FRANK L. ENGEL
Geographer
U.S. Geological Survey
Water Mission Area – Observing Systems Division
Hydrologic Remote Sensing Branch
5563 De Zavala Rd., Ste. 290
San Antonio, TX 78249

EDUCATION

B.S. Texas State University-San Marcos, San Marcos, Texas, 2005, Physical Geography
M.S. Texas State University-San Marcos, San Marcos, Texas, 2007, Geography
Ph.D. University of Illinois, Urbana, Illinois, May 2014, Geography

PROFESSIONAL EXPERIENCE

Jan 2022–Present	EDGE Geographer, U. S. Geological Survey, Hydrologic Remote Sensing Branch
Jun 2017–Dec 2021	Geographer, U. S. Geological Survey, Texas Water Science Center
Apr 2013–Jun 2017	Geographer, U. S. Geological Survey, Illinois Water Science Center
Apr 2012–Apr 2013	Hydrologist, U. S. Geological Survey, Illinois Water Science Center

SHORT BIOGRAPHY

Frank Engel is a Geographer with the U.S. Geological Survey (USGS), specializing in implementing cutting-edge research applications into operational science. Originally trained as a fluvial geomorphologist, Frank now applies his expertise to process-oriented field studies of fluvial environments, with a heavy emphasis on applying his findings to river management decisions. Of particular interest to him is how current research advances in non-contact measurements of riverine parameters can be operationalized in the USGS for day-to-day gaging and project applications to solve real-world problems. Dr. Engel advocates using camera and radar sensors to measure hydraulic parameters at USGS streamgages or elsewhere to enable increased observation of our surface water networks. As the National Water Information System (NWIS) Modernization Imagery and Remote Sensing Subprogram Director, Dr. Engel is working to create enterprise-level cyberinfrastructure for cameras and multispectral sensors located at gaging stations throughout the USGS. Frank also chairs the USGS Water Mission Area (WMA) Surface Velocity Workgroup, where he and his colleagues aim to coordinate the national USGS effort at implementing novel non-contact flow measurement techniques including Image Velocimetry and Surface Velocity Radar (SVR) for stream gaging and research purposes. Dr. Engel's goal is to advance our national mission to collect timely and accurate information about our nation’s water resources through innovative and modern techniques that advance the boundaries of our scientific knowledge.

PUBLICATIONS

Morel, D.B., Kirk, C.A., Fulton, J.F., **Engel, F.L.**, Legleiter, C.J., Forbes, B.T., Eno, N., Nicotra, M.J., Gyves, M.C., Lotspeich, R.R., and Best, H.R. *in review*. Order of Operations for Measuring Surface Velocity with Radars and Drones and Computing River Discharge using the Entropy-based Probability Concept and Image Velocity Algorithms, 2023. *For submission to Frontiers in Remote Sensing.*

Legleiter, C.J., Kinzel, P.J., **Engel, F.L.**, Harrison, L.R., and Hewitt, G. 2024. A two-dimensional, reach-scale implementation of Space Time Image Velocimetry (STIV) and comparison to Particle Image Velocimetry (PIV). *Earth Surface Processes and Landforms.* https://doi.org/10.1002/esp.5878.

Fulton, J.W., **Engel, F.L.**, Eggleston, J.R., and Chiu, C.L., *in review*, Computing River Discharge Using the Probability Concept Algorithm: U.S. Geological Survey Techniques and Methods 3–A26.

Duan, J.G., **Engel, F.L., and** Cadogan, A., 2023, Discharge estimation using video recordings from small unoccupied aircraft systems. *Journal of Hydraulic Engineering*, 149 (11). https://doi.org/10.1061/JHEND8.HYENG-13591.

Figlus, Jens, Song, Y.K., Maglio, C.K., Friend, P.L., **Engel, F.L.**, Schnoebelen, D., and Boburka, K., 2021, Particle tracer analysis for submerged berm placement of dredged material near South Padre Island, Texas. *Western Dredging Association Journal of Dredging*, 19(1), 14–30, https://doi.org/10.13140/RG.2.2.24440.98564.

Despax, A., Le Coz, J., Hauet, A., Mueller, D. S., **Engel, F. L.**, Blanquart, B., Renard, B., and Oberg, K.A., 2019, Decomposition of uncertainty sources in acoustic Doppler current profiler streamflow measurements using repeated measures experiments. *Water Resources Research*, 55, 7520–7540, https://doi.org/10.1029/2019WR025296.

Engel, F.L., and Choi, N., 2019, Flood warning toolset for the Medina River in Bandera County, Texas: U.S. Geological Survey Fact Sheet 2019–3043, 2 p., https://doi.org/10.3133/fs20193043.

Choi, N., and **Engel, F.L.**, 2019, Flood-inundation maps for a 23-mile reach of the Medina River at Bandera, Texas, 2018: U.S. Geological Survey Scientific Investigations Report 2019–5067, 15 p., https://doi.org/10.3133/sir20195067.

Engel, F.L., Jackson, P.R., and Murphy, E.A., 2018, Flow hydraulics and mixing characteristics in and downstream of Brandon Road Lock, Joliet, Illinois: U.S. Geological Survey Scientific Investigations Report, https://doi.org/10.3133/sir20185094.

Davis, J.J., LeRoy, J.Z., Shanks, M.R., Jackson, P.R., **Engel, F.L.**, Murphy, E.A., Baxter, C.L., McInerney, M.K., and Barkowski, N.A., 2017, Effects of tow transit on the efficacy of the Chicago Sanitary and Ship Canal Electric Dispersal Barrier System. *Journal of Great Lakes Research*, 43(6), 1119-1131, https://doi.org/10.1016/j.jglr.2017.08.013.

Engel, F.L. and Rhoads, B.L., 2017, Velocity profiles and the structure of turbulence at the outer bank of a compound meander bend. *Geomorphology* 295, 191-201, https://doi.org/10.1016/j.geomorph.2017.06.018.

Davis, J.J., Jackson, P.R., **Engel, F.L.**, LeRoy, J.Z., Neeley, R.N., Finney, S.T., and Murphy, E.A., 2016, Entrainment, retention, and transport of freely swimming fish in junction gaps between commercial barges operating on the Illinois Waterway. *Journal of Great Lakes Research*, 42(4), 837–848, https://doi.org/10.1016/j.jglr.2016.05.005.

Engel, F.L. and Rhoads, B.L., 2016, Three-dimensional flow structure and patterns of bed shear stress in an evolving compound meander bend. *Earth Surface Processes & Landforms*, https://doi.org/10.1002/esp.3895.

Engel, F.L., 2014, The Fluvial Dynamics of Compound Meander Bends. *Ph.D. Thesis*, Geography, University of Illinois. Urbana, IL., http://hdl.handle.net/2142/49644.

Mills, P.C., Duncker, J.D., Over, T.M., Domanski, M.M., and **Engel, F.L.**, 2014, Evaluation of a mass-balance approach to determine consumptive water use in northeastern Illinois: U.S. Geological Survey Scientific Investigations Report 2014–5176, 90 pp. https://doi.org/10.3133/sir20145176.

Parsons, D.R., Jackson, P.R., Czuba, J.A., **Engel, F.L.**, Rhoads, B.L., Oberg, K.A., Best, J.L., Mueller, D.S., Johnson, K.K., and Riley, J.D., 2013, Velocity Mapping Toolbox (VMT): A processing and visualization suite for moving-vessel ADCP measurements. *Earth Surface Processes & Landforms*, https://doi.org/10.1002/esp.3367.

Engel, F.L. and Rhoads, B.L., 2012, Interaction among Mean Flow, Turbulence, Bed Morphology, Bank Failures and Channel Planform in an Evolving Compound Meander Loop. *Geomorphology*, 163–164(15), pp. 70-83, https://doi.org/10.1016/j.geomorph.2001.05.026.

Rhoads, B.L., **Engel, F.L.**, and Abad, J., 2011, "Geomorphologically Based Design for Naturalizing Straight Channels." In *Stream Restoration in Dynamic Fluvial Systems: Scientific Approaches, Analyses, and Tools.* A. Simon, S. J. Bennett, J. M. Castro, and C. Thorne (eds.), AGU Monograph, 500pp, https://doi.org/10.1029/GM194.

Engel, F.L., 2008, Book Review: Gary J. Brierley and Kirstie A. Fryirs, *Geomorphology and River Management: Application of the River Styles Framework*, Blackwell Publishing, Malden, MA, USA (2005) ISBN 1-4051-1516-5 xii + 398 pp. $109.95 paperback, *Geomorphology*, 99(1–4), pp. 446-447, https://doi.org/10.1016/j.geomorph.2007.10.008.

Engel, F.L., 2007, Geomorphic Classification of the Lower San Antonio River, Texas. Technical Report. Texas Water Development Board, accessed November 23, 2021, at http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0604830637_LowerSanAntonioRiver.pdf.

Engel, F.L., 2007, Classification of the Lower San Antonio River Using a Multivariate Statistical Approach. *Masters Thesis*, Geography, Texas State University. San Marcos, TX, https://digital.library.txstate.edu/handle/10877/9795.

SOFTWARE

Lee, A., **Engel, F. L.**, Andrews, S., Nicotra, M.J., and Gyves, M.C., *in review*, Camera Data Collection Platform (CameraDCP), U.S. Geological Survey software release, https://code.usgs.gov/hydrologic-remote-sensing-branch/cameradcp-applications/cameradcp.

Engel, F. L., and Knight, T., *Forthcoming*, Image Velocimetry Framework (IVy Framework), U.S. Geological Survey software release, https://code.usgs.gov/hydrologic-remote-sensing-branch/ivy.

Engel, F. L., 2023, Surface Velocity Tools (SurfVelTools), U.S. Geological Survey software release, https://doi.org/10.5066/P9I5JABK.

DATA PRODUCTS

Engel, F.L., Fulton, J.W., Legleiter, C.J., Kinzel, P.J., Morel, D.B., Nicotra, M.J., Kirk, C.A., and Forbes, B.T., 2024, Unoccupied Aerial System-mounted image velocimetry and Doppler velocity radar data for computation of river velocity and discharge collected at seven locations in Colorado in 2023: U.S. Geological Survey data release, https://doi.org/10.5066/P9DOXMW3.

Engel, F. L., Cadogan, A., Duan, J. D., 2022. Small Unoccupied Aircraft System Imagery and Associated Data used for Discharge Measurement at Eight Locations Across the United States in 2019 and 2020: U.S. Geological Survey data release. https://doi.org/10.5066/P9H2MM1M.

Prater, C.D., LeRoy, J.Z., **Engel, F.L.**, Johnson, K.K., 2021, Discharge measurements at USGS streamgage 05536890 Chicago Sanitary and Ship Canal near Lemont, Illinois, 2005-2013: U.S. Geological Survey data release, https://doi.org/10.5066/F7X63K41.

Engel, F.L., Hartmann, C.A., Petri, B.L., Bryan, P.W., Ockerman, D.J., and Schnoebelen, D.J., 2020, Oceanographic Observations Made Near South Padre Island, Texas, as Part of the South Padre Island Beach Replenishment Study, August 2018–February 2019: U.S. Geological Survey data release, https://doi.org/10.5066/P9HDIZOC.

Engel, F.L., Fulton, J.W., Lane, J.W., Eggleston, Corbett, S.C., Kohn, M.S., Pulli, J.J., J.R., Adams, J.D., Burton, T.A., Nicotra, M.S., Stephens, V.C., and Dawson, C.D., 2020, Near-field Remote Sensing of River Velocity, Bathymetry, Floodplain Topography, and Discharge at the Arkansas River at Parkdale, Colorado, USA, March 2018: U.S. Geological Survey data release, https://doi.org/10.5066/F7VT1RDH.

Keele, J.D., and **Engel, F.L.**, 2020, Videos collected for Image Velocimetry at Boneyard Creek at Urbana, IL from 2017 to 2018: U.S. Geological Survey data release, https://doi.org/10.5066/P9VZ6VYM.

LeRoy, J.Z., Jackson, P.R., and **Engel, F.L.**, 2017, Velocity profiling at the US Army Corps of Engineers Electric Dispersal Barrier in the Chicago Sanitary and Ship Canal during passage of fully loaded commercial tows in August 2016 in August 2016: U.S. Geological Survey data release, https://doi.org/10.5066/F7K35RTP.

LeRoy, J.Z., Jackson, P.R., Murphy, E.A., and **Engel, F.L.**, 2017, Water velocity profiling at the U.S. Army Corps of Engineers Electric Dispersal Barrier in the Chicago Sanitary and Ship Canal during passage of fully-loaded commercial tows in August 2017: U.S. Geological Survey data release, https://doi.org/10.5066/F77D2TB3.

Engel, F.L., and Bosch, C.J., 2017, Acoustic Doppler current profiler velocity and discharge measurements collected in and near the lock chamber of Brandon Road Lock and Dam, Joliet, Illinois, USA in December 2014: U.S. Geological Survey data release, https://doi.org/10.5066/F7P26X39.

Engel, F.L., and Krahulik, J.R., 2016, Bathymetric survey of the Brandon Road Dam Spillway, Joliet, Illinois: U.S. Geological Survey data release, https://dx.doi.org/10.5066/F73F4MRV.

Engel, F. L., 2016, Miscellaneous flow discharge measurements collected downstream of Brandon Road Lock and Dam: U.S. Geological Survey data release, https://dx.doi.org/10.5066/F7S180NN.

Engel, F.L., 2016, Acoustic Doppler current profiler velocity data collected in the approach channel of Brandon Road Lock and Dam in 2015: U.S. Geological Survey data release, http://dx.doi.org/10.5066/F76W986V.

Engel, F.L., 2016, Acoustic Doppler current profiler velocity data collected during 2015 and 2016 in the Calumet Harbor, Illinois: U.S. Geological Survey data release, http://dx.doi.org/10.5066/F7BZ645J.

Jackson, P.R., and **Engel, F.L.**, 2016, Water surface elevation in the Brandon Road Lock chamber near Rockdale, Illinois (October 19-21, 2015): U.S. Geological Survey data release, http://dx.doi.org/10.5066/F7VQ30S2.

INVITED TALKS AND CONFERENCE PRESENTATIONS

Eggleston, J.R., **Engel, F.L.**, Harlan, M., and Riggs, R, Monitoring every lake and reservoir: how the USGS combines satellite and in-situ data to monitor surface water across the United States. *Bureau of Reclamation Hydrology and Hydraulics Community of Practice Lunch-and-Learn Series,* October 10, 2024, virtual.

Engel, F.L. Introduction to Image Velocimetry Short Course. *Pennsylvania State University,* September 5, 2024, State College, PA.

Engel, F.L. Development of Image Velocimetry Software for Hydrography: Bridging Research and Applied Applications. *Pennsylvania State University,* September 5, 2024, State College, PA.

Engel, F.L. Introduction to Image Velocimetry Short Course. *University of Arizona,* September 3, 2024, Tucson, AZ.

Engel, F.L., Fulton, J.W., Gyves, M.C., Nicotra, M.J., Lotspeich, R. Owens, D., Legleiter, C.J., Jones, J.J., Vande Pol, C. Harlan, M., and Kinzel, P.J. Rise Above (Imagery and Remote Sensing Training Track). *USGS National Water Data Training Workshop*. July 15, 2024, St. Louis, MO.

Engel, F.L. Introduction to the Image Velocimetry (IVy) Framework, a Windows Software Application for Processing Streamflow with Videos. *USGS National Water Data Training Workshop.* July 16, 2024, St. Louis, MO.

Engel, F.L. Imagery and Remote Sensing Listening Session. *USGS National Water Data Training Workshop.* July 17, 2024, St. Louis, MO.

Eggleston, J., Engel, F.L., and Johnson, C. Hydrologic Remote Sensing Branch Non-contact Activities and Services. *USGS National Water Data Training Workshop.* July 17, 2024, St. Louis, MO.

Engel, F.L. Operationalizing Remote Measurements of Streamflow with Fixed and Mobile Camera Platforms. *Water Observing Technology Forum (University of Alabama).* April 23, 2024, Tuscaloosa, AL.

Duan, J.G., **Engel, F.L.**, and Cadogan, A. Flow Discharge Measurements Using Small Uncrewed Aerial Systems. *National Innovation Center Seminar.* April 4, 2024, virtual.

Engel, F.L. Water Mission Area Scientific Software Applications. *Information Technology Exchange Meeting.* April 30, 2023, Shepherdstown, WV.

Engel, F.L. Panel Discussion Member for the "EDGE Program Overview" hosted by the California Water Science Center. December 8, 2023, virtual.

Lotspeich, R., **Engel, F.L.**, and Gyves, M. Advances in the application of cameras for USGS water data collection. *Kansas Water Science Center Science Seminar Series*. December 5, 2023, virtual.

Engel, F.L. and Federer, J. We are Gamifying a Complex Machine Learning Training Task To Crowdsource Creation of Segmented Imagery Training Data. *2023 Community for Data Integration Workshop.* May 2–4, 2023, Shepherdstown, WV.

Engel, F.L. Planning and Operations for Image Velocimetry. *Water Mission Area sUAS Community of Practice*. January 31, 2023, virtual.

Engel, F.L. Imagery Orthorectification Workflows. *Community for Data Integration Imagery Data Collaboration Area.* October 11, 2022, virtual.

Engel, F.L. Implementation of an Enterprise Camera-based Observation Framework. *ALERT Users Group Training Conference & Exposition.* May 5, 2022, Palm Springs, CA.

Engel, F.L. Planning and Operations for Image Velocimetry. *Water Mission Area sUAS Community of Practice.* January 31, 2023, virtual.

Engel, F.L. Applications of Non-contact Hydrograph in the US Geological Survey. *University of Texas – Design Safe Program.* June 16, 2022, virtual.

Engel, F.L. Image Velocimetry: Latest Tools, Techniques, and Plans. *Community for Data Integration Imagery Data Collaboration Area Camera-based Monitoring Workshop*. March 3, 2022, virtual.

Engel, F.L. Using Near-field Remote Sensing for Streamflow Measurements – An operational perspective. *University of Texas at San Antonio Dept. of Earth and Planetary Sciences Seminar Series*. October 15, 2021, virtual

Engel, F.L. USGS Non-contact streamflow activities overview. *Environment and Climate Change Canada-US Geological Survey Technical Exchange*. July 13, 2021, virtual

Engel, F.L. Using Near-field Remote Sensing for Streamflow Measurements: Perspectives after ~~3 years~~ (now 4 years!) of methods development. *USGS Hydrologic Data Advisory Committee Virtual Seminar Series*. March 18, 2021, virtual.

Engel, F.L., and Fulton, J.W. NextGen Sensors for Storm Surge Monitoring. *USGS Real-time Wave, Storm Tide, and Water Quality Technical Group Meeting*. January 26, 2021, virtual.

Engel, F.L. NWIS Mod: Imagery and Remote Sensing Subprogram. *USGS Community for Data Integration Meeting*. January 13, 2021, virtual.

Engel., F.L., and Wagner, C.R. Case Study of a Cloud-based Web-camera Observation Framework for Streamgages in the Context of the USGS Next Generation Water Observing System. *2020 AGU Fall Meeting Session IN027*. December 11, 2020, virtual.

Engel, F.L. NGWOS Testing: Imagery as a Tool in our Monitoring Programs. *USGS Water Mission Area National Webinar Series*. Aug 5, 2020, virtual.

Engel, F.L. A Cloud-based Framework for Camera Gaging—Serving Camera Imagery for Use in River Observation and Measurement. *USGS Southeast Region Science Workshop*. July 30, 2020, virtual.

Engel, F.L. Develop Cloud Computing Streamgage using Cameras – Final Report. *Community for Data Integration and WMA Executive Leadership Team Joint Briefing*. April 8, 2020, virtual.

Engel, F.L. Using Near-field Remote Sensing for Streamflow Measurements. *New Zealand Hydrologic Society Meeting*. Mar 17, 2020, Christchurch, NZ, (presented by proxy due to COVID-19).

Engel, F.L. Using Amazon Web Services IoT Framework for Camera Image Velocity Gaging. *Office of Enterprise Information Executive Leadership Team Meeting*. March 5, 2020, virtual.

Engel, F.L. EDC-5 Initiative: USGS Timely Science. *U.S. Federal Highways Administration EDC Region 5 Workshop*. February 27, 2020, Tucson, AZ

Engel, F.L. Using Near-field Remote Sensing for Streamflow Measurements. *Texas A&M University Geosciences Spring Colloquium Series*, February 7, 2020, College Station.

Engel, F.L. Surface Water Metrics with Non-contact Approaches. *WMA Executive Leadership Team Meeting*, September 4, 2019, virtual.

Engel, FL, and Hernandez, R. Operationalizing Small Unoccupied Aircraft Systems for Rapid Flood Inundation Mapping and Event Response. *2019 Sedimentation and Hydrologic Modeling Joint Federal Interagency Conference*. June 24, 2019, Reno, NV.

Choi, N. J., **Engel, F. L.**, Banta, J. R., Chief, H. S., Survey, U. S. G., & Antonio, S. Evaluating Uncertainty in Manning's Roughness Coefficients in One-dimensional Steady HEC-RAS Modeling. *2019 Sedimentation and Hydrologic Modeling Joint Federal Interagency Conference*. June 24, 2019, Reno, NV.

Schnoebelen, D. J., **Engel, F. L.**, Petri, B., Hartman, C., Bryan, P., Lee, M, Sparks, D. Monitoring Hydroacoustic Flow and Tracers of Offshore Dredge Material near South Padre Island, Texas. *2019 Sedimentation and Hydrologic Modeling Joint Federal Interagency Conference*. June 24, 2019, Reno, NV.

Engel, F.L. Surface Velocity Workgroup: What We Do, and How We Can Help. *USGS Southeast Region Data Programs Meeting*. June 4, 2019, Norcross, GA, virtual.

Engel, F.L. We Are Using Cloud Processing and IoT Smart Sensors to Measure River Streamflow with Web-cameras. *2019 Community for Data Integration Workshop*, June 4, 2019, Boulder, CO.

Engel, F.L. Using Drones During Flood Response: And Some Other Ways Drones are Changing the Game. *Greater Austin Contractors & Engineers Association Symposium*. April 24, 2019, Austin TX.

Engel, F.L. SurfBoard: Image Velocimetry. *USGS Water Mission Area Remote Sensing of Streamflow Workshop*. Jan 16, 2019, Reston, VA.

Engel, F.L. Using Drones During Emergency Response: Lessons from the 2018 Hawaii Volcano Eruption. *SCTRIG Workshop*. December 4, 2018, San Antonio, TX.

Engel, F.L. Surface Water Measurement Techniques: From the Traditional to Sky's the Limit. *Texas Commission on Environmental Quality Watermaster's Symposium*. October 25, 2018, San Antonio, TX.

Engel, F.L. Using Drones for SCIENCE! St. *Mathews School STEM Outreach Elementary Program*. October 3, 2018, San Antonio, TX.

Engel, F.L. DSS (GSCI) Brownbag: What is Non-Contact Hydrography: An Overview of the Nexus Between Emerging Tech and the Traditional USGS Data Program. *USGS Texas Water Science Center DSS (GSCI) Brownbag*. Austin, TX. August 1, 2018.

Engel, F.L. and Fulton, J.W. Surface Water Discharge During Extreme Events: Development and Applications of Non-Contact Velocity Technology. *USGS Water Mission Area National Seminar Series.* March 28, 2018, virtual.

Engel, F.L. Remote Sensing of Streamflow HQ Meeting, Denver: SurfBoard: Image Velocimetry. *USGS Water Mission Area*. Denver, CO. January 16, 2018

Engel, F.L. and Jamieson, Elizabeth. Practical Tips for Collecting Quality Video for Image Velocimetry Techniques. *USGS Water Mission Area National Seminar Series.* Nov 8, 2017, virtual.

Engel, F.L. 2017. Surface Velocities for Floods, Hydraulic Analysis, And Continuous Gaging. *MBES in River Workshop.* Baton Rouge, LA. Mar. 15–17, 2017.

Engel F.L., Patalano A., García C. M., Use of Large-Scale Particle Image Velocimetry (LSPIV) for Continuous Streamflow Gaging During Flood Events, HMEM 2017, University of New Hampshire, Durham, EEUU, June 2017.

Guillén N.F., Patalano A., García C.M., Engel F.L., Oberg K., Use of synthetic flow fields evaluating LSPIV errors, HMEM 2017, University of New Hampshire, Durham, EEUU, June 2017.

Engel, F.L. 2017. Resolving Rivers in High Definition Using Hydroacoustics. *Teledyne Marine Technical Workshop.* San Diego, CA. October 22–25, 2017.

Engel, F.L., and Jamieson, E. 2017. Near-Field Remote Sensing: Surface Velocity Measurements Using Video and Radar. *Environment and Climate Change Canada-US Geological Survey Technical Exchange.* Reston, VA. Feb. 13–15, 2017.

Engel, F.L. Surface Velocity Measurements Using Video: An Incomplete Introduction. *Southeast Region Data Chiefs' Meeting.* Jan. 12, 2017, virtual.

Engel, F.L. Understanding Hydrodynamic Characteristics in The Brandon Road Lock and Approach Channel for Application of Asian Carp Controls. *Great Lakes Panel on Aquatic Nuisance Species.* Ann Arbor, MI. Nov 3, 2016.

Engel, F.L. Using ADCPs to Evaluate Bed Shear Stress and Sediment Entrainment in A Compound Meander Bend. *River Flows 2016.* Iowa City, IA. July 11–14, 2016.

Engel, F.L. Surface Velocity Measurements Using Video: An Incomplete Introduction *Western Region Data Chiefs' Meeting.* Salt Lake City, UT. Sept. 21, 2016, virtual.

Engel, F.L. Surface Velocity Measurements: An Example from Our Backyard: Disruptive Innovation? *Midwest Area Leadership Team Summit.* Urbana, IL. Aug 23, 2016.

Engel, F.L., Jackson, P.R., Murphy, E.A., Cupp, A. USGS Barriers Research Activities. *USACE ERDC CHL Vicksburg Meeting.* Vicksburg, MS. Feb 29–Mar. 1, 2016

Engel, F.L. Velocity Mapping in the Brandon Road Lock Chamber. *CO_2 Workshop: USACE Chicago District.* Chicago, IL. May 26, 2015.

Engel, F.L. The Velocity Mapping Toolbox (VMT): Use That ADCP for All It's Worth. *ADCP in Action,* San Diego, CA. Sept 29, 2013 (Government Shutdown—poster given in my absence).

Engel, F.L., and Rhoads, B.L. Investigation of Near Outer-Bank Turbulence in an Active Compound Bend. *3rd International Symposium on Shallow Flows,* Iowa City, IA. June 4–6, 2012.

Engel, F.L., and Rhoads, B.L. Preliminary Investigation of Near Outer-bank Turbulence in an Active Compound Bend. *108th Meeting of the American Association of Geographers*, New York, NY. Feb. 24–28, 2012.

Jackson, P.R., Parsons, D.R., Czuba, J.A., Mueller, D.S., Rhoads, B.L., **Engel, F.L.**, Oberg, K.A., Best, J.L., Johnson, K.K., and Riley, J.D. Velocity Mapping Toolbox (VMT): a Processing And Visualization Suite For Moving-Vessel ADCP Measurements. *Eos Transaction 2011 AGU Fall Meeting Supplement.* Abstract EP31E-0876.

Engel, F.L. Can Boundary Shear Stress Be Estimated from aDcp Data in a Bend? *107th Meeting of the American Association of Geographers,* Seattle, WA. Apr. 12–16, 2011.

Zinger (LeRoy), J.A., Rhoads, B.L, Best, J.L., **Engel, F.L.**, and Konsoer, K.M. Mobilization of Floodplain Sediments by Chute Cutoffs on a Large River: Lower Wabash River Illinois-Indiana. *Eos Transaction 2010 AGU Fall Meeting Supplement.* Abstract EP31C-0753.

Engel, F.L. Turbulent Flow and Planform Change in an Evolving Compound Meander Loop. *106th Meeting of the American Association of Geographers,* Washington D.C. Apr. 14–18, 2010.

Rhoads, B.L., Best, J.L., Johnson, K.K., and **Engel, F.L.** Fluvial Dynamics of a Chute Cutoff (or Two) along a Large Meandering River. *106th Meeting of the American Association of Geographers*, Washington D.C. Apr. 14–18, 2010.

Rhoads, B.L., Best, J.L., Johnson, K.K., and **Engel, F.L.** Flow Structure and Channel Change in a Chute Cutoff along a Large Meandering River. *Eos Transactions 2009 AGU Fall Meeting Supplement.* 90(52). Abstract H41B-0883.

Engel, F.L., and Rhoads, B.L. Flow Structure and Channel Change in an Evolving Compound Meander Loop. *Eos Transactions 2009 AGU Fall Meeting Supplement.* 90(52). Abstract H41B-0883.

Engel, F.L., and Rhoads, B.L. Investigating Linkages Between Planform Evolution and Flow Structure in Complex Meander Bends. Invited Talk. *National Center for Earth-Surface Dynamics: Meandering Rivers Workshop.* Urbana, IL., Apr. 28, 2009.

Engel, F. L., and Rhoads, B.L. Evolving Flow Patterns in an Evolving Compound Meander Loop. *105th Meeting of the American Association of Geographers*, Las Vegas, NV. Mar. 22–27, 2009.

Engel, F.L. Three-Dimensional Flow Structure in an Elongate Meander Loop. *School of Earth, Society, and Environment Research Review,* Urbana, IL. Feb. 27, 2009.

Engel, F.L. Stream Naturalization Design: HEC-RAS *Modeling of Pool-Riffle Structure Designs, Copper Slough Ditch, Champaign County, IL*. Illinois Water Conference 2008, Champaign, IL. Oct. 8–9, 2008.

Engel, F.L. Geomorphic Characterization of a Fluvial System Using Clustering Algorithms. *104th Meeting of the American Association of Geographers*, Boston, MA. Apr. 14–19, 2008.

Engel, F.L. Geomorphic Characterization of the Lower San Antonio River, Texas. *West Lakes Regional Meeting of the American Association of Geographers*, Urbana, IL. Nov. 7–9, 2007.

Engel, F.L. Classification of the Lower San Antonio River Using Clustering Algorithms. *Texas Fluvial Geomorphology Symposium*, Austin, TX. June 8, 2007.

Engel, F.L., and Curran, J.C. Aggradation in Response to Extreme Flooding and Watershed Management. *Eos Transactions 2006 AGU, Fall Meeting Supplement*. 87(52). Abstract H51G-0571.

Engel, F.L., and Curran, J.C. Effects of Flood Management Practices in the San Marcos River, Texas. *37th International Binghamton Geomorphology Symposium: The Human Role in Changing Fluvial Systems*, Columbia, SC. Oct. 20–22, 2006.

Engel, F.L., and Curran, J.C. Channel Bed Changes in Response to Control Structures on the San Marcos River, Texas. *Texas Rivers and Reservoirs Management Symposium*, Austin, TX. May 19–20, 2006.

Engel, F.L., and Curran, J.C. Effects of Flood Control Structures on the San Marcos River, Texas. *2005 Environmental Flows for the Future Conference*, San Marcos, TX. Oct. 31–Nov. 1, 2005.

COLLABORATORS AND OTHER AFFILIATIONS

Select Collaborators & Co-Editors (more than singular interactions)
Jorge D. Abad (Red Yaku Environmental Consultants, Peru)
Josip (Joe) Adams (US Geological Survey, National UAS Project Office)
Jim L. Best (University of Illinois)
Joanna C. Curran (US Army Corps of Engineering, Seattle District)
Jerimiah Davis (US Fish & Wildlife Service, Midwest Region)
Cian B. Dawson (US Geological Survey, Hydro-geophysics Branch)
Jennifer G. Duan (Arizona State University)
Jack Eggleston (US Geological Survey, Hydrologic Remote Sensing Branch)
Joe Federer (US Geological Survey, Upper Midwest Water Science Center)
Roberto Fernández (Penn State University)
John W. Fulton (US Geological Survey, Colorado Water Science Center)
P. Ryan Jackson (US Geological Survey, Central-Midwest Water Science Center)
Elizabeth Jamieson (Environment and Climate Change Canada)
Carl Legleiter (US Geological Survey, Geomorphology and Sediment Transport Laboratory)
Jessica Z. LeRoy (US Geological Survey, Upper Midwest Water Science Center)
Xiaofeng Liu (Penn State University)
David Mauk (Bandera County River Authority and Groundwater District)
David S. Mueller (US Geological Survey, retired)
Elizabeth A. Murphy (University of Illinois)
Kevin A. Oberg (US Geological Survey, retired)
Dan Parsons (University of Leeds)
John Parks (US Geological Survey, Office of the Associate Chief Information Officer)
Antoine Patalano (Nacional University of Córdoba)
Bruce L. Rhoads (University of Illinois)
James D. Riley (Eastern Illinois University)
Doug Schnoebelen (US Geological Survey, Oklahoma-Texas Water Science Center)

Graduate Advisors and Committees
M.S. Joanna C. Curran (US Army Corps of Engineering, Seattle District)
David R. Butler (Texas State University)
Jonathan D. Philips (University of Kentucky)
Mark A. Fonstad (University of Oregon)
Ph.D. Bruce L. Rhoads (University of Illinois)
James L. Best (University of Illinois)
Gary Parker (University of Illinois)
Marcelo H. Garcia (University of Illinois)

Previous Affiliations
American Association of Geographers (2005–2013)
Specialty Groups: Geomorphology, Water Resources, Applied Geography

American Geophysical Union (2006–2013, 2020, 2024-)
Hydrology Section