

Timu W. Gallien

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EDUCATION

Postdoctoral Scholar, Scripps Institution of Oceanography, University of California, San Diego

Research Interests: Urban coastal flood prediction, Wave runup and overtopping, Coastal hazards, Sea level rise, Flood control infrastructure and mitigation methods, Nearshore remote sensing and observation, Beach morphodynamics and groundwater

Advisor: Robert Guza

Ph.D., University of California, Irvine, Civil Engineering, December, 2012

Dissertation: Integrated parcel-scale urban coastal flood modeling: Accounting for tide, surge, wave, sea level rise and flood control infrastructure

Advisor: Brett Sanders

M.S., Purdue University, Agricultural and Biological Engineering, May, 2008

Thesis: Design and Evaluation of an Embedded Sensor in a Polymer Sealing System

Advisor: Gary Krutz

B.S., Purdue University, Agricultural Engineering, 1996

Power and Machinery Specialty

AWARDS, HONORS AND FUNDING

- 2015** California Department of Parks and Recreation, Division of Boating and Waterways
Beach data analysis and hydrodynamic sea level rise modeling, PI, \$130K
Beach-estuary groundwater dynamics, Co-PI with Russ Detwiler, \$30K
FEMA, Mobile Beach Erosion Monitoring (MoBERM) Platform, PI, \$40K
USC Sea Grant, MoBERM, Co-PI with Robert Guza, \$55K
- 2014** Chancellor's Postdoctoral Fellowship, University of California, San Diego, \$62K
California Department of Parks and Recreation, Division of Boating and Waterways, Flood Control Infrastructure Survey, lead contributor, PI Robert Guza, \$77K
- 2013** Chancellor's Postdoctoral Fellowship, University of California, San Diego, \$62K
California Department of Parks and Recreation, Division of Boating and Waterways, Anthropogenic beach berm observations, lead contributor, PI Robert Guza, \$56K
- 2012** Graduate Dean's Dissertation Fellowship, \$10K
Distinguished Paper Award, FPNI PhD Symposium on Fluid Power
- 2011** Robert L. Wiegel Scholarship for Coastal Studies, \$1.2K
California Department of Boating and Waterways, Graduate Research Funding, \$34K
Newkirk Fellowship, \$3K
- 2010** Pan-American Advanced Studies Institute in Computational Science and Engineering
Nortek Student Equipment Grant
National Science Foundation, Graduate Research Supplement, contributor,
PI Brett Sanders (2009 and 2010), \$82K
- 2008** Fluid Power Educational Foundation Scholarship
- 2007** Ross Fellowship, Purdue University (2006 and 2007), \$98K

RESEARCH EXPERIENCE

Scripps Institution of Oceanography University of California, San Diego, CA, 2013-present

Develop integrated hydrodynamic coastal flood prediction methodologies responsive to beach dynamics, permanent and temporary flood control infrastructure, tides, surge, waves, sea level rise

and groundwater. Observe, model and evaluate anthropogenically modified beaches. Design, develop and lead field observations of waves, beaches, water table, runup and flooding.

University of California, Irvine, CA, 2008-2012

Developed a coupled wave, surge and tidally forced two dimensional hydrodynamic modeling methodology concomitantly resolving overtopping volumes and sea walls. Designed, developed and led field studies for observation of localized winter storm conditions. Deployed wave, tide and current gauges. Developed and executed protective berm erosion study using terrestrial LiDAR. Developed validation data surfaces for coastal flood events.

Purdue University, West Lafayette, IN, 2006-2008

Designed, developed and tested a novel capacitive polymer sensor for monitoring hydraulic seal failure. This work resulted in patent 7,977,952 B2 titled "Polymeric Structures and Methods for Producing and Monitoring Polymeric Structures".

TEACHING EXPERIENCE

University of California, Irvine, CA, 2009-2010

Infrastructure Hydraulics, Teaching Assistant, Winter 2009 and 2010

Prepared and delivered boundary layer lecture to 130 students. Taught four hydraulic laboratory sections of approximately 16 students per section. Prepared and delivered conceptual lectures for laboratory sections. Graded weekly homework and lab reports. Assisted students in data analysis and laboratory report writing. Mentored students in graduate school applications.

Purdue University, West Lafayette, IN, 2007-2008

Machine Design, Grader, Spring 2007 and 2008

Graded machine design homework and laboratory reports for 30 students weekly. Assisted students with homework and projects.

Hydraulic Control Systems for Mobile Equipment, Teaching Assistant, Fall 2008

Taught two mobile hydraulic laboratory sections to approximately 15 students per section.

Graded weekly homework and laboratory reports. Tutored students in hydraulic control theory. Assisted students with homework assignments and project calculations.

PUBLICATIONS

Gallien, T.W., Flick, R.E., Guza, R.T., Sea level rise flood mapping: A tale of two modeling methodologies. In prep for Nature Climate Change.

Shakeri Majd, M., Gallien, T.W., Schubert, J.E., Sanders, B.F., in review. Multi-phase Shock-Capturing Model of Beach Hydromorphodynamics. Coastal Engineering.

Gallien, T.W., in revision. Validated coastal flood modeling at Imperial Beach, California: Comparing total water level, empirical and numerical overtopping methodologies. Coastal Engineering.

Gallien, T.W., O'Reilly, W.C., Flick, R.E., Guza, R.T., 2015. Geometric properties of anthropogenic flood control berms on southern California beaches. Ocean & Coastal Management 105, 37-45.
doi:10.1016/j.ocecoaman.2014.12.014

Schubert, J.E., Gallien, T.W., Shakeri Majd, M., Sanders, B.F., 2015. Terrestrial laser scanning of anthropogenic beach berm erosion and overtopping. Journal of Coastal Research 31, 47-60.
<http://www.bioone.org/doi/abs/10.2112/JCOASTRES-D-14-00037.1>

Gallien, T.W., Sanders, B.F., Flick, R.E., 2014. Urban coastal flood prediction: integrating wave overtopping, flood defenses and drainage. *Coastal Engineering* 91, 18-28.

Gallien, T.W., Barnard, P.L., van Ormondt, M., Foxgrover, A.C., Sanders, B.F., 2013. A Parcel-Scale Coastal Flood Forecasting Prototype for a Southern California Urbanized Embayment. *Journal of Coastal Research* 29(3), 642-656.

Gallien, T.W., Schubert, J.E., Sanders, B.F., 2011. Predicting tidal flooding of urbanized embayments: A modeling framework and data requirements. *Coastal Engineering* 58, 567-577.

Harmeyer, K.J., Holland, M.A., Gallien, T.W., Lumkes, J.H., Krutz, G.W., 2009. Embedded Sensors in Rubber and Other Polymer Components. *Strain* 45(6) 543-546.

PATENT

Krutz, G.W., Harmeyer, K.J., Holland, M.A., Gallien, T.W., 2011. Polymeric Structures and Methods for Producing and Monitoring Polymeric Structures. U.S. Patent No. 7,977,952 B2, Washington, DC.

REFEREED CONFERENCE PROCEEDINGS

Krutz, G., Gallien, T., Newell, B., Stewart, F., 2013. Design and Evaluation of an Embedded Sensor in a Polymer Sealing Structure "Smart Seal". In: *Proceedings ASME/Bath Symposium on Fluid Power and Motion Control*, ASME, 6pp.

Gallien, T.W., Schubert, J.E., Poon, Y.K., Sanders, B.F., 2011. Development and Validation of a Coastal Flood Model in an Urbanized Embayment: Accounting for Tides, Waves and Higher Ocean Levels in the Eastern Pacific. In: *Proceedings of the 34th International Association for Hydro-Environment Research and Engineering*, IAHR, pp. 114-121.

Gallien, T.W., Schubert, J.E., Sanders, B.F., 2009. High Resolution, Unstructured Grid Modeling of Coastal Flood Inundation at Newport Harbor, CA. In: *Proceedings of the 33rd International Association for Hydro-Environment Congress, Water Engineering For a Sustainable Environment*, IAHR, pp. 2532-2539.

INVITED TALKS

Beaches, Backshores and Bathtubs: The science of urban coastal flood prediction.
University of California, Los Angeles, Civil and Environmental Engineering, November 5, 2015.

California Coastal Flooding – What is needed to improve predictions?
University of California Center Sacramento. October 1, 2015.

Urban Coastal Flood Prediction: Modeling methodology, infrastructure and coastal management.
Stanford University, Civil and Environmental Engineering, April 7, 2015.
Northeastern University, Civil and Environmental Engineering, March 2, 2015.
University of California, Davis, Earth and Planetary Sciences, February 4, 2015.
University of Southern California, Civil and Environmental Engineering, January 20, 2015.

Sea Level Rise and Flooding in San Diego.
League of Women Voters, San Diego, California, September 18, 2014.

Engineering and Sea Level Rise.
Workshop on Sea Level Rise, Scripps Institution of Oceanography, May 7, 2014.

Advances in Urban Coastal Flood Modeling.

San Diego Port Authority, San Diego, California, April 29, 2014.

Urban Coastal Flood Prediction – Datums, water levels, waves and mitigation.

American Meteorological Society, La Jolla, California, June 2, 2014.

NOAA/National Weather Service, Rancho Bernardo, California, March 26, 2014.

PRESENTATIONS

Gallien, T.W. and Guza, R.T., Modeling and observations of wave overtopping flooding on a southern California beach. 36th International Association for Hydro-Environment Research and Engineering World Congress, The Hague, Netherlands, July 3, 2015.

Gallien, T.W., Guza, R.T., Static and Hydrodynamic Sea Level Rise Flood Mapping in California. Headwaters to Oceans 2014, San Diego, California, May 29, 2014.

Gallien, T.W., O'Reilly, W.C., Flick, R.E., Guza, R.T., Anthropogenic Flood Control Berms in Southern California, Mitigation for Sea Level Rise?, Ocean Sciences, Honolulu, Hawaii, February 25, 2014.

Gallien, T.W., Flick, R.E., O'Reilly, W.C., Guza, R.T., Beach berming for coastal flood defense in southern California. Coastal and Estuarine Research Federation, San Diego, California, November 5, 2013.

Gallien, T.W. and Sanders, B.F., Parcel-scale urban coastal flood predictions: Identifying critical data and forcing requirements. American Geophysical Union Fall Meeting, San Francisco, California, December 4, 2012.

Gallien, T.W., Flick, R.E. and Sanders, B.F., Parcel-scale urban coastal flood prediction: Integrating water level, wave and flood control infrastructure. International Conference on Coastal Engineering, Santander, Spain, July 2, 2102.

Gallien, T.W. and Sanders, B.F., Flood Prediction in an Urbanized Embayment: Advancing the predictive skill of urban flood models through the integration of tide, surge, wave and flood control processes. Computational Methods in Water Resources XIX International Conference, Urbana, Illinois, June 17, 2102.

Gallien, T.W. and Sanders, B.F., An integrated high resolution urban coastal flood model. Headwaters to Oceans 2012, San Diego, California, May 31, 2012.

Gallien, T.W., Schubert, J.E., Poon, Y.K., Sanders, B.F., Development and Validation of a Coastal Flood Model in an Urbanized Embayment: Accounting for Tides, Waves and Higher Ocean Levels in the Eastern Pacific. 34th International Association for Hydro-Environment Research and Engineering, Brisbane, Australia, June 29, 2011.

Gallien, T.W. and Sanders, B.F., High-Resolution Urban Coastal Inundation Modeling. Headwaters to Oceans 2011, San Diego, California. May 24, 2011.

Gallien, T.W. and Sanders, B.F., Two-Dimensional High Resolution Coastal Flood Modeling: Validation at Newport Harbor, CA. Engineering Mechanics Institute. Los Angeles, California. August 9, 2010.

Gallien, T.W., Schubert, J.W., Sanders, B.F., High Resolution Grid Modeling of Coastal Flood Inundation at Newport Harbor, CA. Headwaters to Oceans 2009, Long Beach, California. October 28, 2009.

Gallien, T.W., Harmeyer K.J, Holland, M.A., Embedded Sensors in Rubber and Other Polymer Components. International Conference on Experimental Mechanics. Alexandroupolis, Greece. July 2, 2007.

POSTER PRESENTATIONS

Shakeri-Majd, M., Schubert, J.E., Gallien, T.W., Sanders, B.F., Two-Dimensional Numerical Modeling of Anthropogenic Beach Berm Erosion. American Geophysical Union, San Francisco, California, December 16, 2014.

Gallien, T.W., Barnard, P.L., Sanders, B.F., Parcel-scale urban coastal flood mapping: Leveraging the multi-scale CoSMoS model for coastal flood forecasting. American Geophysical Union, San Francisco, California, December 7, 2011.

Gallien, T.W., Schubert, J.E., Poon, Y.K., Sanders, B.F., Mapping developed coastal flood zones for climate change adaptation planning: Accounting for tides, waves, sea level rise and flood defense structures. American Geophysical Union, San Francisco, California, December 14, 2010.

Gallien, T.W., Schubert, J.E., and Sanders, B.F., Adapting to higher high tides: Development and validation of an inundation model for tidal flooding of urbanized lowlands. Hydrology Conference, San Diego, California. October 12, 2010.

PROFESSIONAL EXPERIENCE

Rotation Dynamics Corporation, 2004-2006

Division General Manager (Precision Machining Division, Chicago, IL) 2004-2006

Responsible for engineering, marketing, sales, production, human resources and accounting of a printing press roller manufacturing and machining division. Developed and executed multi-year strategic and tactical divisional plans.

Parker Hannifin, 1996-2004

Plant Manager (Accumulator Division, Santa Fe Springs, CA), 2002-2004

Responsible for \$9.5 million rubber milling, molding and assembly operation.

Mobile Account Manager (Mobile Systems Division, Lincolnshire, IL), 2000-2002

Managed \$14 Million, multi-state technical and sales territory in mobile hydraulics industry. Negotiated and implemented multi-million dollar contracts with Fortune 200 companies.

Product Design Engineer (Cylinder Division, Des Plaines, IL), 1999-2000

Conceptualized, sketched, designed and optimized mechanical and hydraulic parts.

Global Development Program (United Kingdom, Germany, Sweden), 1998-1999

Participated in global technology transfer program living and working in Hellaby, UK, Watford, UK, Cologne, Germany and Ulricehamn, Sweden during a one year period.

Technical Product Specialist (Cylinder Division), 1997-1998

Responsible for external technical, applications and product support.

Engineering and Marketing Trainee, (Cylinder Division), 1996-1997

Manufactured, assembled and tested hydraulic and pneumatic cylinders.

PROFESSIONAL SOCIETIES

American Geophysical Union (AGU)
American Society of Civil Engineering (ASCE)
Society of Women Engineers (SWE)

CERTIFICATIONS

Certified Fluid Power Specialist, 1997
Engineer in Training License # ET39700084

SKILLS

Adobe Illustrator, Agilent 4263B LCR Meter, ArcGIS, BreZo, E2, GNSS Solutions, LaTeX, Matlab, Mathematica, Microsoft Office, Nortek AWAC Deployment, GPS Surveying, SAS, SWAN, Terrestrial LiDAR Surveying, VDatum, UAV surveying, VDatum

SERVICE

Primary scientist for engaging underserved students in quantitative beach observations using the Mobile Beach Erosion Monitoring (MoBERM) platform, Birch Aquarium Beach Science Program
Volunteer scientist for Long Beach, a climate resilient city effort
Engineering chair, Workshop on Sea Level Rise, Scripps Institution of Oceanography, May 7-8, 2014
Scientific panel for Nature Conservancy Coastal Resilience Network Project
Mentored numerous undergraduate and graduate students
Panel member for ASCE graduate school information sessions
Surf Science outreach volunteer
Reviewer for: Climatic Change, Computers, Environment and Urban Systems, Journal of Hydraulic Engineering, Natural Hazards and Earth System Science