vortex simulations," *Applied Energy*, 183 (2016) 823–836. [http://dx.doi.org/10.1016/j.apenergy.2016.08.185 ]
- Tom, N., Madhi, F., and Yeung, R. W., "Balancing Power-Absorption and Structural Loading for a Heaving Asymmetric Wave-Energy Converter in Regular Waves", *Proceedings*, ASME 35th International Conference on Offshore Mechanics and Arctic Engineering, Paper OMAE2016-55050, Busan, S. Korea, June 19-22, 2016.
- Kanner, S. A., Koukina, E., and Yeung, R. W., "Real-Time Hybrid Model Testing of Floating Wind Turbines Using Autonomous Actuation and Control", *Proceedings*, ASME 36th International Conference on Offshore Mechanics and Arctic Engineering, Paper OMAE2017-62575, Trondheim, Norway, June 25-30, 2017.
- Chen, Z., Zhang, L., and Yeung, R. W., "Analysis and Optimization of a Dual Mass-Spring-Damper (DMSD) Wave-Energy Converter with Variable Resonance Capability", Manuscript in review, December 2016.
- Zhong, Q. and Yeung, R. W., "Convex Formulation for Model Predictive Control for Generic Wave-Energy PTO Systems," *Proceedings*, ASME 36th International Conference on Offshore Mechanics and Arctic Engineering, Paper OMAE2017-62575, Trondheim, Norway, June 25-30, 2017.

### Recent Ph.D. graduates & thesis title:

- Robert K. M. Seah, "The SS-FSRVM Computational Model for Three-Dimensional Ship Flows with Viscosity", Ph.D. 2007. Dr. Seah is a senior staff researcher at Chevron Energy Technology Corporation, Houston, Texas.
- Hui Wan, "Interactions of Multiple Bodies in a Free Surface with Consideration of Cross Flow", Ph.D. 2008. Dr. Wan is a CFD staff specialist in fluid-dynamics simulation at the Air Force Research Laboratory (AFRL) of the Wright-Patterson Air Force Base, Dayton, Ohio.
- Nathan Tom, "Design and Control of a Floating Wave-Energy Converter Utilizing a Permanent Magnet Linear Generator", Ph.D. 2013. Dr. Tom is a post-doctoral fellow in the Marine & Hydrokinetic Energy Division of the National Renewable Energy Laboratory (NREL) at Golden, Colorado.
- Yichen Jiang, "Three-Dimensional Computational Modeling of Multi-DOF Ship Motion in a Viscous Fluid", Ph.D. 2014.. Prof. Jiang is an associate professor at Dalian University of Technology, China, after 2 years of post-doc at the Marine Mechanics Laboratory of Univ. Calif. at Berkeley.
- Samuel A. Kanner, "Design, Analysis, Hybrid Testing and Power Optimization of a Semi-Submersible Platform with Counter-Rotating Vertical-Axis Wind Turbines," Ph.D. 2015. Dr. Kanner is now a staff member of Principle Power Inc., Emeryville, CA.

Lu Wang, "High-Performance Discrete-Vortex Algorithms for Unsteady Viscous-Fluid Flows near Moving Boundaries," Ph.D. 2016. Dr. Wang is a Post-doctoral Fellow in Ocean Engineering at UC-Berkeley.

Farshad Madhi, "Operational Control and Survivability Enhancement of Asymmetric Wave-Energy Converters", Ph.D. 2016. Dr. Madhi is a practicing Consultant in the State of California.

Daewoong Son, "Performance Evaluation and Optimization of a Dual Coaxial-Cylinder System as an Ocean-Wave Energy Converter", Ph.D. 2016. Dr. Son is now a staff scientist at *RE-Vision*, Consulting Company for Renewable Energy, Sacramento, CA.

### **Recent M.S. / MEng graduates & thesis titles:**

Antoine Peiffer. "Modeling and Evaluation of a Wave-Energy Device - A Point Absorber with Linear Generator." 12/2009

Nathan Tom. "Data-Acquisition Design for Experimental Methods at the Richmond-Field-Station Model-Testing Facility." 12/2009

Diego Garcia Giraldo. "Oil Spill in the Gulf of Mexico - Flow-Rate Estimation Based on Satellite Images." 12/2010.

Meghan Sinclair. "Design and Properties of a Horizontal Cylindrical wave-Energy Extractor." MEng. 5/2011

Chloe Matte. "Free-Surface Deformation Under a Moving Pressure Distribution In Water of Arbitrary Depth." 12/2011

Samuel Kanner. "Performance of a Rolling-Cam Energy Extractor on the WindFloat Platform and Design of the Rotary Power Take-Off Mechanism." 5/2012

Weng Yin Chow. "Investigation of a two-dimensional Low-Resistance Shape and the Associated Flow." 5/2012

Farshad Madhi. "Design, Fabrication, and Testing of a Horizontal Cylindrical Wave-Energy Device of High Performance." 12/2012

Alexandre Immas. "Skimming Tidal Energy on the Surface.." Co-advisor, 12/2012

Louis-Alexandre Couston. "Long-Wave Runup on a Sloping Beach, Validation of a Lagrangian Numerical Model." Co-Advisor, 5/2013

Melody Suchail. "Comparison of ABS design rules and theoretical mechanics." Co-Advisor, 5/2013

Abdulrahman Jbaily. "Piezoelectricity for Ocean Energy Extraction-A Brief Overview." 12/2014

David Fernandez Gutierrez. "Implementation of a Panel Method to Predict the Hydrodynamic Performance of Horizontal-Axis Marine Current Turbines." Plan II. 12/2014

Elena Koukina. "Simulation of Wind-Loading Torque on Turbine at Model Scale." 12/2014

Tristan Leclercq. "Numerical Simulation of the Flow About Vertical-Axis Turbines by a Vortex Method." 12/2014

Valentin Belissen. "Redesign, Optimization and Fabrication of the Supporting Structure of the UC Berkeley PMLG System for Wave Energy Extraction," 12/2014

Qiuchen Guo. "Preliminary design and structural analysis of concrete floating offshore platform for a wind turbine." Co-Advisor, 5/2014

Onur Kaltakci. "Turbulent Skin Friction Measurements on Textured Superhydrophobic Surfaces in a Tow Tank: Model Construction and Preliminary Tests." Co-Advisor, 12/2014

Ritwik Ghosh. "Investigating the Potential Noise Reduction Due to Nonlinear Interactions between Noise and Ultrasound." Co-Advisor, 12/2014

Andrew Czarniak. "An Investigation into Establishing a Suitable Construction Guide for Small High-Speed Passenger Vessels." 5/2015

Bo Yang. "The Launching of a Prolate-Spheroidal Body in a Deep Fluid and its Descending Trajectory." 5/2015

Brian Howard. "Modeling Wave Action in Stern Ramp During Boat Launching and Recovery Operations." 5/2015

Dongchi Yu. "Wave-making Resistance and Wave Interference of Di-hull Systems." 12/2015

Pierre Lecointre. "An Analysis of Wave-making Resistance and Wave Interference of Di-hull Systems Using Wave-Height Measurements.." 12/2015

Christiaan Brekelmans. "Nonlinear Model Predictive Control with Wave Disturbance Preview for Active Fin Roll Stabilization of Marine Vessels." 5/2016.

Onur Bilgi. "Experimental Investigation of End Plate Influence on Propeller Vortex Wake at Low Reynolds Numbers." Co-Advisor, 5/2016