Ben R. Hodges, Ph.D.

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Research: Expertise in computational modeling for water flows in the natural environment, including lakes, rivers and estuaries. Interested in both fundamental problems of environmental fluid mechanics and applications to practical problems in predicting oil spill fate, urban flooding, desalination brine mixing, and river flow for continental-scale networks.

Public Committee Service: Active in national, state, and local committees serving the public interest, including: two committees formed by the National Academy of Sciences to investigate water issues (Mississippi River delta and St. Johns River), the Texas Bay and Basin Expert Science Team for the Nueces River basin, and the Lake Austin Task force for the City of Austin.

Publications: More than 50 papers published in journals, books, and conference proceedings, along with another 60+ conference, workshop and seminar presentations.

Sponsored Research: Oversight of more than $2.75 million in research grants funded through federal, state, and local agencies.

Graduate students: Supervisor or co-supervisor to 10 Ph.D. students and 15 MS students from 2000-2014 while at the University of Texas.

Consulting Experience: Advising to RPSEspey, City of Austin, Kinetrics Inc., Southwest Florida Water Management District, Doucet & Associates, USGS, Texas Water Development Board on a variety of issues regarding inland water computational modeling. These issues included: modeling leakage from the Longhorn Pipeline, modeling of lake cooling for a nuclear power plant, minimum freshwater flows in an estuary, and modeling dissolved oxygen levels associated with wastewater treatment plant permit renewal.

Industry Experience: Seven years as a B.S. level engineer working in a variety of positions in the offshore marine and shipbuilding industries.

Education:
Ph.D. Stanford University, Civil Engineering, 1997.
M.S. The George Washington University, Mechanical Engineering, 1991.
B.S. The U.S. Merchant Marine Academy, Marine Engineering/Nautical Science 1984.

Selected Projects

- **Simulation Program for River Networks (SPRNT).** In collaboration with computer engineer Dr. Frank Liu of IBM, Dr. Hodges developed an approach to translate modeling techniques used for microchip design to river network modeling, with dramatic speed-up of model performance.
- **Nueces Delta Restoration Study.** This project resulted in development of the Fine Resolution Environmental Hydrodynamic model (Frehd) to study the combined landscape and channelized flow in the complex salt and freshwater marshes of the Nueces Delta.

- **Climate-Aware Renewable Hydropower Generation and Disaster Avoidance.** This NSF-sponsored collaboration with electrical engineering professors at Carnegie Mellon Univ, University of Southern California, and a civil engineering professor at Penn State University is developing new approaches to understand how run-of-the river hydropower affects both rivers and the electrical network.
- **Integrating next-generation models into the oil spill prediction system for Texas bays.** This project is developing a modeling system that integrates hydrodynamic models, forecast data downloaded automatically from the internet, and visualization output through Google Maps and Google Earth. This system makes possible real-time oil spill prediction for emergency managers.
- **Evaluating Hydrodynamic Uncertainty in Oil Spill Modeling.** This project developed methods for estimating contributions of evolving forecasts to the uncertainty in predicted oil spills.
- **Barton Springs Hydrodynamic Study.** The Frehd model is being used to evaluate changes in the dam structure for Barton Springs in light of issues with endangered species that have limited velocity habitats.

Selected Publications

Wescoat, J.L., X. Cai, G.M. Kondolf, **B.R. Hodges**, S.B. Joye, W.M. Lewis, L.A. Shabman, E. van Beek, *Delta Waters: Research to Support Integrated Water and Environmental Management in the Lower Mississippi River*, National Academies Press, 2013, 140 pgs. http://www.nap.edu/catalog.php?record_id=18484

Brezonik, P.L. ,M.S. Fennessy, **B.R. Hodges**, J.R. Karr, M.S. Peterson, J. L. Pinckney, J.I. Restrepo, R.C. Steiner, J.C. Stevenson, *Review of the St Johns River Water Supply Impact Study*, National Academies Press, 2011, 160 pgs. ISBN-13: 978-0-309-22567-0

Hodges B R. (2014) "Hydrodynamical Modeling." in S.A. Elias (Editor), Reference Module in Earth Systems and Environmental Sciences, Elsevier, 22 pgs. ISBN: 978-0-12-409548-9 http://dx.doi.org/10.1016/B978-0-12-409548-9.09123-5

Hodges, B.R. (2014), "A new approach to the local time stepping problem for scalar transport," *Ocean Modelling,* 77:1-19. http://dx.doi.org/10.1016/j.ocemod.2014.02.007

Liu, F. and **B.R. Hodges**, (2014) "Applying microprocessor analysis methods to river network modeling," *Environmental Modelling & Software.* 52:234-252. http://dx.doi.org/10.1016/j.envsoft.2013.09.013

Hodges, B.R., and F. Liu (2014), "Rivers and electrical networks: Crossing disciplines in modeling and simulation," *Foundations and Trends in Electronic Design Automation*, 8:1:1-116. http://dx.doi.org/10.1561/1000000033

Hodges, **B.R.** (2013) "Challenges in continental river dynamics," *Environmental Modelling & Software* 50:16-20. DOI 10.1016/j.envsoft.2013.08.010

Hodges, B.R., J.E. Furnans and P.S. Kulis (2011), "Case Study: A thin-layer gravity current with implications for desalination brine disposal," *Journal of Hydraulic Engineering,* 137:3:356-371. DOI: 10.1061/(ASCE)HY.1943-7900.0000310.

Hodges, B.R. (2010), "The Importance of Mixing and Isolation Time for Desalination Brine Discharge," *Proceedings of the International Engineering Conference on Hot Arid Regions* (IECHAR 2010), Al-Ahsa Kingdom of Saudi Arabi, March 1-2, 2010, pp. 235-240.