

PAUL H. ZIEHL

Associate Dean for Research
Smart State Chair for Multifunctional Materials and Structures
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PROFESSIONAL EXPERIENCE

Associate Dean for Research, College of Engineering and Computing (2018 – present), UofSC
Smart State Chair for Multifunctional Materials and Structures (2019 – present, acting), UofSC
Assistant Dean for Research, College of Engineering and Computing (2016 – 2018), UofSC
Professor, Mechanical Engineering (joint appointment), U. South Carolina (2018 – present), UofSC
Professor, Civil and Environmental Engineering (2013 – present), UofSC
Associate Professor, Civil and Environmental Engineering (2008 – 2012), UofSC
Assistant Professor, Civil and Environmental Engineering (2004 – 2008), UofSC
Assistant Professor, Civil and Environmental Engineering (2001 – 2004), Tulane University, New Orleans, Louisiana.
Bridge Engineer Assistant (2001), TXDOT, Austin, Texas
Graduate Research/Teaching Assistant, Phil M. Ferguson Structural Engineering Laboratory (1994 – 2000), UT Austin
Structural Engineering Assistant (Oct. 1989 – May 1992 and Sept. 1992 – Aug. 1994), Armentrout, Roebuck & Co., Athens, Georgia

EDUCATION

2000 Ph.D., Structural Engineering (Civil), The University of Texas at Austin
1997 M.S., Structural Engineering (Civil), The University of Texas at Austin
1991 B.S., Architectural Engineering, California Polytechnic State University, San Luis Obispo

CURRENT FUNDING

Principal Investigator

“Atoms to Aircraft to Spacecraft” (formal title: Synthetic Design Synthesis of “Thermoplastic UD Tape based, Fastener-free Assemblies” for Urban Air Mobility Vehicles), PI, August 2020 – July 2024, NASA University Led Initiative, \$5,688,000.
“Safe and Cost-Effective Removal of Load Postings for SC Bridges”, PI, March 2020 – February 2023, Federal Highway Administration/SCDOT, \$487,882.
“NDE Based Condition Assessment of Sub-Surface Concrete with Limited Access – Phase II”, PI, August 2019 – October 2021, US Air Force/TRI, \$245,000.
“MOC3HA – Manufacturing Carbon-Carbon Composites for Hypersonic Applications”, PI, January 5, 2021 – August 31, 2022, Battelle Memorial Institute/AFROL/DOD, \$203,748.
“Online Monitoring System for Concrete Structures affected by Alkali-Silica Reaction”, PI at U.S.C (lead institution: U. Nebraska), October 1, 2016 – September 30, 2021, DOE NEUP, \$199,200 (UofSC amount).
“Sensors vs. Humans in Monitoring the Health of System: The Case for SC Bridges”, PI, ASPIRE II (UofSC), \$99,995.
“Field Trials for Cost Effective Strengthening of SC Load Posted Bridges”, October 2021 – October 2025, PI, Federal Highway Administration, Federal Highway Administrations, \$960,000.
“Building Smarter Cities via Intelligent Asset Management: South Carolina Case Study using IBM Maximo”, PI, October 2021 – October 2022, USDOT, \$49,999.

“Digital Twins to Increase Mobility in Rural South Carolina”, PI, October 2020 – March 2022, USDOT, \$59,999.

Co-Principal Investigator

“Innovative Manufacturing, Operation, and Certification of Advanced Structures for Civil Vertical Lift Vehicles (IMOCAS)”, co-PI, September 2021 – September 2024, NASA University Led Initiative, \$1,599,446 (UofSC amount).

“Robust Wireless Skin Sensor Networks for Long-Term Fatigue Crack Monitoring of Bridges”, co-PI, May 2020 – May 2023, Federal Highway Administration/IOWA DOT, \$80,000.

“Automatic Extraction of Vehicle, Bicycle, and Pedestrian Traffic from Video Data”, co-PI, September 2018 – February 2022, Federal Highway Administration, \$148,890.

“Real-time Edge Computing in Structures Experiencing Shock”, co-PI, September 2020 – September 2022, Air Force Office of Scientific Research, \$201,882.

“CAE Simulation Modeling”, Fraunhofer, co-PI, January 2020 – January 2021, Fraunhofer, \$40,000.

“Distributed Condition Prognostics System for Navy Shipboard Machinery”, co-PI (PI: B. Zhang, U. South Carolina), August 2017 – August 2022, Navy Surface Warfare Center/DOD, \$294,672.

COMPLETED FUNDING

“Strengthening of SC Bridges”, PI, February 2020 – January 2021, Federal Highway Administration, \$200,000.

“Progressive Damage Analysis, TC1 2C18, Advanced Composites Consortium”, co-PI (PI: Z. Gurdal, U. South Carolina), January 2017 – November 2019, NASA, \$759,833 (U.S.C amount).

“NDE Based Condition Assessment of Sub-Surface Concrete with Limited Access – Phase I”, PI, August 2018 – April 2019, US Air Force/TRI, \$43,000.

“Development of Pavement Design and Investigation Strategies for Non-Interstate Routes”, co-PI (PI: N. Huynh, U. South Carolina), September 2017 – December 2018, FHWA/SCDOT, \$86,677 (U.S.C amount).

“Stress Wave Propagation Simulation for Stress Corrosion Cracking Applied to Austenitic Stainless Steel Dry Cask Storage Systems”, PI, October 2017 – March 2019, Electric Power Research Institute (EPRI), \$110,000.

“Assessment of Structural Degradation for Bridges and Culverts”, PI (collaboration with Clemson U.), January 2018 – June 2020, SCDOT, \$349,927.

“Improved Resiliency of Transportation Networks through Connected Mobility”, PI (collaboration with Clemson U.), August 1, 2017 – July 31, 2018, Clemson U./USDOT Center for Connected Multimodal Mobility, \$47,500 (U.S.C amount, funded through C2M2).

“Center for Connected Multimodal Mobility (C2M2)”, co-PI at U.S.C (PI: M. Chowdhury, Clemson U., PI at U.S.C: N. Huynh), November 30, 2016 - September 30, 2022, Clemson U./USDOT University Transportation Centers Program, \$1,263,045 (U.S.C amount).

“Evaluation of Inclined Cracking in Prestressed Concrete Bridge Girders”, PI, August 2016 – September 2017, New Mexico State University/New Mexico DOT, \$19,999.

“Feasibility Study for Rapid Condition Assessment of Bridge Decks”, PI, January 1, 2016 – September 30, 2018, FHWA/SCDOT, \$247,500.

“Wireless Damage Assessment during Manufacturing”, PI, January 1, 2016 – June 30, 2017, the Boeing Company, \$50,320.

“SCDOT Asset Collection”, co-PI, March 1, 2015 – January 29, 2017, FHWA/SCDOT (Clemson lead institution), \$120,000 (U.S.C amount).

“Acoustic Emission Evaluation of Bridge Superstructure”, PI, September 2015 – August 2016, New Mexico State University/New Mexico DOT, \$24,995.

- “Performance of Double Tee Flange Connections and Joint Leakage in Parking Structures”, PI, August 15, 2015 – August 15, 2016, PCI Foundation (Fellowship: Rafal Anay), \$35,000.
- “Radionuclide Waste Disposal: Development of Multi-Scale Experimental and Modeling Capabilities”, co-PI, August 2014 – August 2017, DOE, total amount: \$5,250,000 (DE SC0012530, Clemson U.); USC amount: \$1,035,000 (sub-award 1750-219-2020199).
- “Acoustic Emission Sensor Systems ISD Sensor Network Demonstration”, PI, July 2014 – December 2015, Savannah River National Laboratory/DOE/SCUREF, \$89,779.
- “Structural Health Monitoring (SHM) of Composite Structure for Airplanes and Helicopters Based on Passive Sensing of Acoustic Emission”, co-PI, December 15, 2014 – December 31, 2016, Fokker Aircraft, \$191,264.
- “Workshop on Multi-Scale Modeling and Estimation of Time or Cycles to Failure of Aging Components and Systems: Deterministic and Stochastic Models of Fatigue with and without NDE Data on Defect Growth and Load Estimation”, Changwon, Republic of Korea, PI, June 2014 – February 2015, National Science Foundation, \$14,923.
- “N122-110 Innovative Structural Health Monitoring (SHM) System Capable of Detecting, Localizing, and Characterizing Damage in Composite Aircraft Structures”, PI, November 2012 – March 2013, U.S. Navy, \$22,000.
- “Self-Powered Wireless Sensor Network for Structural Bridge Health Prognosis”, PI (U. South Carolina), February 2009 - January 2014, NIST, \$5,250,000 total, \$1,974,000 (U. South Carolina amount; joint venture with Mistras, U. Miami, and Virginia Tech).
- “Distributed Sensing for the Nuclear Infrastructure”, PI, May 2012 – August 2013, ASPIRE I – Track III, U. South Carolina, \$13,414.
- “Investigation of the Performance and Benefits of Deck Tee Bridge Girders for Accelerated Construction”, PI, December 2012 – November 2016, FHWA/SCDOT, \$199,979.
- “AF093-179 Built-In Damage State Detection and Localization Capabilities for Composite Engine Structures (Phase II)”, PI, January 2012 - June 2013, USAF/TRI, \$129,998.
- “In-Situ Monitoring of Precast Approach Slabs”, PI, July 2012 – March 2015, FHWA/SCDOT, \$26,000.
- “In-Situ Decommissioning Sensor Network, Meso-scale Test Bed”, PI, July 2011 - December 2011, DOE, \$60,000.
- “AF093-179 Built-In Damage State Detection and Localization Capabilities for Composite Engine Structures (Phase I)”, PI, August 2010 - December 2010, USAF/TRI, \$22,938.
- “Innovative Bridge Research and Design Project: Connections between Prestressed Concrete Piles and Precast Concrete Bent Caps”, PI, March 2010 - May 2011, FHWA/SCDOT, \$150,000.
- “Testing of T&TD Brackets”, PI, February 2010 - June 2010, Force Protection, \$30,000.
- “AF073-119: Inspection of Subsurface Flaws around Fasteners on Aircraft”, PI, June 2009 - September 2009, USAF/TRI, \$20,000.
- “Investigation of Spliced Concrete Pile Connections”, PI, December 2007 - December 2008, Sun Piledriving Equipment, LLC, \$115,500.
- “Behavior of Pile to Pile-Cap Connections Subjected to Seismic Forces”, PI, January 2008 - July 2011, FHWA/SCDOT, \$491,000.
- “Damage Identification Algorithms for Composite Structures”, PI, October 2006 - January 2007, USAF/TRI, \$20,000.
- “Sensor Fusion Approach to Structural Health Assessment”, PI, April 2006 - June 2007, University of South Carolina (USC) Research and Productive Scholarship Program, \$18,000.
- “CLT and AE Methods of In-Situ Load Testing: Comparison and Development of Evaluation Criteria”, PI, January 2006 - March 2007, ACI Concrete Research Council, \$9,550.

- “Concept Study – Bridging Small Gaps with Treadways”, PI, March 2006 - February 2007, US Army, \$49,994.
- “Nanocomposite Concrete Research: Graduate Student Support”, PI, March 2006 - March 2007, USC College of Engineering and Computing (CEC), \$21,000.
- “Request for Enhancement of Facilities for Competitiveness in Federally Funded Research”, PI, USC-Vice-President for Research/CEC, February 2005 - June 2006, \$98,238.
- “Investigation of the Performance and Benefits of Self Consolidating Concrete”, co-PI, May 2005 - September 2009, FHWA/SCDOT, \$245,000.
- “Investigation of the Performance and Benefits and Development of Guidelines for the Acceptance of Lightweight Self-Consolidating Concrete”, PI (February 2007 – July 2009), co-PI (September 2005 - January 2007), September 2005 – July 2009, SCDOT, \$199,489.
- “Vanadium Steel Non-Standard (not a standard military bridge set) Fixed Bridge Case Study – Phase I, II & III”, co-PI, July 2006 – June 2008, US Army/ATI (in collaboration with US Army Corps of Engineers – Engineer Research Development Center [ERDC]), Total amount = \$1,283,519.
- Phase I: July 2005 – June 2006 (USC budget \$165,000)
 - Phase II: July 2006 – June 2007 (USC budget \$101,000)
 - Phase III: August 2007 - July 2008 (USC budget \$120,000)
- “Structural Evaluation and Monitoring of a HPS 70W Steel Bridge”, co-PI, March 2003-May 2007, FHWA-IBRC program (in collaboration with SCDOT), \$172,806 (assumed in 2004).
- “Bridge Rehabilitation Using CFRP Materials”, co-PI, SCDOT, \$80,000, January 2001 – April 2005 (assumed in 2004, total amount = \$506,755)
- “Optimization of High Performance Prestressed Concrete Girders”, PI, November 2003, the Louisiana Transportation Research Center (LTRC), \$5,000.
- “Repair of Cracked Prestressed Concrete Girders”, PI, September 2004–December 2008, FHWA/Auburn University, \$25,000.
- “Nondestructive Evaluation of Fiber Reinforced Polymer Vessels Designed to Act at Elevated Temperature”, PI, September 2003 - December 2004, NSF/U. Kansas, \$16,893.
- “Health Monitoring for Condition Based Assessment – Phase II SBIR”, PI, September 2004-August 2005, U.S. Army/TRI, \$77,250.
- “Strengthening of Bridge Beams using Fiber Reinforced Polymers”, PI, July 2003 - June 2005, LTRC, \$199,911.
- “Health Monitoring for Condition Based Assessment – Option Phase”, PI, November 2003 - April 2004, US Army/TRI, \$6,000.
- “Health Monitoring for Condition Based Assessment – Phase I SBIR”, PI, March 2003 - August 2003, US Army/TRI, \$14,000.
- “Monitoring of the Bonnet Carre’ Spillway Bridge During Extreme Overload”, PI, November 2002 - March 2004, LTRC, \$7,636.
- “Nondestructive Evaluation of Fiber Reinforced Polymer Bridges and Decks”, PI, July 2002 - December 2002, LTRC, \$5,000.
- “Fatigue and Shear Behavior of HPC Bulb-Tee Girders”, co-PI, June 2002 - July 2003, LTRC, \$354,496.
- “Finite Element Modeling and Nondestructive Evaluation of a Modular Fiber Reinforced Polymer Bridge System”, PI, January 2002 - July 2002, NYSDOT/KSCI, \$25,689.
- “Structural Health Monitoring of the San Patricio County FRP Bridge”, Investigator, November 2003 - August 2006, TxDOT/UT Austin, \$60,000.

“Acoustic Emission Evaluation of FRP Bridge Beams”, Investigator, January 2003 - December 2004, TxDOT/UT Austin, \$9,072.

“Fabrication and Quality Control of San Patricio FRP Bridge”, Investigator, September 2002, FHWA (travel).

JOURNAL PUBLICATIONS (*individuals supervised by PZ shown in italics*)

1. *Anay, R., Dennis, M., Addis, T., Roudy, W., Ziehl, P., Tatting, B., Gurdal, Z., and Harik, R., (2021), “An Experimental Investigation Concerning the Effect of AFP Defects on Progressive Damage in CFRP Coupons”, *Composite Structures (in revision)*.*
2. *Alsaman, A., Assi, L., Kareem, R., Carter, K., and Ziehl, P., (2021), “Energy and CO2 Emission Assessments of Alkali-Activated Concrete and Ordinary Portland cement Concrete: A comparative Analysis of Different Grades of Concrete,” *Cleaner Environmental Systems (in press)*.*
3. *Liu, H.; Laflamme, S.; Li, J.; Bennett, C.; Collins, W.; Downey, A.; Ziehl, P., (2021), “Investigation of Surface Textured Sensing Skin for Fatigue Crack Localization and Quantification”, *Smart Materials and Structures (in press)*.*
4. *Ai, L., Soltangharaei, V., and Ziehl, P., (2021), “Evaluation of ASR in Concrete Using Acoustic Emission and Deep Learning”, *Journal of Nuclear Engineering and Design (accepted)*.*
5. *Kia, M., Amini, A., Bayat, M., and Ziehl, P., (2021), “Probabilistic Seismic Demand Analysis of Structures using Reliability Approaches”, *Journal of Earthquake and Tsunami*, DOI: 10.1142/S1793431121500111.*
6. *Assi, L., N., Alsaman, A., Bianco, D., Ziehl, P., El-Khatib, J., Bayat, M., and Hussein, F., H., (2021) “Multiwall Carbon Nanotubes (MWCNTs) Preparations & Mechanical Effects in OPC Mortar & Paste: A Review,” *Journal of Building Engineering (in revision)*.*
7. *Ai, L., Soltangharaei, V., Ziehl, P., and van Tooren, M., (2021), “A Smart Impact Detection System for Thermoplastic Aircraft Components based on Acoustic Emission and AdaBoost Algorithm”, *International Journal of COMADEM (in press)*.*
8. *Bayat, M., Pakar, I., Ziehl, P., (2021), “Nonlinear Vibration of Axially Loaded Railway Track Systems Using Analytical Approach,” *Journal of Low-Frequency Noise, Vibration & Active Control (in press)*.*
9. *Ai, L., Soltangharaei, V., Bayat, M., van Tooren, M., and Ziehl, P., (2021), "Detection of Impact on Aircraft Composite Structure Using Machine Learning Techniques," *Measurement Science and Technology, MST-111530, <https://doi.org/10.1088/1361-6501/abe790>*.*
10. *Soltangharaei, V., Ai, L., Anay, R., Ziehl, P., (2021), “Implementation of Information Entropy, b-value, and Regression Analyses for Temporal Evaluation of AE Data Recorded During ASR Cracking”, *ASCE Practice Periodical on Structural Design and Construction*, Volume 26, Issue 1.*
11. *Crabtree, B., Cousins, T., Ross, B., Moore, R., Soltangharaei, V., and Ziehl, P., (2021), “Service Load and Failure Tests of Short Span Precast Reinforced Concrete Arch Beams”, *PCI Journal (in press)*.*
12. *Ai, L., Bayat, M., Soltangharaei, V., Greer, B., and Ziehl, P., (2021), “Source Localization on Large-Scale Canisters for Nuclear Fuel Storage Using Optimal Number of Acoustic Emission Sensor”, *Journal of Nuclear Engineering and Design*, 375 (2021) 111097.*
13. *Soltangharaei, V., Anay, R., Assi, L., Bayat, M., Rose, J., and Ziehl, P., (2021), “Analyzing Acoustic Emission Data to Identify Cracking Modes in Cement Paste using Artificial Neural Network”, *Journal of Construction and Building Materials*, Volume 267, January 2021, 121047.*
14. *Crabtree, B., Ross, B., Cousins, T., and Ziehl, P., (2021), “Live Load Testing of Flat Precast Slab Bridge to Determine Joint Efficiency and Distribution Factors for Moment”, Vol. 35, Issue No. 1, *ASCE Journal of Performance of Constructed Facilities*.*
15. *Assi, L., Deaver, E., and Ziehl, P., (2021), “Effect of Portland Cement Replacement on Short-term Properties of Fly Ash-Based Concrete”, *Construction Materials (accepted)*.*

16. *Soltangharaei, V., Anay, R., Ai, L., Giannini, E., Zhu, J., and Ziehl, P., (2020), "Temporal Evaluation of ASR Damage in Concrete Specimens with a Data-Driven Approach", ASCE Journal of Materials in Civil Engineering, 32(10): 04020285, DOI: 10.1061/(ASCE)MT.1943-5533.0003353.*
17. *Amini, A., Kia, M., Bayat, M., and Ziehl, P., (2020), "Probabilistic Seismic Demand Analysis of Structures Using Reliability Approaches", Probabilistic Seismic Demand Analysis of Structures Using Reliability Approaches, Journal of Earthquake and Tsunami.*
18. *Assi, L., Deaver, E., Ziehl, P., Soltangharaei, V., Al-Hamadani, Y. A., Yoon, Y., (2020), "Effect of Sonicated Deionized Water on the Early Age Behavior of Portland Cement Based Concrete and Paste", Journal of Construction and Building Materials, Vol. 247, June 2020, 118571, https://doi.org/ 10.1016/j.conbuildmat.2020.118571.*
19. *Bayat, M., Kia, M., Soltangharaei, V., Ahmadi, H., and Ziehl, P., (2020), "Bayesian Demand Model Based Seismic Vulnerability Assessment of a Concrete Girder Bridge," Advances in Concrete Construction, Volume 9, Number 4, April 2020, pages 337-343, DOI: http://dx.doi.org/10.12989/acc.2020.9.4.337.*
20. *Bayat, M., Soltangharaei, V., and Ziehl, P., (2020), "Analytical Approach on Nonlinear Vibration of Dry Cask Storage Systems," Structural Engineering and Mechanics an International Journal, Vol. 75, No. 2 (2020) 239-246 DOI: https://doi.org/10.12989/sem.2020.75.2.239.*
21. *Soltangharaei, V., Hill, J., Ai, L., Anay, R., Greer, B., Bayat, M., Ziehl, P., (2020), "Acoustic Emission Technique to Identify Stress Corrosion Cracking Damage, Structural Engineering and Mechanics, Vol. 75, No. 6 (2020) 1- DOI: https://doi.org/10.12989/sem.2020.75.6.001*
22. *Anay, R., Lane, A., Jáuregui, D., Weldon, B., Soltangharaei, V., and Ziehl, P., (2020), "On-Site Acoustic-Emission Monitoring for Assessment of a Prestressed Concrete BT-54 AASHTO Girder Bridge", ASCE Journal of Performance of Constructed Facilities, Vol. 34, Issue No. 3, 04020034.*
23. *Anay, R., Assi, L., Soltangharaei, V., Abdulshaheed, A., Gleich, H., Ziehl, P., (2020), "Performance of Double Tee Flange Connections and Joint Leakage for Parking Structures," November – December 2020, (ISSN 0887-9672) V. 65, No. 6, PCI Journal.*
24. *Assi, L., Carter, K., Deaver, E., and Ziehl, P., (2020), "Review of Availability of Source Materials for Geopolymer/Sustainable Concrete", Journal of Cleaner Production, Volume 263, 121477, https://doi.org/10.1016/j.jclepro.2020.121477.*
25. *Madarshabian, R., Ziehl, P., and Caicedo, J., (2019), "Acoustic Emission Bayesian Source Location: Onset Time Challenge", Mechanical Systems and Signal Processing, 123, pp. 483 – 495, DOI: 10.1016/j.ymssp.2019.01.021.*
26. *Madarshabian, R., Soltangharaei, V., Anay, R., Caicedo, J., and Ziehl, P., (2019), "Hsu-Nielsen Source Acoustic Emission Data on a Concrete Block," Data in Brief. March 6: 103813, DOI: 10.1016/j.dib.2019.103813.*
27. *Soltangharaei, V., Anay, R., Hayes, N., Assi, L., Le Pape, Y., Ma, Z., and Ziehl, P., (2018), "Damage Mechanism Evaluation of Large-Scale Concrete Structures Affected by Alkali-Silica Reaction Using Acoustic Emission, Journal of Applied Sciences, 8 (11), 2148, https://doi.org/10.3390/app8112148.*
28. *Abdelrahman, M., ElBatanouny, M., Dixon, K., Serrato, M., and Ziehl, P., (2018), "Remote Monitoring and Evaluation of Damage at a Decommissioned Nuclear Facility Using Acoustic Emission", Journal of Applied Sciences, 8, 1663, 28 pp., doi:10.3390/app8091663.*
29. *Assi, L., Deaver, E., and Ziehl, P., (2018), "Using Sucrose for Improvement of Initial and Final Setting Times of Silica Fume Based Activating Solution of Fly Ash Geopolymer Concrete", Construction and Building Materials, 191, pp. 47-55.*
30. *Assi, L., Carter, K., Deaver, E., Anay, R., and Ziehl, P., (2018), "Sustainable Concrete: Building a Greener Future", Journal of Cleaner Production (DOI: 10.1016/j.jclepro.2018.07.123).*
31. *Assi, L., Deaver, E., and Ziehl, P., (2018), Effect of Source and Particle Size Distribution on the Mechanical and Microstructural Properties of Fly Ash-Based Geopolymer Concrete" Construction and Building Materials, 167, pp. 372-380. (DOI: 10.1016/j.conbuildmat.2018.01.193).*

32. *Assi, L., Soltangharaei, V., Anay, R., Ziehl, P., and Matta, F., (2018) "Investigation of Portland Cement Paste Hydration using Acoustic Emission", Journal of Cement and Concrete Research, Vol. 103, pp.216-225. (DOI: 10.1016/j.cemconres.2017.10.019).*
33. *Anay, R., Soltangharaei, V., Assi, L., DeVol, T., Ziehl, P., (2018), "Identification of Damage Mechanisms in Cement Paste Based on Acoustic Emission", Construction and Building Materials, Volume 164, pp. 286-296. (DOI: 10.1016/j.conbuildmat.2017.12.207).*
34. *Abdelrahman, M., ElBatanouny, M., Rose, J., and Ziehl, P., (2018), "Signal Processing Techniques for Filtering Acoustic Emission Data in Prestressed Concrete", Journal of Research in Nondestructive Evaluation, (DOI: 10.1080/09349847.2018.1426800).*
35. *Assi, L., Anay, R., Leaphart, D., Soltangharaei, V., and Ziehl, P., (2018), "Investigation of Early Geopolymerization Process of Fly Ash-Based Geopolymer Paste Using Pattern Recognition", ASCE Journal of Materials in Civil Engineering, Vol. 30, No. 6, 04018092-1 to 04018092-9. (DOI: 10.1061/(ASCE)MT.1943-5533.0002270).*
36. *ElBatanouny, M., Anay, R., Jauregui, D., and Ziehl, P., (2017), "Evaluating Damage in Simple-Span Prestressed Concrete Girders using Acoustic Emission: Laboratory Specimens and Existing County Bridge", Materials Evaluation, Vol. 75, No. 1, 77-83.*
37. *Al-Hamadani, Y., Chang Min Park, C., Assi, L., Chu, K. H., Hoque, S, Jang, M., Yoon, Y, and Ziehl, P., (2017), "Sonocatalytic Removal of Ibuprofen and Sulfamethoxazole in the Presence of Fly Ashes," Ultrasonics Sonochemistry, Vol. 39, Nov. 2017, pp. 354-362.*
38. *Assi, L., Ghahari, S. A., Leaphart, D., Anay, R., and Ziehl, P., (2016) "Improvement of the Early and Final Strength of Fly Ash-Based Geopolymer Concrete at Ambient Conditions", Construction and Building Materials, Vol.123, pp. 806–813.*
39. *Assi, L., Deaver, E., ElBatanouny, M., and Ziehl, P., (2016), "Investigation of Early Compressive Strength of Fly Ash-Based Geopolymer Concrete, Journal of Construction and Building Materials, Vol.112, pp. 807–815.*
40. *Aich, N., Kim, E., ElBatanouny, M., Plazas-Tuttle, J., Yang, J., Ziehl, P., and Saleh, N., (2016), "Detection of Crack Formation and Stress Distribution for Carbon Fiber Reinforced Polymer Specimens through Triboluminescent-Based Imaging", Journal of Intelligent Material Systems and Structures, Vol. 26, Issue 8.*
41. *Appalla, A., ElBatanouny, M., Velez, W., and Ziehl, P., (2016), "Assessing Corrosion Damage in Post-Tensioned Concrete Structures Using Acoustic Emission", ASCE Journal of Materials in Civil Engineering, Vol. 28, Issue 2.*
42. *Yu, L., Tian, Z., Ziehl, P., and ElBatanouny, M., (2016), "Crack Detection and Evaluation in Grout Structures with Passive/Active Methods", ASCE Journal of Materials in Civil Engineering, Vol. 28, Issue 4.*
43. *Anay, R., Cortez, T., Jáuregui, D., ElBatanouny, M., Ziehl, P., (2016), "On-Site Acoustic Emission Monitoring for Assessment of a Prestressed Concrete Double-Tee Beam Bridge without Plans", ASCE Journal of Performance of Constructed Facilities, Vol. 30, Issue 4, 04015062-1 to 04015062-9.*
44. *Abdelrahman, M., ElBatanouny, M., Ziehl, P., Fasl, J., Larosche, C., and Fraczek, J., (2015), "Classification of Alkali-Silica Reaction Damage using Acoustic Emission: A Proof-of-Concept Study", Construction and Building Materials, Vol. 95, pp. 406-413.*
45. *Velez, W., Matta, F., and Ziehl, P., (2015), "Electrochemical Characterization of Early Corrosion in Prestressed Concrete Exposed to Saltwater", Journal of Materials and Structures, Vol. 49, pp. 507-520.*
46. *Larosche, A., Ziehl, P., Mangual, J., and ElBatanouny, M., (2015), "Damage Evaluation of Prestressed Pile to Bent Cap Connections with Acoustic Emission", Engineering Structures, February 2015, Vol. 84: pp. 184-194.*
47. *Barrios, F. and Ziehl, P., (2015), "A Global Integrity Parameter with Acoustic Emission for Load Testing of Prestressed Girders", ACI Structural Journal, Vol. 112-S01, January-February 2015, pp. 3 - 11.*
48. *Velez, W., Matta, F., and Ziehl, P., (2015), "Acoustic Emission Monitoring of Early Corrosion in Prestressed Concrete Piles", Journal of Structural Control and Health Monitoring, Vol. 22, Issue 5, pp. 873-877.*

49. Martí-Vargas, J.R., García-Taengua, E., Hale, W.M., ElBatanouny, M., and Ziehl, P. (2015), “Bibliometric Analysis of WoS-Indexed Scientific Articles on Concrete Segmental Bridges”, *PCI Journal*, January-February 2015.
50. Larosche, A., Cukrov, M., Sanders, D., and Ziehl, P., (2014). "Prestressed Pile to Bent Cap Connections: Seismic Performance of a Full-Scale Three-Pile Specimen." *ASCE Journal of Bridge Engineering*, 19 (3), 04013012: pp. 1-10.
51. ElBatanouny, M., Nanni, A., Ziehl, P., and Matta, F., (2014), “Condition Assessment of Prestressed Concrete Beams using Cyclic and Monotonic Load Tests”, *ACI Structural Journal*, Vol. 111, No. 1 - 6, December-January 2014.
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19. **Ziehl, P.** (2009), "Update on Selected SCDOT Research Projects at U. South Carolina", *12th Annual SCDOT/ACEC-SC Fall Meeting*, Columbia, South Carolina.
20. **Ziehl, P.,** (2007), "Evaluation of Existing Structures through Load Testing", *ASCE South Carolina Section, Annual Fall Seminar*, September 14, Columbia, South Carolina.
21. **Ziehl, P.,** Rizos, D., and Caicedo, J., (2007), "Investigation of the Performance and Benefits of SCC for Prestressed Girders", *Joint Meeting of the Precast/Prestressed Concrete Institute (PCI) and the South Carolina Department of Transportation (SCDOT)*, June 20, Columbia, South Carolina.
22. *Chen, Y., Ziehl, P., Fowler, T., and Engelhardt, M.,* (2007), "Design Methodology and Ultimate Capacity of a Hybrid FRP/RC Bridge System", *Polymer Composites Conference IV (PCC IV)*, March 20-22, Morgantown, West Virginia.
23. **Ziehl, P.,** Galati, N., and Tumialan, G., (2006), "CLT and AE Methods of In-Situ Load Testing: Comparison and Development of Evaluation Criteria", *presented to ACI Committee 437: Strength Evaluation of Existing Concrete Buildings*, November 6, Denver, Colorado.
24. **Ziehl, P.,** (2006), "Nondestructive Evaluation of Structural Systems", *Commercializing USC Engineering Technologies: Putting USC Discoveries into the Marketplace*, November 3, Columbia, South Carolina.

25. Rizos, D., **Ziehl, P.**, and Howard, R. (2006), “Investigation of Self-Consolidating Concrete for Prestressed Bridge Girders in South Carolina”, *ACPA 4th Annual South Carolina “Count on Concrete” Conference*, October 4, Columbia, South Carolina.
26. Caicedo, J., Rizos, D., and **Ziehl, P.**, (2006), “Long Term Bridge Monitoring: Overview and Research Possibilities”, *presented to SCDOT*, November 8, Columbia, South Carolina.
27. **Ziehl, P.**, (2006), “Structural Health Monitoring of an Efficient Hybrid FRP/Reinforced Concrete Bridge System”, *presented to ACI Committee 440-J: Stay-in-Place Forms*, ACI Spring Convention, March 27.
28. Cole, T., Lopez, M., and **Ziehl, P.**, (2006), “Nondestructive Evaluation of Fatigue Damage to Full-Scale FRP Honeycomb Bridge Specimen”, *2006 NDE Conference on Civil Engineering, the 7th Structural Materials Technology (SMT) and the 6th International Symposium on NDT in Civil Engineering*, August 14-18, St. Louis, Missouri.
29. Chen, Y., and **Ziehl, P.**, (2005), “Effect of Temperature on the Nondestructive Evaluation of FRP Vessels (Tensile Specimens)”, *presented to DUPONT and DOW Chemical*, December 15, Houston, TX.
30. Rizos, D., **Ziehl, P.**, Caicedo, J., Howard, R., *Liu, Z.*, (2005), “Investigation of Self-Consolidating Concrete for Prestressed Bridge Girders using South Carolina Materials”, *presented at the Workshop on Self-Consolidating Concrete sponsored by Georgia/Carolinas PCI*, December 1, Charlotte, NC.
31. **Ziehl, P.** (2004), “Nondestructive Assessment of FRP Strengthened Concrete Beams”, *National Academy of Building Inspection Engineers, Fourteenth Annual Meeting*, New Orleans, Louisiana.
32. **Ziehl, P.**, (2002), “Recent Applications of Fiber Reinforced Polymers for the Transportation Infrastructure”, *Louisiana Transportation Research Conference*, Baton Rouge, Louisiana.
33. **Ziehl, P.** (2001), “Fiber Reinforced Polymers for Improvements to the Transportation Infrastructure”, *Tulane Engineering Forum*, New Orleans, Louisiana.

CONTRIBUTED

1. *Anay, R.* and **Ziehl, P.**, (2020), “Performance of Double Tee Flange Connections and Joint Leakage for Parking Structures,” *2020 Precast/Prestressed Concrete Institute (PCI) Convention*, March 3 – 7, Dallas, Texas.
2. *Anay, R.* and **Ziehl, P.**, (2019), “Assessment of Shear in Prestressed Bridge Girders using Acoustic Emission,” *presentation to ACI Committee 437, American Concrete Institute (ACI) Fall Convention*, October 20 – 24, Cincinnati, Ohio.
3. **Ziehl, P.**, (2019), “Remote Structural Assessment,” *presentation to Dave Drazen and Benjamin Grisso*, Naval Surface Warfare Center, Carderock, Maryland.
4. *Soltangharaei, V., Anay, R., Ai, L., and Ziehl, P.*, (2019), “Structural Health Monitoring of Concrete Structures Affected by Alkali-Silica Reaction Using Acoustic Emission,” *Engineering Mechanics Institute (EMI) Conference*, June 18-21, 2019, California Institute of Technology, California.
5. *Soltangharaei, V., Anay, R., Le Pape, Y, Ma, Z., and Ziehl, P.*, (2019), “Monitoring Alkali Silica Reaction of Large and Medium-Scale Concrete Specimens Using Acoustic Emission”, *SMiRT25*, Charlotte, North Carolina.
6. Advanced Composites Project, ACP Fall Review (2019), NASA Langley, 2C18 Progressive Damage Analysis, October 2019.
7. *Anay, R., Lane, A., Jáuregui, D., Weldon, B., Soltangharaei, V., and Ziehl, P.*, (2018), Acoustic Emission Working Group-60, “On-Site Acoustic-Emission Monitoring for Assessment of a Prestressed Concrete BT-54 AASHTO Girder Bridge”, *60th Meeting of the Acoustic Emission Working Group*, June 19 and 20, Charleston, South Carolina.

8. *Anay, R., and Ziehl, P., (2018), "Improved Resiliency of Transportation Networks through Connected Mobility," 6th Annual UTC Conference for the Southeastern Region, Center for Connected Multimodal Mobility (C²M²), Madren Conference Center, October 24 - 25, South Carolina.*
9. *Ai, L., Anay, R., Soltangbaraei, V., Assi, L., and Ziehl, P., (2018), "Finite Element Modeling of Elastic Wave Generated by Crack Growth," 60th Meeting of the Acoustic Emission Working Group, June 19 and 20, Charleston, South Carolina.*
10. *Hill, J., Ai, L., Soltangbaraei, V., Greer, B., and Ziehl, P., (2018), Intergranular Stress Corrosion Crack Detection in 304L Stainless Steel using Acoustic Emission", 60th Meeting of the Acoustic Emission Working Group, June 19 and 20, Charleston, South Carolina.*
11. *Al-Tofan, M., Elkholy, M., Khilqa S., Anay, R., Assi, L., Chaudhry, H., and Ziehl, P., (2018), Blockage Detection in Pipes by Continuous Emission of Acoustic Signal", 60th Meeting of the Acoustic Emission Working Group, June 19 and 20, Charleston, South Carolina.*
12. *Abdelrahman, M., ElBatanouny, M., Rose, J., and Ziehl, P.,(2018), "Signal Processing Based Filters for Acoustic Emission Data in Prestressed Concrete", 60th Meeting of the Acoustic Emission Working Group, June 19 and 20, Charleston, South Carolina.*
13. *Soltangbaraei, V., Anay, R., Begrajka, D., Van Tooren, M., and Ziehl, P., (2018), "Acoustic Emission Working Group (AEWG), "Zonal Source Location of AE Events on an Airplane Elevator using Neural Network Supervised Method", 60th Meeting of the Acoustic Emission Working Group, June 19 and 20, Charleston, SC.*
14. *Soltangbaraei, V., Anay, R., Assi, L., and Ziehl, P., (2018), "Unsupervised Pattern Recognition for clustering Acoustic Emission Data during Early Hydration and Uniaxial Compression of Cement Paste," 44th Annual Review of Progress in Quantitative Nondestructive Evaluation (QNDE), Provo, Utah.*
15. *Advanced Composites Project, ACP Fall Review (2018), NASA Langley, 2C18 Progressive Damage Analysis, October 2018.*
16. *Assi, L., Jasim, J., Carter, K., Anay, R., Ziehl, P., (2017) "Geopolymer Concrete Can be One Solution for Sustainable Infrastructure", 13th Annual Inter-University Symposium on Infrastructure Management (AISIM), West Lafayette, Indiana USA.*
17. *Anay, R., and Ziehl, P., (2017), "Damage Mechanisms Classification in Cement Paste under Compression Using Acoustic Emission", American Society of Nondestructive Testing, NDE/NDT for Highway and Bridges: Structural Materials Technology, Nashville, Tennessee.*
18. *Soltangbaraei, V., Anay, R., Assi, L., and Ziehl, P., (2017) "Unsupervised Pattern Recognition for Clustering Acoustic Emission Data during Early Hydration and Uniaxial Compression of Cement Paste", 44th Annual Review of Progress in Nondestructive Evaluation (QNDE 2017), Provo, Utah, September 2017.*
19. *Anay, R. and Ziehl, P., (2017), "On-Site Acoustic-Emission Monitoring for Assessment of a Prestressed Concrete Double-Tee Beam Bridge without Plans", American Concrete Institute, Spring Convention, Technical Session sponsored by ACI Committee 437 - Strength Evaluation of Existing Concrete Structures, Detroit, Michigan.*
20. *Anay, R., Soltangbaraei, V., Assi, L., DeVol, T., Matta, F., and Ziehl, P., (2017), "Damage Mechanisms Classification in Cement Paste under Compression using Acoustic Emission", NDE/NDT for Highway and Bridges: Structural Materials Technology (SMT), Nashville, Tennessee.*
21. *Anay, R. and Ziehl, P., (2017), "Performance of Double Tee Flange Connections and Joint Leakage for Parking Structures", Precast/Prestressed Concrete Institute Convention and National Bridge Conference, Cleveland, Ohio.*
22. *Anay, R. and Ziehl, P., (2017), "On-Site Acoustic-Emission Monitoring for Assessment of a Prestressed Concrete BT-54 AASHTO Girder Bridge", presented by request to ACI 437 committee for Strength Evaluation of Existing Concrete Structures, American Concrete Institute Fall Convention, Anaheim, California.*

23. *Assi, L., Anay, R., Leaphart, D., Soltangharaci, V., and Ziehl, P., (2016), "Investigation of Early Geopolymerization of Fly Ash-Based Geopolymer Paste Using Acoustic Emission", 4th International Conference in Sustainable Construction Materials and Technologies (SCMT4), Las Vegas, Nevada.*
24. *Anay, R. and Ziehl, P., (2016), "Damage Evaluation of Alkali-Silica Reaction Using Acoustic Emission," ASNT NDE/NDT for Highways and Bridges: Structural Materials Technology, August 29 - August 31, Portland, Oregon.*
25. *ElBatanouny, M., Larosche, C., Fasl, J., Abdelrahman, M., and Ziehl, P., (2014), "Acoustic Emission for Assessment of Alkali-Silica Reaction in Concrete Structures", ACI Fall Convention, Session on Structural Health Monitoring of Concrete Structures (Durability), Washington, D.C., October 26.*
26. *Larosche, C., Ziehl, P., and Fraczek, J., (2014), "Wireless Assessment of Damage Due to Alkali-Silica Reaction (ASR) in Aging Concrete", EPRI Symposium on Concrete Structures, Liner Barriers, and Tanks, Electric Power Research Institute (EPRI), Charlotte, North Carolina.*
27. *Fasl, J., ElBatanouny, M., Larosche, C., Jones, M., and Ziehl, P., (2014), "Using Acoustic Emission to Detect ASR Growth", ACI Spring Convention, Reno, Nevada.*
28. *Abdelrahman, M., ElBatanouny, M., and Ziehl, P., (2014), "Acoustic Emission Damage Assessment and Pattern Recognition Analysis for Prestressed Concrete Structures", ASNT 23rd Research Symposium, Minneapolis, Minnesota.*
29. *Larosche, C., Ziehl, P., and West, J., (2014), "Using Acoustic Emission to Detect ASR Growth", ACI Strategic Development Council, Atlanta, Georgia, February 21.*
30. *Tian, Z., Yu, L., ElBatanouny, M., and Ziehl, P., (2013), "Dual Mode Sensing on Grout Structures with Piezoelectric Sensors", 9th International Workshop on Structural Health Monitoring 2013, Stanford University, Stanford, CA, September 10-12.*
31. *ElBatanouny, M., Ziehl, P., Aich, N., Zohhadi, N., Saleh, N., and Matta, F., (2013), "Recent Developments Towards Creating Sustainable Infrastructures", InnoVenture 2013 Conference, Greenville, SC, May 8-9.*
32. *Vélez, W., ElBatanouny, M., Mangual, J., Matta, F., and Ziehl, P., (2013), "Corrosion Monitoring of Prestressed Concrete Bridges Using Acoustic Emission", ACI Spring Convention, Minneapolis, April 14 –18.*
33. *ElBatanouny, M., Di Benedetti, M., Ziehl, P., and Nanni, A., (2013), "Condition Assessment of Concrete Members. Load Testing Procedure and Results", ACI Spring Convention, Minneapolis, MN, April 14-18.*
34. *ElBatanouny, M., Larosche, A., Ziehl, P., and Yu, L., (2013), "Wireless Monitoring of in Situ Decommissioning of Nuclear Structures using Acoustic Emission", ACI Spring Convention, Minneapolis, MN, April 14-18.*
35. *ElBatanouny, M., Mangual, J., and Ziehl, P., (2012), "Damage Classification during Cyclic Load Test of Prestressed Concrete Girders using Acoustic Emission", ACI Fall Convention 2012, Toronto, ON, Canada.*
36. *Larosche, A. and Ziehl, P., (2012), "Damage Evaluation of Prestressed Piles Connected to CIP Bent Caps Using Acoustic Emission". ACI Fall Convention 2012, Toronto, ON, Canada. October 2012.*
37. *ElBatanouny, M., Mangual, J., Vélez, W., Ziehl, P. and Matta, F., (2012), "Early Detection of Steel Corrosion in Concrete Using Acoustic Emission", NACE Eastern Area Conference 2012, Princeton Junction, New Jersey, October 7-12, 2012.*
38. *Larosche, A., Mangual, J., ElBatanouny, M., Velez, W., Ziehl, P., Matta, F., (2012), "Evaluation of Prestressed Concrete Structures using Acoustic Emission: An overview of NIST TIP at the University of South Carolina", AEWG Conference, Princeton, NJ. May 2012.*
39. *Liu, A., Ziehl, P., and Larosche, A., (2011), "The Connection Behavior of Precast Prestressed Piles to Precast Bent Caps", American Council of Engineering Companies (ACEC), 14th Annual Meeting and Trade Show, (October 26, 2011), Columbia, South Carolina.*
40. *Ramirez, G., Ziehl, P., and Fowler, T., (2010), "Hybrid FRP/Concrete Bridges – Design and Nondestructive Evaluation", ACI Fall Convention (October 24-29, 2010), Pittsburgh, Pennsylvania.*

41. Ozevin, D., Inman, D., Nanni, A., and **Ziehl, P.**, (2010), “Overview of 5-Year NIST Technology Innovation Program: *Self-Powered Wireless Sensor Network for Structural Health Prognostics*”, TRB 89th Annual Meeting (January 10-14, 2010).
42. Larosche, A., Sweigart, S., Mays, T., Caicedo, J., and **Ziehl, P.**, (2010), “Behavior of Pile to Pile-Cap Connections Subject to Seismic Forces”, 2010 FHWA Bridge Engineering Conference – Highways for LIFE and Accelerated Bridge Construction, April 8 and 9, Orlando, Florida.
43. Yu, J., **Ziehl, P.**, Zárate, B., Caicedo, J., Yu, L., Giurgiutiu, V., Metrovich, B., and Matta, F., (2010), “Quantification of Fatigue Cracking in CT Specimens with Passive and Active Piezo-Electric Sensing”, *Proceedings of the SPIE*, March, San Diego, California.
44. Zárate, B., Caicedo, J., Giurgiutiu, V., Yu, L., **Ziehl, P.**, (2010), “Bayesian Finite Element Model Updating for Crack Growth”, *Proceedings of IMAC XXVIII: A Conference and Exposition on Structural Dynamics*, February 1-4, 2010, Jacksonville, Florida.
45. Suma, A., Ferraro, R., Metrovich, B., Matta, F., Nanni, A., and **Ziehl, P.**, (2009), “Nondestructive Evaluation and Acoustic Emission Monitoring of RC Slab Bridge Exposed to Marine Environment”, ACI Fall Convention, *Session: Current Trends in Structural Health Monitoring Systems of Concrete Structures, Part I*, New Orleans, Louisiana.
46. **Ziehl, P.** (2007), “Acoustic Emission - Civil Applications”, *presented to Physical Acoustics Corporation*, January 19, Princeton Junction, New Jersey.
47. **Ziehl, P.**, Galati, N., and Tumialan, G., (2006), “CLT and AE Methods of In-Situ Load Testing: Comparison and Development of Evaluation Criteria”, *presented to ACI Concrete Research Council*, November 8, Denver, Colorado.
48. Tumialan, J., Kelly, D., Galati, N., **Ziehl, P.**, and Nanni, A., (2006), “Load Testing of Post-Tensioned Concrete Garage Slabs”, *American Concrete Institute Fall Convention*, November 9, Denver, Colorado.
49. Tanner, C. and **Ziehl, P.**, (2005), “An Evaluation of the Fatigue Behavior of High Performance Concrete Bulb-tee Girders”, *American Concrete Institute Fall Convention*, November 6-10, New Orleans, Louisiana (*not given due to Hurricane Katrina*).
50. Grimson, J., Fu, J., and **Ziehl, P.**, (2005), “Load Testing and Analysis of Three Superloads on the Bonnet Carre’ Overpass (Louisiana)”, *American Concrete Institute Fall Convention*, November 6-10, Kansas City, Kansas.
51. Fowler, T., McDad, P., Medlock, R., Ulloa, F., and **Ziehl, P.**, (2004), “FRP/Concrete Hybrid Bridge, San Patricio County, Texas”, *The Acoustic Emission Working Group, AEWG-47*, Penn State University, Pennsylvania.
52. Fowler, T., Ativitavas, N., Ramirez, G., and **Ziehl, P.**, (2004), “Damage Based Design Criterion for ASME Section X Code Vessels”, *The Acoustic Emission Working Group, AEWG-47*, Penn State University, Pennsylvania.
53. Felkel, J., Rizos, D., **Ziehl, P.**, Caicedo, J., and Schuch, G., (2004), “Structural Evaluation and Fatigue Performance of HPS 70W Bridge Girders”, *FHWA Steel Bridge Conference*, San Antonio, Texas.
54. **Ziehl, P.**, and Ridge, A., (2004), “Nondestructive Assessment of FRP Strengthened Concrete Beams”, *American Concrete Institute Fall Convention*, San Francisco, California.
55. **Ziehl, P.** (2004), “Appropriateness of Knockdown Factors for the Design of Glass Fiber Reinforced Polymer Structural Components”, *American Concrete Institute Spring Convention*, Washington, D.C.
56. **Ziehl, P.** (2004), “Structural Health Monitoring of the Bonnet Carre’ Spillway Bridge during Extreme Overload”, *Louisiana Transportation Research Conference*, Baton Rouge, Louisiana.
57. Constantino, J., and **Ziehl, P.**, (2003), “Development of an Accept/Reject Criterion for Fiber Reinforced Polymer Ring Specimens”, *Louisiana Alliance for Minority Participation - Research Symposium*, New Orleans, Louisiana.
58. **Ziehl, P.**, (2003), “Finite Element Modeling and Experimental Investigation of a Full-Scale FRP Honeycomb Bridge Specimen”, *ASCE Civil Engineering Conference*, Baton Rouge, Louisiana.

59. Cole, T. and Ziehl, P., (2002), “Finite Element Modeling of an FRP Honeycomb Bridge with a Representative Volume Element Approach”, *ASCE/ACI Louisiana Civil Engineering Conference*, New Orleans, Louisiana.
60. Green, T. and Ziehl, P., (2002), “An Experimental Study of Accumulating Damage in Fiber Reinforced Polymer Specimens”, *Louisiana Alliance for Minority Participation - Research Symposium*, New Orleans, Louisiana.

POSTERS and MEDIA PUBLICATIONS (selected)

- Wiggins, J., Ziehl, P., van Tooren, M., Jankowski, E., and Comert., G., (2020), Up and Away – Making Urban Air Mobility a Reality, *Materials World*.
- Assi, L. and Ziehl, P., (2017), “Cost and Fuel Usage Optimization of Activating Solution-Based Silica Fume Geopolymer Concrete”, *Discovery Day*, University of South Carolina, Columbia, USA.
- Assi, L., Jasim, J., Carter, K., Anay, R., Ziehl, P., (2017) “Geopolymer Concrete can be One Solution for Sustainable Infrastructure”, 13th Annual Inter-University Symposium on Infrastructure Management (AISIM), Purdue University.
- Hildebrandt, P., (2009), “Research that’s Paving the Way for Better, Safer Bridges and Work Environments”, *Concrete Construction*.
- Williams, J., (2008), “The Ongoing Evolution of FRP Bridges”, *Public Roads*, September/October, Vol. 72, No. 2 (cover and article).

PATENTS

- 2021 “Integrated and Automated Video/Structural Health Monitoring System,” P. Ziehl, U.S. Utility Patent No. 11,022,561, Issued: June 2021.
- 2020 “Wireless Damage Assessment During Manufacturing”, P. Ziehl, U.S. Patent No.: US 10,816513 B2, Issued: October 27, 2020.
- 2020 “Fly Ash-Based Geopolymer Concrete and Method of Formation”, U.S. Patent No.: US 10,800,704, Issued: October 13, 2020.
- 2018 “Non-Intrusive Methods for the Detection and Classification of Alkali-Silica Reaction in Concrete Structures”, P. Ziehl, M. ElBatanouny, and M. K. Jones, U.S. Patent 10,156,550 B2, Issued: December 2018.
- 2018 “Determination of the Remaining Life of a Structural System Based on Acoustic Emission Signals”, J. Caicedo, B. Zárate, and P. Ziehl, U.S. Patent No. 9,581,570 B2, Issued: 2018.
- 2014 “Polymeric Additive for Strength, Deformability, and Toughness Enhancement of Cementitious Materials and Composites,” N. Saleh, P. Ziehl, F. Matta, N. Aich, N. Zohhadi, and I. Khan, U.S. Patent 8,907,050 B2, Issued: 2014.

HONORS

- 2021: *Fellow*, Acoustic Emission Working Group
- 2020: *Outstanding Paper Award*, CAMX – The Composites and Advanced Materials Expo. CAMX Conference Proceedings.
- 2011: *Research Progress Award*, University of South Carolina, College of Engineering and Computing
- 2007: *Southeastern Section New Faculty Research Award*, First Place, American Society of Engineering Education
- 2007: *Certificate of Appreciation*, ASTM Committee E-07 on Nondestructive Testing
- 2004: *ASCE Teacher of the Year Award*, Department of Civil and Environmental Engineering, Tulane University
- 2004: *Award of Excellence*, Advisor for PCI Big Beam, Prestressed Concrete Institute, Tulane University
- 2002: *Award of Excellence*, Advisor for PCI Big Beam, Prestressed Concrete Institute, Tulane University
- 2000: *Harold Dalrymple Endowed Presidential Scholarship*, The University of Texas at Austin
- 1999: *Harold Dalrymple Endowed Presidential Scholarship*, The University of Texas at Austin
- 1999: *John Focht Endowed Presidential Scholarship*, The University of Texas at Austin
- 1998: *John Focht Endowed Presidential Scholarship*, The University of Texas at Austin

1999: *University Tuition Fellowship*, Department of Civil Engineering, The University of Texas

1998: *University Tuition Fellowship*, Department of Civil Engineering, The University of Texas

CERTIFICATIONS

Registered Professional Engineer, South Carolina (#24003, current)

Fellow, PALS (Pipeline for Academic Leaders) 2018

Fellow, LEAD 2 (Learn, Educate and Develop - Effective Management) 2017

Fellow, LEAD 1 (Learn, Educate, and Develop - Supervisory Essentials) 2016

SCIENTIFIC AND PROFESSIONAL SOCIETIES

American Concrete Institute (ACI)

American Society of Mechanical Engineers (ASME)

American Society of Civil Engineers (ASCE)

Precast/Prestressed Concrete Institute (PCI)

Sigma Xi, Chi Epsilon, Phi Kappa Phi

PROFESSIONAL SERVICE

2021 – present: *Executive Steering Committee*, The Composites Consortium (TCC)

2020 – present: *Executive Steering Committee*, ACI Committee 562: Code Requirements for Evaluation, Repair, and Rehabilitation of Concrete Buildings and Commentary.

2020 – present: *Editorial Board*, *Sustainability*

2018: *Host and Chair*, 60th Meeting of the Acoustic Emission Working Group, Charleston, SC, June.

2017: Co-Chair and Member of Symposium Organizing Committee, “Special Symposium on Computation Mechanics and the Finite Method: Impact of Accuracy and Uncertainty on Engineering Safety and Advanced Manufacturing,” *International Conference on Computational and Experimental Engineering and Sciences (ICCES 2017)*, Madeira, Portugal, June.

2016 - present: *Voting Member*, ACI Committee 444: Structural Health Monitoring

2014: *Co-Chair and Symposium Organizer*, “Multi-scale Modeling and Estimation of Time or Cycles to Failure of Aging Components, Structures, and Systems”, *International Conference on Computational & Experimental Engineering and Sciences (ICCES'14)*; Changwon, South Korea, June.

2014 – 2020: *Chair*, ACI Committee 437: Strength Evaluation of Existing Concrete Structures

2013 – 2016: *Chair*, Civil and Environmental Engineering Committee on Tenure and Promotion

2012: *Seminar Coordinator and Lecturer*, “Fundamentals of Reinforced Concrete Design of Hydraulic Structures”, *ASDSO*, Phoenix, Arizona, and Columbus, Ohio, UofSC

2011: *Seminar Coordinator and Lecturer*, “Fundamentals of Reinforced Concrete Design of Hydraulic Structures”, *ASDSO*, Baltimore, Maryland, and Columbia, South Carolina, UofSC

2008 – 2010: *Chair*, ACI Committee 335: Composite and Hybrid Structures

2012: Co-Chair and Symposium Organizer, “Applications of Acoustic Emission for Reinforced Concrete”, ACI Fall Convention, Toronto, Ontario, Canada.

2002 - present: *Voting Member*, ASME Section X: Fiber Reinforced Plastic Pressure Vessels

2002 - present: *Voting Member*, ACI Committee 437: Strength Evaluation of Existing Concrete Structures

2002 - 2012: *Voting Member*, ACI Committee 335: Composite and Hybrid Structures

2004 - present: *Member*, TRB Subcommittee AFF-40: Field Testing and Nondestructive Evaluation of Transportation Structures

2011: *Member*, Task Group on Repair of Reinforced Concrete of Existing Nuclear Power Plants

2010: *Panelist*, Remote Monitoring of Decommissioned Structures, U.S. Department of Energy

INSTITUTIONAL SERVICE

2021: *External Reviewer*, Tenure and Promotion

2019 - 2020: *Reviewer*, National Science Foundation

2019: *Chair*, College of Engineering and Computing Awards Committee

2018: *Reviewer*, National Science Foundation

2015: *Founder*, U. South Carolina ACI Student Chapter

2011 – 2017: *Member*, Research Awards Committee
2013 – 2014: *Member*, University Committee on Tenure and Promotion
2013: *Reviewer*, National Science Foundation
2013: *External Advisor*, Gilbert Middle School robotics team
2013: *Reviewer*, Nuclear Energy University Cooperative (NEUP) program
2009 - 2011: *Faculty Senator*
2004 - 2012: *Member*, Graduate Studies Committee
2008 - 2011: *Faculty Advisor*, Concrete Canoe Team
2008: *Faculty Advisor*, PCI Big Beam Team
2008: *External Reviewer*, Tenure and Promotion
2007: *Judge*, South Carolina Junior Academy of Science, SCAS/SCJAS Annual Meeting
2007: *Coordinator*, SCDOT Resident Engineer Academy (Materials Module)
2006: *Judge*, South Carolina Junior Academy of Science, SCAS/SCJAS Annual Meeting
2006: *Coordinator*, SCDOT Resident Engineer Academy (Materials Module)
2005 - 2010: *Mentor*, Alfred P. Sloan Foundation Scholarship Program (recruitment and retention related to under-represented PhD candidates)
2004 - 2016: *Member*, Faculty Search Committees (approx. 8 committees)
2004 - present: *Reviewer*, ACI, ASCE and other journals (approx. six reviews per year)
2001 - 2004: *Member*, Graduate Studies Committee
2002 - 2004: *Faculty Advisor*, ASCE Concrete Canoe Team
2004: *Faculty Advisor*, PCI Big Beam Team
2003: *Investigator*, Tulane Institute for Macromolecular Engineering and Science (TIMES) sponsored by NASA.
2003: *Investigator*, Tulane Research Institute for Security Engineering (RISE) sponsored by the Missile Defense Administration (MDA).
2003: *Vice-Chair*, Louisiana ASCE Structures Committee 2003
2002: *Faculty Advisor*, PCI Big Beam Team
2001 - 2004: *Member*, Faculty Search Committees (six committees)
2002 - 2004: *Reviewer*, ACI, ASCE and other journals (six reviews per year)
2002 - 2004: *Reviewer and Panelist*, NSF and other agencies
2002 - 2004: *Member*, University Committee on Computing
2002 - 2003: *Mentor*, LS-LAMP (Louisiana Alliance for Minority Participation) Summer Internship

COURSES DELIVERED

Graduate

- Composite Materials for Civil Applications
- Mechanics of Composite Materials
- Advanced Mechanics of Materials
- Prestressed Concrete Analysis and Design
- Advanced Reinforced Concrete

Undergraduate

- Composites for Urban Air Mobility
- Sustainability and Connected Mobility
- Reinforced Concrete Analysis and Design
- Mechanics of Solids

RESEARCH PROFESSOR/POST DOCTORAL FELLOW SUPERVISION CURRENT

Li Ai (Postdoctoral Fellow, full time) 2021 - present
Mahmoud Bayat (Research Associate Professor, full time) 2019 – present
Darun Barazanchy (Research Assistant Professor, full time) 2019 - present
Wout de Backer (Research Assistant Professor, full time) 2019 – present
Vafa Soltangharaei (Postdoctoral Fellow, part time) 2020 - present
Lateef Assi (Postdoctoral Fellow, part time) 2019 - present
Rafal Anay (Postdoctoral Fellow, part time) 2019 – present

RESEARCH PROFESSOR/POST DOCTORAL FELLOW SUPERVISION COMPLETED

Ramin Madarshahian (Postdoctoral Fellow) 2017
 Jianguo Yu (Research Assistant Professor) 2009 – 2013
 Boris Zárate (Postdoctoral Fellow) 2009 – 2012
 Mohamed ElBatanouny (Postdoctoral Fellow) 2012 – 2014
 Aaron Larosche (Postdoctoral Fellow) 2012 – 2013

GRADUATE RESEARCH STUDENT SUPERVISION

Ph.D. COMPLETED

- 2021 Li Ai, *Toward Intelligent Structural Health Monitoring of Infrastructure Systems: An Interdisciplinary Study of Acoustic Emission Monitoring, Numerical Simulation, and Artificial Intelligence*
- 2020 Vafa Soltangharai, *Evaluation of Temporal Damage Progression in Concrete Structures Affected by ASR Using Data-driven Methods*
- 2019 Rafal Anay, *Damage Evaluation of Concrete Structures using Acoustic Emission*
- 2018 Lateef Assi, *Understanding the Geopolymerization Process for Enhancement of Mechanical Properties of Fly Ash Based-Geopolymer Concrete*
- 2016 Marwa Abdelrahman, *Evaluation of Concrete Degradation using Acoustic Emission: Data Filtering and Damage Detection*
- 2013 Mozahid Hossain, *Probability of Detection Based on Acoustic Emission Associated with Fatigue Crack Extension in Steel Bridge Material*
- 2012 Mohamed ElBatanouny, *Implementation of Acoustic Emission as a Non-Destructive Testing and Evaluation Method for Concrete Structures*
- 2012 Aaron Larosche, *Behavior of Prestressed Pile to Bent Cap Connections and Evaluation with Acoustic Emission*
- 2010 Francisco Barrios, *Acoustic Emission and CLT Method for Integrity Evaluation of Normal Weight and Lightweight SCC Girders*
- 2008 Shawn Carey, *Damage Detection and Characterization in CFRP Composites Using Acoustic Emission and Acousto-Ultrasonics*
- 2007 Zhiwei Liu, *Evaluation of Reinforced Concrete Beams using Cyclic Load Test, Acoustic Emission, and Acousto-Ultrasonics*
- 2007 Yizhuo Chen, *Optimization of Hybrid FRP/RC Bridge Beam System*

Ph.D. IN PROGRESS

Laxman KC (PhD), expected 2022

M.S. COMPLETED

- 2021 Rebekah Krol, *Rehabilitation of Timber Piles using Fiber Reinforced Polymers Analyzed with Acoustic Emission*
- 2020 Brenna Feirer, *Damage Evaluation of Rolling Element Bearings for Shipboard Machinery*
- 2021 Alex Brasington, *Creation of an Integrated Environment for Automated Fiber Placement: Connecting Design and Process Planning* (co-advised with Dr. Ramy Harik)
- 2020 David Bianco, *The Effect of Aggregate Size and Reinforcement on Concrete Structures Affected by ASR Investigated by Different Nondestructive Evaluation Methods*
- 2018 Joseph Hill, *Acoustic Emission Detection in 304H Stainless Steel due to Intergranular Stress Corrosion Cracking*
- 2018 Rawya Abd Jbr, *Nondestructive Evaluation of Corrosion Damage in Reinforced Concrete Aged Slab Specimen*
- 2017 Lateef Assi, *Cost and Fuel Energy Optimization of Activating Solution Based Silica Fume Geopolymer Concrete*
- 2013 Matthew Jones, *Structural Health Monitoring of Concrete Systems*
- 2013 Clark Baer, *Investigation of Longitudinal Joints between Precast Prestressed Deck Bulb Tee Girders Using Latex Modified Concrete*
- 2013 Aditya Apalla, *Assessing Corrosion Damage in Post-Tensioned Concrete Structures using Acoustic Emission and a Preliminary Investigation of Biopolymer Doped Cement Mortar for use in Structural Restoration*
- 2013 Marwa Abdelrahman, *Assessment of Damage in Concrete Structures Using Acoustic Emission*
- 2012 Bradley Mustain, *Finite Element Analysis of the Connection Behavior of Precast Prestressed Piles to Cast-in-Place Bent Caps*
- 2011 Jese Mangual, *Assessing Corrosion Damage in Prestressed Concrete with Acoustic Emission*
- 2011 Aaron Larosche, *The Connection Behavior of Precast Prestressed Piles to Cast-In-Place Bent Caps*
- 2010 Mohamed ElBatanouny, *Effect of Confinement on Prestressed Pile to CIP Bentcap Connections in Seismic Regions*

- 2010 Shawn Sweigart, *Seismic Performance of Prestressed Concrete Piles in CIP Reinforced Concrete Pile Caps*, 2010
2009 Joel Fuziol, *Numerical Simulation of Pile to Pile-Cap Connections Subjected to Seismic Forces*, 2009
2008 Alexander Colmorgan, *Performance of AASHTO Type III Bridge Girders Made with Self-Consolidating Concrete (co-advisor)*
2007 Robert Howard, *Characterization and Benefits of Self-Consolidating Concrete for Use in Prestressed Bridge Girders (co-advisor)*
2006 Francisco Barrios, *Effects of Temperature on the Nondestructive Evaluation of Fiberglass Tensile Specimens*
2004 Adam Ridge, *Nondestructive Techniques for Field Evaluation of FRP Strengthened Reinforced Concrete Bridge Beams*
2004 Chris Tanner, *Evaluation of the Fatigue Behavior of High Performance Concrete Bulb-Tee Girders*
2003 Thomas Cole, *Finite Element Modeling and Experimental Verification of Fiber-Reinforced Polymer Honeycomb Sandwich Flat Slab Bridges*

M.S. IN PROGRESS

Elhussein Elbatanouny (MS), expected 2021

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Jennifer Snape, Senior Honors Thesis, 2004, Tulane University
David Birrcher, Senior Honors Thesis, 2004, Tulane University

William Bane, Senior Honors Thesis, 2003, Tulane University
Jason Constantino, LS-LAMP program, 2003, Tulane University
Terrell Green, LS-LAMP program, 2003, Tulane University