

## **CURRICULUM VITA**

David Brandes, Professor of Civil & Environmental Engineering  
Co-Chair of the Programs in Environmental Science & Environmental Studies  
Lafayette College  
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### **Education**

Ph.D. Civil Engineering (Water Resources), The Pennsylvania State University, 1998  
M.S. Environmental Systems Engineering, Clemson University, 1992  
B.S. Civil Engineering (Environmental/Water Resources) with Honors, University of Maryland, 1988

### **Professional Experience**

Co-Chair, Environmental Science & Studies Program, 2016-  
Professor, Civil & Environmental Engineering, Lafayette College, 2014-  
Associate Professor, Civil & Environmental Engineering, Lafayette College, 2006-present  
Visiting Professor, Division of Natural Sci and Engineering, St. Louis University-Madrid, spring 2011  
Visiting Scientist, Acopian Center for Conservation Learning, Hawk Mountain Sanctuary, 2007-08  
Acting Head, Civil & Environmental Engineering, Lafayette College, 2006-07  
Assistant Professor, Civil & Environmental Engineering, Lafayette College, 1999-05  
Graduate Research Assistant, Environ Science Group, Los Alamos National Laboratory, 1994-97  
Consulting Engineer, ENVIRON Corp., 1989-90, 1992-94

### **Courses Taught** (\* = most frequently taught courses)

ES 101 Introduction to Engineering  
CE 201/CE 396 Numerical Methods in Civil Engineering  
\*CE 203 Envisioning a Sustainable World  
\*CE 251 Fluid Mechanics  
\*CE 321 Introduction to Environmental Engineering & Science  
\*CE 351 Water Resources Engineering  
\*CE 421 Hydrology  
CE 423 Water Quality  
EVSC 211 Rivers and Watersheds: Form and Function  
EVST 254 Cultures of Nature  
\*EVST 400 Engineering Studies Capstone

### **Awards**

2014 Lindback Foundation Award for excellence in teaching and outstanding contributions to campus life  
2009 B. Vincent Viscomi Engineering Prize for excellence in mentoring and teaching  
2011 Pennsylvania Society for Ornithology Conservation Award (with T. Katzner, M. Lanzone, T. Miller)  
2013 USDA U.S. Forest Service, Research Management and Partnership Award 2013, Eastern Golden Eagle Working Group

## College Service

### Current

Co-Chair, Programs in Environmental Science and Studies  
Co-Convener, Environment & Sustainability Focus Group and co-author of report *Environment and Sustainability at Lafayette College: a Blueprint for 2025*  
Co-Chair, Engineering Division Interdisciplinary Themes Task Group  
Member of Steering Committee, Lafayette Office of Sustainability  
Member of Advisory Board, LaFarm (Lafayette's Working Farm and Community Garden)  
Member of the Promotion, Tenure, and Review Committee

### Former

Prepared the first Self-Study Report in 2016 for the Programs in Environmental Science and Studies  
Chair, Student Conduct Committee  
Chair, Information Technology & Library Committee  
Acting Head, Dept of Civil & Environmental Engineering  
Member of Advisory Committee, Programs in Environmental Science and Studies  
Member of Advisory Committee, Center for Community Engagement  
Member of Presidential Task Force on Curriculum Innovation, 2013-2014  
Member of the Steering Committee, Mellon Environmental Initiative, 2008-2012  
Member of the Academic Progress Committee, the Computing Services Advisory Committee, the Governance Committee, the Library Advisory Committee, the Trustees Committee on Grounds and Buildings  
Advisor of Lafayette Chapter of Engineers Without Borders

## Research Expertise

- I. Hydrology & Hydraulics: impacts of urbanization on streamflow regimes, particularly baseflow; watershed assessment; detention basin hydraulics
- II. Movement Ecology of Raptors: mathematical modeling of raptor flight patterns based on interaction of terrain and weather, especially in relation to wind energy development

## Professional Memberships/Activities

Member, American Geophysical Union (Hydrology Section)  
Member, American Water Resources Association  
Member, American Society of Civil Engineers (ASCE) Environmental & Water Resource Institute (EWRI)

- Served on ASCE Blue Ribbon Review Panel responsible for reviewing the text *Design of Urban Stormwater Controls, ASCE Manual of Practice 87*, published 2012 by WEF Press

Member, Lehigh Valley Planning Commission Watershed Advisory Committee  
Member, Raptor Research Foundation  
Member, Eastern Golden Eagle Working Group  
Raptor Population Index Steering Committee (a partnership of Hawk Mountain Sanctuary, Hawkwatch International, Hawk Migration Association of North America, Bird Studies Canada) – former Chair  
Reviewer for ASCE J. of Hydrologic Eng, ASCE J. of Water Resources Planning and Management, Water Resources Research, Hydrological Processes, Environmental Science & Techn., Journal of the Am. Water Res. Assoc., Journal of Environmental Management, Journal of Raptor Research

## Refereed Journal Publications - Hydrology & Hydraulics

- Barlow, W.T., and D. Brandes, 2015. Stage-discharge models for concrete orifices: impact on estimating detention basin drawdown time. *ASCE J of Irrigation and Drainage Engineering* 141(12).
- Brandes, D. and W.T. Barlow, 2012. New method for modeling thin-walled orifice flow under partially submerged conditions. *ASCE J of Irrigation and Drainage Engineering* 138(10): 924-928.
- Thompson, M.Y., D. Brandes, and A.D. Kney, 2012. Using electronic conductivity and hardness data for rapid assessment of stream water quality. *J. Environ. Management*. 104:152-157.
- Kney, A.D., and D. Brandes, 2007. A graphical screening method for assessing stream water quality using specific conductivity and alkalinity data. *J. Environ. Management*, 82(4):519-528.
- Brandes, D., Cavallo, G.J., and M.L. Nilson, 2005. Baseflow trends in urbanizing watersheds of the Delaware River basin. *J. Am. Water Res. Assoc.* 41(6):1377-1391.
- Brandes, D., Hoffmann, J.G., and J.T. Mangarillo, 2005. Correlation of baseflow recession rates, low flows, and hydrologic features of small watersheds in Pennsylvania. *J. Am. Water Res. Assoc.* 41(5):1177-1186.
- Duffy, C.J., and D. Brandes, 2001. Dimension reduction and source identification for multispecies groundwater contamination. *J. Contam. Hydrol.*, 48(1-2), 151-165.
- Brandes, D., 2001. Calibration of conceptual stormwater runoff models using the genetic algorithm: a preliminary study. In *Urban Drainage Modeling*, Proceedings of the Specialty Symposium, ASCE World Water and Environmental Resources Congress, 808-817.
- Brandes, D., and B.P. Wilcox, 2000. Evapotranspiration and soil moisture dynamics on a semiarid ponderosa pine hillslope. *J. Am. Water Res. Assoc. (JAWRA)*, 36(5), 965-974.
- Brandes, D., Duffy, C.J. and J.P. Cusumano, 1998. Stability and damping in a nonlinear dynamical model of hillslope soil moisture. *Water Resour. Res.*, 34, 3303-3313.
- Wilcox, B.P., Newman, B.D., Brandes, D., Davenport, D.W., and K. Reid, 1997. Runoff from a semiarid ponderosa pine hillslope in New Mexico. *Water Resour. Res.*, 33, 2301-2314.
- Brandes, D., and K.J. Farley, 1993. Importance of phase behavior on the removal of residual DNAPLs from porous media by alcohol flooding. *Water Environ. Res.* 65(7):869-878.

## Refereed Journal Publications – Movement Ecology

- Hagar, S. et al., 2017. Continent-wide analysis of how urbanization affects bird-window collision mortality in North America. *Biological Conservation* 212A:209-215 (collaborative paper with >50 co-authors including **D Brandes**)
- Miller, T.A., R.P. Brooks, M.J. Lanzone, J Cooper, K O'Malley, **D Brandes**, A Duerr, and T.E. Katzner, 2017. Summer and winter space use and home range characteristics of Golden Eagles (*Aquila chrysaetos*) in eastern North America. *The Condor*, 119(4):697-719.
- Dennyhardt, A.J., A.E. Duerr, **D. Brandes**, and T.E. Katzner, 2017. Applying citizen-science data and mark-recapture models to estimate numbers of migrant Golden Eagles in an Important Bird Area in eastern North America. *The Condor*, 119(5):817–831.
- Paprocki, N, D Oleyar, **D Brandes**, L Goodrich, T Crewe, and S Hoffman, 2017. Combining migration and wintering counts to enhance understanding of population change in a generalist raptor species, the North American Red-tailed Hawk. *The Condor*, 119(1): 98-107.
- Miller, T., R. Brooks, M. Lanzone, **D Brandes**, J Cooper, J. Tremblay, J Wilhelm, A Duerr, and T Katzner, 2016. Limitations and mechanisms influencing the migratory performance of soaring birds. *Ibis* 158, 116–134.
- Katzner, T.K., P.J. Turk, A Duerr, T Miller, M Lanzone, J Cooper, **D Brandes**, J. Tremblay, and J. Lemaitre, 2015. Use of multiple modes of flight subsidy by a soaring terrestrial bird, the golden eagle *Aquila chrysaetos*, when on migration. *J. R. Soc. Interface* 12: 20150530

- Dennyhardt, A., A. Duerr, **D. Brandes**, and T. Katzner, 2015. Modeling autumn migration of a rare soaring raptor identifies new movement corridors in central Appalachia. *Ecol. Modelling*. 303:19-29
- Dennyhardt, A., A. Duerr, **D. Brandes**, and T. Katzner, 2015. Integrating citizen-science data with movement models to estimate the size of a migratory golden eagle population. *Biol. Conservation*, 184:68-78.
- Duerr, A., T. Miller, M. Lanzone, **D. Brandes**, J. Cooper, K. O'Malley, C. Maisonneuve, J. Tremblay, and T. Katzner, 2014. Flight response of slope-soaring birds to seasonal variation in thermal generation. *Functional Ecol.* DOI: 10.1111/1365-2435.12381.
- Miller, T., R. Brooks, M. Lanzone, **D. Brandes**, J. Cooper, K. O'Malley, C. Maisonneuve, J. Tremblay, A. Duerr, and T. Katzner, 2014. Assessing risk to birds from industrial wind energy development via paired resource selection models. *Conservation Biology* 28(3):745-755.
- Dodge, S., G. Bohrer, K. Bildstein, S.C. Davidson, R. Weinzierl, M.J. Bechard, D. Barber, R. Kays, **D. Brandes**, J. Han, M. Wikelski, 2014. Environmental drivers of variability in the movement ecology of turkey vultures (*Cathartes aura*) in North and South America. *Phil. Trans. R. Soc. B* 369, 20130195
- Dodge, S., G. Bohrer, R. Weinzierl, S.C. Davidson, R. Kays, D. Douglas, S. Cruz, J. Han, **D. Brandes**, M. Wikelski, 2013. The Environmental-Data Automated Track Annotation (Env-DATA) System: Linking Animal Tracks with Environmental Data. *Movement Ecology* 1:3
- Katzner, T.E., **D. Brandes**, T. Miller, M. Lanzone, C. Maisonneuve, J.A. Tremblay, R. Mulvihill, and G.T. Merovich. 2012. Topography drives migratory flight altitude of golden eagles: implications for on-shore wind energy development. *Journal of Applied Ecology* 49: 1178-118.
- Bohrer, G., **D. Brandes**, et al. 2012. Estimating updraft velocity components over large spatial scales: contrasting migration strategies of golden eagles and turkey vultures. *Ecology Letters*, 15(2):96-103.
- Katzner, T., B. Smith, T. Miller, **D. Brandes**, J. Cooper, M. Lanzone, D. Brauning, C. Farmer, S. Harding, D. Kramar, C. Koppie, C. Maisonneuve, M. Martell, E. Mojica, C. Todd, J. Tremblay, M. Wheeler, D.F. Brinker, T. Chubbs, R. Gubler, K. O'Malley, S. Mehus, B. Porter, R.P. Brooks, B.D. Watts, and K.L. Bildstein. 2012. Status, Biology, and Conservation Priorities for North America's eastern Golden Eagle (*Aquila chrysaetos*) Population. *The Auk* 129(1):168–176.
- Lanzone, M., T. Miller, P. Turk, **D. Brandes**, C. Halverson, C. Maisonneuve, J. Tremblay, J. Cooper, K. O'Malley, R. P. Brooks, and T.E. Katzner. 2012. Flight responses by a migratory soaring raptor to changing meteorological conditions. *Biology Letters* 8: 710-713.
- Duerr, A., T. Miller, M. Lanzone, **D. Brandes**, J. Cooper, K. O'Malley, C. Maisonneuve, J. Tremblay, and T. Katzner. 2012. Testing an emerging paradigm in migration ecology shows surprising differences in efficiency between flight modes. *PLoS ONE* 7(4): e35548. doi:10.1371/journal.pone.0035548
- Brandes, D. and D.W. Ombalski, 2004. Modeling raptor migration pathways using a fluid flow analogy. *J. Raptor Research* 38(3): 195-207.

### Book Chapters – Movement Ecology of Raptors

- Ombalski, D. and D. Brandes, 2010. "Golden Eagle (*Aquila chrysaetos*)" in *Terrestrial Vertebrates of Concern in Pennsylvania: A Guide to Conservation, Management, and Research*, Edited by M. A. Steele, M.C. Brittingham, T.J. Maret, J.F. Merritt. Johns Hopkins University Press. 528 pp.
- Brandes, D., 2010. "Golden Eagle Migration through Central Pennsylvania" in *Birds of Central Pennsylvania* by N. Bolgiano & G. Grove, Stone Mountain Press.
- Brandes, D., Miller, T.A., and T.E. Katzner, 2009. "Wind Power Mortality" in *Avian Ecology and Conservation: A Pennsylvania Focus with National Implications*, Pennsylvania Academy of Science.
- Miller, T.A., Brandes, D., Lanzone, M.J., Ombalski, D., Maisonneuve, C., and T.E. Katzner, 2009. "Golden Eagle Migration and Winter Behavior in Pennsylvania" in *Avian Ecology and Conservation: A Pennsylvania Focus with National Implications*, Pennsylvania Academy of Science.

## Recent Conference Proceedings and Presentations – Hydrology, Environmental Engineering, & Sustainability

- Brandes, D., 2017. The 100-yr Flood on our Changing Planet. Invited public lecture at the Nurture Nature Center.
- Emilie H., B. Pinke, D Germanoski, and D. Brandes, 2017. Baseline Channel Characterization of lower Bushkill Creek Prior to the Removal of Three Low-Head Dams. Susquehanna River Symposium, Bucknell University.
- Buckley, K., D. Cantrel, M. Chifetete, T. Shoemaker, W. Ye, and D. Brandes, 2016. Are streamflow regimes changing in the upper Delaware and Susquehanna River basins? Susquehanna River Symposium, Bucknell University.
- Brandes, D., A. Smith, J. Cooley, S. Hogan, and V. Hoyt, 2016. Enhancing community connections through the Bushkill Creek “Story of Place” project. LVAIC 2016 Campus Sustainability Conference, Lehigh University.
- Brandes, D., 2014. Dams, Dam Removal, and the U.S. Environmental Movement, introductory comments for a public screening of the documentary film DamNation. Invited - Nurture Nature Center.
- Brandes, D., B. Cohen, S. Edmonds, B. Kohler, and J. Ingraio, 2014. The Lafayette College Sustainable Food Loop. LVAIC 2014 Campus Sustainability Conference, Lehigh University. (\*student coauthors)
- Barlow, W.T., and D. Brandes, 2012. Experimental testing of unsteady flow through partially submerged thick-walled orifices. 2012 ASCE Hydraulic Measurement and Experimental Methods Conference, Snowbird, UT.
- Thompson, M. and D. Brandes, 2012. Investigations of fluid behavior in critical transition pipe flow: initial results. ASCE World Environmental & Water Resources Congress, Albuquerque, NM.
- Brandes, D., 2011. Sustainable stormwater management as an opportunity for campus and community-based engineering education. Proceedings of the 2011 ASEE Annual Conference & Exposition, Vancouver, B.C.
- Brandes, D., Barlow, W., and B. Hendrickson, 2010. An experimental study of stage-discharge relationships for thick-walled concrete orifices. Proceedings of the 2010 ASCE World Environmental & Water Resources Congress, Providence, RI.
- Thompson, M., Brandes, D, and A.D. Kney, 2010. Using electronic conductivity and hardness data for rapid assessment of stream water quality. Proceedings of the 2010 ASCE World Environmental & Water Resources Congress, Providence, RI.
- Berzott, E., and D. Brandes. 2010. Potential Impacts of Energy Development on High Quality Streams in PA, Keystone Coldwater Conference, State College, PA.
- Voltz, T.J., and D. Brandes. 2010. Patterns of Streamflow Response to Suburbanization in the Northeast U.S. Megalopolis, 2010 Pennsylvania Water Symposium (best poster award).
- Smith, J.H., and D. Brandes, 2010. Academic support for Engineers Without Borders-USA student chapters: The Lafayette College experience. ASEE Spring 2010 Mid-Atlantic Section Conference, Lafayette College.

## Recent Conference Proceedings and Presentations – Movement Ecology of Raptors

- Oleyar, D., L. Goodrich, T. Crewe, D. Brandes, S.W. Hoffman, J Brown, J Sodergren, 2017. The Latest in Diurnal Raptor Migration Count Trends Suggest Some New Concerns in Migratory Raptor Populations. Raptor Research Foundation Annual Meeting, Salt Lake City, UT.
- Katzner, T.E., R. Arlettaz, M. Braham, J. Hall & D. Brandes. 2017. Bio-logging flying wildlife for conservation management. 6th International Bio-logging Science Symposium. Konstanz, Germany.
- Farmer, C., T. Hiester, G. Aldrich, and D Brandes, 2017. Validating *à priori* Risk Estimates Using Machine Vision Technology. AWEA Wind Project Siting & Environmental Compliance Conference, Austin, TX.

- Brandes, D. 2016. Using Movebank Env-DATA to annotate raptor telemetry data. Invited workshop presentation. Raptor Research Foundation Annual Meeting, Cape May, NJ.
- Brandes, D., M. Bechard, J.F. Therrien, D. Barber, and K. Bildstein, 2015. Why the eastward-arc migration route of Turkey Vulture (*Cathartes aura*) through the Great Plains of North America? Raptor Research Foundation Annual Meeting, Sacramento, CA. Also given as an invited talk at Hawk Mountain Sanctuary, Acopian Center for Conservation Learning.
- Farmer, C., D. Brandes, L. Gnagy, and K. Kosciuch, 2014. Predicting raptor collision risk from first principles: Application of updraft modeling to wind farms. National Wind Coordinating Collaborative Research Meeting. Denver, CO, USA
- Brandes, D., L. Goodrich, S.W. Hoffman, and D. Oleyar, 2014. The Raptor Population Index-2013 Summary of Results. Raptor Research Foundation Annual Meeting, Corpus Christi, TX.
- Brandes, D. et al. 2014. Annotation of raptor telemetry tracks with orographic and thermal lift velocities using Movebank Env-DATA. Raptor Research Foundation Annual Meeting, Corpus Christi, TX.
- Brandes, D. 2014. Simulating orographic lift, with examples related to land-based wind energy, golden eagles, and griffon vultures. Symposium on Animal Movement and the Environment, Raleigh, NC.
- Brandes, D., L. Barrios, and A. Rodriguez. 2012. High resolution modeling of updrafts to investigate griffon vulture (*Gyps fulvus*) collision risk with wind turbines. National Wind Coordinating Collaborative Research Meeting. Denver, CO, USA
- Brandes, D., L Barrios, and A Rodriguez. 2011. Modeling the Interaction of Terrain and Wind to Quantify High-Risk Conditions for Eurasian Griffon Vultures (*Gyps fulvus*) at Wind Farms. Raptor Research Foundation Annual Meeting, Duluth, MN.
- Brandes, D., C Maisonneuve, J Tremblay, T Miller, T Katzner, and M Lanzone. 2011. Influence of High-Latitude Warming on Fall Migration Timing of Eastern Golden Eagles (*Aquila chrysaetos*). Raptor Research Foundation Annual Meeting, Duluth, MN.