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Education

- University of Delaware, Newark, Delaware.
Ph.D., Applied Sciences (Civil Engineering), 1983
- Brown University, Providence, Rhode Island.
Sc.B.(magna cum laude), Environmental Engineering, 1975.
Sc.M., Engineering Mechanics, 1976.

Professional Experience

- Edward C. Davis Professor of Civil Engineering, Department of Civil and Environmental Engineering, University of Delaware, 2003-present.
- Visiting Professor, Grupo de Dinámica de Flujos Ambientales, CEAMA, Universidad de Granada, 2010, 2012.
- Professor of Civil and Environmental Engineering, Department of Civil and Environmental Engineering, University of Delaware, 1994-2002. Secondary appointment in College of Earth, Ocean and the Environment, University of Delaware, 1994-present.
- Associate Professor of Civil Engineering, Department of Civil Engineering, University of Delaware, 1989-1994. Secondary appointment in College of Marine Studies, University of Delaware, as Associate Professor, 1989-1994.
- Associate Professor, Coastal and Oceanographic Engineering Department, University of Florida, 1988.
- Assistant Professor, Coastal and Oceanographic Engineering Department, University of Florida, 1984-1988.
- Assistant Professor, Marine Sciences Research Center, State University of New York at Stony Brook, 1983-1984.
- Graduate Research Assistant, Department of Civil Engineering, University of Delaware, 1979-1983.
- Principle Research Engineer, Alden Research Laboratory, Worcester Polytechnic Institute, 1979.
- Research Engineer, Alden Research Laboratory, Worcester Polytechnic Institute, 1977-1979.

Technical Societies

- American Society of Civil Engineers
 - Waterway, Port, Coastal and Ocean Engineering Division. (Now COPRI, the Coastal, Ocean, Port and River Institute).
 - * Member, Organizing Committee, *Coastal Hydrodynamics '87*, Newark, June 1987.
 - * Member, Publications Committee, 1987-2002.
 - * Assistant Editor, *Journal of Waterway, Port, Coastal and Ocean Engineering*, 1994 - 1996.
 - * Editor, *Journal of Waterway, Port, Coastal and Ocean Engineering*, 1996 - 2000.
 - * Member, Technical Committee, *WAVES '01*, San Francisco, September 2001.
 - * Member, Scientific Committee, *33d International Conference on Coastal Engineering*, Santander, 2012.
 - * Member, Scientific Committee, *34th International Conference on Coastal Engineering*, Seoul, 2014.
 - Engineering Mechanics Division
 - * Member, Fluids Committee, 1991-present.
 - * Organizer, Wave Hydrodynamics sessions, *Joint SES-ASME-ASCE Meeting*, Charlottesville, June 1993.
 - * Vice-Chairman, Fluids Committee, 1993-1994.
 - * Chairman, Fluids Committee, 1994 - 1996.
 - * Associate Editor, *Journal of Engineering Mechanics*, 1994 - 1996.
 - * Organizer, session on Breaking Waves and Turbulence, *10th Engineering Mechanics Division Specialty Conference*, Boulder, May 1995.
 - * Member, Organizing Committee, *17th Engineering Mechanics Conference*, Newark, DE, June 2004.
- American Geophysical Union
 - Organizer, Nearshore Hydrodynamics sessions, *American Geophysical Union Fall Meeting*, December 1992.
 - Editor, *Journal of Geophysical Research - Oceans*, 2003-2006.
 - Editor-in-Chief, *Journal of Geophysical Research - Oceans*, 2006-2009.
 - Member, Governing Board, American Institute of Physics, 2011-2013.
 - Organizer, Natural Hazards sessions on inundation, AGU Fall Meeting, 2012.
- American Physical Society
- Coastal and Estuarine Research Federation
- United States Association for Computational Mechanics

Technical Advisory Panels, Committees and Editorial Boards

- Member, Advisory Committee, NSF Network for Earthquake Engineering and Simulation (NEES), Tsunami Basin Project, 2001-2005.
- Member, NSF Physical Oceanography Review Panel, May 2002.
- Co-organizer, NSF Workshop on model validation and benchmarking for tsunami generation by submarine mass failure, University of Hawaii, May 30-31, 2003.
- Member, Nearshore Advisory Group - informal advisory panel appointed to assist ONR and NSF program managers in areas of nearshore physical oceanography.
- Member (East Coast Technical Representative), Coordinating Committee, National Tsunami Hazard Mitigation Program, NOAA, 2008-present.
- Mapping and Modeling Subcommittee, National Tsunami Hazard Mitigation Program, NOAA, 2008-present.
- Member, NSF CBET Review Panel, January 2009.
- Member, ERDC External Advisory Panel on Boussinesq Models, 2014 - present.
- Associate Editor, *Journal of Marine Energy and Ocean Engineering*, 2015-present.
- Organizer, NTHMP Landslide Tsunami Modeling Workshop, Galveston, TX, Jan 9-11, 2017.
- Associate Editor, *Journal of Fluid Mechanics*, 2017-present.

Academic Advisory Panels

- National Advisory Board, Department of Naval Architecture and Marine Engineering, University of Michigan, 2005-2008.

Prizes and Honors

- Walter L. Huber Civil Engineering Research Prize, American Society of Civil Engineers, 1992.
- John G. Moffatt - Frank E. Nichol Harbor and Coastal Engineering Award, American Society of Civil Engineers, 2011.

Research Interests

Numerical modeling and laboratory investigation of ocean surface waves, tsunamis, wave-driven circulation and resulting sediment transport. Linear and nonlinear signal processing and nonlinear dynamics. Mechanics of breaking waves. Bubbles in the ocean and their influence on acoustic and optical signals. Dynamics and long term evolution and resilience of salt marshes. Surface wave processes and internal hydraulics in stratified river mouths.

PUBLICATIONS

Edited Proceedings

1. Kaliakin, V. N., Kirby, J. T., Yamamuro, J., Bhattacharya, B. and Shenton, H. W. (eds), EM2004, The 17th ASCE Engineering Mechanics Conference, Newark, June 13-16, 2004. Published on CD.

Chapters in Books

1. Kirby, J. T., 1997, "Nonlinear, dispersive long waves in water of variable depth", *Advances in Fluid Mechanics*, **10**, J. N. Hunt (ed), Computational Mechanics Publ., 55 - 125.
2. Martin, P. A., Dalrymple, R. A. and Kirby, J. T., 1997, "Parabolic modeling of water waves", *Advances in Fluid Mechanics*, **10**, J. N. Hunt (ed), Computational Mechanics Publ., 169 - 213.
3. Kirby, J. T., 2003, "Boussinesq models and applications to nearshore wave propagation, surfzone processes and wave-induced currents", in *Advances in Coastal Modeling*, V. C. Lakhan (ed), Elsevier, 1-41.
4. Kirby, J. T., 2017, "Recent advances in nearshore wave, circulation and sediment transport modeling", *The Sea*, **17**, in press.

Refereed Journal Articles

(Web of Science, 5/19/2017: 5729 citations, h-index = 37. Google Scholar, 8/4/2017: 12964 citations, h-index=51)

1. Kirby, J.T., Dalrymple, R.A. and Liu, P.L.-F., 1981, "Modification of edge waves by barred-beach topography", *Coastal Engineering*, **5**, 35-49, doi:10.1016/0378-3839(81)90003-X.
2. Kirby, J.T. and Dalrymple, R.A., 1983, "Propagation of obliquely incident water waves over a submerged trench", *Journal of Fluid Mechanics*, **133**, 47-63, doi:10.1017/S0022112083001780.
3. Kirby, J.T. and Dalrymple, R.A., 1983, "Oblique envelope solutions of the Davey-Stewartson equations in intermediate water depth", *Physics of Fluids*, **26**, 2916-2918.
4. Kirby, J.T. and Dalrymple, R.A., 1983, "A parabolic equation for the combined refraction-diffraction of Stokes waves by mildly-varying topography", *Journal of Fluid Mechanics*, **136**, 453-466, doi:10.1017/S0022112083002232.
5. Kirby, J.T., 1984, "A note on linear surface wave-current interaction over slowly varying topography", *Journal of Geophysical Research*, **89**, 745-747.
6. Dalrymple, R.A., Kirby, J.T. and Hwang, P.A., 1984, "Wave diffraction due to areas of energy dissipation", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **110**, 67-79, doi:10.1061/(ASCE)0733-950X(1984)110:1(67).
7. Kirby, J.T. and Dalrymple, R.A., 1984, "Verification of a parabolic equation for propagation of weakly-nonlinear waves", *Coastal Engineering*, **8**, 219-232, doi:10.1016/0378-3839(84)90002-4.
8. Liu, P.L.-F., Yoon, S.B. and Kirby, J.T., 1985, "Nonlinear refraction-diffraction of waves in shallow water" *Journal of Fluid Mechanics*, **153**, 184-201, doi:10.1017/S0022112085001203.
9. Kirby, J.T., 1986, "A general wave equation for waves over rippled beds", *Journal of Fluid Mechanics*, **162**, 171-186, doi:10.1017/S0022112086001994.
10. Kirby, J. T., 1986, "On the gradual reflection of weakly-nonlinear Stokes waves in regions with varying topography", *Journal of Fluid Mechanics*, **162**, 187-209, doi:10.1017/S0022112086002008.
11. Kirby, J. T. and Dalrymple, R. A., 1986, "Modelling waves in surfzones and around islands", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **112**, 78-93, doi:10.1061/(ASCE)0733-950X(1986)112:1(78).

12. Kirby, J. T., 1986, "Higher-order approximations in the parabolic equation method for water waves", *Journal of Geophysical Research*, **91**, 933-952.
13. Dalrymple, R. A. and Kirby, J. T., 1986, "Water waves over ripples", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **112**, 309-319, doi:10.1061/(ASCE)0733-950X(1986)112:2(309).
14. Kirby, J. T. and Dalrymple, R. A., 1986, "An approximate model for nonlinear dispersion in monochromatic wave propagation models", *Coastal Engineering*, **9**, 545-561, doi:10.1016/0378-3839(86)90003-7, and reply to discussions, **11**, 87-92, 1987, doi:10.1016/0378-3839(87)90041-X.
15. Kirby, J. T., 1986, "Open boundary condition in the parabolic equation method", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **112**, 460-465, doi:10.1061/(ASCE)0733-950X(1986)112:3(460).
16. Kirby, J. T., 1986, "Rational approximations in the parabolic equation method for water waves", *Coastal Engineering*, **10**, 355-378, doi:10.1016/0378-3839(86)90021-9.
17. Kirby, J. T., Dalrymple, R. A. and Seo, S. N., 1987, "Propagation of obliquely incident water waves over a trench 2. Currents flowing along the trench" *Journal of Fluid Mechanics*, **176**, 95-116, doi:10.1017/S0022112087000582.
18. Kirby, J. T., 1988, "Current effects on resonant reflection of surface water waves by sand bars", *Journal of Fluid Mechanics*, **186**, 501-520, doi:10.1017/S0022112088000242.
19. Dalrymple, R. A. and Kirby, J. T., 1988, "Models for very wide-angle water waves and wave diffraction", *Journal of Fluid Mechanics*, **192**, 33-50, doi:10.1017/S0022112088001776.
20. Kirby, J. T. and Vengayil, P., 1988, "Non-resonant and resonant reflection of long waves in varying channels", *Journal of Geophysical Research*, **93**, 10,782-10,796.
21. Kirby, J. T., 1988, "Parabolic wave computations in non-orthogonal coordinate systems", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **114**, 673-685, doi:10.1061/(ASCE)0733-950X(1988)114:6(673).
22. Kirby, J. T. and Chen, T-M., 1989, "Surface waves on vertically sheared flows: approximate dispersion relations", *Journal of Geophysical Research*, **94**, 1013-1027.
23. Dalrymple, R. A., Suh, K., Kirby, J. T. and Chae, J. W., 1989, "Models for very wide-angle water waves and wave diffraction. Part 2. Irregular bathymetry", *Journal of Fluid Mechanics*, **201**, 299-322, doi:10.1017/S0022112089000959.
24. Kirby, J. T., 1989, "A note on parabolic radiation boundary conditions for elliptic wave calculations", *Coastal Engineering*, **13**, 211-218, doi:10.1016/0378-3839(89)90049-5.
25. Kirby, J. T., 1989, "Propagation of surface waves over an undulating bed", *Physics of Fluids A*, **1**, 1898-1899.
26. Dalrymple, R. A., Munasinghe, L. C., Wood, D. H. and Kirby, J. T., 1990, "A very wide angle acoustic model for underwater sound propagation", *Journal of the Acoustical Society of America*, **88**, 1863-1876.
27. Suh, K. D., Dalrymple, R. A. and Kirby, J. T., 1990, "An angular spectrum model for propagation of Stokes waves", *Journal of Fluid Mechanics*, **221**, 205-232, doi:10.1017/S0022112090003548.
28. Kirby, J. T., 1991, "Intercomparison of truncated series solutions for shallow water waves", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **117**, 143-155, doi:10.1061/(ASCE)0733-950X(1991)117:2(143).
29. Bailard, J. A., DeVries, J. W. and Kirby, J. T., 1992, "Considerations in using Bragg reflection for storm erosion protection", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **118**, 62-74, doi:10.1061/(ASCE)0733-950X(1992)118:1(62).
30. Dalrymple, R. A. and Kirby, J. T., 1992, "Angular spectrum modelling of water waves", *CRC Reviews in Aquatic Sciences*, **6**, 383-404.

31. Kirby, J.T., 1993, "A note on Bragg scattering of surface waves by sinusoidal bars", *Physics of Fluids A*, **5**, 380-386.
32. Kirby, J.T. and Lee, C., 1993, "Short waves in a rotating, shallow tank with bathymetry: a model equation in the mild-slope approximation", *SIAM Journal of Applied Mathematics*, **53**, 1381-1400.
33. Mase, H. and Kirby, J. T., 1993, "Hybrid model for nonlinear transformation of random waves", *Transactions Japanese Society of Civil Engineers*, No. 479-25, 91-100. (in Japanese)
34. Kirby, J. T., Dalrymple, R. A. and Kaku, H., 1994, "Parabolic approximations for water waves in conformal coordinate systems", *Coastal Engineering*, **23**, 185-213, doi:10.1016/0378-3839(94)90001-9.
35. Ting, F. C. K. and Kirby, J. T., 1994, "Observations of undertow and turbulence in a laboratory surfzone", *Coastal Engineering*, **24**, 51-80, doi:10.1016/0378-3839(94)90026-4.
36. Dalrymple, R. A., Kirby, J. T. and Martin, P. A., 1994, "Spectral methods for forward-propagating water waves in conformally-mapped channels", *Applied Ocean Research*, **16**, 249-266, doi:10.1016/S0141-1187(94)90015-9.
37. Lee, C. H. and Kirby, J. T., 1994, "Analytical comparison of time-dependent mild-slope equations", *Journal of the Korean Society of Coastal and Ocean Engineers*, **6**, 389-396.
38. Ting, F. C.-K. and Kirby, J. T., 1995, "Dynamics of surf-zone turbulence in a strong plunging breaker", *Coastal Engineering*, **24**, 177-204, doi:10.1016/0378-3839(94)00036-W.
39. Wei, G., Kirby, J. T., Grilli, S. T. and Subramanya, R., 1995, "A fully nonlinear Boussinesq model for surface waves. I. Highly nonlinear, unsteady waves", *Journal of Fluid Mechanics*, **294**, 71-92, doi:10.1017/S0022112095002813.
40. Kaihatu, J. M. and Kirby, J. T., 1995, "Nonlinear transformation of waves in finite water depth", *Physics of Fluids*, **7**, 1903-1914.
41. Wei, G. and Kirby, J. T., 1995, "A time-dependent numerical code for extended Boussinesq equations", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **121**, 251-261, doi:10.1061/(ASCE)0733-950X(1995)121:5(251).
42. Ting, F. C.-K. and Kirby, J. T., 1996, "Dynamics of surf-zone turbulence in a spilling breaker", *Coastal Engineering*, **27**, 131-160, doi:10.1016/0378-3839(95)00037-2.
43. Walker, C. A., Kirby, J. T. and Dentel, S. K., 1996, "The streaming current detector: a quantitative model", *Journal of Colloid and Interface Science*, **182**, 71-81.
44. Chajes, M. J., Finch, W. W. and Kirby, J. T., 1996, "Dynamic analysis of a ten-story reinforced concrete building using a continuum model", *Computers and Structures*, **58**, 487-498.
45. Chajes, M. J., Zhang, L. and Kirby, J. T., 1996, "Dynamic analysis of tall building using reduced-order continuum model", *Journal of Structural Engineering*, **122**, 1284-1291.
46. Özkan-Haller, H. T. and Kirby, J. T., 1997, "A Fourier-Chebyshev collocation method for the shallow water equations including shoreline runup", *Applied Ocean Research*, **19**, 21-34, doi:10.1016/S0141-1187(97)00011-4.
47. Kaihatu, J. M. and Kirby, J. T., 1998, "Two-dimensional parabolic modeling of extended Boussinesq equations", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **124**, 57-67, doi:10.1061/(ASCE)0733-950X(1998)124:2(57).
48. Chawla, A., Özkan-Haller, H. T. and Kirby, J. T., 1998, "Spectral model for wave transformation over irregular bathymetry", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **124**, 189-198, doi:10.1061/(ASCE)0733-950X(1998)124:4(189).

49. Wei, G., Kirby, J. T. and Sinha, A., 1999, "Generation of waves in Boussinesq models using a source function method", *Coastal Engineering*, **36**, 271-299, doi:10.1016/S0378-3839(99)00009-5.
50. Chen, Q., Dalrymple, R. A., Kirby, J. T., Kennedy, A. and Haller, M. C., 1999, "Boussinesq modeling of a rip current system" , *Journal of Geophysical Research*, **104**, 20,617 - 20, 637.
51. Özkan-Haller, H. T. and Kirby, J. T., 1999, "Nonlinear evolution of shear instabilities of the longshore current: A comparison of observations and computations", *Journal of Geophysical Research*, **104**, 25,953 - 25,984.
52. Gobbi, M. F. and Kirby, J. T., 1999, "Wave evolution over submerged sills: Tests of a high-order Boussinesq model", *Coastal Engineering*, **37**, 57-96, doi:10.1016/S0378-3839(99)00015-0, and erratum, **40**, 277, 2000, doi:10.1016/S0378-3839(00)00022-3.
53. Kennedy, A. B., Chen, Q., Kirby, J. T., and Dalrymple, R. A., 2000, "Boussinesq modeling of wave transformation, breaking and runup. I: One dimension", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **126**, 39-47, doi:10.1061/(ASCE)0733-950X(2000)126:1(39).
54. Gobbi, M. F., Kirby, J. T. and Wei, G., 2000, "A fully nonlinear Boussinesq model for surface waves. II. Extension to $O(kh^4)$ " , *Journal of Fluid Mechanics*, **405**, 181-210, doi:10.1017/S0022112099007247.
55. Chawla, A. and Kirby, J. T., 2000, "A source function method for generation of waves on currents in Boussinesq models", *Applied Ocean Research*, **22**, 75-83, doi:10.1016/S0141-1187(00)00005-5.
56. Kennedy, A. B., Dalrymple, R. A., Kirby, J. T. and Chen, Q., 2000, "Determination of inverse depths using direct Boussinesq modelling", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **126**, 206-214, doi:10.1061/(ASCE)0733-950X(2000)126:4(206).
57. Chen, Q., Kirby, J. T., Dalrymple, R. A., Kennedy, A. B. and Chawla, A., 2000, "Boussinesq modeling of wave transformation, breaking and runup. II: Two horizontal dimensions", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **126**, 48-56, doi:10.1061/(ASCE)0733-950X(2000)126:1(48).
58. Svendsen, I. A., Veeramony, J., Bakunin, J. and Kirby, J. T., 2000, "The flow in weak turbulent hydraulic jumps", *Journal of Fluid Mechanics*, **418**, 25-57, doi:10.1017/S0022112000008867.
59. Kennedy, A. B., Kirby, J. T., Chen, Q. and Dalrymple, R. A., 2001, "Boussinesq-type equations with improved nonlinear behaviour", *Wave Motion*, **33**, 225-243.
60. Shi, F., Dalrymple, R. A., Kirby, J. T., Chen, Q. and Kennedy, A., 2001, "A fully nonlinear Boussinesq model in generalized curvilinear coordinates", *Coastal Engineering*, **42**, 337-358, doi:10.1016/S0378-3839(00)00067-3.
61. Kennedy, A. B., Kirby, J. T. and Gobbi, M. F., 2002, "Simplified higher order Boussinesq equations. 1: Linear considerations", *Coastal Engineering*, **44**, 205-229, doi:10.1016/S0378-3839(01)00032-1.
62. Chawla, A. and Kirby, J. T., 2002, "Monochromatic and random wave breaking at blocking points", *Journal of Geophysical Research*, **107(C7)**, doi:10.1029/2001JC001042.
63. Misra, S. K., Kennedy, A. B. and Kirby, J. T., 2003, "An approach to determining nearshore bathymetry using remotely sensed ocean surface dynamics", *Coastal Engineering*, **47**, 265-293, doi:10.1016/S0378-3839(02)00118-7.
64. Shi, F., Kirby, J. T., Dalrymple, R. A., Chen, Q., 2003, "Wave simulations in Ponce de Leon Inlet using a Boussinesq model", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **129**, 124-135, doi:10.1061/(ASCE)0733-950X(2003)129:3(124).
65. Kennedy, A. B. and Kirby, J. T., 2003, "An unsteady wave driver for narrow-banded waves: Modeling nearshore circulation driven by wave groups", *Coastal Engineering*, **48**, 257-275, doi:10.1016/S0378-3839(03)00031-0.

66. Shi, F., Svendsen, I. A., Kirby, J. T. and Smith, J. M., 2003, "A curvilinear version of a quasi-3D nearshore circulation model", *Coastal Engineering*, **49**, 99-124, doi:10.1016/S0378-3839(03)00049-8.
67. Watts, P., Grilli, S. T., Kirby, J. T., Fryer, G. J. and Tappin, D. R., 2003, "Landslide tsunami case studies using a Boussinesq model and a fully nonlinear tsunami generation model", *Natural Hazards and Earth System Sciences*, **3**, 391-402, doi:10.5194/nhess-3-391-2003.
68. Chen, Q., Kirby, J. T., Dalrymple, R. A., Shi, F. and Thornton, E. B., 2003, "Boussinesq modeling of longshore currents", *Journal of Geophysical Research*, **108(C11)**, 3362, doi:10.1029/2002JC001308.
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70. Thomas, M., Misra, S., Kambhamettu, C. and Kirby, J. T., 2005, "A robust motion estimation algorithm for PIV", *Measurement Science and Technology*, **16**, 865-877.
71. Shi, F. and Kirby, J. T., 2005, "Curvilinear parabolic approximation for surface wave transformation using covariant-contravariant tensor method", *Journal of Computational Physics*, **204**, 562-586.
72. Misra, S. K., Thomas, M., Kambhamettu, C., Kirby, J. T., Veron, F. and Brocchini, M., 2006, "Estimation of complex air-water interfaces from PIV images", *Experiments in Fluids*, **40**, doi 10.1007/s00348-006-0113-1.
73. Terrile, E., Briganti, R., Brocchini, M. and Kirby, J. T., 2006, "Topographically-induced enstrophy production/dissipation in coastal models", *Physics of Fluids*, **18(12)**, 126603, doi:10.1063/1.2400076.
74. Kaihatu, J. M., Veeramony, J., Edwards, K. L. and Kirby, J. T., 2007, "Asymptotic behavior of frequency and wavenumber spectra of nearshore shoaling and breaking waves", *Journal of Geophysical Research*, **112**, C06016, doi:10.1029/2006JC003817.
75. Ioualalen, M., J. A. Asavanant, N. Kaewbanjak, N., Grilli, S. T., Kirby, J. T. and Watts, P., 2007, "Modeling of the 26th December 2004 Indian Ocean tsunami: Case study of impact in Thailand", *Journal of Geophysical Research*, **112**, C07024, doi:10.1029/2006JC003850.
76. Grilli, S. T., Ioualalen, M., Asavanant, J., Shi, F., Kirby, J. T. and Watts, P., 2007, "Source constraints and model simulation of the December 26, 2004 Indian Ocean tsunami", *Journal of Waterway, Port, Coastal and Ocean Engineering*, **133**, 414-428, doi:10.1061/(ASCE)0733-950X(2007)133:6(414).
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80. Terrile, E., Brocchini, M., Christensen, K. H. and Kirby, J. T., 2008, "Dispersive effects on wave-current interaction and vorticity transport in nearshore flows: a GLM approach", *Physics of Fluids*, **20**, 036602, doi:10.1063/1.288973.
81. Waythomas, C. F., Watts, P., Shi, F. and Kirby, J. T., 2009, "Pacific basin tsunami hazards associate with mass flows in the Aleutian Arc of Alaska", *Quaternary Science Reviews*, **28**, 1006-1019, doi:10.1026/j.quascirev.2009.02.019.
82. Debsarma, S., Das, K. P. and Kirby, J. T., 2010, "Fully nonlinear higher order model equations for long internal waves in a two-fluid system", *Journal of Fluid Mechanics*, **645**, 281-303, doi:10.1017/S0022112010000601.
83. Zhang, W.-Z., Shi, F., Hong, H.-S., Shang, S.-P., Kirby, J. T., 2010, "Tide-surge interaction intensified by the Taiwan Strait", *Journal of Geophysical Research*, **115**, C06012, doi:10.1029/2009JC005762.

84. Shi, F., Kirby, J. T. and Ma, G., 2010, "Modeling quiescent phase transport of air bubbles induced by breaking waves", *Ocean Modelling*, **35**, 105-117, doi:10.1016/j.ocemod.2010.07.002.
85. Grilli, S. T., Dubosq, S., Pophet, N., Perignon, Y., Kirby, J. T. and Shi, F., 2010, "Numerical simulation of co-seismic tsunami impact on the North Shore of Puerto Rico and far-field impact on the US East Coast: a first-order hazard analysis", *Natural Hazards and Earth Systems Science*, **10**, 2109-2125, doi:10.5194/nhess-10-2109-2010.
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87. Shi, F., Hanes, D. M., Kirby, J. T., Erikson, L., Barnard, P. and Eshleman, J., 2011, "Pressure gradient-dominated nearshore circulation on a beach influenced by an adjacent large inlet", *Journal of Geophysical Research*, **116**, C04020, doi:10.1029/2010JC006788.
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119. Mieras, R., Kirby, J. T. and Shi, F., 2014, "The frictional nature of tidal propagation in channelized estuaries, with application to a tidal marsh in Delaware", *Young Coastal Scientists and Engineers Conference - North America*, Newark, July.
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134. Tehranirad, B., 2015, "Effects of bathymetry on tsunami propagation on the US East Coast; Application of ray tracing to tsunamis", presented at *Young Coastal Scientists and Engineers Conference - North America* Newark, July.
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138. Derakhti, M. and Kirby, J. T., 2015, "On the structure of turbulence dissipation rate under unsteady breaking waves", presented at *APS DFD Meeting*, Boston, November.
139. Abdolali, A., Kirby, J. T., Shi, F., Wu, G., Sommerfield, C. and McDowell, C., 2016, "An overview of the NFWF Post-Sandy Bombay Hook project: Numerical modeling and in-situ measurements", presented at the *Delaware Wetlands Conference*, Wilmington, Feb. 3-4.

140. Deb, M., Abdolali, A. and Kirby, J. T., 2016, "Modeling wind waves in a confined tidal flat area: Bombay Hook National Wildlife Refuge, Delaware", presented at the *Delaware Wetlands Conference*, Wilmington, Feb. 3-4.
141. McDowell, C., Sommerfield, C. and Kirby, J., 2016, "Salt marsh sediment accumulation and morphological change at Bombay Hook National Wildlife Refuge", presented at the *Delaware Wetlands Conference*, Wilmington, Feb. 3-4.
142. Shi, F., Kirby, J. T., Wu, G. and Deb, M., 2016, "Subgrid modeling of geomorphological and ecological processes in salt marsh evolution in Delaware", presented at *Delaware Wetlands Conference*, Wilmington, Feb. 3-4.
143. Kirby, J. T., 2016, "Modeling tsunami impacts on the Atlantic coast of the United States", presented at *Drowning coasts: Rising sea levels and extreme events on time scales for minutes to millennia*, Symposium honoring Brian Atwater, Newark, April 20. (invited)
144. Kirby, J. T. and Derakhti, M., 2016, "Short-crested wave breaking", presented at *B'Waves 2016*, University of Bergen, Bergen, Norway, June 13-17. (invited)
145. Abdolali, A., Kirby, J. T. and Shi, F., 2016, "Field and modeling studies of salt marshes in Bombay Hook National Wildlife Refuge, Kent County, Delaware, presented at *14th Estuarine and Coastal Modeling Conference (ECM14)*, Kingston, RI, June 13-15.
146. Deb, M. and Abdolali, A. and Kirby, J. T. and Shi, F., 2016, "Salt marsh response to wind waves in a confined tidal flat: Bombay Hook National Wildlife Refuge, Delaware", presented at *14th Estuarine and Coastal Modeling Conference (ECM14)*, Kingston, RI, June 13-15.
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148. Kukulka, T., Jenkins III, R. L., Kirby, J. T., Shi, F., Rodrigues, A. and Scarborough, R. W., 2016, "Surface wave dynamics in Delaware Bay and its adjacent coastal shelf", presented at *14th Estuarine and Coastal Modeling Conference (ECM14)*, Kingston, RI, June 13-15.
149. Lu, Y., Shi, F., Kirby, J. T. and Feng, W., 2016, "On the mechanism of an oblique tidally-recurring internal hydraulic jump: an idealized case study", presented at *14th Estuarine and Coastal Modeling Conference (ECM14)*, Kingston, RI, June 13-15.
150. Schambach, Tehranirad, B., Grilli, A., Spaulding, M., King, J., Kirby, J. T. and Shi, F., 2016, "Modeling of historical storms in Rhode Island", presented at *14th Estuarine and Coastal Modeling Conference (ECM14)*, Kingston, RI, June 13-15.
151. Shelby, M., Grilli, S. T., Ma, G., Kirby, J. T. and Shi, F., 2016, "Sensitivity of coastal tsunami hazard to the modeling of tsunami generation by submarine mass failures of various rheology", presented at *14th Estuarine and Coastal Modeling Conference (ECM14)*, Kingston, RI, June 13-15.
152. Tehranirad, B., Kirby, J. T., Shi, F. and Grilli, S.T., 2016, "Morphological response of barrier islands during tsunami inundation", presented at *14th Estuarine and Coastal Modeling Conference (ECM14)*, Kingston, RI, June 13-15.
153. Abdolali, A., Callahan, J., Guiteras, S., Kirby, J.T., Shi, F. and Mitchell, L., 2016, "Vegetation bias correction in tidal salt marsh Lidar data sets with Artificial Neural Networks", (*RAETCS16*) *Restore Americas Estuaries*, 8th National Summit on Coastal and Estuarine Restoration and 25th Biennial Meeting of The Coastal Society, December 10-15, 2016 New Orleans, LA, USA
154. Abdolali, A., Kirby, J.T., Shi, F., Guiteras, S. and Deb, M., 2016, "Field and modeling studies of salt marshes in Bombay Hook National Wildlife Refuge in Delaware", (*RAETCS16*) *Restore Americas Estuaries*, 8th National Summit on Coastal and Estuarine Restoration and 25th Biennial Meeting of The Coastal Society, December 10-15, 2016 New Orleans, LA, USA.

155. Abdolali, A., Kadri, U. and Kirby, J. T., 2016, "Acoustic gravity waves generated by an oscillating ice sheet in Arctic zone", *AGU Fall Meeting*, Abstract S52A-02, San Francisco, December 12-16.
156. Derakhti, M. and Kirby, J. T., 2016, "Large-scale vortex generation and evolution in short-crested isolated wave breaking", *AGU Fall Meeting*, Abstract OS23B-2020, San Francisco, December 12-16.
157. Grilli, S. T., Shelby, M., Kimmoun, O., Dupont, G., Nicolsky, D., Ma, G., Kirby, J. T. and Shi, F., 2016, "Effect of rheology on tsunami inundation caused by submarine mass failures along the US East Coast", *AGU Fall Meeting*, Abstract NH32B-03, San Francisco, December 12-16.
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159. Ma, G., Kirby, J. T., Shi, F., Grilli, S. and Hsu, T.-J., 2016, "Modeling tsunami wave generation using a two-layer granular landslide model", *AGU Fall Meeting*, Abstract NH43B-1857, San Francisco, December 12-16.
160. Shi, F., Kirby, J. T., Wu, G., Abdolali, A. and Deb, M., 2016, "Subgrid modeling of geomorphological and ecological processes in salt marsh evolution", *AGU Fall Meeting*, Abstract OS21C-04, San Francisco, December 12-16.
161. Tehranirad, B., Kirby, J. T., Shi, F. and Grilli, S. T., 2016, "Does morphological adjustment during tsunami inundation increase levels of hazard?", *AGU Fall Meeting*, Abstract NH34A-02, San Francisco, December 12-16.
162. Kadri, U., Abdolali, A., and Kirby, J. T., 2017, "Propagation of acoustic gravity waves in arctic zones with elastic ice-sheets", *European Geophysical Union General Assembly 2017*, Abstract EGU2017-15629.
163. Kirby, J. T., Shi, F., Deb, M., Wu, G., 2017, "Sub-grid modeling of biogeomorphological processes on salt marsh platforms", *CERF 2017*, Abstract 4086, Kingston, RI, Nov.
164. Shi, F., Hsu, T. J., Kirby, J. T. and Geyer, W. R., 2017, "Simulation of a river plume modulated by a cross-flow using a sub-meter resolution nonhydrostatic model", *CERF 2017*, Abstract 2608, Kingston, RI, Nov.
165. Kirby, J. T. and Grilli, S. T., 2017, "Modeling landslide tsunamis: Review of the NTHMP Benchmarking Workshop", submitted for *AGU Annual GSA Meeting*, Seattle, Oct. 22-25.
166. McDowell, C., Sommerfield, C. K., Guiteras, S. and Kirby, J. T., 2017, "Marsh sediment accumulation and accretion in a rapidly fragmenting wetland complex", submitted for *AGU Annual GSA Meeting*, Seattle, Oct. 22-25.
167. Kirby, J. T. and Derakhti, M., 2017, "Coherent structures and evolution of vorticity in short-crested breaking surface waves", submitted for *AGU 70th Annual Meeting of the APS Division of Fluid Dynamics*, Denver, Nov. 19-21.

Published Programs and Documentation

One of the primary products of the Center for Applied Coastal Research are computer models designed for use in engineering practice and by other scientists. I have directed the development of the REF/DIF and FUNWAVE models, and the history of this development is outlined below. Public access to these programs is available through <http://chinacat.coastal.udel.edu/programs/>. In addition, the recently developed NEARCOM (for Nearshore Community Model) developed with NOPP funding, is also maintained at this site.

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2. Kirby, J.T. and Dalrymple, R.A., 1985, "Combined refraction/diffraction model REF/DIF 1, user's manual", Coastal and Offshore Engineering and Research, Inc., Newark, DE., January. (Revised June, 1986)
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5. Kirby, J. T. and Dalrymple, R. A., 1993, "Combined Refraction/Diffraction Model REF/DIF 1, Version 2.4. Documentation and User's Manual", Research Report No. CACR-92-04, Center for Applied Coastal Research, Department of Civil Engineering, University of Delaware, Newark.
6. Kirby, J. T. and Özkan, H. T., 1994, "Combined Refraction/Diffraction Model for Spectral Wave Conditions REF/DIF S, Version 1.1. Documentation and User's Manual", Research Report No. CACR-94-04, Center for Applied Coastal Research, Department of Civil Engineering, University of Delaware, Newark.
7. Kirby, J. T. and Dalrymple, R. A., 1994, "Combined Refraction/Diffraction Model REF/DIF 1, Version 2.5. Documentation and User's Manual", Research Report No. CACR-94-22, Center for Applied Coastal Research, Department of Civil Engineering, University of Delaware, Newark.
8. Kirby, J. T., Wei, G., Chen, Q., Kennedy, A. B. and Dalrymple, R. A., 1998, "FUNWAVE 1.0. Fully nonlinear Boussinesq wave model. Documentation and user's manual", Report CACR-98-06, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
9. Kirby, J. T., Dalrymple, R. A. and Shi, F., 2002, "Combined Refraction/Diffraction Model REF/DIF 1, Version 2.6. Documentation and User's Manual", Research Report No. CACR-02-??, Center for Applied Coastal Research, Department of Civil Engineering, University of Delaware, Newark (in preparation).
10. Tehranirad, B., Shi, F., Kirby, J. T., Harris, J. C. and Grilli, S. T., 2011, "Tsunami benchmark results for fully nonlinear Boussinesq wave model FUNWAVE-TVD, Version 1.0", Research Report No. CACR-11-02, Center for Applied Coastal Research, University of Delaware, Newark.
11. Shi, F., Kirby, J. T., Tehranirad, B., Harris, J. C. and Grilli, S. T., 2011, "FUNWAVE-TVD, Fully nonlinear Boussinesq wave model with TVD solver, documentation and user's manual (Version 2.0)", Research Report No, CACR-11-04, Center for Applied Coastal Research, Univ. of Delaware, Newark.
12. Shi, F., Kirby, J. T. and Tehranirad, B., 2012, "Tsunami benchmark results for spherical coordinate version of FUNWAVE-TVD (Version 2.0)", Research Report No. CACR-12-02, Center for Applied Coastal Research, Univ. of Delaware, Newark.
13. Tehranirad, B., Kirby, J. T., Ma, G. and Shi, F., 2012, "Tsunami benchmark results for non-hydrostatic wave model NHWAVE (Version 1.1)", Research Report No. CACR-12-03, Center for Applied Coastal Research, Univ. of Delaware, Newark.
14. Shi, F., Kirby, J. T. , Ma, G. and Tehranirad, B., 2012, "Non-hydrostatic wave model NHWAVE. Users's guide for modeling submarine landslide tsunami (Version 1.1)", Research Report No. CACR-12-04, Center for Applied Coastal Research, Univ. of Delaware, Newark.
15. Derakhti, M., Kirby, J. T., Shi, F. and Ma, G., 2015, "NHWAVE: Model revisions and tests of wave breaking in shallow and deep water", Research Report No. CACR-15-18, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
16. Kirby, J. T., Shi, F., Grilli, S. T., Nemati, F. and Tehranirad, B., 2017, "NTHMP Current Benchmark Workshop: FUNWAVE-TVD results", Research Report No. CACR-16-01, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.

17. Zhang, C., Tehranirad, B., Kirby, J. T., Derakhti, M., Nemati, F., Grilli, S. T., Ma, G. and Shi, F., 2017, "Tsunami benchmark results for the non-hydrostatic wave model NHWAVE, Version 3.0", Research Report No. CACR-17-03, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.

Additional Technical Reports

1. Kirby, J. T., "Some aspects of the upstream disturbance in the flow of a two-layered stratified fluid over an obstacle", M.S. thesis, Brown University, June, 1976.
2. Roberge, J. C. and Kirby, J. T., "Hydraulic model studies for the expansion of the port of Champerico, Guatemala", Alden Research Laboratory, Worcester Polytechnic Institute, Report No. 122-77/M350CF, September, 1977.
3. Kirby, J.T. and Brocard, D.N., "Minimization of recirculation in submerged intakes located offshore of a diffuser discharge - a hydrothermal model study for the J.H. Campbell Electric Generating Station, Units 1 through 4", Alden Research Laboratory, Worcester Polytechnic Institute, Report No. 35-78/M182CF, February, 1978.
4. Kirby, J.T. and Brocard, D.N., "Feasibility study for various remedial plans for achieving full mixing in a discharge canal", Alden Research Laboratory, Worcester Polytechnic Institute, letter report, April, 1978.
5. Kirby, J.T. and Brocard, D.N., 1978, "An investigation of the effect of discharge velocity on surface isotherm areas", Alden Research Laboratory, Worcester Polytechnic Institute, letter report, June.
6. Kirby, J.T. and Roberge, J.C., 1979, "An investigation of remedial plans for minimizing shoaling in a recessed intake forebay", Alden Research Laboratory, Worcester Polytechnic Institute, Report No. 21-79, February.
7. Kirby, J.T. and Brocard, D.N., "Analytical prediction of surface temperature rises induced by blowdown discharge - Palisades Nuclear Power Plant", Alden Research Laboratory, Worcester Polytechnic Institute, Report No. 40-79, April, 1979.
8. Kirby, J.T., Steiner, U. and Brocard, D.N., "Analytic prediction of bounding streamlines for flow into offshore submerged intakes", Alden Research Laboratory, Worcester Polytechnic Institute, Report No. 107-79, June, 1979.
9. Kirby, J.T. and Brocard, D.N., "Remedial structures for inducing full lateral mixing in a discharge channel", Alden Research Laboratory, Worcester Polytechnic Institute, Report No. 93-79, July, 1979.
10. Kirby, J.T. and Brocard, D.N., "Hydrothermal model studies of a diffuser discharge in a coastal environment", Alden Research Laboratory, Worcester Polytechnic Institute, Report No. 127-79, July, 1979.
11. Kirby, J.T. and Dalrymple, R.A., "Numerical modelling of the nearshore region", Department of Civil Engineering, University of Delaware, Research Report CE-82-24, June, 1982.
12. Kirby, J.T., "Propagation of weakly-nonlinear surface water waves in regions with varying depth and current", Department of Civil Engineering, University of Delaware, Research Report CE-83-37, July, 1983. (also Ph.D. dissertation)
13. Kirby, J.T., "Water wave propagation over uneven bottoms", Coastal and Oceanographic Engineering Department, University of Florida, Technical Report UFL/COEL-TR/055, January, 1985.
14. Kirby, J.T., 1986, "A model for the gradual reflection of weakly two-dimensional waves in water with varying depth and currents: governing equations", Tech. Report UFL/COEL-TR/060, Coastal and Oceanographic Engineering Department, University of Florida, Gainesville, July.
15. Vengayil, P. and Kirby, J.T., 1986, "Shoaling and reflection of nonlinear long waves", Tech. Report UFL/COEL-TR/062, Coastal and Oceanographic Engineering Department, University of Florida, Gainesville, August.

16. Kirby, J.T., 1987, "A program for calculating the reflectivity of beach profiles", Misc. Report UFL/COEL-87/004, Coastal and Oceanographic Engineering Department, University of Florida, Gainesville, March.
17. Kirby, J.T., 1987, "A large - grid parabolic approximation for surface wave propagation", Tech. Report UFL/COEL-TR/068, Coastal and Oceanographic Engineering Department, University of Florida, Gainesville, Draft, April.
18. Kaku, H. and Kirby, J.T., 1988, "A parabolic model in polar coordinates for breakwater harbors", Tech. Report UFL/COEL-TR/075, Coastal and Oceanographic Engineering Department, University of Florida, Gainesville, May.
19. Kirby, J.T., 1988, "Survey data report: Cape Canaveral March - July 1988", Report UFL/COEL-88/011, Coastal and Oceanographic Engineering Department, University of Florida, Gainesville, November.
20. Kirby, J. T. and Anton, J. P. , 1990, "Modelling Bathymetric Control of Near Coastal Wave Climate: Report 2", Report CACR-90-1, Center for Applied Coastal Research, Department of Civil Engineering, University of Delaware, Newark, April.
21. Kirby, J. T., 1990, "Evaluation of wave height correction algorithm for SHOALS system", for Coastal Engineering Research Center, USAE-WES, Vicksburg, draft, August.
22. Holman,R.A., Bowen,A.J., Dalrymple, R.A., Dean, R.G., Elgar, S., Flick, R., Freilich, M., Guza, R.T., Hanes, D., Kirby, J., Madsen, O., Sternberg, R. and Svendsen, I., 1990, "Report on the state of nearshore processes research. Report from the Nearshore Processes Workshop, St. Petersburg, FL, April 1989", Report OSU-CO-90-6, Oregon State University.
23. Kirby, J. T., 1993, "Wave conditions in North Channel", consulting report to Marex Technology Limited, Isle of Wight, UK.
24. Bowen, G. D. and Kirby, J. T., 1994, "Shoaling and breaking random waves on a 1:35 laboratory beach", Report No. CACR-94-14, Center for Applied Coastal Research, Department of Civil Engineering, University of Delaware, June.
25. Kirby, J. T., 1994, "Wave conditions at Bacton, U. K. and Zeebrugge, Belgium", Consulting report to Paras Limited, Isle of Wight, UK.
26. Gobbi, M. F. and Kirby, J. T., 1998, "A new Boussinesq-type model for surface water wave propagation", Report No. CACR-98-01, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
27. Chawla, A. and Kirby, J. T., 1999, "Waves on opposing currents: Data report", Report CACR-99-03, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware, May.
28. Misra, S. K., Kennedy, A. B. and Kirby, J. T., 2000, "Determining water depths from surface images using Boussinesq equations", Report CACR-00-01, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware, January.
29. Chawla, A. and Kirby, J. T., 2000, "An experimental study on the dynamics of wave blocking and breaking on opposing currents", Report CACR-00-02, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware, March.
30. Hommel, D. L., Kirby, J. T. and Shi, F., 2001, "Vortex formation resulting from solitary wave interaction with a breakwater", Report CACR-01-03, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware, July.
31. Gungordu, O. and Kirby, J. T., 2001, "Evolution of coupled hydrodynamic and bed instabilities", Report CACR-01-04, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware, July.

32. Misra, S. K., Kirby, J. T. and Brocchini, M., 2005, "The turbulent dynamics of quasi-steady spilling breakers - Theory and experiment", Report CACR-05-0X, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
33. Qin, W., Kirby, J. T. and Badiey, M., 2005, "Application of the spectral wave model SWAN in Delaware Bay", Report CACR-05-09, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
34. Shi, F., Kirby, J. T., Newberger, P. and Haas, K., 2005, "NearCoM master program for nearshore community model, Version 2005.4 - Documentation and user's manual", Research Report No. CACR-05-10, Center for Applied Coastal Research, Dept. of Civil and Environmental Engineering, Univ. of Delaware, Newark.
35. Long, W. and Kirby, J. T., 2006, "Boussinesq modeling of waves, currents and sediment transport", Research Report No. CACR-06-02, Center for Applied Coastal Research, Dept. of Civil and Environmental Engineering, Univ. of Delaware, Newark.
36. Xu, L., DiToro, D. and Kirby, J. T., 2006, "Numerical study in Delaware Inland Bays", Research Report No. CACR-06-04, Center for Applied Coastal Research, Dept. of Civil and Environmental Engineering, Univ. of Delaware, Newark.
37. Shi, F., Kirby, J. T. and Ma, G., 2010, "Modeling quiescent phase transport of air bubbles by breaking waves", Research Report No. CACR-10-05, Center for Applied Coastal Research, Dept. of Civil and Environmental Engineering, Univ. of Delaware, Newark.
38. Chen, Y., Shi, F. and Kirby, J. T., 2010, "Coupling of wave and circulation models for predicting storm-induced waves, surges, and coastal inundations", Research Report No. CACR-10-06, Center for Applied Coastal Research, Univ. of Delaware, Newark.
39. Castellano, P. J. and Kirby, J. T., 2011, "Validation of a hydrodynamic model of Delaware Bay and the adjacent coastal region", Research Report No. CACR-11-03, Center for Applied Coastal Research, Univ. of Delaware, Newark.
40. Ma, G., Kirby, J. T. and Shi, F., 2012, "Multiscale numerical study of turbulent flow and bubble entrainment in the surf zone", Research Report No. CACR-12-08, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, Univ. of Delaware, Newark.
41. Tehranirad, B., Banihashemi, S., Kirby, J. T., Callahan, J. A. and Shi, F., 2014, "Tsunami inundation mapping for Ocean City, MD NGDC DEM", Research Report No. CACR-14-04, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
42. Mieras, R. and Kirby, J. T., 2014, "Discharge, pressure and bathymetry measurements in Brockonbridge Gut, Kent County, Delaware: Data report", Research Report No. CACR-14-05, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware. (in preparation)
43. Derakhti, M. and Kirby, J. T., 2014, "Bubble entrainment and liquid-bubble interaction under unsteady breaking waves", Research Report No. CACR-14-06, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
44. Mieras, R., Kirby, J. T. and Shi, F., 2014, "A high-resolution numerical model investigation into the response of a channelized salt marsh to a storm surge event", Research Report No. CACR-14-07, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
45. Tehranirad, B., Kirby, J. T., Callahan, J. A. and Shi, F., 2015, "Tsunami inundation mapping for Atlantic City, NJ NGDC DEM", Research Report No. CACR-15-01, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware. (DRAFT)
46. Tehranirad, B., Kirby, J. T., Callahan, J. A. and Shi, F., 2015, "Tsunami inundation mapping for the northern half of the State of New Jersey", Research Report No. CACR-15-02, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware. (DRAFT)

47. Tehranirad, B., Kirby, J. T., Callahan, J. A. and Shi, F., 2015, "Tsunami inundation mapping for New York City", Research Report No. CACR-15-03, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware. (DRAFT)
48. Tehranirad, B., Kirby, J. T., Callahan, J. A. and Shi, F., 2015, "Tsunami inundation mapping for Montauk, NY NGDC DEM", Research Report No. CACR-15-04, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware. (DRAFT)
49. Tehranirad, B., Kirby, J. T., Callahan, J. A. and Shi, F., 2015, "Tsunami inundation mapping for Nantucket, MA NGDC DEM", Research Report No. CACR-15-05, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware. (DRAFT)
50. Tehranirad, B., Kirby, J. T. and Shi, F., 2015, "Tsunami Inundation Mapping for Virginia Beach, VA NGDC DEM", Research Report No. CACR-15-11, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware. (DRAFT)
51. Tehranirad, B., Kirby, J. T. and Shi, F., 2015, "Tsunami Inundation Mapping for Cape Hatteras, NC NGDC DEM", Research Report No. CACR-15-12, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware. (DRAFT)
52. Tehranirad, B., Kirby, J. T. and Shi, F., 2015, "Tsunami Inundation Mapping for Myrtle Beach, SC NGDC DEM", Research Report No. CACR-15-13, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware. (DRAFT)
53. Tehranirad, B., Kirby, J. T. and Shi, F., 2015, "Tsunami Inundation Mapping for Savannah, GA NGDC DEM", Research Report No. CACR-15-14, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware. (DRAFT)
54. Tehranirad, B. and Kirby, J. T. and Shi, F., 2016, "Does morphological adjustment during tsunami inundation increase levels of hazard?", Research Report No. CACR-16-02, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
55. Dong, Z., Kirby, J. T. and Shi, F., 2016, "Wave-current interaction in strongly sheared mean flows", Research Report No. CACR-16-03, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.

RECENT SEMINARS

1. "Evaluating the low frequency predictions of a Boussinesq wave model: Field cases", College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis, June 2, 2003.
2. "Acceleration effects in a time-resolved cross-shore sediment transport model", College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis, June 3, 2003.
3. "A progress report on various applications of the Boussinesq equations", Department of Civil and Environmental Engineering, University of Delaware, Newark, November 11, 2003.
4. "From surf to tsunami: modeling weakly dispersive shallow water waves", Inaugural lecture, E. C. Davis Professorship, College of Engineering, University of Delaware, October 5, 2004.
5. "Lectures on Boussinesq wave modeling", College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis, August 2005.
6. "Modeling the 2004 Sumatra tsunami", Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, April 13, 2006.
7. "The 2004 Indian Ocean tsunami: Source determination and runup in Thailand", Department of Civil and Environmental Engineering, University of Delaware, April 2007.

8. "The 2004 Indian Ocean tsunami: Source determination and runup in Thailand", Department of Civil and Engineering, Johns Hopkins University, April 2007.
9. "Applications of Boussinesq models to surf zone flows: shear waves, rip currents and mixing", Grupo de Dinámica de Flujos Ambientales, CEAMA, Univ. de Granada, May 2010.
10. "The 2011 Tohoku tsunami: missing pieces of the puzzle?", Grupo de Dinámica de Flujos Ambientales, CEAMA, Univ. de Granada, May 2012.
11. "Multiple source mechanisms for the 2011 Tohoku-oki tsunami", Physical Ocean Sciences and Engineering, College of Earth, Ocean and Environment, University of Delaware, November 2012.
12. "Modeling ocean waves at a variety of scales", Department of Civil Engineering, Notre Dame University, March 25, 2014.
13. "Surface waves on strongly sheared currents", Applied Ocean Sciences and Engineering, Woods Hole Oceanographic Institution, Sept. 10, 2015.

OTHER PUBLIC PRESENTATIONS

1. "Modeling tsunamis: Science issues and social impacts", Marine Associates Meeting, College of Marine Studies, University of Delaware, March 22, 2005.
2. "Hydrodynamics of tsunami waves", Delaware Academy of Sciences, May 18, 2005.
3. "From surf to tsunami: modeling water waves from nearshore to oceanic scale", Ocean Currents Series Lecture, College of Marine Studies, Lewes, June 16, 2005.
4. "From surf to tsunami: modeling water waves from nearshore to oceanic scale", Academy of Life Long Learning, Wilmington, Sept. 28, 2005.

Other Activities

1. Judge, Sophomore Science Fair, Charter School of Wilmington, Wilmington, DE, January 9, 2004.

FUNDED RESEARCH PROJECTS (University of Delaware)

1. Project title: Studies of Methods for Wave Field and Mean Flow Modification near Open Coastlines
 Sponsor: Office of Naval Research
 Sponsor's Grant Number:
 P.I.: James T. Kirby
 Duration: 01/01/1990 - 12/31/1990
 Amount of support: \$70,000
2. Project title: Sloshing and Wave Breaking in a Rectangular Container
 Sponsor: University of Delaware Research Foundation
 Sponsor's Grant Number:
 P.I.: James T. Kirby
 Duration: 06/01/1990 - 05/31/1991
 Amount of support: \$17,000
3. Project title: Modelling Effects of Vertical Current Shear in Wave Propagation Schemes
 Sponsor: Delaware Sea Grant College (U. S. Department of Commerce)
 Sponsor's Grant Number: R/OE-9
 P.I.: James T. Kirby
 Duration: 02/01/1991 - 01/31/1993
 Amount of support: \$111,198

4. Project title: Enhancements and extension to the program REF/DIF 1
 Sponsor: U. S. Army Corps of Engineers, Coastal Engineering Research Center
 Sponsor's Grant Number: DACW 39-90-D-0006-D002
 P.I.: James T. Kirby
 Duration: 01/01/1992 - 12/31/1992 ?
 Amount of support: \$39,697

5. Project title: Nearshore Wave and Circulation Modelling
 Sponsor: Army Research Office (University Research Initiative)
 Sponsor's Grant Number: DAAL03-92-G-0116
 P.I.: Robert A. Dalrymple, James T. Kirby, Ib A Svendsen, Nobu Kobayashi, John D. McCalpin, Philip L. F. Liu (Cornell University)
 Duration: 07/01/1992 - 06/30/1997
 Amount of support: ~ \$2,000,000

6. Project title: Spectral Wave Evolution Near Tidal Inlets
 Sponsor: Delaware Sea Grant College (U. S. Department of Commerce)
 Sponsor's Grant Number: R/OE-13
 P.I.: James T. Kirby
 Duration: 02/01/1993 - 01/31/1995
 Amount of support: \$126,500

7. Project title: Studies of Finite Amplitude Shear Wave Instabilities
 Sponsor: Office of Naval Research, Coastal Dynamics Program
 Sponsor's Grant Number: N00014-94-1-0214
 P.I.: James T. Kirby
 Duration: 01/01/1994 - 12/31/97
 Amount of support: \$162,621

8. Project title: Study of Breaking Wave Dynamics
 Sponsor: National Science Foundation, Physical Oceanography Program
 Sponsor's Grant Number: OCE-9203277
 P.I.s: Ib A. Svendsen, James T. Kirby and Pablo I. Huq
 Duration: 07/01/1994 - 12/31/1996
 Amount of support: \$360,000

9. Project title: Wave Processes Near Tidal Inlets
 Sponsor: Delaware Sea Grant College (U. S. Department of Commerce)
 Sponsor's Grant Number: R/OE-13
 P.I.: James T. Kirby
 Duration: 02/01/1995 - 01/31/1997
 Amount of support: \$105,000

10. Project title: Using Hydrodynamic Models to Interpret Remote Sensing Images of the Sea Surface
 Sponsor: Office of Naval Research, Base Enhancement Program
 Sponsor's Grant Number: N00014-97-1-0283
 P.I.'s: James T. Kirby and Robert A. Dalrymple
 Duration: 01/01/1997 - 06/30/2001
 Amount of support: \$526,581

11. Project title: Harbor Response to Wave Breaking on Opposing Ebb Currents
 Sponsor: Delaware Sea Grant College (U. S. Department of Commerce)
 Sponsor's Grant Number: R/OE-21
 P.I.: James T. Kirby
 Duration: 02/01/1997 - 01/31/1999
 Amount of support: \$90,000

12. Project title: Hydrodynamics of the Nearshore Zone
 Sponsor: Office of Naval Research, Coastal Dynamics Program
 Sponsor's Grant Number: N00014-98-1-0521
 P.I.'s: Robert A. Dalrymple, James T. Kirby and Ib A. Svendsen
 Duration: 03/01/1998 - 09/30/1999
 Amount of support: \$154,319

13. Project title: Boussinesq Modelling of Waves in Harbors and Tidal Inlets
 Sponsor: Army Research Office
 Sponsor's Grant Number: DAAG55-98-0173
 P.I.'s: James T. Kirby and Robert A. Dalrymple
 Duration: 04/15/1998 - 04/14/2001
 Amount of support: \$165,000

14. Project title: Effects of Vertical Current Shear on Spatial Wave Evolution
 Sponsor: Delaware Sea Grant College (U. S. Department of Commerce)
 Sponsor's Grant Number: R/OE-24
 P.I.: James T. Kirby
 Duration: 02/01/1999 - 01/31/2001
 Amount of support: \$67,000

15. Project title: Modeling Beach Morphology Changes Coupled to Incident Wave Climate and Low Frequency Currents
 Sponsor: Office of Naval Research, Coastal Dynamics Program
 Sponsor's Grant Number: N00014-99-1-0398
 P.I.'s: James T. Kirby
 Duration: 03/01/1999 - 06/30/2001
 Amount of support: \$100,851

16. Project title: Development and Verification of a Comprehensive Community Model for Physical Processes in the Nearshore Ocean
 Sponsor: National Ocean Partners Program (National Science Foundation and Office of Naval Research)
 Sponsor's Grant Number: N00014-99-1-1051
 P.I.s: James T. Kirby, John Allen (Oregon State University), Tom Drake (North Carolina State University), Steve Elgar (Woods Hole Oceanographic Institution), Bob Guza (Scripps Institution of Oceanography), Dan Hanes (University of Florida), Tom Herbers (Naval Postgraduate School), James Kaihatu (Naval Research Laboratory), George Mellor (Princeton University), H. Tuba Özkan-Haller (Oregon State University), Ib A. Svendsen, Ed Thornton (Naval Postgraduate School)
 Duration: 08/01/1999 - 03/31/2005
 Amount of support: \$4,360,192

17. Project title: Alongshore Propagating Waves in the Nearshore Region
 Sponsor: Office of Naval Research, Coastal Dynamics Program

Sponsor's Grant Number: N00014-00-1-0076
P.I.'s: James T. Kirby
Duration: 10/01/1999 - 09/30/2000
Amount of support: \$34,647

18. Project title: Surface Wave Propagation on Vertically-Sheared Currents
Sponsor: Delaware Sea Grant College (U. S. Department of Commerce)
Sponsor's Grant Number: R/OE-30
P.I.: James T. Kirby
Duration: 02/01/2001 - 01/31/2003
Amount of support: \$75,000

19. Project title: Directional, Dissipative and Random Effects in Wave Forcing of Nearshore Circulation"
Sponsor: Office of Naval Research, Ocean Modeling Program
Sponsor's Grant Number:
P.I.: J. Kaihatu, J. Veeramony and J. T. Kirby
Duration: 10/01/2002 - 03/31/2005
Amount of support: \$246,200

20. Project title: Coupling Inner Shelf Ocean Model and a Nearshore Community Model for Wave and Current Predictions at Tidal Inlets"
Sponsor: Delaware Sea Grant College (U. S. Department of Commerce)
Sponsor's Grant Number: R/OE-31
P.I.: James T. Kirby and F. Shi
Duration: 02/01/2003 - 01/31/2005
Amount of support: \$175,457

21. Project title: Coupled Wind Wave and Acoustic Model to Predict Sea Surface Roughness in Delaware Bay"
Sponsor: Delaware Sea Grant College (U. S. Department of Commerce)
Sponsor's Grant Number: R/OE-32
P.I.: James T. Kirby, M. Badiey, K. C. Wong
Duration: 02/01/2003 - 01/31/2005
Amount of support: \$271,131

22. Project title: Parameterization of a Two-Phase Sheet Flow Model and Application to Nearshore Morphology
Sponsor: Office of Naval Research, Coastal Geosciences Program
Sponsor's Grant Number:
P.I.'s: J. T. Kirby, T.-J. Hsu, S. Elgar, D. M. Hanes
Duration: 10/01/2003 - 09/30/2005
Amount of support: \$71,378

23. Project title: Collaborative Research: CROSSTEX - Experimental Study of Onshore Bar Movement
Sponsor: National Science Foundation, Physical Oceanography Program
P.I.s: H. T. Ozkan-Haller, M. C. Haller, J. T. Kirby
Duration: 06/01/2004 - 12/31/2007
Amount of support: \$270,637 (Delaware)

24. Project title: Generation and transport of vorticity and effects on mean surfzone currents: wave-averaged and wave-resolving formulations

- Sponsor: Office of Naval Research, Coastal Geosciences Program
 P.I.: J. T. Kirby
 Duration: 10/1/2004 - 9/31/2006
 Amount of support: \$123,577
25. Project title: Real-time surface wave measurement and modeling in Delaware Bay
 Sponsor: Delaware Sea Grant College (U. S. Department of Commerce)
 Sponsor's Grant Number: R/OE-xx
 P.I.: James T. Kirby, M. Badiey, K. C. Wong
 Duration: 02/01/2003 - 01/31/2005
 Amount of support: \$169,138
26. Project title: Field observations and predictions of rip currents
 Sponsor: Delaware Sea Grant College (U. S. Department of Commerce)
 Sponsor's Grant Number: R/OE-xx
 P.I.: James T. Kirby
 Duration: 02/01/2003 - 01/31/2005
 Amount of support: \$128,104
27. Project title: Parallel computing facilities for ONR-sponsored nearshore and coastal ocean research
 Sponsor: ONR DURIP program
 Sponsor's Grant Number: N00014-05-1-0752
 PI: James T. Kirby, A. D. Kirwan, B. Lipphardt and F. Shi
 Duration: 6/1/2005-4/31/2006
 Amount of support: \$142,639
28. Project title: Enhancement of the NearCoM model for nearshore hydrodynamics
 Sponsor: ONR Coastal Geosciences
 Sponsor's Grant number: N00014-05-1-0423
 PI: J. T. Kirby
 Duration: 5/1/2005-6/30/2006
 Amount of support: \$49,075
29. Project title: Operation and maintenance of a video beach observing system at Sea Colony, Bethany Beach, DE
 Sponsor: State of Delaware Department of Natural Resources (DNREC)
 PI: J. T. Kirby
 Duration: 11/01/2005 - 6/30/06
 Amount of support: \$14,825.40
30. Project title: Community sediment transport model
 Sponsor: NOPP, subcontract to WHOI
 P.I.: C. Sherwood, W. R. Geyer, T. R. Keen (Kirby co-PI)
 Duration: 06/01/2006-12/31/2009
 Amount of support: \$150,000 (UD), \$2,700,000 (overall)
31. Project title: Generation, transport and fate of surfzone bubbles
 Sponsor: ONR Coastal Geosciences
 P.I. J. T. Kirby, F. Shi
 Duration: 02/01/07-9/30/09
 Amount of support: \$350,218.
32. Project title: Video-based bathymetric determination for rip current studies
 PIs: James T. Kirby, Chandra Kambhamettu, Jamie MacMahan

- Sponsor: Sea Grant
Amount: \$140,000
Duration: 02/01/07-01/31/09
33. Project title: ESMF coupling of meteorology, ocean and nearshore models for use in predicting coastal inundation.
PIs: Fengyan Shi, James T. Kirby
Sponsor: Sea Grant
Amount: \$125,600
Duration: 02/01/07-01/31/09
34. Project title: Understanding rip current outbreaks and tracking victims in a rip current
PIs: Jamie MacMahan, Fengyan Shi and James T Kirby
Sponsor: Sea Grant
Amount: \$139,900
Duration: 02/01/07-01/31/09
35. Project title: Effects of oceanographic variability on underwater communications
PIs: W. Hodgkiss (SIO) et IX alia. (J. T. Kirby and M. Badiey, UD)
Sponsor: ONR MURI program
Amount: \$4,500,000 (total, estimate), \$850,000 (UD, estimate)
Duration: ???/07-???/12
36. Project title: Generation, transport and fate of surfzone bubbles
PIs: James T. Kirby and Fengyan Shi
Sponsor: ONR Coastal Geosciences
Amount: \$390,000
Duration: 3/1/07-9/30/09
37. Project title: Collaborative Research: Rip current dynamics in a complex beach environment
PIs: James T. Kirby (UD), Jamie MacMahan, Tim Stantoin, Ed Thornton (NPGS), Ad Reniers (U. Miami)
Sponsor: NSF Physical Oceanography
Amount:\$229,214 (UD)
Duration: 12/1/07-11/30/10
38. Project Title: Validation of a coupled model system for Delaware Bay and adjacent coastal region
PIs: James T. Kirby
Sponsor: Sea Grant
Amount:\$150,144
Duration: 2/1/09-1/31/11
39. Project Title: CHRP07: Modeling hypoxia and ecological responses to climate and nutrients
PIs: W. Kemp (U. MD) et alia (D. DiToro and J. T. Kirby, UD)
Sponsor: NOAA Coastal Hypoxia Research Program (CHRP)
Amount: \$2,321,845 Duration: 7/1/07-6/30/12
40. Project Title: Collaborative research: The dynamics of sediment-laden river plume and initial deposition off small mountainous rivers
PI's: T-J Hsu and J. T. Kirby (UD), W. R. Geyer (WHOI)
Sponsor: NSF Physical Oceanography
Amount:\$450,361 (UD) Duration: 9/1/09-8/31/12
41. Project Title: Simulating surf zone bubbles
PI's: J. T. Kirby and F. Shi
Sponsor: ONR Coastal Geosciences
Amount: \$496,628
Duration: 10/1/09-9/31/12

42. Project Title: Best practices for physical processes and impact assessment in support of dredging operations on the U. S. outer continental shelf
 PI's: J-T Kirby (UD), J. Ramsey (ACE), S. Misra (Gerwick, Inc.)
 Sponsor: Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE)
 Amount: \$490,000 (\$140,000 UD)
 Duration: 10/1/10-9/30/12
43. Project Title: Modeling tsunami inundation and assessing tsunami hazards for the U. S. east coast
 PI's: J. T. Kirby (UD), S. T. Grilli, (URI)
 Sponsor: NTHMP (NOAA)
 Amount:
 Duration: 9/1/10-8/31/14
44. Project Title: A process-based model of long term marsh platform and shoreline evolution in response to rising sea level and subsurface flow
 PI's: J. T. Kirby and F. Shi
 Sponsor: Delaware Sea Grant College (NOAA)
 Amount: \$57,073
 Duration: 2/1/11-1/31/12
45. Project Title: A process-based model of long term marsh platform and shoreline evolution in response to rising sea level and changing sediment supplies
 PI's: J. T. Kirby and F. Shi
 Sponsor: Delaware Sea Grant College (NOAA)
 Amount: \$121,226
 Duration: 2/1/12-1/31/14
46. Project Title: Surfzone bubbles: Model development, testing and extension to chemical/biological processes
 PI's: J. T. Kirby and F. Shi
 Sponsor: ONR Littoral Geosciences and Optics
 Amount: \$322,406
 Duration: 10/1/12-9/30/15
47. Project Title: Interactions of waves, tidal currents and riverine outflow and their effects on sediment transport
 PI's: T. J. Hsu, F. Shi and J. T. Kirby
 Sponsor: ONR Littoral Geosciences and Optics
 Amount: \$322,406
 Duration: 12/1/12-11/30/14
48. Project Title: Interactions of waves, tidal currents and riverine outflow and their effects on the delivery and resuspension of sediments in the near field
 PI's: J. T. Kirby, T. J. Hsu, F. Shi (UD) and G. Ma (ODU)
 Sponsor: NSF Physical Oceanography
 Amount: \$483,437 (UD)
 Duration: 9/1/13 - 8/31/17
49. Project Title: Modeling tsunami inundation and assessing tsunami hazards for the U. S. east coast (Phase 2)
 PI's: J. T. Kirby (UD), S. T. Grilli, (URI)
 Sponsor: NTHMP (NOAA)
 Amount: \$144,056
 Duration: 9/1/13-8/31/15
50. Project Title: Extension of NHWAVE for modeling wave-ice floe interaction
 PI's: F. Shi, J. T. Kirby
 Sponsor: Office of Naval Research
 Amount: \$83,557
 Duration: 10/1/13-9/30/15

51. Project Title: Extending models of surface hydrodynamics in complex natural and modified tidal marsh environments
 PI's: J. T. Kirby and F. Shi
 Sponsor: Delaware Sea Grant College (NOAA)
 Amount: \$70,000
 Duration: 2/1/14-1/31/16
52. Project Title: A hydrodynamic modeling system for the Delaware coast environment PI's: T. Kukulka, J. T. Kirby and F. Shi
 Sponsor: State of Delaware DNREC
 Amount: \$243,605
 Duration: 8/1/14-7/30/17
53. Project Title: Modeling tsunami inundation and assessing tsunami hazards for the U. S. east coast (Phase 3)
 PI's: J. T. Kirby (UD), S. Grilli (URI)
 Sponsor: NTHMP (NOAA)
 Amount:\$175,000
 Duration: 9/1/14 - 8/31/15
54. Project Title: Wave breaking across the inner shelf and nearshore regions
 PI's: J. T. Kirby, F. Shi
 Sponsor: NSF Physical Oceanography
 Amount: \$363,133
 Duration: 9/1/14 - 8/31/17
55. Project Title: Modeling, validation and accretion data for Bombay Hook NWR
 PI's: J. T. Kirby, C. Sommerfield, F. Shi
 Sponsor: National Fish and Wildlife Foundation
 Sponsors Grant Number:
 Amount: \$400,000
 Duration: 10/1/14 - 9/31/16
56. Project Title: Modeling tsunami inundation and assessing tsunami hazards for the U. S. east coast (Phase 4)
 PI's: J. T. Kirby (UD), S. Grilli (URI)
 Sponsor: NTHMP (NOAA)
 Sponsors Grant Number:
 Amount:\$248,000
 Duration: 9/1/15 - 8/31/17
57. Project Title: Collaborative Research: Development, experimental validation and case studies for the next generation of landslide tsunami models for coastal hazard mitigation
 PI's: S. T. Grilli (URI), J. T. Kirby (UD), G. Ma (ODU)
 Sponsor: NSF CMMI- Engineering for Natural Hazards (ENH)
 Sponsors Grant Number:
 Amount: \$244,995 (UD portion)
 Duration: 9/1/15 - 8/31/18
58. Project Title: Frontal structures in the Columbia River plume nearfield - a non-hydrostatic coastal modeling study
 PI's: T. J. Hsu, F. Shi and J. T. Kirby
 Sponsor: ONR Littoral Geosciences and Optics
 Sponsors Grant Number:
 Amount: \$322,406
 Duration: 10/1/15 - 9/30/17
59. Project Title: Coupling geomorphological and ecological processes in numerical simulations of Delaware salt marsh evolution

PI's: J. T. Kirby and F. Shi
Sponsor: Delaware Sea Grant College (NOAA)
Sponsors Grant Number:
Amount: \$135,636
Duration: 2/1/16-1/31/18

60. Project Title: U. S. East Coast: Maritime Assessments and Improvements to Source and Inundation Modeling Procedures

PI's: J. T. Kirby (UD), S. Grilli (URI)
Sponsor: NTHMP (NOAA National Weather Service)
Sponsors Grant Number: NA16NWS4670034
Amount:\$236,658
Duration: 9/1/16 - 8/31/18

61. Project Title: Development and Validation of Ship-Wake Generation in FUNWAVE-TVD for Predicting Ship-Wake Effects on Adjacent Shorelines

PI's: F. Shi and J. T. Kirby
Sponsor: US Army Corps of Engineers
Amount: \$144,953
Duration: 9/27/16 - 9/26/17

EDUCATIONAL ACTIVITIES

Graduate Degrees Supervised

University of Florida

1. Padmaraj Vengayil, Master of Science, 1986. "Shoaling and reflection of nonlinear shallow water waves".
2. Haruhiko Kaku, Master of Science, 1987. "A parabolic equation method in polar coordinates for waves in harbors".
3. Renji Philip, Master of Science, 1988. "Numerical simulation of shallow water waves".
4. Jeffrey P. Anton, Master of Science, 1989. "Resonant and non-resonant reflection of linear waves over rapidly varying bottom undulations".
5. Thomas R. McSherry, Master of Science, 1989. "Wave-current interaction over a submerged bar field."

University of Delaware

1. Christina A. Rasmussen, Master of Civil Engineering, 1992. "Transient numerical modeling of the mild-slope equation".
2. H. Tuba Özkan-Haller, Master of Civil Engineering, 1993. "Evolution of breaking directional spectral waves in the nearshore zone".
3. Glenn D. Bowen, Master of Civil Engineering, 1994. "Shoaling and breaking random waves on a 1:35 laboratory beach".
4. Changhoon Lee, Ph.D. Civil Engineering, 1994. "A study of time-dependent mild-slope equations".
5. James M. Kaihatu, Ph.D. Civil Engineering, 1994. "Frequency domain models for nonlinear finite depth water wave propagation".
6. Arun Chawla, Master of Civil Engineering, 1995. "Wave transformation over a submerged shoal".
7. John Bakunin, Master of Civil Engineering, 1995. "Experimental study of hydraulic jumps in low Froude number range".
8. Ge Wei, Ph.D. Civil Engineering, 1997. "Simulation of water waves by Boussinesq models".
9. H. Tuba Özkan-Haller, Ph.D. Civil Engineering, 1997. "Nonlinear evolution of shear instabilities of the longshore current".
10. Mauricio F. Gobbi, Ph.D. Civil Engineering, 1998. "A new Boussinesq-type model for surface water wave propagation".
11. Arun Chawla, Ph.D. Civil Engineering, 1999. "An experimental study on the dynamics of wave blocking and breaking on opposing currents".
12. Shubhra Misra, Master of Civil Engineering, 1999. "Determining water depths from surface images using Boussinesq equations".
13. Lisa Hommel, Master of Civil Engineering, 2000. "Vortex formation resulting from solitary wave interaction with a breakwater".
14. Ozgur Gungordu, Master of Civil Engineering, 2001. "Evolution of coupled hydrodynamic and bed instabilities".
15. Furong Zhen, Master of Civil Engineering, 2004. "On the numerical properties of staggered vs. non-staggered grid schemes for a Boussinesq equation model".

16. Shubhra Misra, Ph.D. Civil Engineering, 2005. "The turbulent dynamics of quasi-steady spilling breakers - Theory and experiment".
17. Wenting Qin, Master of Civil Engineering, 2005. "Application of the spectral wave model SWAN in Delaware Bay" (co-advised with Mohsen Badiy, CMS)
18. Wen Long, Ph. D. Civil Engineering, 2006. "Boussinesq modeling of waves, currents and sediment transport".
19. Long Xu, Master of Civil Engineering, 2006, "Numerical study in Delaware Inland Bays" (co-advised with Dom DiToro, CEE).
20. Todd DeMunda, Master of Civil Engineering, 2006, "A system for video observation of nearshore processes".
21. Pablo Teran, Master of Civil Engineering, 2007. "Model simulations of bar evolution on a large scale laboratory beach"
22. Allison Bridges, Master of Civil Engineering, 2008. "The effect of model seagrass on wave runup. A laboratory investigation"
23. Joseph Geiman, Master of Ocean Engineering, 2008. "Vorticity dynamics in the presence of shallow water waves"
24. Rob Hampson, Master of Civil Engineering, 2008. "Video-based nearshore depth inversion using WDM method".
25. Jeff Brown, Master of Civil Engineering, 2008. (Joint with J. H. MacMahan), "Lagrangian field observations of rip currents"
26. Cihan Bayandir, Master of Civil Engineering, 2009, (Joint with M. Badiy), "Impact of linear and nonlinear surface gravity waves on high frequency acoustic propagation"
27. Jennifer Brown, Master of Civil Engineering, 2009, (joint with J. H. MacMahan), "Field measurements and modeling of surfzone currents on inhomogeneous beaches".
28. Yunfeng Chen, Master of Civil Engineering, 2010, (Joint with F. Shi), "Coupling of wave and circulation models for predicting storm-induced waves, surges, and coastal inundation".
29. Phil Castellano, Master of Civil Engineering, 2011, "Validation of a hydrodynamic model of Delaware Bay and the adjacent coastal region".
30. Joseph Geiman, Ph.D. Ocean Engineering, 2011, "Forced vortex dynamics in the surf zone".
31. Gangfeng Ma, Ph.D. Civil Engineering, 2012, "Multiscale numerical study of turbulent flow and bubble entrainment in the surf zone".
32. Nuttita Pophet, Master of Ocean Engineering, 2012, "Parallel implementation of a three-dimensional non-linear wave model for random directional seas".
33. Morteza Derakhti, Master of Civil Engineering, 2013, "Bubble entrainment and liquid-bubble interaction under unsteady breaking waves".
34. Ryan Mieras, Master of Civil Engineering, 2014, "A high-resolution numerical model investigation into the response of a channelized salt marsh to a storm surge event".
35. Morteza Derakhti, Ph. D. Civil Engineering, 2016, "LES and σ -coordinate RANS simulations of laboratory surface wave breaking".
36. Babak Tehranirad, Ph. D. Civil Engineering, 2016, "Does morphological adjustment during tsunami inundation increase levels of hazard?".

37. Zhifei Dong, Ph. D. Ocean Engineering, 2016, “Wave-current interaction in strongly sheared mean flows”.
38. Saedah Banihashemi, Ph. D. expected 2018.
39. India Woodruff, MCE, expected 2018.
40. Cheng Zhang, Ph. D., expected 2019.
41. Mithun Deb, Ph. D., expected 2019.

Courses Taught at University of Delaware

1. CIEG 125, “Introduction to Civil Engineering”. Occasional guest lectures and laboratory tours.
2. MECH 305/CIEG 305, “Fluid Mechanics”
3. MECH 306/CIEG 306, “Fluid Mechanics Laboratory”
4. CIEG 639, “Hydromechanics” (now “Ocean Fluid Dynamics”). Existing course, providing first semester graduate students with an introduction to the differential equation approach to fluid mechanics.
5. CIEG 672, “Water Wave Mechanics”. Existing course, providing first semester graduate students an introduction to the linear theory of surface water waves.
6. CIEG 681, “Water Wave Spectra”. Existing course providing an introduction to spectral time series analysis in the context of ocean waves and other marine phenomena.
7. CIEG 682. “Nearshore Processes”. Existing course. Introduction to physical basis for wave-current interaction and wave-driven surfzone processes.
8. CIEG 684, “Numerical Methods in Coastal Modeling”. New course. Introduction to numerical methods for partial differential equations, with applications to parabolic, hyperbolic and elliptic model equation systems appearing in coastal engineering applications.
9. CIEG 693/MAST 693, “Waves in the Marine Environment”. New course developed in conjunction with Mohsen Badiy, CMS. Course provides a broad based introduction to wave processes in the marine environment, including water gravity waves, acoustic waves, seismic waves and electromagnetic waves. Course is required for graduate students in the CEOE POSE program.
10. CIEG 872, “Advanced Water Wave Mechanics”. Existing course providing an introduction to the nonlinear theories of surface water waves.

A textbook, “Waves in the Nearshore and Coastal Ocean”, covering the content of CIEG672, CIEG 682 NS CIEG 872, is in preparation for publication by *World Scientific*.

Recent Consulting Activities

1. Mactec, Inc., 2009, 2011.

Tsunami simulations as part of flood analysis for an NRC licensing effort for a proposed expansion for an East Coast nuclear power plant.

2. Sargent & Lundy, 2011.

Tsunami simulations as part of flood analysis for an NRC licensing effort for a proposed Gulf Coast nuclear power plant.

3. Bechtel, Inc., 2012-2013.

Tsunami simulations as part of flood analysis for an NRC licensing effort for expansion of an East Coast nuclear power plant.

4. CH2M-Hill, Inc., 2012-2013.

Tsunami simulations as part of flooding reanalysis for an existing West Coast nuclear power plant.

5. AMEC, Inc., 2013-2014.

Tsunami hazard assessment as part of flooding reanalysis for East Coast nuclear power plant.

6. Water Institute of the Gulf, 2013.

Evaluation of storm surge protection system for New Orleans, LA.

7. Chevron, 2014-2015.

Landslide tsunami hazard analysis.

8. State of Alaska, 2014.

Simulations of wave activity and harbor resonance in a small fishing harbor.

Recent Short Courses

1. Coastal modeling, *30th Intl. Conf. Coastal Engineering*, San Diego, September 2, 2006. (with R. A. Dalrymple).
2. Modeling shallow water waves, *CEAMA, Univ. of Granada*, May 2012.