

**Hae-Bum (Andrew) Yun, Ph.D.**

Assistant Professor

Department of Civil, Environmental and Construction Engineering, University of Central Florida  
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**I. EDUCATION**

**Ph.D. in Civil Engineering**, University of Southern California, Los Angeles, CA 2007

Advisory faculty: Professor Sami F. Masri

Area of specialization: Structural Health Monitoring

Dissertation title: *Analytical and Experimental Studies of Modeling and Monitoring Uncertain Nonlinear Systems*

**M.S. in Civil Engineering**, Carnegie Mellon University, Pittsburgh, PA 2002

Advisory faculty: Professor James H. Garrett, Jr.

Area of specialization: Computer-Aided Engineering (CAE)

Thesis title: *NMR Detectability Study for Chloride in Concrete*

**B.S. in Civil Engineering**, Pusan National University, Pusan, Korea 1996

**II. RESEARCH INTERESTS**

- Structural Health Monitoring
- Smart sensing and algorithms
- Nondestructive evaluation and test (NDE&T) using spectroscopy technology

**III. EMPLOYMENT**

**Assistant Professor**, Civil, Environmental and Construction Engineering Department,  
 University of Central Florida 2010 – Date

**Co-Founder and Senior Technical Director**, Institute of Structural Health Monitoring  
 and Control (ISHM&C), Korea 2008 – 2011

**Postdoctoral Research Associate**, Civil and Environmental Engineering Department,  
 University of Southern California 2007 – 2009

**Research Assistant**, Civil and Environmental Engineering Department, University of  
 Southern California 2003 – 2007

**Research Assistant**, Civil and Environmental Engineering Department, Carnegie Mellon  
 University 2000 – 2002

**Teaching Assistant**, Civil and Environmental Engineering Department, Carnegie Mellon University 2001  
**Engineer (Intern)**, Daimler-Chrysler Rail System, Pittsburgh, PA 2000

#### IV. PUBLICATIONS

##### 1. Refereed Chapters in Edited Books

1. L.N. Reddi, A.K. Jain and H.-B. Yun, “Ch 6. Soil materials – classification and testing for sustainability,” in M.R. Hall, R. Lindsay, and M. Krayenhoff (Ed): *Modern Earth Buildings: Materials, Engineering, Construction and Applications*, Woodhead Publishing LTD. Cambridge, UK. 2012.
2. H.-B. Yun, “8.4 Vincent Thomas Bridge,” in F.N. Catbas, T. Kijewski-Correa, and A.E. Aktan (Ed): *Structural Identification (St-Id) of Constructed Systems: Approaches, Methods and Technologies for Effective Practice of St-Id*, ASCE, Structural Engineering Institute (SEI). 2013.
3. H.-B. Yun, R.D. Nayeri, R.W. Wolfe, S.F. Masri, M. Wahbeh, F. Tasbihgoo, J.P. Caffrey and L.-H. Sheng, “Use of structural health monitoring techniques for forensic study of bridge accidents,” in K.M. Mahmoud (Ed): *Innovations in Bridge Engineering Technology*, London, UK., pp. 179-185, 2007.

##### 2. Peer-Reviewed Journal Publications

1. Yun, H.-B., Sundaresan, G., Jung, Y., Kim, J., and Park, K. (2013). "A Novel Pattern Detection Algorithm for Monitoring Phase Change of Moisture on Concrete Pavement Using Surface Temperature Data." *Journal of Computing in Civil Engineering*, ASCE, 10.1061/(ASCE)CP.1943-5487.0000330.
2. Yun, H.-B., Kim, S.-H., Wu, L. and Lee, J.-J. (2013) “Development of Inspection Robots for Bridge Cables.” *The Scientific World Journal*. Volume 2013. 10.1155/2013/967508.
3. Kallinikidou, E., Yun, H.-B., Masri, S., Caffrey, J., and Sheng, L. (2013). ”Application of Orthogonal Decomposition Approaches to Long-Term Monitoring of Infrastructure Systems.” *Journal of Engineering Mechanics, ASCE*. 139, SPECIAL ISSUE: Dynamics and Analysis of Large-Scale Structures, 678–690. 10.1061/(ASCE)EM.1943-7889.0000331.
4. Reddi, S., Jain, A.K., Yun, H.-B. and Reddi, L.N. (2012) “Biomimetics of stabilized earth construction: Challenges and opportunities,” *Energy and Buildings, Elsevier*, Vol. 55 pp. 452-458. 10.1016/j.enbuild.2012.09.024.

5. Yun, H.-B. and Reddi, L.N. (2011) "Non-parametric monitoring for geotechnical structures subject to long-term environmental change," *Advances in Civil Engineering*, Vol. 2011, No. 275270, 17 pages. 10.1155/2011/275270.
6. Yun, H.-B., Masri, S.F., Wolfe, R.W., Tasbihgoo, F., and Benzoni, G. (2009) "Data-driven methodologies for change detection in large-scale nonlinear dampers with noisy measurements," *Journal of Sound and Vibration, Elsevier*. 322, pp. 336-357.
7. Yun, H.-B., and Masri, S.F. (2009) "Stochastic change detection in uncertain nonlinear systems using reduced-order models: classification," *Smart Materials and Structures, IOP*. 18(1), (12 pp.).
8. Yun, H.-B., and Masri, S.F. (2008) "Stochastic change detection in uncertain nonlinear systems using reduced-order models: identification," *Smart Materials and Structures, IOP*. 17(1), (12 pp.).
9. Wolfe, R.W., Yun, H.-B., Masri, S.F., Tasbihgoo, F., and Benzoni, G., "Fidelity of reduced-order models for large-scale nonlinear orifice viscous dampers," *Structural Control and Health Monitoring, Wiley*. 15(8) pp. 1143-1163.
10. Yun, H.-B., Tasbihgoo, F., Masri, S.F., Caffrey, J.P., Wolfe, J.W., Makris, M. and Black, C. (2008) "Comparison of modeling approaches for full-scale nonlinear viscous dampers," *Journal of Vibration and Control, SAGE*. 14(1) pp. 51-76.
11. Yun, H.-B., Nayeri, R., Tasbihgoo, F., Wahbeh, M., Caffrey, J.P., Wolfe, R.W., Nigbor, R., Masri, S.F., Abdel-Ghaffar, A., and Sheng, L.-H. (2007) "Monitoring the collision of a cargo ship with the Vincent Thomas Bridge," *Structural Control and Health Monitoring, Wiley*. 15, pp. 183-206.
12. Yun, H.-B., Patton, M., Garrett, J., Fedder, G., Frederic, K., Hsu, J., Lowe, I., Oppenheim, I. and Sides, P. (2004) "Detection of free chloride in concrete by NMR," *Cement and Concrete Research, Elsevier*, 34(3) pp. 379-390.
13. Lee, H., Yun, H.-B., and Maclean, B. (2002) "Development and field testing of a prototype Hybrid Uniaxial Strain Transducer," *NDT&E International, Elsevier*, 35(2) pp. 125-134.
14. Yun, H.-B., Lee, H. and Maclean, B. (2001) "Development of field testing of a prototype Hybrid Uniaxial Strain Transducer," *Transportation Research Record*, 1742, pp. 78-86.

### **3. Journals and Book Chapters in Preparation**

1. Yun, H.-B., Wu, L., Mokhtari, S., Nazef, A., and Nam, B.-H. "Local and global crack recognition using morphological image-processing techniques for flexible pavement," *Automation in Construction, Elsevier*. (Under review).

2. Yun, H.-B., “Biomimetics of spike-based sensing for civil infrastructure monitoring: challenges and opportunities,” *Smart Materials and Structures*. (Under review)
3. Paul, B., Al-Rumaithi, A., Li, P., Park, K.-T., Masri, S.F., and Yun, H.-B. “System Identification of 12-Story Building Models on Different Foundations: Local Damage Quantification Using Nonlinear Method.” *Journal of Earthquake Engineering, Taylor & Francis*. (Under review)
4. Al-Rumaithi, A., Kim, Y., Li, P., Park, K.-T., Masri, S.F., and Yun, H.-B. “System Identification of 12-Story Building Models on Different Foundations : Global Damage Quantification Using Linear Methods.” *Journal of Engineering Mechanics, ASCE*. (Under review)
5. Derkevorkian, A., Hernandez-Garcia, M., Yun, H.-B., Masri, S.F., and Li, P. “Nonlinear Data-Driven Computational Models for Response Prediction and Change Detection.” *Structural Control and Health Monitoring, Wiley*. (Under review)
6. Yun, H.-B., Park, S.-H., Mehdawi, N., Chopra, M., Reddi, L.N., and Park, K.-T. “Monitoring for Close Proximity Tunnelling Effects on Existing Tunnel Using Blind Source Separation Technique with Limited Sensor Data.” *Tunnelling and Underground Space Technology, Elsevier*. (Under review)
7. Yun, H.-B., Masri, S.F. and Kitsteiner, R. “Data-driven methodologies for structural monitoring of instrumented systems based on system identification approaches,” ASC TCLEE Monograph on Instrumentation for Monitoring and Performance of Port and Coastal Infrastructure, ASCE Technical Council on Lifeline Earthquake Engineering. (in press)
8. Yun, H.-B., Sundaresan, G., Kim, J.-W., Kim, Y.-S., Masri, S.F., and Reddi, L.N., “Summarization of extremely large data from heterogeneous infrastructure network for hazard monitoring,” *Structure and Infrastructure Engineering*, 2012 (submitted).
9. Yun, H.-B., Masri, S.F., Lee, J.-S. and Reddi, L.N., “Long-term monitoring of a retaining wall using non-parametric identification methods,” *Journal of Geotechnical and Geoenvironmental Engineering, ASCE*, 2012 (Under review).

#### 4. Refereed Publications in Conference Proceedings

1. Sundaresan, Ganesh, Seung-Yeon Kim, Jong-Jae Lee, Ki-Tae Park, and Hae-Bum Yun. 2014. “Spatiotemporal Sensing for Pipeline Leak Detection Using Thermal Video Associated with Non-Stationary Data Processing Technique.” In *IMAC XXXII A Conference and Exposition on Structural Dynamics*. Orlando, FL, USA.
2. Al-Rumaithi, Ayad, Hae-Bum Yun, Ki-Tae Park, and Peizhen Li. 2014. “Comparative Study of Effects of Nonlinearity and Foundation on Mode Realization Using Large-Scale Building Models.” In *IMAC XXXII A Conference and Exposition on Structural Dynamics*. Orlando, FL, USA.

3. Mehdawi, Nader, Hae-Bum Yun, Jong-Woo Kim, Ki-Tae Park, Manoj Chopra, and Soroush Mokhtari. 2014. "Monitoring Proximity Tunneling Effects Using Blind Source Separation Technique." In *IMAC XXXII A Conference and Exposition on Structural Dynamics*.
4. Sundaresan, Ganesh, Liuliu Wu, Hae-Bum Yun, Ki-tae Park, and Jong-woo Kim. 2014. "Data Summarization for Heterogeneous Infrastructure Using Spike- Based Monitoring Technique." In *7th International Conference on Bridge Maintenance, Safety and Management*. Shanghai, China.
5. Sundaresan, Ganesh, Hae-Bum Yun, Jong-Woo Kim, and Ki-Tae Park. 2013. "A Novel Model-Free Data Processing Technique for Ad Hoc Analysis in Monitoring for Heterogeneous Infrastructure Networks." In *2013 SPIE Smart Structures/NDE*. San Diego, California, USA.
6. Yun, Hae-Bum, Ganesh Sundaresan, and Lakshmi N Reddi. 2013. "Geodermis: Biomimicry of Distributed Sensing for Earth-Based Buildings." In *2013 SPIE Smart Structures/NDE*. San Diego, California, USA.
7. Yun, Hae-Bum, Ganesh Sundaresan, Youngwoo Jung, and Jong-Woo Kim. 2013. "A Novel Pattern Detection Algorithm for Monitoring Snow and Ice Forming on Pavement Using Surface Temperature Data Only." In *TRB 92nd Annual Meeting*, 1–17. Washington, D.C., USA.
8. Rank, Aaron, Hae-Bum Yun, and Sami F Masri. 2012. "An Innovative Experimental Approach for Nonlinear Dynamic Physical Simulation Using a Reconfigurable Test Setup." In *6th International Conference on Bridge Maintenance, Safety and Management (IABMAS 2012)*. Stresa, Lake Maggiore, Italy.
9. Yun, Hae-Bum, Ganesh Sundaresan, Youngwoo Jung, and Jong-woo Kim. 2012. "A Novel Model-Free Data Processing Algorithm for Monitoring Snow and Ice Forming on Pavement Using Surface Temperature Data Only." In *6th International Conference for Safety of Infrastructure (ICSI 2012)*, 1–10. Seoul, Korea.
10. Yun, Hae-Bum, Ganesh Sundaresan, Yoonhwak Kim, and Lakshmi N Reddi. 2011. "Data-Driven Identification Methodology for Geotechnical Structures Using Long-Term Field Data." In *International Symposium on Innovation & Sustainability of Structures in Civil Engineering (ISISS' 2011)*. Xiamen, China.
11. Rank, Aaron, Hae-Bum Yun, and Sami F Masri. 2011. "System Identification and Classification of Stochastic Change Detection of Uncertain Nonlinear Systems with Reduced-Order Models." In *International Symposium on Innovation & Sustainability of Structures in Civil Engineering (ISISS' 2011)*, 1–6. Xiamen, China.
12. Yun, Hae-Bum, Aaron Rank, Sami F Masri, and Gianmario Benzoni. 2011. "A Non-Parametric Identification Methodology for Large-Scale Nonlinear Dynamic Systems with Uncertain Measurements." In *International Symposium on Innovation & Sustainability of Structures in Civil Engineering (ISISS' 2011)*. Xiamen, China.

13. Yun, H.-B., Masri, S. F., Reddi, L. N., and Lee, J. (2010). "Data-driven techniques of performance-related monitoring for geotechnical structures subject to environmental change." *5th World Conference on Structural Control and Monitoring*, Tokyo, Japan, 1–15.
14. Yun, H.-B., Masri, S.F., Nayeri, R.D., Kallinikidou, E., Wahbeh, M., Wolfe, R.W., and Sheng, L.-H. (2008) "Long-term monitoring of stochastic characteristics of a full-scale suspension bridge," *In the Proceeding of 4th International Conference on Bridge Maintenance, Safety and Management (IABMAS'08)*, Seoul, South Korea, July 13-17.
15. Yun, H.-B., Masri, S.F., and Caffrey, J.P. (2008) "Stochastic change detection in uncertain nonlinear systems using data-driven system identification methods," *In the Proceeding of MAC-XXVI: Conference & Exposition on Structural Dynamics*, Orlando, FL, February 4-7.
16. Yun, H.-B., Nayeri, R.D., Wolfe, R.W., Masri, S.F., Wahbeh, M., Tasbihgoo, F., Caffrey, J.P., and Sheng, L.-H. (2007) "Use of structural health monitoring techniques for a forensic study of bridge accidents," *In the Proceeding of 2007 New York City Bridge Conference*, New York City, NY, August 27-28.
17. Yun, H.-B., Nayeri, R.D., Masri, S.F., Tasbihgoo, F., Wahbeh, M. and Wolfe, R.W. (2007) "A forensic study of the collision of a cargo ship with the Vincent Thomas Bridge," *In the Proceeding of World Forum on Smart Materials and Smart Structures Technology*, Chongqing and Nanjing, China, May 22-27.
18. Yun, H.-B., Masri, S.F., Tasbihgoo, F., and Wolfe, R.W. (2007) "Some data-driven modeling approaches for detecting changes in nonlinear dampers," *In the Proceeding of SPIE Smart Structures and Materials/NDE*, San Diego, CA, March 18-22.
19. Yun, H.-B., Tasbihgoo, F., Masri, S.F., Caffrey, J.P. and Wolfe, R.W. (2006) "Parametric and non-parametric identification approaches for full-scale nonlinear viscous damper," *In the Proceeding of MOVIC 2006*, Daejeon, Korea, August 27-30.
20. Yun, H.-B., Masri, S.F., Tasbihgoo, F. and Caffrey, J.P. (2006) "Statistical nonparametric system identification of nonlinear viscous dampers using the Bootstrap method," *In the Proceeding of 4<sup>th</sup> World Conference of Structural Control and Monitoring (4WCSCM)*, San Diego, CA, July 11-13.
21. Tasbihgoo, F., Masri, S.F., Yun, H.-B. and Caffrey, J.P. (2006) "On-line monitoring of large-scale nonlinear viscous dampers," *In the Proceeding of 4<sup>th</sup> World Conference of Structural Control and Monitoring (4WCSCM)*, San Diego, CA, July 11-13.
22. Tasbihgoo, F., Yun, H.-B., Masri, S.F., Wolfe, R.W., and Caffrey, J.P. (2006) "Some issues in modeling nonlinear viscous dampers for monitoring and identification," *In the Proceeding of 15th U.S. National Congress on Theoretical and Applied Mechanics*, Boulder, CO, USA, June 25-30.

23. Wahbeh, M., Tasbihgoo, F., Yun, H.-B., Masri, S.F. and Caffrey, J.P. (2005) "Real-time earthquake monitoring of large-scale bridge structures," *In the Proceedings of the 5th International Workshop on Structural Health Monitoring*, Stanford, CA, September 12-14.
24. Garrett, J. H. Jr., Fedder, G., Frederick, K.M., Hsu, J.J., Lowe, I.J., Patton, M.E., Sides, P. and Yun, H.-B., "Developments in chlorine detection in concrete using NMR," *In the Proceeding of SPIE Smart Structures Conference SS05: Systems for Bridges, Structures, and Highways*, pp. 310-321, San Diego, CA, March 17-21.
25. Yun, H.-B. and Lee, H. (1999) "Optimal mix design of polymer concrete," *Transportation Research Board (TRB)*, Washington D.C, January 3-5.

## 5. Reports and Other Publications

1. Sundaresan, G., Yun, H.-B., Kim, J.-W., and Park, K.-T. (2012). "Auto Modulating Pattern Detection Algorithm: a novel data processing technique to enhance pattern detectability in pavement surface monitoring applications." *2012 Joint Conference of the Engineering Mechanics Institute & the 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability (EMI/PMC 2012)*, Notre Dame, Indiana, USA.
2. Kim, Y., Paul, B., Yun, H.-B., Jain, A., Masri, S., and Li, P. (2012). "Comparative Study of System Identification Methods for Large-Scale Soil-Foundation-Superstructure Systems with Pile, Box and Fixed Foundations." *2012 Joint Conference of the Engineering Mechanics Institute & the 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability (EMI/PMC 2012)*, Notre Dame, Indiana, USA.
3. Yun, H.-B., Reddi, L., Hall, M., Maini, S., McCulloch, T.-G., and Paul, B. (2012). "Geodermis: Biomimicry of Distributed Sensing for Earth-Based Buildings." *2012 Joint Conference of the Engineering Mechanics Institute & the 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability (EMI/PMC 2012)*, Notre Dame, Indiana, USA.
4. Yun, H.-B., Masri, S.F., Reddi, L.N. and Lee, J.-S. (2010) "Non-parametric methodology for monitoring geotechnical structure subject to environmental variation," *ASCE Engineering Mechanics Institute 2010*, Los Angeles, CA, August 8-11.

## 6. Invited Lectures and Presentations

1. "A novel model-free data processing algorithm for monitoring snow and ice forming on pavement using surface temperature data only," 6th International Conference for Safety of Infrastructure (ICSI), Seoul, Korea, 14 September 2012. (with travel support)

2. "Monitoring for data-intensive urban infrastructure: Challenges and opportunities," Hanyang University ERICA Campus, Ansan, Korea, 10 September 2012.
3. "Recent developments of civil infrastructure maintenance technologies in U.S.A.," Kangnam University, Yongin, Korea, 11 September 2012.
4. "Monitoring for data-intensive urban infrastructure: Challenges and opportunities," Sejong University, Seoul, Korea, 11 September 2012.
5. "Recent advances in monitoring for civil infrastructure systems," Hunan University, Changsha, Hunan Province, China, October 31, 2011. (with travel support).
6. "State-of-the-art Structural Health Monitoring methodologies for complex civil infrastructure," Sangji University, Wonjoo-si, Kangwon Province, Korea Republic, January 24, 2011.
7. "State-of-the-art Structural Health Monitoring methodologies for complex civil infrastructure: with emphasis on geotechnical structures," Korea University, Seoul, Korea Republic, January 21, 2011.
8. "State-of-the-art condition assessment methodologies for complex infrastructure systems," Korea Railroad Research Institute (KRRI), Euiwang-si, Kyounggi Province, Korea Republic, January 18, 2011.
9. "State-of-the-art technologies in structural health monitoring for civil infrastructure systems," Tongji University, Shanghai, P.R. China, June 21, 2010.
10. "Disentanglement of performance-related information for geotechnical structures," Tongji University, Shanghai, P.R. China, June 28, 2010.
11. "State-of-the-art technologies in structural health monitoring for civil infrastructure systems," Korea Research Institute of Standards and Science (KRISS), Daejeon, Korea Republic, July 16, 2010.
12. "State-of-the-art technologies in structural health monitoring for civil infrastructure systems," Korea Electric Power Research Institute (KEPRI), Daejeon, Korea Republic, July 16, 2010.
13. "Disentanglement of performance-related information for geotechnical structures," ENB Group, Seoul, Korea Republic, July 22, 2010.
14. "Analytical and experimental studies of modeling and monitoring uncertain nonlinear systems," *Department of Civil and Environmental Engineering, University of Connecticut, Storrs, CT, 2008.*

## **V. SPONSORED RESEARCH EXPERIENCES**



**1. Active & Accepted**

1. Principal Investigator, “Feasibility Study of Corrosion Detection Using Raman Spectroscopy as Mobile Sensing Technique,” Baytech Korea, Principal Investigator, \$16,000, 2014.
2. “Collaborative Research between UCF and KICT: Development of In-Situ Smart Sensors for Monitoring of Soil-Interfaced Structures Subjected to Long-Term Environmental Variations,” Korea Institute of Construction Technology, Principal Investigator, \$76,019 + \$54,753 (match), 2012-2013.
3. “International Workshop: Thermoregulatory Sensing Analogies Between Skin, Plants and Soils – Research Challenges and Opportunities,” National Science Foundation, Principal Investigator, \$47,300, 2010-2012.
4. “Planning Visit to Korea: A Catalyst for Collaborations on Civil Infrastructure Research Involving Monitored Data,” National Science Foundation, Principal Investigator, \$14,300, 2010-2011.
5. “Development of Pavement Surface Condition Monitoring Algorithm for De-icing Applications Using Temperature Sensor Data,” Judico, Co., Principal Investigator, \$60,006, 2011-2012.
6. “Vision-Based Autonomous Crack Detection in Concrete for Nuclear Power Plants (Phase II),” Judico, Co., Principal Investigator, \$26,916, 2010-2011.
7. “Vision-Based Autonomous Crack Detection in Concrete for Nuclear Power Plants,” Judico, Co., Principal Investigator, \$13,114, 2010.

**2. Selected Proposals Submitted**

1. “CAREER: Advances in Sensing Technology for Civil Infrastructure Monitoring Using Bio-Inspired Sensing Approach,” National Science Foundation, Principal Investigator, \$480,000, 2014-2018, (Pending).
2. “I-4 Ultimate Project,” Vinci, Co-PI (with 20%), \$5,318,511, 2014-2019, (Pending).
3. “Stress and Corrosion Measurement in Bridge Cables Using Raman (Piezo) Spectroscopy as Passive Sensors,” Transportation Research Board, Principal Investigator, \$149,008, 2014-2015, (Pending).
4. “Raman Piezospectroscopy for Rail Stress Measurement as Passive Mobile Sensor,” Federal Rail Administration, Principal Investigator, \$450,000, 2014-2016, (Pending).
5. “Development of Data Processing Algorithms and Software for Sediment-Related Disaster Monitoring,” Sangji University, Principal Investigator, \$538,118, 2013-2017, (Pending).

6. "Reuse of Waste Glass in Hot-Mix Asphalt and Portland Cement Concrete," Hinkley Center, Co-PI (with 40%), \$78,610, 2013-2014, (Pending).
7. "An Innovative Pavement Rating and Forecasting Methodology Using Multimode Monitoring Swarm with Inexpensive Vision Sensors," Georgia Institute of Technology, Principal Investigator, \$65,694, 2012-2014.
8. "BIGDATA:Small: DCM: Collaborative Research: Point Cloud Data Management for Ubiquitous Cities," National Science Foundation, Principal Investigator, \$162,558, 2013-2015.
9. "Collaborative Research: Application of Thermoregulatory Sensing in Biological Systems to Stabilized Earth Construction," National Science Foundation, Principal Investigator, \$307,131, 2012-2015.
10. "Summarization of Inundated Data from Data-Intensive Infrastructure," National Science Foundation, Principal Investigator, \$224,138, 2013-2015.
11. "Development of In-Situ Smart Sensor for Geomonitoring Applications: Disentanglement of Critical Information from Long-Term Environmental Effects Using Less Sensors," National Science Foundation, Principal Investigator, \$300,126, 2012-2014.
12. "Engineering Plant-Fiber Embedded Soils to Mimic Temperature Sensitivity of Skin," National Science Foundation, Principal Investigator, \$109,744, 2011-2013.
13. "Cross-Cutting Tool: An Innovative Experimental Approach for Stochastic Nonlinear Dynamics Studies Using Reconfigurable Test Apparatus," National Aeronautics and Space Administration, Principal Investigator, \$99,000, 2011-2012.
14. Performance-Based Monitoring Methodology for Geotechnical Structures: Disentanglement of Raw Data for Decision-Making," National Science Foundation, Principal Investigator, \$ 142,787, 2011-2012.
15. "Future Climate Change and Transportation Infrastructure Impacts," Florida Department of Transportation, Principal Investigator, \$146,556, 2010-2011.

### **3. Patents**

1. "Systems and Methods for Estimating Structural Characteristics of Mechanical Structures," Sole Inventor, U.S. Patent and Trademark Office (USPTO) Serial No. 61/489,855, UCF Docket No. 32145PRV, TK Docket No. 292102-8620, May 25, 2011.

## **VI. Teaching and Advising**

### **1. Summary of Courses Taught**

- EGN 3331 Mechanics of Materials
- CES 4702 Reinforced Concrete Structures
- CES 5706 Advanced Reinforced Concrete
- CES 6715 Prestressed Concrete Structures
- CES 6230 Advanced Structural Mechanics
- CES 6971 Independent Studies

## **2. Course and Laboratory Development**

- Structural Health Monitoring Laboratory located in Engineering Building 2-426A is 600 sq. ft facility, completely was newly developed in 2011 for interdisciplinary research on structural health monitoring, facilitating ~\$200K testing equipment and computing systems.

## **3. Post-Docs, Graduate and Undergraduate Student Advisees**

- Toni-Gaye McCulloch, PhD student
- Liuliu Wu, PhD student
- Ganesh Sundaresan, PhD student
- Soroush Mokhtari, PhD student
- Ayad Al-Rumaithi, MS student
- Bryan Paul, “Analytical and experimental study of monitoring for building-like nonlinear dynamic systems,” MS Thesis, University of Central Florida, Spring 2013.
- Yoonhwak Kim, “The effects of assumption on subspace identification methods using simulation and experimental data,” MS Thesis, University of Central Florida, Spring 2013.
- Nader Mehdawi, “Monitoring for underdetermined underground structures during excavation using limited sensor data,” MS Thesis, University of Central Florida, Spring 2013.
- Ahmad Alneali, “Multi-physics modeling of geomechanical systems with coupled hydromechanical behaviors,” MS Thesis, University of Central Florida, Spring 2013.
- Aaron Rank, “A novel experimental approach using a reconfigurable test setup,” MS Thesis, University of Central Florida, Summer 2011.

## **4. Faculty Development Workshops and Meetings**

- ASCE Excellence in Civil Engineering Education (ExCEED) Fellowship in participating in the 2011 ExCEED Teaching Workshop at the University of Texas at Tyler, July 10-15.

## **VII. PROFESSIONAL SERVICE**

### **1. Professional Membership and Services**

- American Society of Civil Engineers (ASCE), member
  - Committee member (since 2010), American Society of Civil Engineers (ASCE) Engineering Mechanics Institute (EMI) Technical Committee on Structural Health Monitoring and Control (SHMC).
- International Association for Bridge Management and Safety (IABMAS), member
  - Technical Committee, 7th International Association for Bridge Maintenance and Safety (IABMAS 2014), Shanghai, China, July 7-11, 2014.
- International Association for Structural Control and Monitoring (IASCM) member
  - U.S. Delegation, 6th International Workshop on Structural Control and Monitoring (6IWSCM), Sydney, Australia, December 10, 2011.
- Transportation Research Board (TRB), member
- Society of Experimental Mechanics (SEM), member
- Korea-American Scientist and Engineers Association
  - Session Chair, The Harmonizing Symposium of High-Speed Rail Technology and Administration: Challenges and Opportunities, Korea America Science and Engineering Association (KSEA), U.S. – Korea Conference 2013 (UKC 2013), New York/New Jersey, August 7-11, 2013.
  - Orlando Chapter President (2012-2013), Member (since 2011), Korean-American Scientists and Engineers Association (KSEA).
- American Society of Engineering Education (ASEE), member.
- American Concrete Institute (ACI), member.
  - Faculty advisor (since 2011), ACI-UCF Student Chapter.
- American Association for the Advancement of Science (AAAS), member
  
- Reviewer for Mechanical Systems and Signal Processing, Elsevier
- Reviewer for Smart Materials and Systems, IOP
- Reviewer for Soil Dynamics and Earthquake Engineering, Elsevier
- Reviewer for Journal of Intelligent Material Systems and Structures, Sage

- Reviewer for Journal for Sound and Vibration, Elsevier
- Reviewer for Journal of Vibration and Control, Sage
- Reviewer for Journal of Engineering Mechanics, ASCE
- Reviewer for Journal of Bridge Engineering, ASCE
- Reviewer for Smart Structures and Systems, Techno Press
- Reviewer for Advances in Structural Engineering
  
- Reviewer, National Science Foundation, Jan 2011; Oct 2011.
- Reviewer, Federal Highway Administration, Technical Panel, 2013 – date

## **2. Professional Services for the University**

- CECE Structure Faculty Search Committee, 2013 – date
- CECE Lecturer Search Committee, Chair, 2013
- CECE Graduate Committee, 2013 – date
- Machine Tool Committee, 2010
- UCF Open House, 2010 – date
- Showcase of Undergraduate Research Excellence (SURE), Faculty judge, 2011 – date

## **VIII. RECOGNITIONS AND AWARDS**

- Award from ASCE to attend Excellence in Civil Engineering Education (ExCEED) Workshop at the University of Texas at Tyler, July 10-15, 2011.
- Award from Tongji University as a Kwang-Hua Visiting Professor of Tongji University, Shanghai, China, June 7, 2010 to August 1, 2010.
- Award from Korea Infrastructure Safety Technology Corporation for invited lecture at 6th International Conference for Safety of Infrastructure (ICSI), Seoul, Korea, 14 September 2012.
- Award from Hanyang University, Korea for invited lecture on 10 September 2012.
- Award from Kangnam University, Korea for invited lecture on 11 September 2012.
- Award from Sejong University, Korea for invited lecture on 11 September 2012.
- Award from Hunan University, China for invited lecture on October 31, 2011.

- Award from Sangji University, Korea for invited lecture on January 24, 2011.
- Award from Korea University, Korea for invited lecture on January 21, 2011.
- Award from Korea Railroad Research Institute (KRRRI), Korea for invited lecture on January 18, 2011.
- Award from Tongji University, China for invited lectures on June 21, 2010.
- Award from Korea Research Institute of Standards and Science (KRISS), Korea for invited lecture on July 16, 2010.
- Award from Korea Electric Power Research Institute (KEPRI), Korea for invited lecture on July 16, 2010.
- Award from ENB Group, Korea for invited lecture on July 22, 2010.
- Award from University of Connecticut, CT for invited lecture, 2008.