

## RESUME

Shiou-San Kuo, Ph.D., P.E.  
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### PERSONAL INFORMATION

Married, 3 children, U.S. Citizen

### EDUCATION

- 4/69-8/72 Ph.D. Civil Engineering, Michigan State University  
Major: Geotechnical Engineering  
Minor: Mechanics
- 9/65-1/67 M.S. Civil Engineering, Mississippi State University  
Major: Geotechnical Engineering  
Minor: Hydraulics
- 9/59-7/63 B.S. Hydraulic Engineering, National Cheng-Kung University, Taiwan

### ACADEMIC EXPERIENCE

- 12/05-Present Associate Chair of the Department of Civil and Environmental Engineering. Assist the department chair, Departmental undergraduate curriculum, Assessment and ABET coordinator.
- 8/94 – Present Director of Florida Sinkhole Research Institute. Providing technical advice on sinkhole activities to individuals, agencies from local, state, nation, and worldwide. Conducting funded research projects related to sinkhole problems.
- 8/93 - Present Professor of Engineering Department of Civil and Environmental Engineering, University of Central Florida. Teaching graduate and undergraduate courses, conducting research on projects funded by NASA, FHWA, FDOT, Cities, and Industries, and providing services to agencies, consulting, and public for the engineering design and problem solving.
- 7/04 - 6/05 Distinguished Visiting Professor. Invited to teach and conduct research at US Air Force Academy in the fields of Geotechnical and Foundation Engineering, and Traffic and Pavement Engineering.
- 8/86-7/93 Associate Professor of Engineering, Department of Civil and Environmental Engineering, University of Central Florida. Teaching, mainly for senior and graduate courses in Geotechnical Engineering I and II, Foundation Engineering, Soil Dynamics, Pavement Design, Theoretical Geotechnical Engineering, Foundation Engineering, Geo-environmental Engineering, and P.E. Review. Heavily involved in research projects in Pavement design and analysis, Paving materials testing, subsurface investigation using GPR and other geophysical methods, evaluation of bridge expansion joints using full-scale test track, and computer automation bridge inspection system. Serve for many university and department level committees.

- 8/81-7/86      Assistant Professor of Engineering, Department of Civil Engineering and Environmental Sciences, University of Central Florida. Teaching graduate and undergraduate level courses including Geotechnical Engineering I and II, Foundation Engineering, Structural Analysis, Soil Dynamics, Pavement Design, CE Materials, Mechanics of Materials, Engineering Mechanics, and Hydraulics. Conducting research on design and testing of bridge expansion joints, automation of bridge inspection process, sinkhole mechanism, sinkhole detection, and subsurface investigation using ground penetrating radar, seismograph, resistivity, and other nondestructive methods, lake restoration, and pavement elevation. Developing geotechnical and CE material laboratory facilities. Directing graduate student thesis. Teaching P.E. Review course.
- 4/69-12/71      Graduate Research Assistant, Department of Civil Engineering, Michigan State University. Conducted research on theoretical and experimental creep behavior of polycrystalline ice. Investigated the creep behavior of frozen soil related to ice contained in the soil interstices.
- 10/65-1/67      Graduate Research Assistant, Department of Civil Engineering, Mississippi State University. Conducted research on the theoretical and experimental open channel hydraulics jump in the models of circular, trapezoidal and triangular channels.

## **INDUSTRIAL EXPERIENCE**

- 2/78-8/81      Senior Transportation Research Engineer, Michigan Department of Transportation. Principle researcher on the most complex phase of the projects related to the design and analysis of flexible pavement systems. Monitoring existing pavement performance, conducting nondestructive field testing using Benkelman Beam and Dynaflect equipment, laboratory routing and MTS testing, developing theoretical model, initiating Michigan Pavement Management system.
- 12/71-2/78      Bridge Design Engineer, Michigan Department of Transportation. Bridge superstructure and substructure design and slope stability analysis. Developed bridge analysis formats and analyzed over 3000 existing bridges in Michigan. Conducted Michigan bridge inspection program. Prepared and compiled the structure inventory and appraisal reports. Designed and checked sign support structures.
- 2/67-7/69      Civil Engineer, Michigan Department of Transportation. Bridge and highway design.

## **CONSULTING EXPERIENCE**

Consulting activities include a broad range of projects for state and local industrial and geotechnical firms such as CH2M Hill, Law Engineering, Ardaman & Associates, Jammal & Associates, Universal Engineering Sciences, Alamo/Saxena Consultants, SM&E, Inc., and Dressler Engineering, PSI, law firms on subsurface investigation using geophysical methods of ground penetrating radar and seismograph, and evaluation of foundation settlement and pavement performance, structural design of aluminum canopy, slope stability analysis of sand mines. Over 100 consulting projects have been contracted.

## **OTHER EXPERIENCE**

- 8/64-9/65     Mathematics Teacher, Tung-Ta High School
- 7/63-7/64     Second Lieutenant Officer, No. 6 Army Training and Engineering Corps., Taiwan

## **SPECIAL PROFESSIONAL TRAINING**

- 8/98            Super Pave Mix Design for Graduate and Undergraduate Teaching – Faculty Workshop, Auburn University, Auburn, AL.
- 6/93            The Engineering and Economics of Concrete Pavements - Faculty Short Course, Portland Cement Association, Skokie, IL.
- 7/90            Highway Materials Engineering- Faculty Short Course, Purdue University, Indiana.
- 6/90            Professor Training in Asphalt Technology, National Center for Asphalt Technology, Auburn University, Alabama.
- 5/88            Bridge Inspection, Evaluation and Rehabilitation Training Course, by A.G. Lichtenstein and Associates.
- 7/84            Pavement Management System for College Faculty at the University of Texas at Austin, Sponsored by FHWA.
- 1/82            Theory and Application of Geophysical Method of Ground Penetrating Radar by Geophysical Survey System, Inc.

## **PROFESSIONAL REGISTRATION**

Registered Professional Engineer

1. Florida (#32904)
2. Michigan (#25696)

## **PROFESSIONAL MEMBERSHIPS - 2006**

American Society of Civil Engineers  
National Society of Professional Engineers  
Florida Engineering Society  
National Association of Education  
U.S. Geomechanics Association  
Transportation Research Board  
Chi Epsilon National Civil Engineering Honor Society  
U.S. University Council on Geotechnical Engineering Research  
The International Association of Foundation Drilling  
FDOT ACI Associate Member

## **PROFESSIONAL COMMITTEES AND SERVICES**

- 2007 Associate Chair, Departmental undergraduate curriculum, Assessment and ABET coordinator.
- 2007 Faculty Advisor of UCF Table Tennis Team.
- 2000 Transportation Research Board A3C13 Research Problem Statement Task Group, Chair
- 2000 Transportation Research Board A3C13 Sub-committee - Bridge Joint
- 2000 Transportation Research Board A3C06-Bridge Deck Inspection and Maintenance Sub-committee
- 2000 CEE Advisory Board Committee
- 2000 COE CEE Chair Evaluation Committee
- 1998 CEE Florida Sinkhole Institute Director – Services to News Media, local, state, nation, and international for Sinkhole information, data, and mechanisms.
- 1998 COE PEP Selection Committee, Chair
- 1998 CEE Institution Effectiveness Matrices Committee, Chair
- 1998 CEE Strategic Planning Committee
- 1998 Ad Hoc Instructional Quality Committee

- 1998 CEE Advisory Board Committee
- 1998 International Conference on Accelerated Paving Testing, paper review
- 1998 TRB paper review
- 1998 ASCE 5<sup>th</sup> Material Engineering Congress, paper review
- 1998 3<sup>rd</sup> International Conference on Road and Airfield Pavement Technology, paper review
- 1998 1<sup>st</sup> Asia Pacific Conference on Transportation and Environment, paper review
- Governor of Florida Appointed Skyway Bridge Special Investigation Panel (past)
- Member of National Council of Engineering Examiners
- Member of U.S. Universities Council on Geotechnical Engineering Research
- National Science Foundation Proposal Reviewers
- Board Member of Florida Sinkhole Research Institute (past)
- UCF Faculty Senate (past)

#### **SOCIAL AND LOCAL COMMUNITY ACTIVITIES**

1999-2007, Member of Taiwanese Government Oversea Social And Study Committee

1999-2004, President of Central Florida Nine-Nine Golf Club Association

1999-2001, President of Central Florida Taiwanese Association

1999-2001, President of National Cheng-kung University Florida Section Alumni Association

#### **PUBLICATIONS AND PRESENTATIONS**

##### Bound Volumes

1. Kuo, S.S. “Investigation of Fiber Reinforced Concrete Made with Reclaimed Concrete Aggregate (RCA)” A Final Report Submitted to AFOSR Research Funds, US Air Force Academy, April 2005 (62 pages)
2. Kuo,S.S. Zhao,L. Mahgoub,H. “ Investigation of Ground Penetrating Radar for Detection of Leaking Pipelines under Roadway Pavement and Development of Fiber-Wrapping Repair Technique”. A final report to The Center for Advanced Transportation Systems CATSS. January 2005. (72 pages)
3. Kuo,S.S. Desai, K. “ A Pilot Study of Ground Penetrating Radar for Detection of Existing Bricks Under Pavement in City of Orlando, FL”. A final report to the city of Orlando,

June 2004. (60 pages)

4. Kuo, S.S. Mahgoub, H.S “Pavement Condition Surveys for the City of Oviedo”. A final report to the city of Oviedo, March 2002. (410pages)
5. Kuo, S.S. Mahgoub, H.S, Chini, A “use of Recycled Concrete Made with Florida Limestone Aggregate for a base Course in Flexible Pavement”. A final report to Florida Department of Transportation January 2002. (220 Pages)
6. Kuo, S.S. “Accelerated Testing of 1620 Elastomeric Concrete “A final report to Lymtal International Inc. October, 2001 (15 Pages)
7. Kuo, S.S. “Accelerated Testing of Pro-Flex 400 Armorless Joint System “A final report to Capital Services, Inc. December, 2001 (17 Pages)
8. Kuo, S. S. Chini, A “Use of Recycled Concrete Made with Florida Limestone Aggregate for a Base Course in Flexible Pavement”. A final report to Florida Department of Transportation under grant contract BC – 409, May, 2001 (205 pages)
9. Kuo, S.S. “ Accelerated Testing of 1620 Elastomeric Concrete and 1610 QC Highway Sealant”. A final report submitted to Lymtal, Internationa, Inc. April 2001 (35 pages).
10. Kuo, S.S., Hoffman, L.L., Kong, F. “Flexible Pavement Performance Prediction Model on the Basis of Pavement Condition Data.” A final report to Florida Department of Transportationn under grant contract WPI403703, March 2000. (152 pages)
11. Kuo, S.S. “Evaluation of Patching Materials and Placement Techniques for Rigid Pavements.” A final report to Florida Department of Transportation under grant contract WP10510861, May, 1999. (243 pages)
12. Kuo, S.S. “Testing of New Bridge Expansion Joint for Capital Service, Inc.” A final report to Capital Service, Inc. N.Y., January, 1999. (34 pages)
13. Chini, A., Kuo, S.S. “Guidelines and Specifications for the Use of Reclaimed Aggregates in Pavement.” A final report to Florida Department of Transportation and grant contract BA50, 1998. (243 pages)
14. Kuo, S.S., Blazek, D., Lewis, N. A Testing and Analysis of Ultra-Thin Fiber Reinforced and Non-Reinforced Portland Cement Concrete (PCC) Over Asphalt Layer. A final report to Florida Department of Transportation under grant contract BA083, 1996. (105 pages)

15. Kuo, S.S., Gassaway, D.M. A Performance Testing and Analysis of Recycled and Non-Recycled Additives in Asphaltic Pavement. A final report to NASA under grant contract NAG 10-0158, 1996. (110 pages)
16. Kuo, S.S., Bennett, C. A Pavement Condition Survey for the City of Oviedo, Florida. A final report to City Council of City of Oviedo under grant contract 1996. (321 pages)
17. Kuo, S.S., Gassaway, D.M. "Accelerated Testing of Bridge Deck Joint." A final report to Harris Specialty Chemicals, Inc., Bristol, PA, July 1995. (36 pages)
18. Kuo, S.S., Gassaway, D.M. "Accelerated Testing of Erie Metal Specialties Bridge Deck Joint". A final report to Erie Metal Specialties. Akron, N.Y., July, 1995. (31 pages)
19. Kuo, S.S., Phan, S. "Accelerated Wear Testing of SSI Bridge Expansion Joints." A report to S.S.I. Construction & Industrial Materials, Tulsa, OK, July, 1994. (31 pages)
20. Kuo, S.S., Phan, S. "Accelerated Wear Testing of Hydrozo/JEENE Bridge Expansion Joints." A report to Hydrozo/JEENE, Inc., Lincoln, Nebraska, July, 1994. (38 pages)
21. Kuo, S.S., Murphy, P. "Accelerated Wear Testing of D.S. Brown Bridge Expansion Joints." A report to D.S. Brown Co., Jan., 1994. (28 pages)
22. Kuo, S.S., Eastman, K. "Phase II Testing of Bridge Expansion Joints." A report to D.S. Brown Co., E-Poxy Industries, Inc. Hydrozo/JEENE, Inc. Watson Bowman Acme, Inc., March, 1993. (88 pages)
23. Kuo, S.S., Clark, D.A., Bennett, C.A. "Automation of Bridge Inspection Process: Phase IV." Final report to Florida Department of Transportation under grant contract WPI 0510427.B-7722, 1993. (398 pages)
24. Kuo, S.S. Testimony for the record on "Reducing the Environmental Costs in Transportation Energy Use." for U.S. Congressional Subcommittee on Science, Space and Technology, Washington, D.C. October, 1992. (12 pages)
25. Waddell, M., Kuo, S.S. "Rehabilitative Bridge Joint Products for the 1-4 Bridge Joint Rehabilitation Program." A report to Florida Department of Transportation-District 5. Oct., 1992. (77 pages)

26. Kuo, S.S., Leo, M.J., Maples, W.R. "Automation of Bridge Inspection Process: Phase III." Final report to Florida Department of Transportation under grant contract WPA0510427.C-0427, 1992. (511 pages)
27. Kuo, S.S., Eastman, K., Ferrer, J.A., Quintero, R., Woodard, M. "Testing on Bridge Expansion Joints: Phase III." Final report to Florida Department of Transportation under grant contract WPA0510427.C-3753, 1992. (279 pages)
28. Kuo, S.S., Davidson, T.E., Fiji, L. "Automation of Bridge Inspection System: Phase II." Final report to Florida Department of Transportation under grant contract WPA0510427.C-3257, 1990. (357 pages)
29. Kuo, S.S., Bergeson, S.P. "The Design and Construction of A Full-Scale Facility for Testing of Bridge Expansion Joints: Phase I." Final report to Florida Department of Transportation under grant contract WPA 0510427.C-2622, 1990. (165 pages)
30. Kuo, S.S., Leftwich, D.S., Davidson, T.E., Fiji, L.M. "Automation of Bridge Inspection Process - Evaluation on Project: Phase I." Final report to Florida Department of Transportation under grant contract WPA 0510427.C-2578, 1989. (103 pages)
31. Kuo, S.S., Beck, B. "The Use of Ground Penetrating Radar for Detecting and Evaluating the Sinkhole Hazard in Florida." Final report to Florida Department of Transportation under STAR grant contract 84-056, 1987. (94 pages)
32. Kuo, S.S., et al. "Cracking Investigation of Foundation Piers in Construction of Skyway Bridge." Final report to Governor Bob Graham and Secretary of the Florida Department of Transportation from Governor appointed investigating panel. March, 1984.
33. Wanielista, M.P., Harper, H.H., Kuo, S.S. "Bottom Sediments of Meginnis Arm, Lake Jackson, Tallahassee, Florida." Final report to Florida Department of Environmental Regulation, 1984. (197 pages)
34. Kuo, S.S. "Development of Base Layer Thickness Equivalency." Research report for Michigan Department of Transportation R-1119, 1979. (41 pages)
35. Kuo, S.S. "Stress and Time Effect on the Creep Rate of Polycrystalline Ice." Doctoral Dissertation. Michigan State University, 1972. (176 pages)
36. Kuo, S.S. "Theoretical and Experimental Investigations of Hydraulic Jump in Circular, Trapezoidal, and Triangular Channels." Masters Thesis. Mississippi State University, 1967. (76 pages)

Journal Articles (Refereed)

1. Pedro F. Suarez, Shiou-San Kuo, Lei zhao, “ Development of Fabric-Wrapping Technique for Leaking Pipeline Joint under Roadway Pavement”. A paper presented and published in ASCE PIPELINES 2006. ASCE, July 30-August 2, 2006. Page 8, **Refereed**, National.
2. Shiou-San Kuo, Pedro suarez, Lei Zhao, “Feasibility of Fiber-Wrapping for Leaking Pipeline Joints under Roadways”. A paper presented and accepted for publication in TRB 86<sup>TH</sup> Annual Meeting, January 22, 2007, Refereed, National.
3. Kuo,S.S. Lymari, R. Desai, K. “ Design Method for Municipal Solid Waste Landfill Liner System Subjected to Sinkhole Cavity at Landfill Site”. A paper published by ASCE Journal Special Edition on Innovation Barrier Systems for Waste Containment, ASCE Volume 9, No. 4; October 2005
4. Kuo, S.S. Maghoub,H. “ Quality of Recycled Concrete Aggregates As Base Course of Flexible Pavement” A paper submitted for ASCE Journal of Construction Materials for publication, August 2005.
5. Kuo, S.S. Maghoub, H. Holliday, H. “ Pavement Responses Due to Hard Landing of Aircraft Impact Loads”. TRB, No.1997, 2005
6. Kuo, S.S. Kong, F. “Development of Flexible Pavement Performance Prediction Model Based on Pavement Condition Data”. TRB No.1787, 2002
7. Kuo. S.S. Maghoub, H. and, Abdelnoor, N “Investigation of Recycled Concrete Made with Limestone aggregate for a Base Course in Flexible Pavement.” A paper accepted for presentation and publication at 81<sup>st</sup> Annual TRB, TRB No.1787. 2002
8. Kuo. S.S. Mahmoud, H. and Maghoub, H. “Evaluation and Selection of Bridge Expansion Joint using fuzzy Logic Expert System.” A paper accepted for presentation and recommended for Publication. 81<sup>st</sup> Annual TRB, January 2002.
9. Chini, A., Kuo, S. S. ,Armaghani. “Performance Testing of Recycled Concrete Aggregate in the Circular Accelerated Test Track”. ASCE Journal of Transportation, NOV./DEC. 2001 VOL.127 NO.6
10. Chini, A., Kuo, S. S. “Performance Test of Recycled Concrete Aggregate in a Circular Accelerated Test Track.” A paper accepted for presentation and publication for 78<sup>th</sup> Annual Transportation Research Board (TRB), January, 1999.

11. Kuo, S.S., Armaghani, J. "Accelerated Pavement Performance Testing of Fiber Reinforced Concrete Overlay". A paper published in ACCELERATED PAVEMENT TESTING at 1999 International Conference, October 1999.
12. Kuo, S.S., Waddell, D.M. "Performance of Bridge Deck Expansion Joints by Large Scale Accelerated Testing Apparatus". A paper published by Fourth World Congress on Joint Sealing and Bearing Systems for Concrete Structures, ACI Specialty, October 1996.
13. Kuo, S.S., H. Mahmoud, "Proposed Application of Fuzzy Logic Expert System In the Selection of Bridge Deck Joints." A paper published by Fourth World Congress on Joint Sealing and Bearing Systems for Concrete Structures, ACI Specialty, October 1996.
14. Kuo, S.S., Clark, D.A., Kerr, R. "A Complete Package for Computer Automated Bridge Inspection Process." A paper accepted for presentation and publication for 73rd annual Transportation Research Board (TRB). 1994. Journal of Transportation Research Board (TRB). Nov. 1994.
15. Kuo, S.S., Kirk Eastman, D. Michael Waddell. "Testing of Bridge Expansion Joints by Large Scale Testing Apparatus." Journal of Transportation Research Board (TRB) No. 1393. pp. 47-53 October, 1993.
16. Kuo, S.S., Davidson, T.E., Fiji, L.M. "New Innovative Technology on Computer Automated Bridge Inspection Process." Journal of Transportation Research Board (TRB). No. 1347 pp. 1-10, Nov. 1992.
17. Kuo, S.S. "Special Facilities for Highway Research - UCF Circular Accelerated Test Track." Journal of Transportation Research Board (TRB) Circular No. 394. April 1992.
18. Woodard, M., Kuo, S.S. "Use of Acoustic Emission Technique to Investigate Cracking of Polymer Concrete Bridge Expansion Joints." Proceedings of the Ninth Conference on Engineering Mechanics. Edited by L. Lutes and J. Niedzneck, The American Society of Civil Engineers. 1992. PP 409-412
19. Kuo, S.S., Davidson, T., Fiji, L. "Development of Computer Automated Bridge Inspection Process." Proceedings of the Eighth Conference on Computing in Civil Engineering and Graphic Information System. Edited by B. Goodno and J. Wright. The American Society of Civil Engineers. 1992. PP. 794-801.
20. Kuo, S.S. "Stress and Time Effects on the Creep of Polycrystalline Ice and Frozen Soil." Proceedings of the Third International Conference on Ice Technology (ITC). Massachusetts

Institute of Technology. Edited by T. Murthy, W. Sackinger, P. Wadhams. 1992. PP. 209-224.

21. Kuo, S.S., Davidson, T., Fiji, L., Leo, M. "New Innovative Technology in Bridge Inspection: Computer Automated Bridge Inspection Process." Proceedings of the International Conference on Bridges and Flyovers. India. Edited by D.L. Rao. 1991. PP 529-537.
22. Kuo, S.S., Bergeson, S.P. "Evaluation of Bridge Expansion Joints by Large Scale Testing Apparatus and Analytical Approach." Proceedings of the International Conference on Bridges and Flyovers. India. Edited by D.L. Rao. 1991. PP 523-527.

#### Proceedings

1. Polt, C. Kuo, S.S. "Investigation of Fiber-Reinforced Concrete Made with Reclaimed Concrete Aggregate (RCA), A paper presented ASCE 2005 Rocky Mountain Regional Conference, University of Utah, 4/8/2005-4/9/2005.
2. Weiser, A. Kuo, S.S. "Use of Fiber reinforced Concrete with the Recycled Concrete Aggregate" Undergraduate Research forum Conference, Sponsored by USAF Academy and University of Colorado at Colorado Springs, 4/30/2005. USAF Academy.
3. Kuo, S.S. "Evaluation and Selection of Bridge Expansion Joint using Fuzzy Logic Expert System" A paper published at 5<sup>th</sup> World Congress on Joints, Bearings, Rome, Italy, July, 2001.
4. Kuo, S.S. Lorie, H. Kong, F. "Flexible Pavement Performance Prediction Model on the Basis of Pavement Condition Data." Proceedings on 20<sup>th</sup> ARRB Conference March 19-21, 2001, Melbourne, Australia.
5. Kuo, S.S., Armaghani, A. "Investigation of Ultra-Thin Fibre Reinforced Concrete Overlay, Recycled Aggregate Concrete Slab and Patching Materials Using Laboratory and Accelerated Performance Tests. "Proceedings on 20<sup>th</sup> ARRB Conference March 19 n-2, 2001. Melbourne, Australia. (Refereed)
6. Kuo, S.S., Armaghani, J. "Accelerated Pavement Performance Testing" A paper published at International Conference on Accelerated Paving Testing, Reno, Nevada, October, 1999. (Refereed)

7. Kuo, S.S., Chini, A., Armaghani, J. "Testing and Evaluation of Recycled Concrete Aggregates as Mixture and Base Material." A paper published on ASCE 5<sup>th</sup> Material Engineering Congress – Mat Cong 5, May 1999. (Refereed)
8. Armaghani, J., Kuo, S.S. "Investigation of Ultra-Thin Fiber Reinforced Concrete Overlay-from Accelerated Performance Testing to Project Implementation." A paper published on ASCE 5<sup>th</sup> Material Engineering Congress - Mat Cong 5, May, 1999. (Refereed).
9. Kuo, S.S., Armaghani, J., Scherling, D. "Accelerated Performance Testing of White Topping" A paper published in Fifth International Conference on the Bearing Capacity of Roads and Airfields. Norway, July, 1998 (Refereed).
10. Kuo, S.S., Armaghani, J. Scherling, D. "Accelerated Performance Testing of Ultra-Thin Fiber Reinforced Concrete Overlay on Asphalt and Concrete Pavements". A paper published in 3<sup>rd</sup> International Conference on Road and Airfield Pavement Technology," Beijing, China, April, 1998.
11. Kuo, S.S., Armaghani, J., Scherling, D. Investigation and Accelerated Performance Testing of Ultra-Thin Fiber Reinforced Concrete Overlay on Asphalt and Concrete Pavements. A paper published in 1<sup>st</sup> Asia Pacific Conference on Transportation and Environment. May 13-15, 1998. Singapore
12. Kuo, S.S., Armaghani, J., Scherling, D. Accelerated Performance Testing of Ultra- Thin Fiber Reinforced Concrete Overlay on Asphalt and Concrete Pavements. A paper published in 1<sup>st</sup> Annual SnFRC Symposium. January 16, 1998, Orlando, FL. (Refereed).
13. Kuo, S.S. "Use of Ground Penetrating Radar Techniques to Aid in the Design of Disposal System in the Karst Terrains." A paper published in 6th International Conference on GPR. Sept. 30-Oct 3, 1996, Sendai, Japan. (Refereed).
14. Kuo, S.S. "The Sinkhole Hazard in Florida". Proceedings on the CASAF 1994 Annual Meeting, Orlando, Florida, Jan. 1994. (Non-refereed, Regional).
15. Waddell, D.M., Kuo, S.S. "Evaluation of Bridge Expansion Joints from Large Scale Testing Apparatus and Water Leak Testing". Proceedings on 10th International Bridge Conference, Pittsburgh, PA. June 14-16, 1993. (Refereed, International).
16. Kuo, S.S. "Increase of Highway Bridge Safety from Computer Automated Bridge Inspection Process." Proceedings on the Third Workshop on Bridge Engineering Research in Progress. University of California, San Diego. November 1992. (Refereed, National).

17. Kuo, S.S. "Safety of Highway Bridge Required An Adequate and Accurate Bridge Inspection Report." Proceedings on the CASAF 1992 Annual Meeting. Miami Beach, Florida. June 1992. pp. 124-131. (Non-refereed, Regional).
18. Kuo, S.S., Powley, M. "Development of Slope Stability Regulation for Sand Mining Industry in Central Florida." Proceedings on the 28th Engineering Geology and Geotechnical Engineering Symposium. Boise, Idaho. April 1992. (Refereed, National).
19. Kuo, S.S., Davidson, T., Fiji, L. "Computer Automated Bridge Inspection Process." Proceedings on the 9th National Conference on Microcomputers in Civil Engineering. Orlando, Florida. October 1990. (Non-refereed, National).
20. Kuo, S.S., Bergeson, S. "Evaluation of Bridge Expansion Joint by Full-Scale Testing Apparatus." Proceedings on the 8th National Conference on Microcomputers in Civil Engineering. Orlando, Florida. October 1990. (Non-refereed, National).
21. Kuo, S.S., Filler, D. "Comparison of Subsurface Cavity Detection Using Earth Resistivity, Seismograph, and Ground Penetrating Radar." Proceedings on the Third National Outdoor Action Conference on Aquifer Restoration, Ground Water Monitoring and Geophysical Methods. May 1989. Orlando, Florida. pp. 827-840. (Refereed, National).
22. Kuo, S.S., Stangland, H. "Use of Ground Penetrating Radar Techniques to Aid in the Design of On-Site Refuse Burning Facility." Proceedings on the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering. March 1989. Reno, Nevada. pp. 11-17. (Refereed, National).
23. Stangland, H., Kuo, S.S. "Use of Ground Penetrating Radar Techniques to Aid in Site Selection for Land Application Sites." Proceedings on the Second Multidisciplinary Conference on Sinkholes and Environmental Impacts of Karst. February 1987. Orlando, Florida. pp. 171-178. (Non-refereed, National).
24. Kuo, S.S., Stangland, H. "Use of Ground Penetrating Radar Techniques to Aid in the Design of On-Site Disposal Systems." Proceedings on National Water Well Association for the Conference of Environmental Problems in Karst Terrains and Their Solutions. October 1986. Bowling Green, Kentucky. (Refereed, National)

#### Presentations

1. Pedro F. Suarez, Shiou-San Kuo, Lei zhao, " Development of Fabric-Wrapping Technique for Leaking Pipeline Joint under Roadway Pavement". A paper presented and published in ASCE PIPELINES 2006. ASCE, July 30-August 2, 2006

2. Shiou-San Kuo, Pedro suarez, Lei Zhao, “Feasibility of Fiber-Wrapping for Leaking Pipeline Joints under Roadways”. A paper presented and accepted for publication in TRB 86<sup>TH</sup> Annual Meeting, January 22, 2007
3. Weiser, A. Kuo, S.S. “Use of Fiber Reinforced Concrete with Recycled Concrete Aggregate” Undergraduate Research forum Conference, Sponsored by USAF Academy and University of Colorado at Colorado Springs, April 2005. USAF Academy.
4. Kuo, S. S. and Mahgoub, H. S. “Specification and Guidelines of Limestone Recycled Concrete Aggregate for Use as Base Course in Flexible Pavement” Transportation Research Board, January,2002.
5. “Development of Fuzzy Logic Expansion Joint using fuzzy Logic Expert System for Selection and Evaluation of Bridge Joints” 2<sup>nd</sup> LASTED International Conference, March 2002.
6. Kuo.S.S. Maghgoub, H. and, Abdelnoor, N “Investigation of Recycled Concrete Made with Limestone aggregate for a Base Course in Flexible Pavement.” A paper presented at 81<sup>st</sup> Annual TRB, January 2002.
7. Kuo.S.S. Mahmoud, H. and Maghgoub, H. “Evaluation and Selection of Bridge Expansion Joint using fuzzy Logic Expert System” A paper presented at 81<sup>st</sup> Annual TRB, January 2002.
8. Kuo, S.S., Armaghani, J. “Accelerated Pavement Performance Testing” A paper presented at International Conference on Accelerated Paving Testing, Reno, Nevada, October, 1999. (Refereed)
9. Kuo, S.S., Chini, A. “Testing and Evaluation of Recycled Concrete Aggregates as Mixture and Base Material.” A paper presented at ASCE 5<sup>th</sup> Material Engineering Congress – MatCong 5, May 1999, Cincinnati, Ohio. (Refereed)
10. Armaghani, J., Kuo, S.S. “Investigation of Ultra-Thin Fiber Reinforced Concrete Over-layer from Accelerated Performance Testing to Project Implementation.” A paper presented on ASCE 5<sup>th</sup> Material Engineering Congress – MatCong 5, May 1999, Cincinnati, Ohio.
11. Kuo, S.S., Armaghani, J., Scherling, D. “Accelerated Performance Testing of Ultra-Thin Fiber Reinforced Concrete Overlay on Asphalt Concrete Pavements.” A paper presented at 3<sup>rd</sup> International Conference on Road and Airfield Pavement Technology, Beijing, China, April 1998.

12. Kuo, S.S., Armaghani, J., Scherling, D. "Investigation and Accelerated Performance Testing of Ultra-Thin Fiber Reinforced Concrete Overlay on Asphalt and Concrete Pavements". A paper presented at 1<sup>st</sup> Asia Pacific Conference on Transportation and Environment. May 13-15, 1998. Singapore.
13. Kuo, S.S., Armaghani, J., Scherling, D. "Accelerated Performance Testing of Ultra-Thin Fiber Reinforced Concrete Overlay on Asphalt and Concrete Pavements." A paper presented at 1<sup>st</sup> Annual SnFRC Symposium. January 16, 1998, Orlando, FL
14. Kuo, S.S., Clark, D.A., Kerr, R. "Complete Package for computer Automated Bridge Inspection Process" 7A paper presented at 3rd Transportation Research Board Annual Meeting. Washington, D.C., January 9-13, 1994.
15. Waddell, D. M., Kuo, S.S. "Testing of Bridge Expansion Joints by Large Scale Testing Apparatus and Water Leak Testing". A paper presented at 10th International Bridge conference, Pittsburgh, PA. June 14-16, 1993.
16. Kuo, S.S., Kirk Eastman, D. Michael Waddell, "Testing of Bridge Expansion Joints by Large Scale Testing Apparatus." A paper presented at 72nd Transportation Research Board Annual Meeting. Washington, D.C., January 10-14, 1993. (Refereed, National)
17. Kuo, S.S. "Increase of Highway Bridge Safety from Computer Automated Bridge Inspection Process." A paper presented at Third Workshop on Bridge Engineering Research in Progress. University of California, San Diego. November 16, 1992. (Refereed, National).
18. Kuo, S.S. "Stress and Time Effects on the Creep Rate of Polycrystalline Ice in Frozen Soil." A paper presented at Third International Conference on Ice Technology. MIT, Cambridge, MA. August 11, 1992. (Refereed, International).
19. Kuo, S.S. "Safety of Highway Bridges Required An Adequate and Accurate Bridge Inspection Report." A paper presented at CASAF 1992 Annual Meeting. Miami Beach, FL. June 19, 1992. (Non-refereed, Regional).
20. Kuo, S.S. "Development of Computer Automated Bridge Inspection Process." A paper presented at Eighth National Conference on Computing in Civil Engineering and Geographic Information Systems Symposium. ASCE Technical Council on Computer Practices. Dallas, TX. June 7, 1992. (Refereed, National).
21. Woodard, M., Kuo, S.S. "Use of Acoustic Emission Technique to Investigate Cracking of Polymer Concrete Bridge Expansion Joints." A paper presented at ASCE Ninth Engineering

- Mechanics Conference. Texas A&M University. College Station, TX. May 25, 1992. (Refereed, National).
22. Kuo, S.S. "New Innovative Technology in Computer Automated Bridge Inspection Process." A paper presented at 71st Transportation Research Board Annual Meeting. Washington, DC. January 12, 1992. (Refereed, International).
  23. Davidson, T., Kuo, S.S. "Computer Automated Bridge Inspection Process." A paper presented at 8th National Conference on Microcomputers in Civil Engineering. Orlando, FL. October 31, 1990. (Non-refereed, National).
  24. Bergeson, S., Kuo, S.S. "Evaluation of Bridge Expansion Joints by Full-Scale Testing Apparatus and Analytical Approach." A paper presented at 8th National Conference on Microcomputers in Civil Engineering. Orlando, FL. October 31, 1990. (Non-refereed, National).
  25. Bergeson, S., Kuo, S.S. "Evaluation of Bridge Expansion Joints by Large-Scale Testing Apparatus and Analytical Approach." A paper presented at ASCE Florida Section Annual Meeting. Panama City Beach, FL. September 20, 1990. (Non-refereed, Regional).
  26. Davidson, T., Kuo, S.S. "Computer Automated Bridge Inspection System." A paper presented at ASCE Florida Section Annual Meeting. Panama City Beach, FL. September 20, 1990. (Non-refereed, Regional).
  27. Kuo, S.S. "Use of Ground Penetrating Radar Techniques to Aid in the Design of On-Site Refuse Burning Facility." A paper presented at 25th Annual Symposium on Engineering Geology and Geotechnical Engineering. Reno, NV. March 20, 1989. (Refereed, National).
  28. Kuo, S.S. "Comparison of Subsurface Cavity Investigation Using Ground Penetrating Radar, Electrical Resistivity, and Seismograph." A paper presented at the Second International Symposium on Geotechnical Applications of Ground Penetrating Radar. Gainesville, FL. March 7, 1988. (Non-refereed, International).
  29. Kuo, S.S. "Capabilities of Ground Penetrating Radar for Studying Sinkhole Cavities in Florida." A paper presented at the Second International Symposium on Geotechnical Applications of Ground Penetrating Radar. Gainesville, FL. March 7, 1988. (Non-refereed, International).
  30. Kuo, S.S. "A Rapid Evaluation of Concrete Pavements Using Ground Penetrating Radar." A paper presented at the Second International Symposium on Geotechnical Applications of Ground Penetrating Radar. Gainesville, FL. March 7, 1988. (Non-refereed, International).

31. Kuo, S.S. "Use of Ground Penetrating Radar Techniques to Aid in the Design of On-Site Disposal Systems." A paper presented at National Water Well Association for Conference of Environmental Problems in Karst Terrains and Their Solutions. Bowling Green, KY. October 28, 1986. (Refereed, National).
32. Kuo, S.S. "Use of Ground Penetrating Radar Techniques to Aid in Site Selection for Land Application Sites." A paper presented at 1986 ASCE Florida Section Annual Meeting. Haines City, FL. September 1986. (Non-refereed, Regional).
33. Kuo, S.S. "Applicability of Ground Penetrating Radar to Subsurface Studies of Karst Terrain in Florida." A paper presented at 1986 Geological Society of America Section Annual Meeting. Orlando, FL. October 1985. (Non-refereed, National).
34. Kuo, S.S. "Capabilities and Limitations of Ground Penetrating Radar for Studying Sinkholes in Florida." A paper presented at 1985 ASCE Florida Section Annual Meeting. Melbourne, FL. September 1985. (Non-refereed, Regional).
35. Kuo, S.S. "Sinkhole Formation and Detection by Ground Penetrating Radar." A paper presented at Florida Academy of Sciences Annual Meeting. Saint Leo College, FL. May 1985. (Non-refereed, Regional).
36. Kuo, S.S. "A Rapid Evaluation of Concrete Pavements by Ground Penetrating Radar." A paper presented at 1984 ASCE Florida Section Annual Meeting. Fort Lauderdale, FL. September 21, 1984. (Non-refereed, Regional).
37. Kuo, S.S. "Application of Ground Penetrating Radar to the Investigation of Subsurface Cavities and Stratifications." A paper presented at American Public Works Association 1984 Convention and Equipment Show. Orlando, FL. May 2, 1984. (Non-refereed, Regional).
38. Kuo, S.S. "Lake Profiles by Ground Penetrating Radar for Restoration Project in Lake Jackson." A paper presented at 48th Annual Meeting of the Florida Academy of Sciences. Fort Lauderdale, FL. March 1984. (Non-refereed, Regional).
39. Kuo, S.S. "Analysis of Flexible Pavement on the Basis of Simple Deflection Basins Measured by Benkelman Equipment." A paper presented at 1982 ASCE Joint Florida/South Florida Annual Meeting. Orlando, FL. September 2, 1982. (Non-refereed, Regional).

Invited Presentations

1. Kuo, S.S. "Florida Sinkholes" An invitation to present for LIFE Learning Institute for Elders. Orlando, Florida, May 20, 1993.
2. Kuo, S.S. "Testing and Evaluation of Bridge Expansion Joints by Large Scale Testing Apparatus." An invitation to present at the ASTM Meeting in Miami, Florida, December 10,1992. (Refereed, National).
3. Kuo, S.S. "UCF-Circular Accelerated Test Track (UCF-CATT)." An invitation to present at the Pavement Testing Workshop sponsored by Federal Highway Administration (FHWA) and Texas Department of Transportation. Austin, TX. July 23-24, 1992. (Refereed, National).
4. Kuo, S.S. "Development of Computer Automated Bridge Inspection Process in Florida." An invitation to present at the Southeast FHWA-State DOT Engineers Bridge Management System Workshop. December 9-10, 1991. Orlando, FL. (Refereed, National).
5. Kuo, S.S. "Testing of Bridge Joint Seal System." An invitation to present at the Transportation Research Board Committee A3C06-Structures Maintenance and Management. Pittsburgh, PA. June 9, 1991. (Refereed, National).
6. Kuo, S.S. "A New Innovative Technology of Bridge Inspection: A Computer Automated Inspection Process." An invitation to present at the FHWA/State Bridge Engineering Region 4 Conference. Charleston, SC. January 28-31, 1991. (Refereed, National).

**CONTRACTS AND GRANTS AWARDED**

Dr. Kuo has served as Principal Investigator on all grants unless otherwise indicated.

<b>TITLE OF GRANT</b>	<b>FUNDING AGENCY</b>	<b>YEAR(S)</b>	<b>AMOUNT</b>
Investigation of Fiber Reinforced Concrete with RCA	US Air Force Academy	2005	\$10,000
Intergovernmental Personnel Act (IPA)	US Air Force Academy	2004-2005	\$134,000
A Pilot Study of Ground Penetration Radar for Detection of Existing Bricks	City of Orlando	2003-2004	\$35,000
Evaluation of Existing Pavement and Development Rehabilitation Strategies	City of Oviedo	2003-2004	\$40,000

TITLE OF GRANT	FUNDING AGENCY	YEAR(S)	AMOUNT
Investigation of Ground Penetrating Radar for Detection of Leaking Pipeline and Fiber Wrapping Repair Technique	CATSS	2003-2004	\$45,000
Pavement Condition Surveys for City of Oviedo	Oviedo	2001 - 2002	\$30,000
Accelerated Testing of 1620 Elastomeric Concrete	Lyntal International	2000	\$4,000
Use of Recycled Concrete Made with Florida Limestone Aggregates for a Base Course in Pavement	FDOT	2000 - 2001	\$5,000
Accelerated Testing of Pro-Flex 4000 Armorless Joint System.	Capital Services	2000	\$3,000
Use of Recycled Concrete Made with Florida Limestone Aggregates for a Base Course in Pavement	FDOT	1999-2001	\$101,183
Introduction of the Superpave System in the University Civil Engineering Curriculum	FHWA/FDOT	1998-1999	\$125,000
Flexible Pavement Performance Model	FDOT	1998-1999	\$86,000
Ground Penetrating Radar Sister Account	Various Firms	1985-1999	\$182,606
Testing of Bridge Expansion Joint	Capital Service Inc.	1998	\$4,000
Evaluation of Patching Materials and Placement Techniques for Rigid Pavement and Bridge Decks	FDOT	1997-1998	\$83,000
Guidelines and Specification for the Use of Reclaimed Aggregates in Pavement	FDOT	1996-1997	\$81,520
Testing and Analysis of Ultra thin Fiber Reinforced Concrete Pavement	FDOT	1995-1996	\$46,000
Testing and Analysis of Recycled and Non-recycled Flexible Pavements	NASA	1995-96	\$67,000
Perform a Non-Destructive Pavement Study	City of Oviedo	1995-96	\$10,000
Testing of Bridge Expansion Joints	Harris Specialty Chemicals, Inc. and Erie Metal Specialties	1994-95	\$19,000
Expansion of Automated Bridge Inspection Process	Florida Department of Transportation	1992-93	\$ 59,000
Testing of Bridge Expansion Joint Program	Various Joint Fabricators	1992-93	\$ 30,000
Test Track Equipment Update	UCF - EIES	1992	\$ 3,500
Phase III Automation Bridge Inspection Process	Florida Department of Transportation	1990-1991	\$ 65,000
Bridge Expansion Joint Test Program	Florida Department of Transportation	1990-1991	\$ 75,000

TITLE OF GRANT	FUNDING AGENCY	YEAR(S)	AMOUNT
Phase II Automation Bridge Inspection Process	Florida Department of Transportation	1989-1990	\$ 72,000
Phase II Testing of Bridge Expansion Joints	Florida Department of Transportation	1988-1989	\$ 69,000
Phase I Automation Bridge Inspection Process	Florida Department of Transportation	1988-1989	\$ 39,000
Ground Radar for Studying Sinkholes in Florida	STAR Research	1984-1985	\$ 32,000
Reflection Pattern of Ground Radar	UCF - DSR Grant	1984-1985	\$ 5,000
Lake Jackson Restoration (Co-PI with Dr. Wanielista)	Florida Department of Environmental Regulation	1983-1984	\$ 40,000
Feasibility of Ground Radar for Detection of Sinkholes	UCF - EIES	1983-1984	\$ 7,000
A Design Method to Prevent Rutting and Shoving of Asphalt Pavement	UCF - DSR Grant	1982-1983	\$ 5,000
Sinkhole Research Institute - Type II (Co-PI with other faculty)	Department of Treasury and Insurance	1982	\$150,000
Sinkhole Detection Using Geophysical Methods and Geotechnical Engineering	UCF - EIES Grant	1981-1982	\$ 4,400
Detection of Sinkholes by Geophysical	UCF - DSR Grant	1981-1982	\$ 2,800
<b>TOTAL</b>			<b>\$1,955,000</b>

**HONORS AND AWARDS**

**Dr. Kuo has received above satisfactory to outstanding Chair's Evaluations in teaching, research, and service for the last six years.**

1. Distinguished Visiting Professor invited by US Air Force Academy, 2004-2005
2. "TIP Award" by UCF, 2003
3. "University Incentive Performance Award" 2000.
4. "Sensor Department Enrichment Award" by Civil and Environmental Department, 1998.
5. "TIP Award" by University of Central Florida, 1995.
6. "Graduate Teaching Award" by Civil and Environmental Engineering Department, UCF, 1994.

7. "Senior Department Research Award." by Civil and Environmental Engineering Department, UCF, 1993.
8. Plaque awarded by ASCE Student Chapter "Excellent Faculty Advisor" 1987.
9. "Outstanding Researcher of the Year." Department Civil and Environmental Engineering UCF, 1989.
10. "Researcher of the Year." UCF, College of Engineering, 1989.
11. "Distinguished Researcher of the Year." Nominated for 1989 UCF
12. "Excellence in Advising Award" Civil and Environmental Engineering Department, 1990.
13. "Excellence in Advising Award". UCF College of Engineering, 1990.
14. "Excellence in Advising Award." Nominated for 1990 UCF.

## **PROFESSIONAL ACTIVITIES AND SERVICES**

### **National Activities**

1. Chair of Research Problem Statement Task Group - TRB A3C13 sub-committee. June 1993.
2. Member of TRB A3C13 sub-committee for Bridge, Pavement Joints, February 1993.
3. Member of TRB A3C06 - Bridge Deck Inspection and Maintenance sub-committee for Problem Statement and Goal. March 1993.
4. Technical expert to testify on "Environmental Costs of Energy Use in Transportation" for the United States Congress House Committee on Science, Space and Technology. September 1992.
5. Office of Faculty Advisor of American Society of Civil Engineers. 1982-Present. Organizing annual ASCE Student Leader Workshop, Annual Regional Student Conferences, Student Chapter By-Laws.

6. Member of National Council of Engineering Examiners. 1986-Present. Activities on this council include making and reviewing the problems for the "Professional Engineers" examinations.
7. Member of the United States Universities Council on Geotechnical Engineering Research. 1984-Present. The Council meets every two years to promote and monitor the research activities and potential research sources for Geotechnical Engineering faculty.
8. Member of National Science Foundation Research Proposal Review Committee. 1990.

#### **State Activities**

1. South Florida Skyway Bridge Special Investigation panel appointed by Governor Bob Graham. 1984.
2. Liaison to Florida Department of Transportation and Southeast Regional FHWA to set up Conference on Bridge Management System and Automation of Bridge Inspection Process. 1991.
3. Organizer for Florida Department of Transportation District Maintenance Engineers on Automation of Bridge Inspection Process Workshop. 1990-1992.
4. Committee member of Board of Directors of Florida Section ASCE Student Activities.

#### **Local Activities**

1. Served in various capacities in local East Central ASCE Chapter activities such as Scholarship Committee and Technical Support.
2. Teaching Professional Engineers examination review course for local engineers.

#### **TEACHING ACTIVITIES**

Dr. Kuo has established the graduate program in Geotechnical and Foundation Engineering since he came to UCF in 1981 and continues successfully to support and maintain this program by himself for the past ten years.

I. Courses Taught

**Undergraduate**

CEG 4101 Geotechnical Engineering I  
CEG 4101L Geotechnical Engineering I Laboratory - (initiated by Dr. Kuo)  
CGN 3501 Civil Engineering Materials  
EGN 3311 Engineering Mechanics - Statics  
EGN 3331 Engineering Mechanics of Materials  
CES 4102 Structural Analysis  
ENV 4402 Hydraulics

**Graduate**

CEG 5015 Geotechnical Engineering II  
CEG 5805 Geotechnical Engineering Design - (initiated by Dr. Kuo)  
CEG 6115 Foundation Engineering - (initiated by Dr. Kuo)  
CEG 6065 Soil Dynamics - (initiated by Dr. Kuo)  
TTE 5835 Pavement Design - (initiated by Dr. Kuo)  
CEG 6317 Theoretical Geotechnical Engineering (initiated by Dr. Kuo)  
CEG 5700 Geo-Environmental Engineering (initiated by Dr. Kuo)  
PE Review Course

II Graduate Students Supervised

**Doctoral Students**

Mahmoud, H. "Application of a Fuzzy Logic Expert System In The Selection of Bridge Deck Joint Systems." Ph.D., Completed, December, 1998

Gassaway, D. "Analytical and Experimental Investigation of FRC Bridge Deck Slabs Without Steel Reinforcement." Incomplete.

**Masters Students**

Kazma, Jad S. "Effects of Bedding Void on Internal Moment Increase in Concrete Pipes". Spring 2005.

Andres, Arvelo M. "Effects of Soil Properties on the Maximum Dry Density Obtained by the Compaction of Soils". Fall 2005.

Suarez, Pedro F. “ Investigation of Ground Penetrating Radar for Detection of Leaking Pipelines under Roadway Pavement and Development of Fiber Wrapping Repair Technique”. Fall 2004.

Desai, Karishma R. “Detection and Evaluation of Existing Pavement System with Bricks Base Using Ground Penetration Radar”. Fall 2004

Ortega, Jose E., “ Use of Florida Recycled Concrete Aggregate for A Base Course in Flexible Pavement.” Spring, 2002.

Kong, Fanzhen, “ Flexible Pavement Performance Prediction Model on the Basis of Pavement Condition Data.” Spring 2000.

Ausher, Gerald S., “Investigation of Florida Department of Transportation Dry Retention/Detention Stormwater Treatment Systems with Subsurface Geotechnical Parameter Approach.” Spring 1999.

Carlo, L. “Evaluation of Patching Materials and Placement Techniques for Rigid Pavements.” Summer, 1998.

Holliday, Russell D., “Pavement Responses Due to Aircraft Impact Load During Hard Landings.” Summer 1998.

Carlo, Lucas, “Evaluation of Patching Materials and Placement Techniques for Rigid Pavements.” Summer 1998.

Duxbury, J. “Testing and Analysis of Rigid and Flexible Pavements Using Recycled Aggregates as Mixture and Base Materials.” Summer 1997.

Rivera, L.L. “Design Method for Municipal Solid Waste Landfill Liner System Subjected to Sinkhole Cavity under Landfill Site.” Spring 1997.

Bennett, C.A. “Computer Method for Municipal Solid Waste Landfill Liner System Subjected to Sinkhole Cavity Under Landfill Site.” Spring 1997.

Lewis, N. “Investigation of Ultra-Thin Fiber Reinforced Concrete and Non-Reinforced Concrete Over Existing Asphalt Pavements.” Fall 1996.

Howard, R.M. “The Design and Implementation of The Orlando Pavemnet Management System.” Fall 1995.

Phan, S. “Development of A Partial Depth Patching Technique in Rigid Pavement.” Spring 1995.

Ouelette, C. “Development of A Three-Dimensional Subsurface Mapping Technique Using GPR Data in a GIS.” Fall 1994.

Clark, D. “Automation of Bridge Inspection and Work Order Systems for Bridge Management.” Summer 1993.

Leo, M. “Automation of Field Bridge Inspection Process Using Gridpad Computer.” Fall 1992.

Eastman, K. “Accelerated Load Testing of Bridge Expansion Joints.” Fall 1992.

Woodard, M. “Evaluation of Polymer Concrete Bridge Expansion Joints Using Acoustic Emission.” Fall 1992.

Ferrer, J. “Finite Element Modeling of Bridge Expansion Joints.” Summer 1992.

Quintero, R. “Computerized Data Acquisition System for Testing of Bridge Expansion Joints.” Fall 1991.

Powley, M. “Slope Stability Analysis for Reclaimed Sand Mines in Central Florida.” Fall 1990.

Fiji, L. “Development of a Bridge Inspection Software.” Summer 1990

Davidson, T. “Computer Automated Bridge Inspection System.” Summer 1990.

Bergeson, S. “Design of Test Track for Bridge Expansion Joints.” Spring 1990.

Filler, D. “Comparison of Subsurface Cavity Investigations Using Earth Resistivity, Seismograph, and Ground Penetration Radar.” Spring 1988.

Kamath, D. “Evaluation of Asphalt Pavement Using Benkelman Beam, Falling Weight Deflectometer, and Ground Penetrating Radar.” Fall 1988.

Henderson, C. “Evaluation of Concrete Pavement performance with Related Cracking and/or Voids.” Fall 1988.

Tannous, B. “Investigation of Electrical Properties of Earth Materials by Ground Penetration Radar.” Spring 1987.

Sweeney, M. “Ground Penetrating Radar in the Detection of Subsurface Cavities Related to Sinkhole Activity in Florida.” Spring 1986.

Tehrani, H. “A Theoretical Evaluation of Water Surface Changes in a Circular Reservoir.” Spring 1986.

Francois, C. “Experimental Investigation of Campbell Pacific Nuclear Corporation MC-1 Density-Moisture Nuclear Gauge on Sand, Clay, Asphalt concrete, and Concrete.” Summer 1984.

Johnson, R. “Geotechnical Investigation of In-Lake Sediment Treatment for Lake Meginnis Arm of Lake Jackson, Tallahassee, Florida.” Summer 1984.

Kuhns, G. “Application of Ground Penetration Radar to the Detection of Subsurface Cavities.” Fall 1983.

## **RESEARCH ACTIVITIES IN CAREER**

Dr. Kuo has established a broad field of research interest through his years of academic and industrial experience. His research activities involve the areas of Geotechnical (subsurface), Transportation (pavements), and Infrastructure (bridges).

In the Geotechnical area, Dr. Kuo uses the high-tech impulse radar system – Ground Penetrating Radar (GPR) to investigate and detect the subsurface anomalies such as sinkholes, buried toxic waste, tanks, pipes and utilities. The technique has resolved many problems for construction and infrastructure.

In the Transportation area, Dr. Kuo has applied the state-of-the-art equipment such as SUPERPAVE testing laboratory, falling weight deflectometer, and GPR to the evaluation of pavement life expectancy. The technique has been widely used by many consulting engineers.

Today, inadequate bridges have become the nation’s most pressing infrastructure problem. Over 41% of the national bridges are either structurally deficient or functionally obsolete. With 10 years of bridge design and analysis experience, Dr. Kuo has designed the UCF Circular Accelerated Test Facility for testing of bridge components such as bridge expansion joints and bridge deck materials to quickly predict and measure the performance of highway structures so that the design engineers can optimize new design strategy and establish the rehabilitation program.

Dr. Kuo’s research technologies and innovations have been published in regional newspapers many times and have been demonstrated for the local ABC and NBC affiliate television

stations in many years. The bridge expansion joint test facility has been video taped by UCF's Division of Sponsored Research.

## **CURRENT AND PAST MAJOR RESEARCH PROJECTS**

### **Testing and Analysis of Pavements**

Sponsored by FDOT, FHWA, Cities, and NASA. Total funding \$723,000 (1995-2005) Using UCF Test Track to test recycled flexible pavement and ultra-thin fiber reinforced concrete pavement. Development of Superpave mix design testing laboratory.

### **Testing of Bridge Expansion Joints**

Sponsored by FDOT, FHWA, and Industries. Total funding to date (1988-2000) \$550,000.

The testing facility is one of the first kind in the nation and the world for this research. Today, this facility becomes a show case for Department, College, and University. This model test track is 50 feet in diameter to the center of a 4 foot wide paved lane. Two bridge sections with an expansion joint in each is built into the track. The bridges are 6 feet wide by 12 feet long with a joint in the middle. The deck is anchored to eight 1 ft<sub>2</sub>, 2 foot high columns.

The loading system consists of three 25 foot long W36 x 150 beams mounted radially from a support at the center of the track. A 12 foot diameter by 8 foot high water tank is centrally mounted on top of the three beams. The total weight up to 80,000 pounds (full water tank) is evenly distributed to three dual truck wheels mounted on the ends of the beams. The dual-wheel assembly consists of a common truck axle cut in half and designed to fit into a hydraulic transmission system which will deliver speeds up to 30 miles per hour. Power is supplied by a 220 horse-power diesel engine and hydraulic pump mounted on the ground off the test track. Instrumentation for load cells, acoustic emission, strain gauges, and electromagnetic impulse will be installed to monitor the system and collect test data. A computerized data acquisition and control system has been assembled to monitor the performance and life expectancy of different expansion joints. The finite element computer program is being used to analyze the test specimens, simulate crack propagation and fatigue life, and compare with test data. Six joint manufactures have participated in the test program and seven joint products have been installed for testing. Many other joints are scheduled to be tested. The replacement cost of the entire facility exceeds over \$600,000 today.

*Potential Research from This Facility*

- ◆ Testing of Highway/Pavement Materials
- ◆ Fatigue and Fracture Testing of Bridge Slab and Components
- ◆ Testing of Tire Wear, Pavement Painting, Hydroplane Study
- ◆ Traffic Weight-in-Motion Research
- ◆ Modeling of Pavement, Joint, and Deck Performance
- ◆ Mitigation of ASR using the Fiber in RCA

UCF Test Tract designed by Dr. Kuo



**Automation of Bridge Inspection Process**

Sponsored by FDOT. Total funding to date (1988-1993) \$295,000.

This study presents the design of a computer automated bridge inspection system for the Florida Department of Transportation (FDOT) to increase field inspection organization and accuracy, and to speed office-based report preparation. A computer program for field data collection based on the FDOT's Condensed Inspection Report (CIR) has been designed for a handheld computer. The program is used to input condition ratings and generate or edit comments for each bridge element on the CIR. A text-file record of the inspection is stored in the handheld computer for later up-loading to an office based personal computer system. Visual information on bridge defects can be recorded with a camcorder, 35mm camera or sketch. The images are digitized and stored on computer disk with an automated system developed for the PC. The PC system uses the JetForm form designing and filling program to place the images and text-file inspection record onto the

Cover, Condensed forms. The complete bridge inspection reports are saved to computer disk for archiving and final copies are printed on a laser printer. This automated procedure was tested in a Florida Department of Transportation bridge inspection district. Time and cost comparisons are made for this automated procedure versus the conventional bridge inspection procedure now used by the FDOT. Under the current conventional process it takes an average of 30 days to finalize the report. Using the automated process the time frame could be reduced to under 5 days. During the testing period, an inspection report preparation and report finalization have occurred in less than 5 hours. The results of this project are currently being implemented in the State of Florida. Other states and consulting engineering firms have requested to use the package of software developed from this project.

*Potential Research from This Technology*

- ◆ State-of-the-Art Bridge Inspection Technique
- ◆ Database for Bridge Management System
- ◆ Decision Making for Bridge Maintenance, Repair, and Rehabilitation
- ◆ Computer Automated Inspection for Building, Utilities, Etc.
- ◆ Automated Railroad Bridge Inspection Process

**Subsurface Exploration Using Non-Destructive Geophysical Methods – Ground Penetration Radar, Resistivity, and Seismography**

Sponsored by Various Engineering Consultants. Total funding to date (1984-2005) \$140,000.

Ground Penetration Radar (GPR) is an impulse radar system which radiates short duration electromagnetic pulses into the ground from an antenna on ground surface. These pulses are reflected from various interfaces within the earth and are picked up by the receiver in the antenna and processed in the control unit and displayed by a graphic recorder. These reflections occur at different soil horizons, soil/rock interfaces, rock/air interfaces (voids, sinkholes), man-made objects (pipes, utilities), or at any interface which creates a contrast in complex dielectric properties (contaminants). The depth of radar penetration is very site specific. Depths of 20 to 40 feet are commonly attained in the Central Florida area. 60 to 90 foot penetration has been achieved under ideal conditions at some sites with a deeper ground water table. High concentrations of salts, clay or losses of sand are highly attenuated by the radar pulse and penetration may not exceed 10 feet. The GPR technique has been applied to many geotechnical site investigations and has resolved many problems for construction and foundation design.

*Potential Research Using GPR*

- ◆ Evaluation of Existing Foundation Structures and Investigation of Subsurface Failure by GPR.
- ◆ Identification of Subsurface Media by Electromagnetic Video Pulse Shapes and Spectral Distribution Using Computer Data Interpretation.
- ◆ GPR Technique for the Detection of Underground Hazardous Waste and Groundwater Contamination.
- ◆ Subsurface Mapping Using GIS and GPR Data.
- ◆ Highway and Airport Pavement Evaluation Using GPR.
- ◆ Detection of leakage of underground utility lines.