

# YIN LU (JULIE) YOUNG

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## RESEARCH INTERESTS & EXPERTISE:

### *Numerical and physical modeling of multiphase flow & composite structures:*

- Smart wind and ocean energy conversion technologies.
- Energy-efficient propellers and turbines that takes advantage of fluid-structure interaction.
- Blast-resistant composite marine structures.
- Wave-soil-structure interactions due to extreme seismic or wave loading.
- Smart biomedical devices to monitor, regulate, and enhance blood flow.

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## EDUCATION

- **The University of Texas at Austin, Ph. D. in Civil Engineering, May 2002.**  
Dissertation: *Numerical Modeling of Supercavitating and Surface-Piercing Propellers.*
- **The University of Texas at Austin, M. S. in Civil Engineering, May 1998.**  
Thesis: *Analytical Investigation of Stress Induced-Anisotropy in Soil Surrounding a Borehole for Use in SASW Testing.*  
Other Research: *Dynamic Vehicular Impact of Highway Noise Barriers.*
- **University of Southern California, B. S. in Civil Engineering, May 1996.**  
Research: *Shear-Band Failure of Soil Particles.*

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## PROFESSIONAL POSITIONS

- **Assistant Professor**, Department of Civil and Environmental Engineering, Princeton University, Sep. 2002 – present.
- **UPS Visiting Professor**, Department of Civil and Environmental Engineering, Stanford University, March. 2008 – August 2008
- **Post-Doctoral Fellow**, Department of Civil and Environmental Engineering, The University of Texas at Austin, Jun. 2002 to Aug. 2002.
- **Graduate Research Assistant**, Prof. Kinnas, Department of Civil and Environmental Engineering, The University of Texas at Austin, Sep. 1997 to May 2002.
- **Teaching Assistant**, Department of Civil and Environmental Engineering, The University of Texas at Austin, Aug. 2001 to Dec.2001.
- **Graduate Research Assistant**, Profs. Stokoe & Roesset, Department of Civil and Environmental Engineering, The University of Texas at Austin, Sep. 1996 to May 1998.
- **Engineering Aid I**, Metropolitan Water District of Southern California, Sep. 1995 to Aug. 1996.

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## HONORS and AWARDS

- UPS Visiting Professorship, Stanford University, 2008.
- Princeton Engineering Commendation List for Outstanding Teaching, 2008.
- ONR Young Investigator Award (“Hydrodynamically Tailored Composite Propulsor Systems), 2005.
- Rheinstein School of Eng. and Applied Science (SEAS) Junior Faculty Award, Princeton University, 2005.
- University Continuing Fellowship (UT Austin), 2000-2001.
- Trust 2000 Fellowship (UT Austin), 1996-2000.
- Recipient, National Science Foundation Graduate Fellowship, 1996-1999.
- Recipient, ASERT Scholarship sponsored by AFOSR, 1995-1996.
- Recipient, National Science Scholars Award, 1993-1997.
- Recipient, National Science Foundation Young Scholars Program, Hawaii, 1992.

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## MEMBERSHIP IN TECHNICAL AND PROFESSIONAL SOCIETIES

- ASME, SNAME, SIAM, ASEE, AGU, ASCE

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## RESEARCH FUNDING

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### Energy-efficient propulsors and turbines:

- High-fidelity fluid-structure interaction modeling of composite rotors, ONR Code 331, 10/1/2008-9/30/2011, PI-Young.
- Hydrodynamically Tailored Composite Propulsor Systems, ONR-YIP, 6/1/2005-5/31/2008, PI-Young.
- Design Tools for the Sea-Base-Connector Transformable Craft (T-Craft) Prototype Demonstrator, ONR BAA 05-20, 9/1/2007-9/30/2008, PI-Troesch (University of Michigan).

### Blast-resistant composite marine structures:

- Transient Response and Failure Mechanisms of Advanced Composite Materials, ONR Code 331, 06/01/08-05/31/2011, PI-Young.
- Shock and Crashback Loading on Composite Propellers, ONR Code 331, 2/1/2007-1/31/2008, PI-Young.

### Wave-soil-structure interactions:

- Transient Flow-Induced Soil Failures of Coastal Structures, awarded, NSF-CMMI division, 9/1/2007-8/31/2010, PI-Young.
- Collaborative Research: SGER-Enhanced Sediment Transport Due to Transient Wave Loads, NSF-CMMI division, 10/1/2006-9/30/2007, PI-Young.
- NEESR-SG: Development of Performance Based Tsunami Engineering, PBTE, NSF-CMS division, 10/1/2005-9/30/2009, PI-Riggs (University of Hawaii at Manoa).

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## SERVICE TO SCIENTIFIC COMMUNITIES

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- Chair, 2009 Offshore Renewable Energy Symposium, 28th International Conference on Offshore Mechanics and Arctic Engineering (OMAE), Honolulu, HI, May 31-June 5, 2009.
- Invited speaker, Workshop on “Energy, wind and water: algorithms for simulation, optimization and control”, New Zealand Institute for Mathematics & its Application (NZIMA), University of Auckland, New Zealand, Feb. 9-12, 2009.
- Chair, Propulsor Hydrodynamics Session, 27th Symp. on Naval Hydrodynamics, Seoul, Korea, 2008.
- Invited speaker, 2nd Canada France Congress: Mini Symposium on Modeling Fluid-Structure Interaction in Naval Architecture, Montreal, Canada, 2008.
- Keynote Speaker, “Wave-Soil-Structure Interactions: Hurricane Katrina,” 3rd Conference for the International Congress of Chemistry and Environment, Kuwait City, Kuwait, 2007.
- Invited speaker, NSF NEES Workshop on Simulation Development, Chicago, US, Sept. 13, 2007.
- Invited panelist, NSF sponsored 2007 Tsunami Sedimentology Seminar to improve the understanding of tsunami deposits and their role in hazard mitigation, San Juan Island, Washington, US, 2007.
- Presenter, The International Workshop on Fundamentals of Coastal Effects of Tsunamis, Hilo, HI, 2006.
- Chair, Propulsor Hydrodynamics Session, 26th Symp. on Naval Hydrodynamics, Rome, Italy, 2006.
- Invited panelist, NSF/NOAA sponsored Tsunami Research Workshop to develop a strategic plan for tsunami research in the US, Oregon, US, 2006.
- Invited panelist, NEES Tsunami Facility Usage and Tsunami Modeling Workshop, Oregon, US, 2006.
- Member, SNAME Panel H-8 (Propulsor Hydrodynamics) Committee, 2005-present
- Invited panelist, NSF Review panels (BES and CMMI divisions), 2004-2009.

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## REVIEWER FOR SCHOLARLY JOURNALS

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- Journal of Fluid Mechanics; Journal of Applied Physics, Journal of Applied Mechanics, Journal of Computational Mechanics; International Journal for Numerical Methods in Fluids; Journal of Fluids Engineering; Journal of Waterway, Port, Coastal, and Ocean Engineering; Journal of Ship Research; Journal of Ocean Technology, Journal of Soil Dynamics and Earthquake Engineering, etc

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## MEDIA/PUBLIC RELATIONS ANNOUNCEMENTS

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- Y.L. Young, I. Robertson, S. Yim, R. Riggs, “Lessons from Hurricane Katrina: The Effect of Storm Surge on Engineered Structures,” SEAS Café Show, Princeton University, April 4-May 11, 2007 – *This public photo exhibit, along with multiple interviews, lead to several news and blog articles (The Daily News, LiveScience.com, CNet.com, The Daily Princetonian) that discussed the findings from my research related to hurricane storm surge and tsunami impact on coastlines and coastal structures.*
- Video: Engineering Our Future, Princeton University, www.princeton.edu, Jan-Feb, 2009 – *This video showcased cutting edge research from three of Princeton University’s engineering professors, including my research on tsunami impact on coastlines and coastal regions.*

## **A. REFEREED ARCHIVAL JOURNAL PUBLICATIONS**

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### **Energy-efficient propulsors and turbines:**

1. **Y.L. Young**, M. Motley, and R.W. Yeung, “*Three-Dimensional Numerical Modeling of the Transient Fluid-Structure Interaction Response of Tidal Turbines*,” Journal of Offshore Mechanics and Arctic Engineering, accepted for publication.
2. M.R. Motley, Z. Liu, and **Y.L. Young**, “*Utilization Fluid-Structure Interactions to Improve Energy Efficiency of Composite Marine Propellers in Spatially Varying Wake*,” Composite Structures, available online March 25, 2009.
3. **Y.L. Young**, “*Fluid-Structure Interaction Analysis of Flexible Composite Marine Propellers*,” Journal of Fluids and Structures, Vol. 24, No. 6, pp. 799-818, 2008.
4. **Y.L. Young** and Z. Liu, “*Performance Prediction of Newton-Radar Propellers*,” Journal of Ship Research, Vol. 52, No. 2, pp. 124-145, 2008.
5. **Y.L. Young** and Y. Shen, “*A Numerical Tool for the Design/Analysis of Dual-Cavitating Propellers*,” Journal of Fluids Engineering, Vol. 129, No. 6, pp. 720-730, 2007.
6. **Y.L. Young**, “*Time-Dependent Hydroelastic Analysis of Cavitating Propulsors*,” Journal of Fluids and Structures, Vol. 23, pp. 269-295, 2007.
7. **Y.L. Young** and S.A. Kinnas, “*Performance Prediction of Surface-Piercing Propellers*,” Journal of Ship Research, Vol. 48, No. 4, pp. 288-305, 2004.
8. **Y.L. Young** and S.A. Kinnas, “*Analysis of Supercavitating and Surface-Piercing Propeller Flows via BEM*,” Journal of Computational Mechanics, Vol. 32, No. 5-6, pp. 269-280, 2003.
9. **Y.L. Young** and S.A. Kinnas, “*Numerical Modeling of Supercavitating Propeller Flows*,” Journal of Ship Research, Vol. 47, pp. 48-62, 2003.
10. S.A. Kinnas and **Y.L. Young**, “*Modeling of Cavitating or Ventilated Flows Using BEM*”, International Journal of Numerical Methods for Heat & Fluid Flow, Vol. 13, No. 6, pp. 672-697, 2003.
11. S.A. Kinnas, H.S. Lee, and **Y.L. Young**, “*Modeling of Unsteady Sheet Cavitation on Marine Propeller Blades*”, International Journal of Rotating Machinery, Vol. 9, No. 4, pp. 263-277, 2003.
12. S.A. Kinnas, J.K. Choi, H.S. Lee, **Y.L. Young**, G. Gu, and K. Kakar, “*Prediction of Cavitation Performance of Single/Multi-Component Propulsors and their Interaction with the Hull*,” Trans. Society of Naval Architects and Marine Engineers, Vol. 110, pp. 215-244, 2002.
13. S.A. Kinnas, H.S. Lee, and **Y.L. Young**, “*Boundary Element Techniques for the Prediction of Sheet and Developed Tip Vortex Cavitation*”, Electronic Journal of Boundary Elements, No. 2, pp. 151-178, [http://tabula.rutgers.edu/EJBE/proceedings/2001/no2/37\\_Kinnas.pdf](http://tabula.rutgers.edu/EJBE/proceedings/2001/no2/37_Kinnas.pdf), 2002.
14. **Y.L. Young** and S.A. Kinnas, “*A BEM for the Prediction of Unsteady Midchord Face and/or Back Propeller Cavitation*,” Journal of Fluids Engineering, Vol. 123, pp. 311-319, 2001.

### **Blast-resistant composite marine structures:**

15. **Y.L. Young**, Z. Liu, and W.F. Xie, “*Fluid-Structure Interaction Effects during Underwater Explosion near Composite Structures*,” J. of Applied Mechanics, in press, 2009.
16. Z. Liu, W.F. Xie, **Y.L. Young**, “*Numerical Modeling of Complex Interactions between Underwater Shocks and Composite Structures*,” J. of Comp. Mechanics, Vol. 43, No. 2, pp. 239-251, 2009.
17. Z. Liu and **Y.L. Young**, “*Transient Response of a Submerged Plate Subject to Underwater Shock Loading: An Analytical Perspective*,” Journal of Applied Mechanics, Vol. 75, 044504, pp. 1-5, 2008.
18. W.F. Xie, **Y.L. Young**, T.G. Liu, “*Multiphase Modeling of Dynamic Fluid-Structure Interaction During Closed-In Explosion*,” Int. J. of Num. Methods in Eng., Vol. 74, No. 6, pp 1019-1043, 2008.
19. W.F. Xie and **Y.L. Young**, “*Two-Dimensional Shock Induced Collapse of Gas Bubble Near a Semi-infinite Deformable Solid*,” Journal of Mechanics of Materials and Structures, Vol. 2, pp. 1881-1900, 2007.
20. W.F. Xie, **Y.L. Young**, T.G. Liu and B.C. Khoo, “*Dynamic Response of Deformable Structures Subject to Shock Load and Cavitation Reload*,” Journal of Computational Mechanics, Vol. 40, pp. 667-681, 2007.

### **Wave-soil-structure interactions:**

21. **Y.L. Young**, J. White, H. Xiao, and R.I. Borja, “*Tsunami-induced Liquefaction Failure of Coastal Slopes*,” Acta Geotechnica, Vol. 4, No. 1, pp. 17-34, 2009.
22. M.A. Millan, **Y.L. Young**, J.H. Prevost, “*3D Effects on the Seismic Response of Dam-Reservoir Systems*,” CDRM Monograph, ASCE, in press, 2009. Also published as Proceedings of US-Bangladesh Workshop on Innovation in Windstorm & Storm Surge Mitigation, Dhaka, Bangladesh, Dec. 19-21, 2005.
23. M.A. Millan, **Y.L. Young**, and J.H. Prevost, “*Seismic Response of Intake Towers Including Dam-Tower Interactions*,” Earthquake Engineering and Structural Dynamics, Vol. 38, pp. 307-329, 2008.

24. M.A. Millan, **Y.L. Young**, J.H. Prevost, "The Effects of Reservoir Geometry on the Seismic Response of Gravity Dams," J. of Earthquake Engineering and Structural Dynamics, Vol. 36, pp. 1441-1459, 2007.
  25. I.N. Robertson, H.R. Riggs, S. Yim, and **Y.L. Young**, "Lessons From Hurricane Katrina Storm Surge on Bridges and Buildings," J. of Waterway, Port, Coastal, and Ocean Eng., Vol. 133, pp. 463-483, 2007.
  26. N.H. Kim, **Y.L. Young**, S.B. Yang, and K.I. Park, "Wave Damping Analysis in a Porous Seabed," KSCE Journal of Civil Engineering, Vol. 10, No. 5, pp. 305-310, 2006.
  27. N.H. Kim, Y.T. Hur, and **Y.L. Young**, "Computation of Non-Linear Wave Height Distribution in the Seogwipo Harbor using Finite Element Method," Journal of the Korean Committee for Ocean Resources and Engineering (KCORE), pp. 32-37, 2003.
  28. M.E. Kalinski, K.H. Stokoe II, **Y.L. Young**, and J.M. Roesset, "Borehole SASW Testing to Evaluate Log (Gmax) - Log (s) Relationships In Situ," Non-Destructive and Automated Testing for Soil and Rock Properties, ASTM STP 1350, Editors: W.A. Marr and C.E. Fairhurst, American Society for Testing and Materials, West Conshohocken, PA, pp. 137-155, 1999.
  29. J.P. Bardet and **J. Young**, "Grain Size Analysis by Buoyancy Method," Geotechnical Testing Journal, ASTM, Vol. 20, No. 4, pp. 481-485, 1997.
- Smart biomedical devices:**
30. C.A. Steeves, **Y.L. Young**, Z. Liu, A. Babat, K. Bhalerao, A.B.O. Soboyejo, and W.O. Soboyejo, "Membrane Thickness Design of Implantable Bio-MEMS Sensors for the In-Situ Monitoring of Blood Flow," Journal of Materials Science: Materials in Medicine, Vol. 28, No. 1, pp. 25-37, 2007.

## **B. REFEREED CONFERENCE PROCEEDINGS**

### **Energy-efficient propulsors and turbines:**

1. **Y.L. Young**, M. Motley, and R.W. Yeung, "Hydroelastic Response of Wind or Tidal Turbines," 28th International Conference on Offshore Mechanics and Arctic Engineering (OMAE), Honolulu, HI, May 31-June 5, 2009.
2. M. Motley, **Y.L. Young**, and J. Baker, "Reliability-Based Design and Optimization of Self-Twisting Composite Marine Rotors," 28th International Conference on Offshore Mechanics and Arctic Engineering (OMAE), Honolulu, HI, May 31-June 5, 2009.
3. **Y.L. Young**, Z. Liu, and M. Motley, "Influence of Material Anisotropy on the Hydroelastic Behaviors of Composite marine Propellers," 27th Symposium on Naval Hydrodynamics, Seoul, Korea, Oct. 5-10, 2008.
4. P.A. Chang, III, M. Elbert, **Y.L. Young**, Z. Liu, K. Mahesh, H. Jang, and ENS M. Shearer, "Propeller Forces and Structural Response due to Crashback," 27th Symposium on Naval Hydrodynamics, Seoul, Korea, Oct. 5-10, 2008.
5. **Y.L. Young**, "Hydroelastic Behavior of Flexible Composite Propellers in Wake Inflow," 16<sup>th</sup> International Conference on Composite Materials, Kyoto, Japan, July 8-13, 2007.
6. Z. Liu and **Y.L. Young**, "Utilization of Bending-Twisting Coupling in Self-Twisting Composite Propellers," 16<sup>th</sup> International Conference on Composite Materials, Kyoto, Japan, July 8-13, 2007.
7. M.M. Plucinski, **Y.L. Young**, and Z. Liu, "Optimization of a Self-Twisting Composite Marine Propeller Using Genetic Algorithms," 16<sup>th</sup> Int. Conference on Composite Materials, Kyoto, Japan, July 8-13, 2007.
8. **Y.L. Young** and Z. Liu, "Hydroelastic Tailoring of Composite Naval Propulsors," 26<sup>th</sup> International Conference on Offshore Mechanics and Arctic Engineering (OMAE), San Diego, CA, June 10-15, 2007.
9. **Y.L. Young**, T.J. Michael, M. Seaver, and S.T. Trickey, "Numerical and Experimental Investigations of Composite Marine Propellers," 26th Symp. on Naval Hydrodynamics, Rome, Italy, Sept. 17-22, 2006.
10. **Y.L. Young**, "Hydroelastic Response of Composite Marine Propellers," SNAME 2006 Propeller and Shafting Symposium, Fort Magruder, VA, Sept. 12-13, 2006.
11. **Y.L. Young** and Y. Shen, "A Numerical Tool for the Design/Analysis of Dual-Cavitating Propellers," ISROMAC-11: 11th International Symposium on Transport Phenomena and Dynamics of Rotating Machinery, Honolulu, HI, Feb. 2006.
12. **Y.L. Young**, "Hydroelastic Modeling of Surface-Piercing Propellers," 25th Symposium on Naval Hydrodynamics, St. John's, Newfoundland and Labrador, Canada, Aug. 2004.
13. **Y.L. Young** and S.A. Kinnas, "Fluid and Structural Modeling of Cavitating Propeller Flows," CAV2003: 5th International Symposium on Cavitation, Osaka, Japan, Nov. 2003.
14. **Y.L. Young** and S.A. Kinnas, "Numerical Analysis of Surface-Piercing Propellers," SNAME 2003 Propeller and Shafting Symposium, Virginia Beach, VA, 2003.
15. **Y.L. Young** and S.A. Kinnas, "A BEM Technique for the Modeling of Supercavitating and Surface-Piercing Propeller Flows," 24th Symposium on Naval Hydrodynamics, Fukuoka, Japan, July 2002.

16. **Y.L. Young** and S.A. Kinnas, "Application of BEM in the Modeling of Supercavitating and Surface-Piercing Propeller Flows," IABEM 2002 Symposium, Austin, TX, May 2002.
17. S.A. Kinnas, H.S. Lee, and **Y.L. Young**, "Modeling of Unsteady Sheet Cavitation on Marine Propulsors," ISROMAC-9: 9th International Symposium on Transport Phenomena and Dynamics of Rotating Machinery, Honolulu, HI, Feb. 2002.
18. S.A. Kinnas, H.S. Lee, and **Y.L. Young**, "Boundary Element Techniques for the Prediction of Sheet and Developed Tip Vortex Cavitation," BeTeQ/IABEM-2001 Symposium of the International Association for Boundary Element Methods, New Brunswick, NJ, July 16-18, 2001.
19. **Y.L. Young** and S.A. Kinnas, "Numerical Modeling of Supercavitating and Surface-Piercing Propeller Flows," CAV2001: 4<sup>th</sup> International Symposium on Cavitation, Los Angeles, CA, Jun. 2001.
20. **Y.L. Young** and S.A. Kinnas, "Prediction of Unsteady Performance of Surface-Piercing Propellers," SNAME 2000 Propeller and Shafting Symposium, Virginia Beach, VA, Sep. 2000.
21. **Y.L. Young** and S.A. Kinnas, "Modeling of Unsteady Sheet Cavities on Hydrofoils and Propellers," EM2000: 14<sup>th</sup> Engineering Mechanics Conference, Austin, TX, May 2000.
22. S.A. Kinnas, J.K. Choi, H.S. Lee, and **Y.L. Young**, "Numerical Cavitation Tunnel," NCT'50 International Conference on Cavitation, New Castle, United Kingdom, Apr. 2000.

**Blast-resistant composite marine structures:**

23. Z. Liu, **Y.L. Young**, M. Motley, and W.F. Xie, "Transient Response of Submerged Composite Structures Subject to Underwater Explosions," 27th Symp. on Naval Hydrodynamics, Seoul, Korea, Oct. 5-10, 2008.
24. W.F. Xie, Z. Liu, and **Y.L. Young**, "Numerical Investigation of Shock Impacts on Composite Marine Structures," 16<sup>th</sup> International Conference on Composite Materials, Kyoto, Japan, July 8-13, 2007.

**Wave-soil-structure interactions:**

25. H. Xiao, **Y.L. Young**, and J.H. Prevost, "Dynamic Interactions between the Vadose and Phreatic Zones during Breaking Solitary Wave Runup and Drawdown over a Fine Sand Beach," 28th International Conference on Offshore Mechanics and Arctic Engineering (OMAE), Honolulu, HI, May 31-June 5, 2009.

**C. OTHER CONFERENCE PROCEEDINGS**

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**Energy-efficient propulsors and turbines:**

26. **Y.L. Young** and Margot Gerritsen, "Marine Energy Technology: Riding the Current," SIAM Minisymposium on Mathematical and Computational Challenges in Global Climate and Energy Processes, Washington, DC, Jan 5-8, 2009.
27. **Y.L. Young**, "Unsteady Hydroelastic Analysis of Self-Twisting Composite Propellers", American Towing Tank Conference, Ann Arbor, Michigan, August 9-10, 2007.
28. **Y.L. Young** and Z. Liu, "Numerical Analysis of Self-Twisting Composite Propellers in Spatially Varying Wake", 9th US National Congress on Computational Mechanics, San Francisco, CA, July 23-26, 2007.
29. Z. Liu and **Y.L. Young**, "Design and Optimization of Self-Twisting Composite Propellers", 9th US National Congress on Computational Mechanics, San Francisco, CA, July 23-26, 2007.
30. **Y.L. Young** and S.A. Kinnas, "Numerical Modeling of High-Speed Propulsors," 24th Duisburg Colloquium on Ship and Ocean Technology, Duisburg, Germany, May 2003.
31. S.A. Kinnas, **Y.L. Young**, H.S. Lee, H. Gu, and S. Natarajan, "Prediction of Cavitating Flow Around Single or Two-Component Propulsors, Ducted Propellers, and Rudders," RINA CFD 2003: CFD Technology in Ship Hydrodynamics conference, London, UK, Feb. 2003.
32. S.A. Kinnas, E.M. Kosal, and **Y.L. Young**, "Computational Techniques for the Design and Analysis of Super-Cavitating Propellers," FAST99: 5<sup>th</sup> Int. Conf. on Fast Sea Transportation, Seattle, Aug. 1999.
33. S.A. Kinnas, J.K. Choi, E.M. Kosal, **Y.L. Young**, and H.S. Lee, "An Integrated Computational Technique for the Design of Propellers with Specified Constraints On Cavitation Extent and Hull Pressure Fluctuations," CFD'99 The International CFD Conference, Williamsburg, May 1999.
34. **Y.L. Young** and S.A. Kinnas, "Numerical and Experimental Validation of a Cavitating Propeller BEM Code," 3<sup>rd</sup> ASME/JSME Joint Fluids Engineering Conference, San Francisco, Jul. 1999.

**Blast-resistant composite marine structures:**

35. **Y.L. Young**, Z. Liu, M. Motley, and W.F. Xie, "Numerical Investigation of Shock and Blast Loads on Composite Marine Structures", 2<sup>nd</sup> Canada France Congress, Modeling Fluid-Structure Interaction in Naval Architecture Mini-symposium, Montreal, Canada, June 1-5, 2008.
36. W.F. Xie, Z. Liu, and **Y.L. Young**, "Underwater Explosion Induced Fluid Structure Interaction with Cavitation", 9th US National Congress on Comp. Mechanics, San Francisco, CA, July 23-26, 2007.
37. W.F. Xie, **Y.L. Young**, T.G. Liu, and B.C. Khoo "A Ghost Fluid Method for Shock, Structure and Free

*Surface Interaction*", 7th World Congress on Comp. Mechanics, Los Angeles, CA, July 16-22, 2006.

**Wave-soil-structure interactions:**

38. **Y.L. Young**, J.H. Prevost, J.A. Smith, H. Xiao, S. Sanborn, M.L. Baeck, and N. Lin, "Numerical Modeling of Hurricanes and Storm Surges, Near-shore Wave-Soil Interactions, and Slope Instability Failures," 2009 NSF Engineering Research and Innovation Conference, Honolulu, Hawaii, June 22-25, 2009.
39. **Y.L. Young** and H. Xiao, "Erosion and Liquefaction Failure of Coastal Sandy Slopes Caused by Breaking Solitary Wave Runup and Drawdown," NEES Seventh Annual Meeting: Seismic Mitigation in a Flat World, Honolulu, Hawaii, June 23-25, 2009.
40. **Y.L. Young**, H. Xiao, and J.H. Prevost, "Transient Responses of Coastal Sandy Slopes during Extreme Wave Runups and Drawdowns," NEES Seventh Annual Meeting: Seismic Mitigation in a Flat World, Honolulu, Hawaii, June 23-25, 2009.
41. **Y.L. Young**, H. Xiao, J. White, and R.I. Borja, "Can Tsunami Lead to Liquefaction Failure of Coastal Sandy Slopes," 14th World Conference on Earthquake Engineering, Beijing, China, Oct. 12-17, 2008.
42. H. Xiao and **Y.L. Young**, "Solitary Wave Runup on Movable Bed: Experimental and Numerical Investigations," NEES 6<sup>TH</sup> Annual Meeting: The Value of Earthquake Engineering Research, Portland, OR, June 18-20, 2008.
43. **Y.L. Young** and H. Xiao, "Enhanced Sediment Transport due to Wave-Soil Interactions," Proceedings of 2008 NSF Engineering Research and Innovation Conference, Knoxville, TE, January 8-10, 2008.
44. H.R. Riggs, I.N. Robertson, K.F. Cheung, G. Pawlak, **Y.L. Young**, and S. Yim, "Experimental Simulation of Tsunami Hazards to Buildings and Bridges," Proceedings of 2008 NSF Engineering Research and Innovation Conference, Knoxville, TE, January 8-10, 2008.
45. I.N. Robertson, S. Yim, H.R. Riggs, and **Y.L. Young**, "Coastal Bridge Performance During Hurricane Katrina," 3<sup>rd</sup> International Conference on Structural Engineering, Mechanics and Computation, Cape Town, South Africa, Sept. 9-12, 2007.
46. H. Xiao and **Y.L. Young**, "Modeling of Solitary Waves over a Movable Bed", 9th US National Congress on Computational Mechanics, San Francisco, CA, July 23-26, 2007.
47. **Y.L. Young** and H. Xiao, "Numerical and Experimental Investigations of Tsunami-Induced Sediment Transport," American Geophysics Union 2007 Joint Assembly, Acapulco, Mexico, May 22-25, 2007.
48. S. Piaskowy and **Y.L. Young**, "Coastal Flooding Induced by Surcharging Storm Sewer Systems at Low Elevations," American Geophysics Union 2007 Joint Assembly, Acapulco, Mexico, May 22-25, 2007.
49. M.A. Millan, **Y.L. Young**, J.H. Prevost, "Seismic Induced Fluid-Structure-Interaction of Dam Intake Towers," Computational Methods in Structural Dynamics and Earthquake Engineering, Rethymno, Crete, Greece, June 13-15, 2007.
50. M.A. Millan, **Y.L. Young**, J.H. Prevost, "Effect of Reservoir Geometry and Vertical Contraction Joints in the Seismic Response of Dams," First European Conference on Earthquake Engineering and Seismology, Geneva, Switzerland, Sept. 3-8, 2006.
51. I.N. Robertson, H.R. Riggs, S. Yim, and **Y.L. Young**, "Lessons from Katrina," ASCE Civil Engineering Magazine, v. 76, no. 4, April 2006.
52. R. Riggs, I. Robertson, S. Yim, and **Y.L. Young**, "Development of Performance Based Tsunami Engineering," NEES Training and Tsunami Engineering Workshop, Corvallis, OR, July 27-28, 2006.

**E. WORK IN PROGRESS**

**Energy-efficient propulsors and turbines:**

1. **Y.L. Young**, "Dynamic Hydroelastic Scaling of Self-Adaptive Composite Marine Rotors," Journal of Composite Structures, under review.
2. Z. Liu and **Y.L. Young**, "Utilization of Bending-Twisting Coupling Effects for Performance Enhancement of Composite Marine Propellers," Journal of Fluids and Structures, under review.
3. Z. Liu and **Y.L. Young**, "Static Divergence of Self-Twisting Marine Propellers," Journal of Fluids Engineering, under review.
4. **Y.L. Young**, "Hydroelastic Response and Tailoring of Composite Propellers for Improved Cavitating Performance," CAV2009: 7<sup>th</sup> International Symposium on Cavitation (CAV2009), Ann Arbor, MI, Aug. 16-22, 2009, accepted.
5. **Y.L. Young** and B.R. Savander, "Design and Analysis of Fuel-Efficient Surface-Piercing Propellers with Consideration for Structural Integrity," CAV2009: 7<sup>th</sup> International Symposium on Cavitation (CAV2009), Ann Arbor, MI, Aug. 16-22, 2009, accepted.

#### **Blast-resistant composite marine structures:**

6. Z. Liu, **Young Y.L.**, and Motley M.R., “*Transient Response of Partially-Bonded Sandwich Plates subject to Underwater Explosions*,” Journal of Shock and Vibration, under review.
7. W.F. Xie, Z. Liu, **Y.L. Young**, “*Application of a Coupled Eulerian-Lagrangian Method to Simulate Interactions between Deformable Composite Structures and Compressible Multiphase Flow*,” Int. J. of Num. Methods in Eng., under review.
8. W.F. Xie, **Y.L. Young**, T. Liu, and B.C. Khoo, “*Bulk/hull Cavitation induced by Underwater Explosion: Effect of Material Elasticity and Surface Curvature*,” Physics of Fluids, under review.

#### **Wave-soil-structure interactions**

9. H. Xiao, J.H. Prevost, and **Y.L. Young**, “*Multiphase Flow Through Deformable Porous Media Under Extreme Wave Loading*,” Proceedings of Royal Society A, under review.
10. **Y.L. Young**, H. Xiao, and T. Maddux, “*Runup and drawdown of breaking solitary waves over a fine sand beach. Part I: experimental modeling*,” Marine Geology, under review.
11. H. Xiao, **Y.L. Young**, and J.H. Prevost, “*Runup and drawdown of breaking solitary waves over a fine sand beach. Part II: numerical modeling*,” Marine Geology, under review.
12. F. Bou-Rabee, **Y.L. Young**, and E. VanMarcke, “*Paleo Liquefaction Evidence in Kuwait & Implications for the Region’s Seismic Vulnerability*,” Soil Dynamics and Earthquake Engineering, under review.

#### **Manuscripts under preparation:**

13. **Y.L. Young**, J. Baker, and M. Motley, “*Reliability-Based Design and Optimization of Adaptive Marine Structures*,” under preparation (95% ready).
14. **Y.L. Young**, B. R. Savander, “*Design and Analysis of Large-Scale Surface-Piercing Propellers*,” under preparation (40% ready).

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#### **ADMINISTRATIVE RESPONSIBILITIES WITHIN PRINCETON**

**Princeton University (PU):** Faculty Advisor, Graduate Women in Science and Education, 2004-2008

##### **School of Engineering and Applied Science (SEAS):**

- Freshman Advisor, Class of 2007, 2009, and 2011; Strategic Planning Committee, SEAS, 2005

##### **Civil and Environmental Engineering (CEE):**

- Academic Advisor, Structural Engineering, Class of 2006, 2007, and 2008
- Faculty Advisor ASCE Student Chapter, 2005-present

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#### **UNIVERSITY TEACHING ACTIVITIES**

- Stanford U, CEE296, Fluid-Solid Interactions, Spring 08 (average student rating: 4.3/5)
- Princeton U, CEE525, Applied Numerical Methods, Spring 04 & 05 & 09 (average student rating: 4.3/5)
- Princeton U, CEE205, Mechanics of Solids, Fall 02-08 (average student rating: 4.2/5)

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#### **POSTDOCTORAL RESEARCH ASSOCIATES AND VISITORS**

- Dr. Miguel Millan, Escuela Superior de Ingenieros Camino de los Descubrimientos, Spain  
Development of kernel independent vortex particle method, Sum 07 – Sum 08  
Numerical analysis of dam-foundation-reservoir interactions, Spr 05 - Spr 06
- Dr. Wenfeng Xie, National University of Singapore, Singapore  
Numerical analysis of shock load and cavitation reloads on composite structures, Spr 06-Fall 07
- Prof. Namhyeong Kim, Cheju National University, Korea  
Numerical analysis of wave profiles over permeable boundaries and breakwaters, Spr 04 – Sum 05

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#### **STUDENT ADVISING**

##### **Doctoral Advising Completed – Chair Advisor**

- Zhanke Liu: Transient Analysis and Design of Composite Structures in Multiphase Flows, degree awarded 9/1/2008. Currently working at Sugar Land Technology Center, Schlumberger, Texas, USA.  
**Winner:** NSF Graduate Student Fellowship, US Congress on Comp. Mechanics, 2007.

##### **Doctoral Students Currently Being Advised**

- Heng Xiao: Physical and Numerical Modeling of Wave Propagation, Sediment Transport, and Soil Failure, expected graduation date, July, 2009. **Winner:** Wu Fellowship, 2005.
- Michael Motley: Response and Failure Mechanisms of Composite Naval Structures Subject to Shock and Blast Loads, expected graduation date, May, 2011.

### Doctoral Dissertation – second or third reader

- |                                |   |             |
|--------------------------------|---|-------------|
| • Wang, Ju<br>(Ph.D. MAE)      | Performance of Truss Panels with Kagome Cores and Design of High Authority Shape Morphing Structure | Fall 2005   |
| • Lui, Ninghui<br>(Ph.D. CEE)  | Vibrations of Piezoelectric Plates Without and With Dissipation                                     | Spring 2006 |
| • Yong, Yang<br>(Ph.D. MAE)    | Fatigue and Fracture of Nickel MEMS Thin Films  | Spring 2007 |
| • Zong, Zong<br>(Ph.D. MAE)    | Small Scale Contact Behavior in Metallic Films : Indentation and Adhesion Experimental Studies      | Spring 2007 |
| • Jimenez, Juan<br>(Ph.D. MAE) | High Reynolds Number Flows about Bodies of Revolution with Application to Submarines and Torpedoes  | Spring 2007 |
| • Chen, Jianbo<br>(Ph.D. MAE)  | Multi-Scale Cell/Surface Interaction on Modified Ti-6Al-4V Surfaces                                 | Spring 2009 |

### Service as General Examiner for Doctoral Students

- **CEE:** Mark Dobossy (5/03), Spencer Quiel (5/06), Gordana Herning (10/06), Sinead Mac Namara (11/06), Siu-Chung Yau (5/08), and Raghav Pant (5/08)
- **MAE:** Zong Zong (11/02), Xinrui Niu (11/03), Yong Yang (11/04), Jun Song (11/04), Jianbo Chen (5/06), Lian Duan (1/07), Ifang Cao (6/06), Wanliang Shan (1/08)

### Bachelor's Candidates (Senior Thesis):

- Courtney Clark: A Comprehensive Analysis of the Felsenau Bridge, 2002-2003
- Molly Seto: A Comprehensive Analysis of the Confederation and Zeeland Bridges, 2002-2003
- Trevor Baine: Design and Analysis of a Trileaflet Mechanical Heart Valve, 2003-2004
- Jameelah Muhammad: Comprehensive Study of the Akashi Kaikyo Bridge, 2003-2004
- Thomas Spencer: Analysis and Design of a Dual Cavitating Propeller, 2004-2005
- Ashley Prescott: A Forensic Analysis of the London Avenue Canal Parallel Protection System, New Orleans, Louisiana, 2005-2006
- Katrina Wechselberger: An Investigation into the Failure of the 17th Street Floodwall, New Orleans, LA, 2005-2006
- Edwin Davisson: Optimization of Beams and Bridge Profiles Using Genetic Algorithms, 2005-2006
- Michael Hsu: Design and Analysis of a new Trileaflet Mechanical Heart Valve, 2006-2007.  
**Winner:** Calvin Dodd MacCracken Senior Thesis/Project Award, 2007.
- Sara Piaskowy: Engineering for Life at Low Elevations-A Case Study of Bayside Flooding in Seaside Park, NJ, 2006-2007.  
**Winner:** Grand Prize and Engineering Award, 2007 Undergraduate Research Symposium  
**Winner:** Tau Beta Pi Prize, 2007.  
**Winner:** NSF Graduate Fellowship (Announced April 1, 2008)
- Abigail Campbell: Structural Analysis and Fatigue Life Prediction of a Drug-Eluting Cardiovascular Stent, 2007-2008.

### Bachelor's Candidates (Junior Independent Work):

- Mathew Plucinski: Optimization of Composite Marine Propellers, 2007.  
**Nominated:** 2008 M. Taylor Pyne Honor Prize  
Zaafir Kherani: Analysis and Biomedical Effects of Cavitation, 2007.  
**Winner:** Stanford Graduate Fellowship
- Michael Hsu: Design and Analysis of a Trileaflet Mechanical Heart Valve, 2006
- Thomas Edwards: Active Pitch Control in Marine Propellers-An Experiment, 2006

### NSF REU Students

- Aneesh Bapat, Predicting Stenosis in Blood Vessels, 2004
- Michael Hsu, Design and Analysis of a new Trileaflet Mechanical Heart Valve, 2004
- Stephen Dao, White Blood Cell and Platelet Aggregation in Stenoses: A Computational Model, 2005
- Cindy Byer, Analysis and Design of a Flexible Composite Marine Propeller, 2006
- Sara Ford, Design Considerations for Tsunamis and Storm Surges, 2006
- Adedo Monronkeji, Physical Modeling of Tsunami Sediment Transport and Scour, 2007

## **PRESENTATIONS & INVITED LECTURES**

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- Y.L. Young, “Transient Hydroelastic Analysis of Marine Turbines,” Workshop on “Energy, wind and water: algorithms for simulation, optimization and control”, New Zealand Institute for Mathematics & its Application (NZIMA), University of Auckland, New Zealand, Feb. 9-12, 2009.
- Y.L. Young, B.R. Savander, and S.L. Ceccio, “Design & Analysis of Large-Scale Surface Piercing Propellers”, ONR Transformational Craft Tool Development Program Review, Feb. 3-5, 2009.
- Y.L. Young, “Renewable Ocean Energy Conversion Systems: Advancing State-of-the-Art,” Energy Seminar, Woods Institute, Stanford University, Stanford, CA, Jan. 28, 2009.
- Y.L. Young, “Analysis and Design of Composite Marine Structures that Utilize Fluid-Structure Interaction,” Michigan University, Ann Arbor, MI, December 1, 2008.
- Y.L. Young, “Hydroelastic Behavior of Advanced Material Propulsors in Forward and Crashback Operations,” 2008 ONR Propulsors S&T Program Review, October 28, 2008.
- Y.L. Young, “Physical and Numerical Modeling of Tsunami Erosion and Soil Failure,” Tsinghua University, Beijing, China, October 16, 2008.
- Y.L. Young, “Physical and Numerical Modeling of Tsunami Erosion and Soil Failure,” Institute of Mechanics, Chinese Academy of Science, Beijing, China, October 14, 2008.
- Y.L. Young, “From Marine Propellers to Current Turbines: How to Take Advantage of Fluid-Structure Interaction,” Stanford University, Stanford, CA, September 26, 2008.
- Y.L. Young, “Hydroelastic Analysis Tools for Advanced Material Propellers,” High Altitude Long Endurance, Non-Linear Aeroelastic Tools Workshop sponsored by DARPA, Institute for Defense Analysis, Alexandria, VA, September 10-11, 2008.
- Y.L. Young, “Tsunami Propagation and Sediment Transport: Physical and Numerical Modeling,” Stanford University, Stanford, CA, May 29, 2008.
- Y.L. Young, “A Coupled BEM-FEM Approach for Transient Hydroelastic Analysis of Advanced Marine Propulsors,” Stanford University, Stanford, CA, May 22, 2008.
- Y.L. Young, “Modeling, Control, and Utilization of Fluid-Structure Interactions,” University of California at Berkeley, Berkeley, CA, February 20, 2008.
- Y.L. Young, W.F. Xie, and Z. Liu, “Transient Response of Composite Naval Structures subject to Shock and Blast Loads,” University of Michigan, Ann Arbor, MI, December 10, 2007.
- Y.L. Young, W.F. Xie, and Z. Liu, “Violent Fluid Flows and Composite Structures,” Stevens Institute of Technology, Hoboken, NJ, November 28, 2007.
- Y.L. Young, “Hydroelastic Behavior of Propulsor in Crashback,” 2007 ONR Propulsors S&T Program Review, October 11, 2007.
- Y.L. Young, “Shock Load and Cavitation Reload on Composite Structures,” 2007 ONR Propulsors S&T Program Review, October 11, 2007.
- Y.L. Young, “Physical and Numerical Modeling of Tsunami Erosion and Soil Failure,” Center for Environmental and Applied Fluid Mechanics, Johns Hopkins University, September 28, 2007.
- Y.L. Young, “Physical and Numerical Modeling of Tsunami Erosion and Soil Failure,” NSF NEES Workshop on Simulation Development, Chicago, September 13, 2007.
- Y.L. Young, “Tsunami and Beach Scour,” REU Tsunami Symposium, Oregon State University, Corvallis, OR, August 1, 2007.
- Y.L. Young, H. Xiao, and M. Plucinski, “Passive Hydroelastic Tailoring of Composite Naval Structures,” University of Michigan, Ann Arbor, MI, May 14, 2007.
- Y.L. Young, H. Xiao, and T. Ting, “Tsunami-Induced Sediment Transport and Scour,” University of Delaware, Newark, DE, May 8, 2007.
- Y.L. Young, H. Xiao, and T. Ting, “Tsunami-Induced Sediment Transport and Scour,” Stanford University, Stanford, CA, April 27, 2007.
- Y.L. Young, H. Xiao, and T. Ting, “Tsunami-Induced Sediment Transport and Scour,” University of Southern California, Los Angeles, CA, April 26, 2007.
- Y.L. Young, W.F. Xie, and Z. Liu, “Violent Fluid Flows and Composite Structures,” University of California at Berkeley, Berkeley, CA, April 25, 2007.
- Y.L. Young, W.F. Xie, and Z. Liu, “Shock Load and Cavitation Reload on Deformable Composite Structures,” California Institute of Technology, Pasadena, CA, April 17, 2007.
- Y.L. Young, W.F. Xie, and Z. Liu, “Shock Load and Cavitation Reload on Deformable Composite Structures,” University of California at Santa Barbara, Santa Barbara, CA, April 16, 2007.
- Y.L. Young, H. Xiao, and T. Ting, “Tsunami-Induced Sediment Transport and Scour,” Oregon State University, Corvallis, OR, April 13, 2007.

- Y.L. Young, H. Xiao, and T. Ting, "Tsunami-Induced Sediment Transport and Scour," Massachusetts Institute of Technology, Cambridge, MA, March 22, 2007.
- Y.L. Young, Z. Liu, and W.F. Xie, "Hydroelastic Tailoring of Composite Naval Structures," The University of Texas at Austin, Austin, TX, February 17, 2007.
- Y.L. Young, Z. Liu, and W.F. Xie, "Wave Impact and Air Bubbles," The International Workshop on Fundamentals of Coastal Effects of Tsunamis, Hilo, Hawaii, December 26-28, 2006.
- Y.L. Young and H. Xiao, "Tsunami-Induced Sediment Transport and Scour," Oregon State University, Corvallis, OR, November 2, 2006.
- Y.L. Young, Z. Liu, and W.F. Xie, "Modeling of Hydroelastic for Composite Propulsors," 2006 ONR Propulsors S&T Program Review, NSWC, West Bethesda, MD, October 16, 2006.
- Y.L. Young, "Hydroelasticity Effects in Propeller Prediction," 2005 ONR Propulsors S&T Program Review, NSWC, West Bethesda, MD, June 2, 2005.
- Y.L. Young, "Fluid-Structure Interaction Problems," SEAS Junior Faculty Seminar Series, Princeton University, March 2, 2005.
- Y.L. Young, "Hydroelastic Modeling of Surface-Piercing Propellers," Hydromechanics Colloquium, Carderock Div., NSWC, West Bethesda, MD, June 2, 2004.
- Y.L. Young, "Multiscale Simulation of Cavitating Flows," SEAS Graduate Orientation, Princeton University, Princeton, NJ, Sept. 10, 2003.
- Y.L. Young, "Surface-Piercing Propellers: Jet Sprays & Fluid-Structure Interactions," Institute of Fluid Mechanics, University Duisburg-Essen, Duisburg, Germany, May 16, 2003.
- Y.L. Young, "Numerical Modeling of High-Speed Propulsors," Ship Technology Conference, University Duisburg-Essen, Duisburg, Germany, May 15, 2003.
- Y.L. Young, "Fluid-Structure Interaction of Cavitating/Ventilated Propulsors," Department of Civil and Environmental Engineering, University of Illinois, Urbana IL, April 14, 2003.
- Y.L. Young, "Fluid-Structure Interaction of Cavitating Propulsors," Applied Research Laboratory, Pennsylvania State University, February 21, 2003.