

## Lu Wang, Ph.D.

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### Education

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- **Ph.D. in Mechanical Engineering, 2016** (4.0 GPA)  
The University of California, Berkeley, CA  
Dissertation: *High-Performance Discrete-Vortex Algorithms for Unsteady Viscous-Fluid Flows near Moving Boundaries.*  
Major field: Ocean Engineering  
Minors: Fluid Mechanics, Mathematics
- **M.Sc. in Mechanical Engineering, 2012** (4.0 GPA)  
The University of California, Berkeley, CA
- **B.Sc. in Mechanical Engineering, 2011** (4.0 GPA)  
The University of California, Berkeley, CA  
*Recipient of Departmental Citation Award (Mechanical Engineering)*

### Professional Experiences

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#### *Research Positions*

#### **The University of California, Berkeley, CA**

**Postdoctoral Researcher** Supervisor: Prof. Ronald W. Yeung 2017 - Present

- Building a 3-D Computational Fluid Dynamics (CFD) software based on the Lattice-Boltzmann Method for flow past arbitrarily shaped solid bodies.
- Developing a CFD software based on the viscous Discrete-Vortex Method that also incorporates free-surface effects.
- Modeling hydrodynamics of 3-D ship hulls in waves with multiple-degree-of-freedom motion based on strip-wise computation with the viscous free-surface Discrete-Vortex Method.
- Developing efficient potential-flow software for computing the hydrodynamic coefficients of a single body or compound bodies of revolution in waves for the design and control of point-absorber wave-energy converters.
- Developing a GPU-accelerated 3-D potential-flow Boundary-Element Method for rapid computation of ship waves.

**Graduate Student Researcher** Advisor: Prof. Ronald W. Yeung 2014 - 2016

- Developing high-resolution CFD software based on a fully deterministic Discrete-Vortex Method (DVM) for two-dimensional unbounded flow with fluid viscosity.
- Utilizing parallel computing and GPU acceleration to improve performance of the DVM software.
- Investigating flow behavior near a flapping wing in the vicinity of a partial ground platform using the DVM software. The key findings are published in the journal *Physics of Fluids*.
- Performing numerical analysis on a drag-based cross-flow turbine using the DVM software. This work is published in the journal *Applied Energy*.
- Investigating the effect of mooring-line stiffness on the energy efficiency of a coaxial-cylinder wave-energy converter with two degrees of freedom. This work is published in the journal *Applied Ocean Research*.

### **Teaching Positions**

**The University of California, Berkeley, CA**

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|------------------------------------|--|-----------------|
| <b>Lecturer</b>                    | <i>Marine Hydrodynamics II</i>                             | Sp2017          |
| <b>Graduate Student Instructor</b> | <i>Ocean-Environment Mechanics</i>                         | Fa2015 / Sp2014 |
|                                    | <i>Fluid Mechanics*</i>                                    | Sp2015          |
|                                    | <i>Introduction to Mechanical Systems for Mechatronics</i> | Fa2014 / Fa2013 |

\*Received the UC Berkeley *Outstanding Graduate Student Instructor Award* for this course.

### **Industry Position**

**American Bureau of Shipping, Houston, TX**

**Corporate Technology Summer Intern**

Summer 2012

Longitudinal strength calculation for tankers and estimation of ship hydrostatic deformation under various loading conditions. Clarification of safety regulations for clients.

### **Publications and Conference Presentations**

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#### ***Archival Journals (Peer-Reviewed)***

- Yeung, R. W. and Wang, L., 2018, "Radiation and exciting forces of axisymmetric structures with a moonpool in waves," *Journal of Marine Science and Application*, **17**(3):297-311. DOI: [10.1007/s11804-018-0043-3](https://doi.org/10.1007/s11804-018-0043-3)
- Wang, L. and Yeung, R. W., 2016, "On the performance of a micro-scale Bach-type turbine as predicted by discrete-vortex simulations," *Applied Energy*, **183**:823-836. DOI: [10.1016/j.apenergy.2016.08.185](https://doi.org/10.1016/j.apenergy.2016.08.185)
- Wang, L., Son, D., and Yeung, R. W., 2016, "Effect of mooring-line stiffness on the performance of a dual coaxial-cylinder Wave-Energy Converter," *Applied Ocean Research*, **59**:577-588. DOI: [10.1016/j.apor.2016.07.014](https://doi.org/10.1016/j.apor.2016.07.014)
- Wang, L. and Yeung, R. W., 2016, "Investigation of full and partial ground effects on a flapping foil hovering above a finite-sized platform," *Physics of Fluids*, **28**(7):071902. DOI: [10.1063/1.4954656](https://doi.org/10.1063/1.4954656)
- Wang, L. and Yeung, R. W., 2015, "Nonlinear and unsteady waves generated by a traveling pressure distribution and the associated waveless shapes," *Journal of Engineering Mathematics*, **91**(1):1-16. DOI: [10.1007/s10665-014-9738-x](https://doi.org/10.1007/s10665-014-9738-x)
- Wang, L., 2014, "Nonlinear waves generated by a moving pressure patch in arbitrary water depth and the implied zero-wave-resistance (ZWR) conditions," *Transactions, Society of Naval Architects & Marine Engineers (SNAME)*, **122**:334-350.
- Wang, L., Chen, X., Wang, L., Sun, S., Tong, L., Yue, X., Yin, S., and Zheng, L., 2011, "Contribution from urban heating to China's 2020 goal of emission reduction," *Environmental Science & Technology*, **45**(11):4676-4681. DOI: [10.1021/es102898p](https://doi.org/10.1021/es102898p)

#### ***Conference Publications***

- Yu, D., Wang, L., and Yeung, R. W., 2017, "[Experimental and numerical studies on di-hull interferences](#)," in *Proceedings of the 32<sup>nd</sup> International Workshop on Water Waves and Floating Bodies*, Dalian, China, April 2017. i+4pp.

- Yeung, R. W., Jiang, Y., and Wang, L., 2016, “Validations of a discrete-vortex method (SS-FSRVM) for modeling nonlinear coupled vertical-plane and lateral-plane ship motions in head waves,” in *Proceedings of the 31<sup>st</sup> Symposium on Naval Hydrodynamics*, Monterey, CA, Sept. 2016. i+17pp.
- Wang, L., Son, D., and Yeung, R. W., 2016, “On the performance of a dual-cylinder wave-energy converter: single versus two degrees of freedom,” in *Proceedings of the 35<sup>th</sup> ASME International Conference on Ocean, Offshore, and Arctic Engineering*, Pusan, Korea, Paper #OMAE2016-54422. pp V006T09A017. DOI:[10.1115/OMAE2016-54422](https://doi.org/10.1115/OMAE2016-54422)
- Wang, L., 2014, “Nonlinear waves generated by a moving pressure patch in arbitrary water depth and the implied zero-wave-resistance (ZWR) conditions,” presented at the SNAME Northern California Section Meeting, March 19, 2014, i+19 pp. (Received 2014 SNAME National *Graduate Paper Honor Prize*.)

### *Preprints*

- Yu, D. and Wang, L., 2018, “Hull Form Optimization with Principal Component Analysis and Deep Neural Network,” *arXiv preprint*. [arXiv:1810.11701](https://arxiv.org/abs/1810.11701)

### **Awards and Honors**

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- UC Berkeley – Inaugural *John V. Wehausen Memorial Graduate Scholar*, 2016.
- UC Berkeley – *Outstanding Graduate Student Instructor Award*, 2015-2016.
- SNAME – 2014 *Graduate Paper Honor Prize* for paper “Nonlinear waves generated by a moving pressure patch in arbitrary water depth and the implied zero-wave-resistance (ZWR) conditions” presented at the SNAME Northern California Section Meeting on Mar. 19, 2014.
- UC Berkeley – *American Bureau of Shipping Ocean Technology Graduate Fellowship*, 2012-2013.
- UC Berkeley – *Mechanical Engineering Departmental Citation Award and Highest Honors in Mechanical Engineering*, Commencement 2011.

### **Skills**

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- Fluid mechanics
- Marine hydrodynamics
- Numerical computation
- Programming in MATLAB, FORTRAN, C/C++
- Object-oriented programming with C++
- Data structures and computer algorithms
- Parallel computing with OpenMP and CUDA
- Working knowledge on machine learning and artificial neural networks