

**Laurence J. Jacobs**  
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Georgia Institute of Technology  
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**RESEARCH INTERESTS:**

Professor Jacobs' research focuses on the development of quantitative methodologies for the nondestructive evaluation and life prediction of structural materials. This includes the application of nonlinear ultrasound for the characterization of fatigue, creep, stress-corrosion, thermal embrittlement and radiation damage in metals. His work in cement-based materials includes the application of linear and nonlinear ultrasonic techniques to quantify microstructure and progressive micro-cracking in concrete.

Dr. Jacobs' publications have been cited more than 3000 times with an *h*-index of 31 (Google Scholar), 26 (Scopus) or 24 (Web of Science) and he is a Fellow of the ASME. Professor Jacobs' research has been funded by DOE, NSF, ONR, AFOSR, DARPA, NASA, US DOT, Georgia DOT, Exxon-Mobil, EPRI and GE. He has been the PI or co-PI on \$6.5M worth of contracts since 1990. Dr. Jacobs has advised 16 Ph.D. students (4 women and 2 African Americans) and 55 M.S. thesis students.

**EDUCATION:**

<b>Ph.D. in Engineering Mechanics</b> <i>Columbia University</i>	May, 1987 <i>New York, New York</i>
<b>M.S. in Civil Engineering (Structures)</b> <i>Polytechnic Institute of New York</i> Part-time evening student on a Grumman Aerospace Masters Fellowship	May, 1981 <i>Brooklyn, New York</i>
<b>B.S. in Civil Engineering</b> <i>Lafayette College</i>	June, 1979 <i>Easton, Pennsylvania</i>

**PROFESSIONAL EXPERIENCE:**

<b>Georgia Institute of Technology</b> <i>College of Engineering (CoE)</i> Associate Dean for Academic Affairs <i>School of Civil and Environmental Engineering (CEE)</i> Professor Joint Appointment in <i>The Woodruff School of Mechanical Engineering (ME)</i> Associate Chair for Undergraduate Programs (CEE) Associate Professor (Tenured May, 1994) Assistant Professor	Atlanta, Georgia November, 2007 - Present May, 2000 - Present October, 2002 - Present January, 1995 - October, 2007 May, 1994 - April, 2000 Sept. 1988- April, 1994
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**Duties as Associate Dean:** Directly responsible for the administration of all academic programs within the largest College of Engineering in the United States. Accomplishments as an individual or a team-member include: successful ABET accreditation for 16 academic programs on two campuses; implementation of Professional Masters in Applied Systems Engineering; and Bio Devices; development of an extensive partnership with universities in Abu Dhabi and Saudi Arabia; coordinated unit level academic program reviews; championed undergraduate curriculum reform that emphasizes multidisciplinary design, problem-based learning, experiential learning and interdisciplinary minors.

**Duties as Associate Chair:** Directly responsible for administration of a BSCE and a BSEnvE undergraduate program consisting of approximately 750 students and 50 faculty members. Accomplishments include: successful program accreditation under ABET Criteria 2000 Guidelines in 1997 and 2002; development and implementation of a new semesters based undergraduate curriculum; development of an outcomes based assessment process for the BSCE program; and development of a BSEnvE degree program.

**Courses Taught:** Statics, Dynamics, Mechanics of Solids, Advanced Strength of Materials, Numerical Analysis, Wave Propagation in Solids, Nondestructive Evaluation of Infrastructure, Infrastructure Rehabilitation, Elasticity I and II, Structured Computer Programming for Engineers, and Dilemmas in Technology and Policy.

- Summer Faculty Fellow** Summer, 1991  
*Arnold Engineering Development Center* *Arnold AFB, Tennessee*  
 Fellowship program sponsored by the Air Force Office of Scientific Research. Nondestructive testing of composite, aircraft engine components using laser ultrasonic techniques.
- Summer Faculty Fellow** Summer, 1989 and 1990  
*Naval Air Development Center* *Warminster, Pennsylvania*  
 Advanced Metallic and Ceramic Materials Group  
 Fellowship program sponsored by the Office of Naval Research. Used a laser interferometric apparatus to investigate the acoustic emission waveform from dynamic crack growth.
- Postdoctoral Fellow** August, 1987-August, 1988  
*Naval Air Development Center* *Warminster, Pennsylvania*  
 Advanced Metallic and Ceramic Materials Group  
 Postdoctoral fellowship program sponsored by the Office of Naval Technology. Investigated crack growth during the delamination fracture of laminated fiber composites. Experimental studies of isotropic and composite materials, using acoustic emission techniques to monitor the effects of dynamic crack propagation.
- Graduate Research/Teaching Assistant** September, 1983-July, 1987  
*Columbia University* *New York, New York*  
 Department of Civil Engineering and Engineering Mechanics  
 Theoretical analysis of dynamic crack propagation, including numerical analysis of singular integral equations. Examined the dynamic stresses generated by an arbitrary crack growth event.
- Mathematics Teacher** September, 1985-June, 1987  
*Lycée Français de New York* *New York, New York*
- Structural Engineer** July, 1981-July, 1982  
*Ammann and Whitney Consulting Engineers* *New York, New York*  
 Design of blast resistant and cable structures using non-linear, dynamic finite element analysis.
- Staff Engineer** July, 1979-June, 1981  
*Grumman Aerospace Corporation* *Bethpage, New York*  
 Responsibilities consisted of the review and evaluation of the engineering and functional aspects of non-conforming aircraft components. Specified all design and repair action to be undertaken to restore structural integrity, fatigue life requirements, and functional acceptability of discrepant materials.

**REFEREED JOURNAL ARTICLES (CURRENTLY UNDER REVIEW):**

1. **In\*, Chi-Won, Arne\*, K.**, Kim, Jin-Yeon, Kurtis, K.E. and Jacobs, L.J., “A Measurement of crack depth in concrete using diffuse ultrasound – Validation on real cracks in a concrete beam,” *Construction and Building Materials*, submitted, 2014.
2. **Marino\*, D.**, Kim, Jin-Yeon, Ruiz, Joo, Young-Sang, Qu, Jianmin, and Jacobs, L.J., “Using nonlinear ultrasound to track thermal aging damage in modified 9% Cr ferritic martensitic steel,” *NDT&E International.*, submitted, 2015.
3. **Romer\*, A.**, Kim, Jin-Yeon, Qu, Jianmin and Jacobs, L.J., “The second harmonic generation in reflection mode – an analytical, numerical and experimental study,” *Journal of Nondestructive Evaluation*, submitted, 2015.

**REFEREED JOURNAL ARTICLES:**

4. **Matlack\*, K.H., Bradley\*, H.A., Thiele\*, S.**, Kim, Jin-Yeon, Wall, J.J., Jung, Hee Joon, Qu, Jianmin, and Jacobs, L.J., “Nonlinear ultrasonic characterization of precipitation in 17-4PH stainless steel,” *NDT&E International.*, Vol. 71, pp. 8-15, 2015.
5. **Kim\*, Gun**, Kim, Jin-Yeon, Kurtis, K.E., Jacobs, L.J., Le Pape, Yann, and Guimaraes, M., “Quantitative evaluation of carbonation in concrete using nonlinear ultrasound,” *Materials and Structures*, accepted for publication, 2014.
6. **Torello\*, D., Thiele\*, S., Matlack\*, K.H.**, Kim, Jin-Yeon, Qu, Jianmin, and Jacobs, L.J., “Diffraction, attenuation, and source corrections for nonlinear Rayleigh wave ultrasonic measurements,” *Ultrasonics*, Vol. 56, pp. 417-426, 2015.
7. **Morlock\*, M.B.**, Kim, Jin-Yeon, Qu, Jianmin, and Jacobs, L.J., “Mixing of two-directional Rayleigh surface waves in a nonlinear elastic material,” *Journal of the Acoustical Society of America*, Vol. 137 (1), pp. 281-292, 2015.
8. **Matlack\*, K.H.**, Kim, Jin-Yeon, Jacobs, L.J., and Qu, Jianmin, “Review of second harmonic generation measurement techniques for material state determination in metals,” *Journal of Nondestructive Evaluation*, DOI 10.1007/s 10921-014-0273-5, 2015.
9. **In\*, Chi-Won, Schempp\*, F.**, Kim, Jin-Yeon, and Jacobs, L.J. “A fully non-contact, air-coupled ultrasonic measurement of surface breaking cracks in concrete,” *Journal of Nondestructive Evaluation*, accepted for publication, 2014.
10. Chen, Zimu, **Tang\*, Guangxin**, Zhao, Youxun, Jacobs, L.J. and Qu, Jianmin, “Mixing of Collinear Pulses in Elastic Solids with Quadratic Nonlinearity ,” *Journal of the Acoustical Society of America*, Vol. 135 (5), pp. 2389-2404, 2014.
11. **Thiele\*, S.**, Kim, Jin-Yeon, Qu, Jianmin, and Jacobs, L.J., “Air-Coupled Detection of Nonlinear Rayleigh Surface Waves to Assess Material Nonlinearity,” *Ultrasonics*, Vol. 54, pp. 1470-1475, 2014.
12. **Kim\*, Gun, In\*, Chi-Won**, Kim, Jin-Yeon, Kurtis, K.E., and Jacobs, L.J. “Air-coupled detection of nonlinear Rayleigh surface waves in concrete – Application to microstructure characterization,” *NDT&E International*, Vol. 67, pp. 64-70, 2014.

13. **Matlack\*, K.H.**, Kim, Jin-Yeon, Wall, J.J, Qu, Jianmin, and Jacobs, L.J., “Nonlinear ultrasonic characterization of radiation damage using Charpy impact specimen,” *JASTM STP 1576*, pp. 1-17, 2014
14. **Zeitvogel\*, D.T., Matlack\*, K.H.**, Kim, Jin-Yeon, Jacobs, L.J, Singh, P.M., and Qu, Jianmin, “Characterization of stress corrosion cracking in carbon steel using nonlinear Rayleigh surface wave,” *NDT&E International*, Vol. 62, pp. 144-152, 2014.
15. **Matlack\*, K.H.**, Kim, Jin-Yeon, Wall, J.J, Qu, Jianmin, Jacobs, L.J, and Sokolov, M., “Sensitivity of ultrasonic nonlinearity to irradiated, annealed, and re-irradiated microstructure changes in RPV steels,” *Journal of Nuclear Materials*, Vol. 448 pp. 26-32, 2014.
16. **Tang\*, Guangxin, Liu\*, Minghe**, Jacobs, L.J. and Qu, Jianmin, “Detecting localized plastic strain by a scanning collinear wave mixing method,” *Journal of Nondestructive Evaluation*, Vol. 33, pp. 196-204, 2014. DOI 10.1007/s10921-014-0224-1.
17. **In\*, Chi-Won**, Holland, R.B., Kim, Jin-Yeon, Kurtis, K.E., Kahn, L.F. and Jacobs, L.J. “Quantitative monitoring of self-healing in concrete using diffuse ultrasound,” *NDT&E International*, Vol. 57 (1) pp. 36-44, 2013.
18. Nagy, P.B., Qu, Jianmin and Jacobs, L.J., “Finite-size effects on the quasistatic displacement pulse produced by an acoustic tone burst propagating through a solid specimen with quadratic nonlinearity,” *Journal of the Acoustical Society of America*, Vol. 134 (3) pp. 1760-1774, 2013.
19. **Leśnicki\*, K.J.**, Kim, J.-Y., Kurtis, K. E., and Jacobs, L.J., “Assessment of alkali-silica reaction damage through quantification of concrete nonlinearity,” *Materials and Structures*, Vol. 46 (3) pp. 497-509, 2013.
20. Lara, N., Medina, A., Ruiz, A., Kim, J.-Y., and Jacobs, L.J., “Application of ultrasonic methods for early detection of thermal damage in 2025 duplex stainless steel,” *NDT&E International* Vol. 54, pp. 19-26, 2013.
21. **Seher\*, M., In\*, Chi-Won**, Kim, Jin-Yeon, Kurtis, K.E. and Jacobs, L.J., “Numerical and experimental study of crack depth measurement in concrete using diffuse ultrasound,” *Journal of Nondestructive Evaluation*, Vol. 32, pp. 81-92, 2013.
22. **Bender\*, F.A.**, Kim, Jin-Yeon, Qu, Jianmin and Jacobs, L.J., “The generation of second harmonic waves in an isotropic solid with quadratic nonlinearity under the presence of a stress-free boundary,” *Wave Motion*, Vol. 50 (2) pp. 146-161, 2013.
23. **Liu\*, Minghe, Tang\*, Guangxin**, Jacobs, L.J. and Qu, Jianmin, “Measuring acoustic nonlinearity parameter using collinear wave mixing,” *Journal of Applied Physics*, Vol. 112, 024908, 2012
24. **Liu\*, Yu**, Kim, Jin-Yeon, Jacobs, L.J, Qu, Jianmin and Li, Zheng, “Experimental investigation of symmetry properties of second harmonic Lamb waves,” *Journal of Applied Physics*, Vol. 111, 053511, 2012.
25. **Matlack\*, K.H.**, Wall, J., Kim, Jin-Yeon, Qu, Jianmin, Jacobs, L.J. and Viehrig, H.-W., “Evaluation of radiation damage using nonlinear ultrasound,” *Journal of Applied Physics*, Vol. 111, 054911, 2012.

26. **Tang\***, **Guangxin**, Qu, Jianmin, and Jacobs, L.J. “Scattering of time-harmonic elastic waves by an inclusion with quadratic nonlinearity,” *Journal of the Acoustical Society of America*, Vol. 131 (4), pp. 2570-2578, 2012.
27. **Walker\***, **S.V.**, Kim, Jin-Yeon, Qu, Jianmin and Jacobs, L.J., “Fatigue damage evaluation in A36 steel using nonlinear Rayleigh waves,” *NDT&E International*, Vol. 48, pp. 10-15, 2012.
28. Qu, J., Nagy, P.B, and Jacobs, L.J., “Pulse propagation in an elastic medium with quadratic nonlinearity,” *Journal of the Acoustical Society of America*, Vol. 131 (3), pp. 1827-1830, 2012.
29. **Schurr\***, **D.P.**, Kim, J.-Y., Sabra, K.G., and Jacobs, L.J., “Damage detection in concrete using coda interferometry,” *NDT&E International*, Vol. 44, pp. 728-735, 2011.
30. Apetre, N. Ruzzene, M., Jacobs L.J. and Qu, J., “Measurement of the Rayleigh wave polarization using 1D laser vibrometry,” *NDT&E International*, Vol. 44, pp. 247-253, 2011.
31. **Liu\***, **Minghe**, Kim, Jin-Yeon, Jacobs, L.J., and Qu, Jianmin “Experimental study of nonlinear Rayleigh wave propagation in shot-peened aluminum plates – feasibility of measuring residual stress,” *NDT&E International*, Vol. 44, pp. 67-74, 2011.
32. **Matlack\***, **K.H.**, Kim, Jin-Yeon, Jacobs, L.J and Qu, Jianmin, “Experimental characterization of efficient second harmonic generation of Lamb wave modes in a nonlinear elastic isotropic plate,” *Journal of Applied Physics*, Vol. 109, 014905, 2011.
33. **Chen\***, **J.**, Kim, Jin-Yeon, Kurtis, K.E., and Jacobs, L.J., “Theoretical and experimental study of nonlinear resonance vibration of cementitious materials with an application to damage characterization,” *Journal of the Acoustical Society of America*, Vol. 130 (5), pp. 1728-2737, 2011.
34. **Leśnicki\***, **K.J.**, Kim, J.-Y., Kurtis, K. E., and Jacobs, L.J., “Characterization of ASR damage in concrete using nonlinear impact resonance acoustic spectroscopy,” *NDT&E International*, Vol. 44, pp. 721-727, 2011.
35. **Pertsch\***, **A.**, Kim, J.-Y., Wang, Y., and Jacobs, L.J. “An intelligent stand-alone ultrasonic device for monitoring local structural damage: implementation and preliminary experiments,” *Smart Materials and Structures*, Vol. 20, 015022, 2011.
36. Qu, Jianmin, Jacobs, L.J. and Nagy P.B., “On the acoustic-radiation-induced strain and stress in elastic solids with quadratic nonlinearity,” *Journal of the Acoustical Society of America*, Vol. 129 (6), pp. 3449-3452, 2011.
37. **Treiber\***, **M.**, Kim, Jin-Yeon, Qu, Jianmin, and Jacobs, L.J., “Effects of sand aggregate on ultrasonic attenuation in cement-based materials,” *Materials and Structures*, Vol. 43 (Supplement 1) 1-11, 2010.
38. **Chen\***, **J.**, Jayapalan, A., Kim, Jin-Yeon, Kurtis, K.E., and Jacobs, L.J., “Rapid evaluation of alkali-silica reactivity of aggregates using a nonlinear spectroscopy technique,” *Cement and Concrete Research*, Vol. 40, pp. 914-923, 2010.
39. **Deroo\***, **F.**, Kim, Jin-Yeon, Qu, Jianmin, Sabra, K.P. and Jacobs, L.J., “Detection of damage in concrete using diffuse ultrasound,” *Journal of the Acoustical Society of America*, Vol. 127 (6), pp. 3315-3318, 2010.

40. **Mueller\***, M.F., Kim, Jin-Yeon, Qu, Jianmin, and Jacobs, L.J., “Characteristics of second harmonic generation of Lamb waves in nonlinear elastic plates,” *Journal of the Acoustical Society of America*, Vol. 127 (4), pp. 2141-2152, 2010.
41. **Kerber\***, F., **Sprenger\* (Kuttig)**, H., **Niethammer\***, M., **Luangvilai\***, K., and Jacobs, L.J. “Attenuation evaluation of Lamb waves using the Chirplet transform,” *EURASIP Journal on Advances in Signal Processing*, <http://www.hindawi.com/journals/asp/2010/375171.html> Article 375171, 6 pages, 2010.
42. **Kuechler\***, S., **Meurer\***, T., Jacobs, L.J., and Qu, J., “Two-dimensional wave propagation in an elastic half-space with quadratic nonlinearity – a numerical study,” *Journal of the Acoustical Society of America*, Vol. 125, No. 3, pp. 1293-1301, 2009.
43. **In\***, **Chi-Won**, Kim, Jin-Yeon, Kurtis, K.E., and Jacobs, L.J., “Characterization of ultrasonic Rayleigh surface waves in asphalt concrete,” *NDT&E International*, Vol. 42, pp. 610-617, 2009.
44. **Pruell\***, C., Kim, Jin-Yeon, Qu, Jianmin, and Jacobs, L.J., “A nonlinear guided wave technique for evaluating plasticity-driven material damage in a metal plate,” *NDT&E International*, Vol. 42, pp. 199-203, 2009.
45. **Pruell\***, C., Kim, Jin-Yeon, Qu, Jianmin, and Jacobs, L.J., “Evaluation of fatigue damage using nonlinear guided waves,” *Smart Materials and Structures*, Vol. 18, 035003 (7 pages), 2009.
46. **Treiber\***, M., Kim, Jin-Yeon, Jacobs, L.J., and Qu, Jianmin, “Correction for partial reflection in ultrasonic attenuation measurements using contact transducers,” *Journal of the Acoustical Society of America*, Vol. 125 (5), pp. 2946-2953, 2009.
47. **Chen\***, J., Jayapalan, A., Kurtis, K.E., Kim, Jin-Yeon, and Jacobs, L.J., “Nonlinear wave modulation spectroscopy method for ultra-accelerated assessment of alkali-silica reaction in Portland cement mortar,” *Journal ACI Materials*, Vol. 106, pp. 340-348, 2009.
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50. **Bermes\***, C., Kim, J.Y., Qu, J., and Jacobs, L.J., “Nonlinear Lamb waves for the detection of material nonlinearity,” *Mechanical Systems and Signal Processing*, Vol. 22, pp. 638-646, 2008.
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52. **Punurai\***, W., Jarzynski, J., Qu, Jianmin, Kurtis, K.E., and Jacobs, L.J., “Characterization of dissipation losses in cement paste with diffuse ultrasound,” *Mechanics Research Communication*, 34, 289-294, 2007.

53. **Punurai\***, *W.*, Jarzynski, J., Qu, Jianmin, Kim, J.-Y., Jacobs, L.J., and Kurtis, K.E., "Characterization of multi-scale porosity in cement paste by advanced ultrasonic techniques," *Cement and Concrete Research*, Vol. 37, pp. 38-46, 2007.
54. **Bermes\***, *C.*, Kim, J.Y., Qu, J., and Jacobs, L.J., "Experimental characterization of material nonlinearity using Lamb waves," *Applied Physics Letters*, Vol. 90 (2), 021901, 2007.
55. **Pruell\***, *C.*, Kim, J.Y., Qu, J., and Jacobs, L.J., "Evaluation of plasticity driven material damage using Lamb waves," *Applied Physics Letters*, Vol. 91, 231911, 2007.
56. **Koreck\***, *J.*, **Valle\***, *C.*, Qu, J., and Jacobs, L.J., "Computational characterization of adhesive layer properties using guided waves in bonded plates," *Journal of Nondestructive Evaluation*, Vol. 26 (2-4) pp. 97-105, 2007.
57. **Kotte\***, *O.*, **Niethammer\***, *M.* and Jacobs, L.J., "Lamb Wave Characterization by Differential Reassignment and Nonlinear Anisotropic Diffusion," *NDT&E International*, Vol. 39, pp. 96-105, 2006.
58. **Punurai\***, *W.*, Jarzynski, J., Qu, J., Kurtis, K.E., and Jacobs, L.J., "Characterization of Entrained Air Voids in Cement Paste with Scattered Ultrasound," *NDT&E International*, Vol. 39 (6), pp. 514-524, 2006.
59. Kim, J.Y., Qu, J., Jacobs, L.J., **Littles\***, *J.W.*, and Savage, M.F., "Acoustic Nonlinearity Parameter due to Microplasticity," *Journal of Nondestructive Evaluation*, Vol. 25 (1), pp. 29-37, 2006.
60. **Junge\***, *M.*, Qu, J., and Jacobs, L.J., "Relationship between Rayleigh wave polarization and state of stress," *Ultrasonics*, Vol. 44 (3), pp. 233-237, 2006.
61. **Kuttig\***, *H.*, **Niethammer\***, *M.*, **Hurlebaus\***, *S.* and Jacobs, L.J., "Model-based Analysis of Dispersion Curves," *Journal of the Acoustical Society of America*, Vol. 119 (7), pp. 2122-2130, 2006.
62. **Hurlebaus\***, *S.* and Jacobs, L.J., "Dual-probe laser interferometer for structural health monitoring," *Journal of the Acoustical Society of America*, Vol. 119 (7) pp. 1923-1925, 2006.
63. **Herrmann\***, *J.*, Kim, J.Y., Jacobs, L.J., Qu, J., Littles, J.W., and Savage, M.F., "Assessment of material damage in a nickel-base superalloy using nonlinear Rayleigh surface waves," *Journal of Applied Physics*, Vol. 99 (12), 124913, 2006.
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65. **Blum\***, *F.*, Jarzynski, J. and Jacobs, L.J., "A Focused Two-dimensional Air-coupled Ultrasonic Array for Non-contact Generation," *NDT&E International*, Vol. 38, pp. 634-642, 2005.
66. Qu, J. and Jacobs, L.J., "Guided Circumferential Waves and Their Applications in Characterizing Cracks in Annular Components," *Materials Evaluation*, Vol. 61, No. 1, pp. 85-93, 2003.
67. Emamian, V., Kaveh, M., Tewfik, M., **Shi\***, *Z.*, Jacobs, L.J., and Jarzynski, J., "Robust Clustering of Acoustic Emission Signals using Neural Networks and Signal Subspace Projections," *EURASIP Journal on Applied Signal Processing*, Vol. 2003, No. 3, pp. 276-286, 2003.

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69. **Becker\***, J., Jacobs, L.J. and Qu, J., “Characterization of Cement-Based Materials using Diffuse Ultrasound,” *Journal of Engineering Mechanics*, Vol. 129, No. 12, pp. 1478-1484, 2003.
70. **Benz\***, R., **Niethammer\***, M., **Hurlebaus\***, S. and Jacobs, L.J., “Localization of Notches with Lamb Waves,” *Journal of the Acoustical Society of America*, Vol. 114 (2), pp. 677-685, 2003.
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#### **NON-REFEREED CONFERENCE PROCEEDINGS:**

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75. **Blum, F.\***, Jarzynski, J., and Jacobs, L.J., "A Focused, Two-dimensional Air Coupled Ultrasonic Array for Non-contact Generation," presented at the *30th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Green Bay, Wisconsin, July 27-August 3, 2003, pp. 834-839, Vol. 23A, 2004.
76. **Luangvilai, K.\***, Jacobs, L.J. and Qu, Jianmin "Far-field Decay of Laser-Generated Axisymmetric Lamb Waves," presented at the *30th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Green Bay, Wisconsin, July 27-August 3, 2003, pp. 158-164, Vol. 23A, 2004.
77. Pinto, P., **Hurlebaus, S.\***, Gaul, L. and Jacobs, L. J. "Localization and Sizing of Discontinuities using Lamb Waves," *Structural Health Monitoring - The Demands and Challenges*, edited by Fuo-Kuo Chang, Destech Publishing, 2003.
78. **Luangvilai, K.\***, Jacobs, L.J. and Qu, Jianmin, "Propagation of guided Lamb waves in concrete repaired with composite plates," presented at the *10th Annual International Symposium on Smart Structures and Materials*, San Diego, California, March 3-6, 2003, SPIE Proceedings 5057, pp. 85-90, 2003.

79. **Luangvilai, K.\*** and Jacobs, L.J., “Characterization of Attenuation in Lamb Waves using Laser Ultrasonic Techniques,” presented at *29th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Bellingham, Washington July 15- 19, 2002, Vol. 22B, pp. 1509-1515, 2003.
80. **Punurai, W.\*** and Jacobs, L.J., “Ultrasonic Methodology to Characterize the State of Cure,” presented at *29th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Bellingham, Washington July 15- 19, 2002, Vol. 22B, pp. 1509-1515, 2003.
81. **Luangvilai, K.\*** and Jacobs, L.J., “Characterization of Repaired Concrete with Guided Lamb Waves,” presented at *EM2002 - the 15th ASCE Engineering Mechanics Conference*, New York, NY, May 2002.
82. **Maess, M.\***, Jacobs, L.J. and Qu, J., “Material Characterization using Nonlinear Wave Propagation,” presented at *28th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Brunswick, Maine, July 30-August 3, 2001, Vol. 21B, pp. 1369-1376, 2002.
83. **Stolzenburg, C.\***, Jacobs, L.J. and Jarzynski, J., “Non-contact System to Measure the Material Properties of a Layered Viscoelastic Medium,” presented at *28th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Brunswick, Maine, July 30-August 3, 2001, Vol. 21B, pp. 1415-1422, 2002.
84. **Luangvilai, K.\***, **Punurai, W.\***, and Jacobs, L.J., “Lamb Wave Techniques to Characterize Repaired Concrete,” presented at *28th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Brunswick, Maine, July 30-August 3, 2001, Vol. 21B, pp. 1369-1376, 2002.
85. **Hurlebaus, S.\***, Gaul, L. and Jacobs, L. J. “Localization of Acoustic Emission Signals of a Fatigue Specimen Using Laser Ultrasonics,” *Structural Health Monitoring - The Demands and Challenges*, edited by Fuo-Kuo Chang, CRC Press, pp. 1219-1228, 2001.
86. **Shi, Z.\***, Jarzynski, J. and Jacobs, L.J., “Study of Acoustic Emission in a Plate using Laser Ultrasonics and the Finite Element Method,” presented at *27th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Ames, Iowa, July 17-21, 2000, Vol. 20B, pp. 1761-1767, 2001.
87. **Seifried, R.\***, Jacobs, L.J. and Qu, J., “Characterization of Adhesive Bond Properties with Lamb Waves,” presented at *27th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Ames, Iowa, July 17-21, 2000, Vol. 20B, pp. 1074-1081, 2001.
88. **Meurer, T.\***, Jacobs, L.J. and Qu, J., “Application of Nonlinear Ultrasonic Waves to Characterize Hysteretic Materials,” presented at *27th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Ames, Iowa, July 17-21, 2000, Vol. 20B, pp. 1242-1247, 2001.
89. **Hughes, M.\***, Jacobs, L.J. and Rix, G.J., “Nondestructive Determination of Unknown Pile-Tip Elevations using Modal Analysis,” presented at *27th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Ames, Iowa, July 17-21, 2000, Vol. 20B, pp. 1186-1193, 2001.
90. **Dokun, D.\***, Jacobs, L.J. and Haj-Ali, R., “Application of Laser Ultrasonics to Monitor Material Degradation in FRP Composites,” presented at *26th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Montréal, Québec, July 25-30, 1999, Vol. 19A, pp. 271-278, 2000.

91. **Shi, Z.\***, Jarzynski, J. and Jacobs, L.J., “Quantitative Acoustic Emission from Fretting Fatigue of PH 13-8 Stainless Steel,” presented at *26th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Montréal, Québec, July 25-30, 1999, Vol. 19A, pp. 367-373, 2000.
92. **Niethammer, M.\***, Jacobs, L.J. and Qu, J., “Application of STFT Techniques to Interpret Ultrasonic Signals,” presented at *26th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Montréal, Québec, July 25-30, 1999, Vol. 19A, pp. 703-708, 2000.
93. **Valle, C.\***, Qu, J. and Jacobs, L.J., “Scattering of Circumferential Waves in a Cracked Annulus,” presented at *26th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Montréal, Québec, July 25-30, 1999, Vol. 19A, pp. 217-224, 2000.
94. **Eisenhardt, C.\***, Jacobs, L.J. and Qu, J., “Experimental Lamb Wave Spectra of Cracked Plates,” presented at *26th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Montréal, Québec, July 25-30, 1999, Vol. 19A, pp. 343-349, 2000.
95. **Shi, Z.\***, Bair, S., Jarzynski, J. and Jacobs, L.J., “Study of Acoustic Emission from Incipient Fatigue Failure,” presented at the *25th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Snowbird, Utah, July 19-24, 1998, Vol. 18A, pp. 395-401, 1999.
96. **Owino, J.\*** and Jacobs, L.J., “Measurement of Rayleigh Wave Attenuation in Concrete using Laser Ultrasonics,” presented at the *25th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Snowbird, Utah, July 19-24, 1998, Vol. 18B, pp. 1919-1925, 1999.
97. Liu, G., Qu, J. and Jacobs, L.J., “Characterizing Adhesive Curing by Nonlinear Ultrasonic Techniques,” presented at the *25th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Snowbird, Utah, July 19-24, 1998, Vol. 18B, pp. 2191-2199, 1999.
98. **Valle, C.\***, Qu, J. and Jacobs, L.J., “On the Dispersion and Displacement Distribution of Circumferential Waves in Composite Circular Cylinders,” presented at the *25th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Snowbird, Utah, July 19-24, 1998, Vol. 18A, pp. 247-253, 1999.
99. **Kley, M.\***, **Valle, C.\***, Jacobs, L.J. and Qu, J., “Development of Dispersion Relationships for Layered Cylinders using Laser Ultrasonics,” presented at the *25th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Snowbird, Utah, July 19-24, 1998, Vol. 18A, pp. 263-268, 1999.
100. **Dokun, D.\***, Jacobs, L.J. and Haj-Ali, R., “Ultrasonic Techniques to Quantify Material Degradation in FRP Composites,” presented at the *25th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Snowbird, Utah, July 19-24, 1998, Vol. 18B, pp. 1365-1371, 1999.
101. **Owino, J.\*** and Jacobs, L.J., “Characterization of Rayleigh Wave Attenuation in Concrete using Laser Ultrasonics,” presented at the ASCE Engineering Mechanics Conference, Baltimore, Maryland, June 13-16, 1999, *Engineering Mechanics*, 1999.
102. **Shi, Z.\***, Koutsak, M., Bair, S., Jarzynski, J. and Jacobs, L.J., “Characterization of Acoustic Emission Signals from Fracture Events,” presented at the *24th Annual Review of Progress in Quantitative Nondestructive Evaluation*, San Diego, California, July 28-August 1, 1997, Vol. 17A, pp. 565-570, 1998.

103. **Owino, J.\*** and Jacobs, L.J., "Characterization of Rayleigh Wave Propagation in Concrete using Laser Ultrasonics," presented at the 24th *Annual Review of Progress in Quantitative Nondestructive Evaluation*, San Diego, California, July 28-August 1, 1997, Vol. 17B, pp. 1545-1550, 1998.
104. **Moser, F.\***, Jacobs, L.J. and Qu, J., "Application of Finite Element Methods to Study Transient Wave Propagation in Elastic Wave-Guides," presented at the 24th *Annual Review of Progress in Quantitative Nondestructive Evaluation*, San Diego, California, 1997, Vol. 17A, pp. 161-167, 1998.
105. **Littles, J.W.\***, Jacobs, L.J. and Zurieck, A.H., "Characterization of Structural Composites for Highway Applications," presented at the 23rd *Annual Review of Progress in Quantitative Nondestructive Evaluation*, Brunswick, Maine, July 29-August 3, 1996, Vol. 16B, pp. 1807-1814, 1997.
106. **Owino, J.\*** and Jacobs, L.J., "Experimental and Theoretical Investigation of Interfacial Losses in Concrete with Laser Ultrasonics," presented at the 23rd *Annual Review of Progress in Quantitative Nondestructive Evaluation*, Brunswick, Maine, July 29-August 3, 1996, Vol. 16A, pp. 547-554, 1997.
107. **Hurlebaus, S.\***, Jacobs, L.J. and Jarzynski, J., "Optical Techniques to Develop Transfer Functions to Remove Geometric Features in Acoustic Emission Signals," presented at the 23rd *Annual Review of Progress in Quantitative Nondestructive Evaluation*, Brunswick, Maine, July 29-August 3, 1996, Vol. 16A, pp. 421-426, 1997.
108. **Bruttomesso, D.A.\*** and Jacobs, L.J., "Optical Techniques to Examine Scattering of Rayleigh Surface Waves," presented at the 22nd *Annual Review of Progress in Quantitative Nondestructive Evaluation*, Seattle, Washington, July 30-August 4, 1995, Vol. 15A, pp. 651-656, 1996.
109. **Littles, J.W.\***, Jacobs, L.J. and Zureick, A.H., "Ultrasonic Characterization of FRP Composites for Bridge Applications," presented at the ASCE Engineering Mechanics Division Conference, Fort Lauderdale, Florida, May 1996, *Engineering Mechanics*, Vol. 2, pp. 959-962, 1996.
110. **Littles, J.W.\***, Jacobs, L.J., and Zurieck, A. -H., "Nondestructive Characterization of FRP Composites with Applications for Highway Structures," presented at the 21st *Annual Review of Progress in Quantitative Nondestructive Evaluation*, Snowmass, Colorado, July 31-August 5, 1994, Vol. 14A, pp. 2209-2214, 1995.
111. Jacobs, L.J. and **Bruttomesso, D.A.\***, "Investigation of Interfacial Losses in Concrete with Laser Ultrasonics," presented at the 21st *Annual Review of Progress in Quantitative Nondestructive Evaluation*, Snowmass, Colorado, July 31-August 5, 1994, Vol. 14A, pp. 537-543, 1995.
112. **Littles, J.W.\***, Jacobs, L.J. and Zurieck, A.H., "Development of Nondestructive Evaluation Techniques for the Characterization of FRP Components," presented at the ASCE Structures Congress 95, Boston, Massachusetts, April 3-5, 1995, *Structures Congress XIII*, Vol. 1, pp. 696-699, 1995.
113. Jacobs, L.J. and **Bruttomesso, D.A.\***, "Investigation of Scattering Losses in Concrete using Laser Ultrasonics," presented at the ASCE Engineering Mechanics Division Conference, Boulder, Colorado, May 1995, *Engineering Mechanics*, pp. 445-448, 1995.
114. Jacobs, L.J. and **Whitcomb, R.\***, "Laser Ultrasonic Evaluation of Concrete," presented at First Joint ASCE/ASME/SES Mechanics Conference, Charlottesville, VA, June 7-10, 1993 *Mechanics of*

*Materials and Structures, Proceedings of the Symposium in Honor of Professor Maciej P. Bieniek at the ASCE-ASME-SES Joint Meeting*, pp. 73-86, 1994.

115. **Littles, J.W.\***, Jacobs, L.J., and Qu, Jianmin, "Laser Interferometric Investigation of Scattering from a Distribution of Cracks," presented at the *20th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Brunswick, Maine, August 1-6, 1993, Vol. 13A, pp. 61-68, 1994.
116. Jacobs, L.J. and **Johnson, H.T.\***, "Laser Ultrasonic Methods for the Nondestructive Evaluation of Concrete," presented at the *20th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Brunswick, Maine, August 1-6, 1993, Vol. 13A, pp. 501-508, 1994.
117. Jacobs, L.J., "Laser Generation and Detection of Ultrasound in Concrete," presented at the ASCE Structures Congress 94, Atlanta, Georgia, April 24-28, 1994, *Structures Congress XII*, pp. 1328-1333, 1994.
118. Jacobs, L.J., and Qu, Jianmin, "Nondestructive Characterization of Damaged Bonds," presented at the *19th Annual Review of Progress in Quantitative Nondestructive Evaluation*, La Jolla, California, July 19-24, 1992, Vol. 12B, pp. 1587-1594, 1993.
119. **Whitcomb, R.\***, Jacobs, L.J. and **Aref, L.\***, "Quantitative Ultrasonic Evaluation of Concrete," presented at *Nondestructive Testing of Concrete in the Infrastructure, 1993 SEM Conference*, Dearborn, MI, June 9-12, 1993, pp. 238-255.
120. Jacobs, L.J., and Qu, Jianmin, "Reflection of Elastic Waves by a Traction-Free Surface with Small Defects," presented at the *18th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Brunswick, Maine, July 29- August 2, 1991, Vol. 11B, pp. 1609-1617, 1992.
121. **Bruttomesso, D.A.\*** and Jacobs, L.J., "Laser Interferometric Characterization of Acoustic Emission Transducers," presented at the ASCE Engineering Mechanics Conference, College Station, Texas, 1992, *Engineering Mechanics*, pp. 256-259, 1992.
122. Lee, Xiaogong, Jacobs, L.J., and Bieniek, M.P., "Crack Initiation and Arrest under Dynamic Loading," presented at the *17th Annual Review of Progress in Quantitative Nondestructive Evaluation*, La Jolla, California, July 15-20, 1990, Vol. 10B, pp. 1883-1889, 1991.
123. Jacobs, L.J., "Characterization of Acoustic Emission Signals," presented at ASCE Engineering Mechanics Conference, Columbus, Ohio, May 19-22, 1991, *Mechanics Computing in 1990's and Beyond*, pp. 949-953, 1991.
124. Jacobs, L.J., Scott, W.R., Granata, D.M., and Ryan, M.J., "Acoustic Emission Signal from a Crack Growth Event," presented at the *16th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Brunswick, Maine, July 24-28, 1989, Vol. 9B, pp. 1749-1756, 1990.
125. Jacobs, L.J., Scott, W.R. and Granata, D.M., "Calculation of Acoustic Emission Signatures from Growing Cracks," presented at the 69th Meeting of the AGARD Structures and Materials Panel, Brussels, Belgium, October 1-6, 1989, *Impact of Emerging NDE-NDI Methods on Aircraft Design, Manufacture and Maintenance*, AGARD-CP-462, pp. 23-1 through 23-7, 1990.

126. Jacobs, L.J., “Analytical and Experimental Characterization of Acoustic Emission Signals,” presented at the 15th Southeastern Conference of Applied Mechanics, Atlanta, Georgia, February 1-3, 1990, *Developments in Theoretical and Applied Mechanics*, Vol. 16, pp. 236-243, 1990.
127. Jacobs, L.J., Scott, W.R., Granata, D.M., and Ryan, M.J. “Acoustic Emission from a Crack Growth Event,” presented at the *15th Annual Review of Progress in Quantitative Nondestructive Evaluation*, La Jolla, California, August 1-5, 1988, Vol. 8B, pp. 1811-1818, 1989.
128. Jacobs, L.J., “Acoustic Emission from a Growing Crack,” presented at AIAA/ASME/ASCE/AHS/ASC 30th Structures, Structural Dynamics and Materials Conference, Mobile, Alabama, April 3-5, 1989, *Research in Structures, Structural Dynamics and Materials*, NASA Conference Publication 10024, pp. 67-76, 1989.
129. Jacobs, L.J., Lee, Xiaogong, and Bieniek, M.P., “Two Problems in Dynamic Fracture Mechanics,” presented at AIAA/ASME/ASCE/AHS/ASC 29th Structures, Structural Dynamics and Materials Conference Williamsburg, Virginia, April 18-20, 1988, *AIAA-88-2385*, pp. 1357-1363, 1988.

**\*Denotes co-author who is a current and/or former undergraduate or graduate research student.**

#### **BOOKS and BOOK CHAPTERS:**

1. Kim, Jin-Yeon, Jacobs, L.J., and Qu, Jianmin, “Material Characterization by Nonlinear Ultrasonic Techniques,” in *Ultrasonic and Electromagnetic NDE of Structure and Material Characterization*, T. Kundu, Editor, CRC Press, pp. 493-514, 2012.
2. Qu, Jianmin and Jacobs, L.J., “Cylindrical Waveguides and Their Applications in Ultrasonic Evaluation,” in *Ultrasonic Nondestructive Evaluation: Engineering and Biological Material Characterization*, T. Kundu, Editor, CRC Press, pp. 311-362, 2003.
3. Voyiadjis, G.Z., Bank, L.C. and Jacobs, L.J. (Editors), *Mechanics of Materials and Structures, Proceedings of the Symposium in Honor of Professor Maciej P. Bieniek at the ASCE-ASME-SES Joint Meeting*, Studies in Applied Mechanics Vol. 35, Elsevier, Amsterdam, 1994.

#### **SELECTED PRESENTATIONS (NOT LISTED IN CONFERENCE PROCEEDINGS):**

1. *2014 CME Distinguished Guest Speaker, University of Illinois, Chicago* “Nonlinear ultrasound for material state awareness” 2014 (*Invited*).
2. *NuMat 2014* “Radiation damage characterization in reactor pressure vessel steels with nonlinear ultrasound,” Clearwater Beach, Florida, 2014.
3. ETH Zurich, “Nonlinear ultrasound for material state awareness,” 2014 (*Invited*).
4. *2013 Review of Progress in Nondestructive Evaluation* “Nonlinear ultrasound for material health awareness” Baltimore, MD 2013 (*Invited Keynote Lecture*).
5. *NuMat 2012* “Nonlinear ultrasound method to monitor radiation damage in RPV steels,” Osaka, Japan, 2012.

6. *15<sup>th</sup> Saudi Technical Exchange Meeting (STEM 2012)* “Trends in engineering education and the role of global collaborations,” Dhahran, KSA, 2012 (*Invited Keynote Speaker*).
7. Drexel University, “Nonlinear ultrasonics for structural health awareness,” 2012 (*Invited*).
8. Kyoto University, “Nonlinear ultrasound for tracking material state,” 2012 (*Invited*).
9. NYU-Poly, “Characterization of civil infrastructure with nonlinear ultrasound,” 2012 (*Invited*).
10. *SAMPE* “Measuring surface stress using nonlinear ultrasound,” Seattle Washington, May 2010.
11. *2010 USNCTAM* “Higher order harmonics and their applications in nondestructive damage assessment in metallic structures,” State College Pennsylvania, June 2010.
12. Bundesanstalt für Materialforschung, “Quantitative characterization of civil infrastructure using ultrasonic techniques,” Berlin Germany, December 2010 (*Invited*).
13. KAIST, “Characterization of fatigue damage using nonlinear ultrasound,” September 2008 (*Invited*).
14. Seoul National University, “Characterization of fatigue damage in metals with nonlinear ultrasound,” September 2008 (*Invited*).
15. *2007 ICU Vienna* “Nondestructive characterization of fatigue damage with nonlinear ultrasound,” Vienna Austria April, 2007.
16. AFRL, “Characterization of fatigue damage in a nickel-base superalloy using nonlinear ultrasonic waves,” May 2007 (*Invited*).
17. *2006 USNCTAM* “Nondestructive characterization of fatigue damage in a nickel-base superalloy with nonlinear ultrasound,” Boulder Colorado June, 2006.
18. Texas A&M University, “Characterization of damage using nonlinear ultrasound,” December 2006 (*Invited*).
19. University of Stuttgart, “Characterization of Lamb Waves in Viscoelastic Plates,” June 2005 (*Invited*).
20. Carnegie-Mellon University, “Quantitative Nondestructive Evaluation of Civil Infrastructure,” September 2005 (*Invited*).
21. Louisiana State University, “Quantitative Nondestructive Evaluation of Civil Infrastructure,” November 2005 (*Invited*).
22. University of Stuttgart COMMAS Program, “Wave Propagation in Solids with Applications for NDE,” September 2003 (*Invited*).
23. University of Stuttgart “Guided Lamb Wave Propagation in a Concrete Component Repaired with an FRP Composite Plate,” June 2002 (*Invited*).

24. *2001 Mechanics and Materials Conference* “Lamb Wave Techniques to Characterize Repaired Concrete,” San Diego California, June, 2001.
25. *2000 ASNT Technical Meeting* “Characterization of Bond Degradation using guided Waves,” Birmingham, Alabama, April 2000.
26. *139<sup>th</sup> Meeting Acoustical Society of America* “Study of Acoustic Emission in a Plate using Laser Ultrasonics and the Finite Element Method,” Atlanta, Georgia, May 2000.
27. University of Maine, Orono “Characterization of Cement-Based Materials using Laser Ultrasonics,” November 2000 (*Invited*).
28. *138<sup>th</sup> Meeting Acoustical Society of America* “Detection of cracks in plates using guided waves,” Columbus, Ohio, November 2, 1999.
29. *First Meeting of the Latin American Acoustic Emission Group (E-GLEA 1)* “Wave propagation in cement-based materials,” Buenos Aires, Argentina, September 1999 (*Invited*).
30. University of Buenos Aires, “Characterization of Civil Engineering Materials with Acoustic Emission and Ultrasonic Techniques” September 1999 (*Invited*).
31. Columbia University, “Characterization of Civil Engineering Materials with Laser Ultrasonic Techniques,” October 1999 (*Invited*).
32. *1999 ASME International Mechanical Engineering Congress and Exposition (IMECE)* “Crack Detection using Guided Waves,” Nashville, TN, November 1999.
33. *Thirteenth U.S. National Congress of Applied Mechanics* “Measurement of attenuation in cement-based materials using laser ultrasonics,” Gainesville, Florida, June 26, 1998.
34. *Thirteenth U.S. National Congress of Applied Mechanics* “Guided circumferential waves in layered annular structures,” Gainesville, Florida, June 26, 1998.
35. *1997 ASME International Mechanical Engineering Congress and Exposition (IMECE)* “Characterization of Acoustic Waveforms from Fracture Events,” Dallas, TX, November 16, 1997.
36. Max-Planck-Society, Rottach-Egern, Germany, International Workshop on Materials Research with Advanced Acoustic Emission Techniques, “Transfer Functions to Remove Geometry Effects from Acoustic Emission Signals,” October 1996 (*Invited*).
37. University of Missouri, Columbia, “Laser Ultrasonics in Concrete,” April 1995 (*Invited*).
38. Johns Hopkins University, “Optical Techniques for the Nondestructive Characterization of Infrastructure,” September 1994 (*Invited*).
39. The Catholic University of America, “Optical Techniques for the Nondestructive Characterization of Concrete,” November 1994 (*Invited*).



40. *Twelfth U.S. National Congress of Applied Mechanics* “Measurement of Ultrasound Attenuation in Concrete using Laser Ultrasonics,” Seattle, Washington, June 27-July 1, 1994.
41. University of Delaware, “Acoustic Emission Techniques for the Evaluation of Composite Materials,” May 1988 (*Invited*).

#### **POSTDOCTORAL STUDENTS ADVISED:**

1. Dr. Chiwon In. Sponsorship: Dr. In worked on a DOE sponsored project, starting in June 2013. Research Topic: *Application of Nonlinear Ultrasonic Techniques to Characterize Damage in Concrete*.
2. Dr. Il-Yoon Choi (co-advised with Dr. Reginald DesRoches) Sponsorship: Dr. Choi started in January 2006 on a Visiting Postdoctoral Fellowship sponsored by Korea Railroad Research Institute. Research Topic: *Application of Ultrasonics for the Structural Health Monitoring of Railroad Structures*.
3. Dr. Xiaojia Chen (co-advised with Dr. Kimberly Kurtis). Sponsorship: Dr. Chen started in September 2005 on a Visiting Postdoctoral Fellowship sponsored by Wuhan University of Technology. Research Topic: *Application of Nonlinear Ultrasonic Techniques to Characterize Damage in Cement-Based Materials*
4. Dr. Jin-Yeon Kim. Sponsorship: Dr. Kim worked on a DARPA sponsored project, starting in June 2004. Research Topic: *Application of Nonlinear Ultrasonic Techniques to Characterize Damage*.
5. Dr. Christian Fiedler. Sponsorship: Dr. Fiedler worked under my direction during the summer of 1994 on a Visiting Postdoctoral Fellowship sponsored by the Deutsche Forschungsgemeinschaft (German Research Foundation). Research Topic: *Boundary Element Method Applied to Elastic Wave Propagation*  
Current Position: Project Manager, IBM

#### **Ph.D. STUDENTS ADVISED:**

1. Ms. Katie Scott (expected 2018). Thesis Topic: *Nonlinear Ultrasonic Techniques to Characterize Radiation Damage*.
2. Mr. Alex Lakocy (NSF Graduate Research Fellow) (expected 2018). Thesis Topic: *Nonlinear Ultrasonic Techniques to Characterize Stress corrosion Cracking*.
3. Mr. Mehdi Nikki Rashidi (co-advised with Dr. Kim Kurtis) (expected 2016). Thesis Topic: *Modeling of Nonlinear Ultrasound in Cement-Based Materials*.
4. Mr. Gun Kim (co-advised with Dr. Kim Kurtis) (expected 2016). Thesis Topic: *Noncontact Nonlinear Ultrasonic Techniques for Cement-Based Materials*.
5. Mr. David Torello (expected 2015). Thesis Topic: *Nonlinear Ultrasonic Mixing Techniques for Materials Characterization*. **(Received First Place Prize at the 2014 QNDE Student Poster Competition)**.
6. Dr. Kathryn Matlack (co-advised with Dr. Jianmin Qu) (2014). Thesis Topic: *Nonlinear Ultrasound for Radiation Damage Detection in Reactor Pressure Vessel Steel*. **(Received Second Place Prize at the 2010 QNDE Student Poster Competition)**.

7. Dr. Chiwon In (co-advised with Dr. Kim Kurtis) (2013). Thesis Topic: *Defect Characterization in Heterogeneous Civil Engineering Materials using Ultrasound*.
8. Dr. Guangxin Tang (co-advised with Dr. Jianmin Qu, student at Northwestern University) (2013). Thesis Topic: *Wave Propagation in Nonlinear Media and Its Applications in Nondestructive Damage Assessment of Metallic Materials*. Current Position: Research Engineer, Eastman Chemical.
9. Dr. Minghe Liu (co-advised with Dr. Jianmin Qu, student at Northwestern University) (2013) Thesis Title: *Characterization of Infrastructure Materials using Nonlinear Ultrasonics*. Current Position: Research Engineer, Flodesign Sonics.
10. Dr. Jun Chen (co-advised with Dr. Kim Kurtis) (2010). Thesis Title: *Ultra-accelerated Assessment of Alkali-reactivity of aggregates by nonlinear acoustic techniques*. Current Position: Associate Professor, Department of Civil Engineering, Beihang University, Beijing, China.
11. Dr. Kritsakorn Luangvilai (co-advised with Dr. Jianmin Qu) (2007). Thesis Title: *Attenuation of Ultrasonic Lamb Waves with Applications to Material Characterization and Condition Monitoring*. Current Position: structural engineer in Thailand.
12. Dr. Wonsiri Punurai (co-advised with Dr. Kim Kurtis) (2006). Thesis Title: *Cement-based Materials' Characterization using ultrasonic attenuation*. Current Position: Assistant Professor, Department of Civil Engineering, Mahidol University, Thailand.
13. Dr. Zhiqiang Shi (co-advised with Dr. Jacek Jarzynski) (2001). Thesis Title: *Studies on Quantitative Acoustic Emission with Applications to Material Fatigue*. Current Position: Senior Research Engineer, Corning.
14. Dr. Mary Hughes (co-advised with Dr. Glenn Rix) (1999). Thesis Title: *Nondestructive Determination of Unknown Pile Tip Elevations Using Modal Analysis*. Current Position: Academic Professional, Department of Civil Engineering, Auburn University.
15. Dr. Christine S. Valle (co-advised with Dr. Jianmin Qu) (1999). Thesis Title: *Guided Circumferential Waves in Annular Structures (Received Sigma Xi Outstanding Ph.D. Thesis Award)*. Current Position: Director of Women in Engineering and Senior Academic Professional, GWW School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA.
16. Dr. Olajide David Dokun (co-advised with Dr. Rami Haj-Ali) (1999). Thesis Title: *Laser Ultrasonic Techniques and Numerical Models for Damage and Degradation Tracking in FRP*. Current Position: Project Engineer, Power Systems, Caterpillar Inc., Griffin, GA.
17. Dr. Joseph O. Owino (1998). Thesis Title: *Study of the Propagation of Rayleigh Waves in Cement-Based Materials*. Current Position: UC Foundation Associate Professor, Department of Civil Engineering, University of Tennessee at Chattanooga
18. Dr. Douglas A. Bruttomesso (1996). Thesis Title: *Laser Ultrasonic Techniques to Determine the Influence of Geometric Features on Rayleigh Waves*. Current Position: Research Engineer, Lockheed Martin, Princeton, New Jersey.

19. Dr. Jerrol W. Littles, Jr. (1996). Thesis Title: *Ultrasonic Characterization of Fiber Reinforced Polymeric (FRP) Composites*. Current Position: Program Manager, Pratt and Whitney Rockets, Huntsville, AL.
20. Dr. Chris Pionke (finished advising Dr. Pionke after Dr. Gerald Wempner retired, 1993). Thesis Title: *Convergence of Finite Elements Based on the Hu-Washizu Variation theorem with Minimum Compatibility* Current Position: Research Engineer, Associate Professor, Department of Mechanical and Aerospace Engineering and Engineering Science, University of Tennessee, Knoxville

#### **M.S. THESIS/PROJECT STUDENTS ADVISED:**

1. Mr. Tobias Oberhardt (Deutscher Akademischer Austausch Dienst (DAAD) Program) (2015). Thesis Title: *Hysteresis Behavior in Stress Corrosion Cracking*.
2. Mr. Matthias Uhrig (Deutscher Akademischer Austausch Dienst (DAAD) Program) (2015). Thesis Title: *Finite element Modelling of Nonlinear Ultrasound*.
3. Mr. Aulon Bajani (Deutscher Akademischer Austausch Dienst (DAAD) Program) (2014). Thesis Title: *Experimental Modelling of Nonlinear Ultrasound*.
4. Mr. Daniel Marino (Deutscher Akademischer Austausch Dienst (DAAD) Program) (2014). Thesis Title: *Using Nonlinear Ultrasound Measurements to Assess the Stage of Thermal damage in Modified 9% Cr Ferritic Martensitic Steel*.
5. Mr. Florian Morlock (Deutscher Akademischer Austausch Dienst (DAAD) Program) (2014). Thesis Title: *Evaluation of Stress Corrosion cracking in Sensitized 304 Stainless Steel using Nonlinear Rayleigh Waves*.
6. Ms. Anne Roemer (Deutscher Akademischer Austausch Dienst (DAAD) Program) (2014). Thesis Title: *The second harmonic generation in reflection mode - an analytical, numerical and experimental study*.
7. Mr. Kevin Arne (2014). Thesis Title: *Crack Depth Measurement in Reinforced Concrete using Ultrasonic Techniques*.
8. Mr. Merlin Morlock (Deutscher Akademischer Austausch Dienst (DAAD) Program) (2013). Thesis Title: *Nonlinear Mixing of Two Collinear Rayleigh waves. (Received Second Place Prize in the 2013 QNDE Student Poster Competition)*.
9. Mr. Sebastian Thiele (Deutscher Akademischer Austausch Dienst (DAAD) Program) (2013). Thesis Title: *Nonlinear Rayleigh Surface Wave Based Assessment of Material Nonlinearity due to Precipitation*.
10. Mr. Fabian Schempp (Deutscher Akademischer Austausch Dienst (DAAD) Program) (2013). Thesis Title: *Fully Non-Contact, Air-Coupled Generation and Detection of Ultrasound in Concrete for Nondestructive Testing*.
11. Mr. Chi-Leun Huang (2013). Thesis Title: *Effect of Beam Diffraction on Nonlinear Rayleigh Surface Wave Measurement*.

12. Mr. Daniel Zeitvogel (Diplomarbeit Student from University of Stuttgart on Deutscher Akademischer Austausch Dienst (DAAD) Program) (2012). Thesis Title: *Characterization of Damage due to Stress Corrosion Cracking in Carbon Steel Using Nonlinear Surface Acoustic Waves*. (**Received Third Place Prize in the 2012 QNDE Student Poster Competition**).
13. Mr. Johann Gross (Diplomarbeit Student from University of Stuttgart on Deutscher Akademischer Austausch Dienst (DAAD) Program) (co-advised with Dr. Kimberly Kurtis) (2012). Thesis Title: *Evaluation of Near Surface Material Degradation in Concrete using Nonlinear Rayleigh Surface Waves*.
14. Mr. Christian Swacek (Diplomarbeit Student from University of Stuttgart on Deutscher Akademischer Austausch Dienst (DAAD) Program) (2012). Thesis Title: *Optical Generation of Tone-burst Rayleigh Surface Waves for Nonlinear Ultrasound Generation*.
15. Mr. Matthias E. Seher (Diplomarbeit Student from University of Stuttgart on Deutscher Akademischer Austausch Dienst (DAAD) Program) (2011). Thesis Title: *Finite Element Simulation of Crack Depth Measurements in concrete using Diffuse Ultrasound*.
16. Mr. Christian Ehrlich (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2011). Thesis Title: *Experimental Characterization of Creep damage using the Nonlinearity Ultrasonic Technique*.
17. Mr. Simon Walker (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2011). Thesis Title: *Characterization of Fatigue Damage in A36 Steel Specimens using Nonlinear Rayleigh Waves*. (**Received Third Place Prize in the 2011 QNDE Student Poster Competition**).
18. Mr. Krzysztof J. Lesnicki (co-advised with Dr. Kimberly Kurtis) (2011). Thesis Title: *Characterization of ASR in Concrete Specimens using a Nonlinear Vibration Technique*. (**Received Third Place Prize in the 2010 QNDE Student Poster Competition**).
19. Mr. Frank Bender (co-advised with Dr. Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2010). Thesis Title: *Analytical Investigation of Second Harmonic Generation at a Free Boundary*.
20. Mr. Dennis P. Schurr (co-advised with Dr. Karim Sabra) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2010). Thesis Title: *Monitoring Damage in Concrete using Diffuse Ultrasound Interferometry*.
21. Mr. Thomas Ruiner (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2010). Thesis Title: *Characterization of Thermal Damage in 2205 Duplex Stainless Steel with Nonlinear Ultrasonics*.
22. Mr. Martin Mueller (co-advised with Dr. Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2009). Thesis Title: *Analytical Investigation of Internally Resonant Second Harmonic Lamb Waves in Nonlinear Elastic Isotropic Plates*. (**Received First Place Prize in the 2009 QNDE Student Poster Competition**).

23. Ms. Natalie Darraugh (co-advised with Dr. Kimberly Kurtis) (2009). Thesis Title: *Air Void Characterization in Fresh Cement Paste through Ultrasonic Attenuation using an Immersion Procedure*. **(Received Second Place Prize in the 2009 QNDE Student Poster Competition)**.
24. Mr. Frederik Deroo (co-advised with Dr. Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2009). Thesis Title: *Damage Detection in Concrete using Diffuse Ultrasound Measurements and an Effective Medium Theory for Wave Propagation in Multi-Phase Materials*.
25. Mr. Alexander Pertsch (co-advised with Dr. Yang Wang) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2009). Thesis Title: *An Intelligent Stand-Alone Ultrasonic Device for Monitoring Local Damage Growth in Civil Structures*.
26. Mr. Richard Kmack (co-advised with Dr. Kimberly Kurtis) (2008). Thesis Title: *Characterization of Air Voids in Fresh Cement Paste with Ultrasonics*.
27. Mr. Martin Treiber (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2008). Thesis Title: *Characterization of Cement-based Multiphase Materials using Ultrasonic Wave Attenuation*. **(Received Second Place Prize in the 2008 QNDE Student Poster Competition)**.
28. Mr. Michael Braun (co-advised with Dr. Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2008). Thesis Title: *Characterization of Nonlinearity Parameters in an Elastic Material with Quadratic Nonlinearity with a Complex Wavefield*.
29. Mr. Christoph Pruell (co-advised with Dr. Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2007). Thesis Title: *Characterization of Fatigue Damage using nonlinear Lamb Waves*.
30. Mr. Sebastian Kuechler (co-advised with Dr. Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2007). Thesis Title: *Wave Propagation in Nonlinear Elastic Materials*. **(Received Third Place Prize in the 2007 QNDE Student Poster Competition)**.
31. Mr. Christian Bermes (co-advised with Dr. Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2006). Thesis Title: *Generation and Detection of Nonlinear Lamb Waves for the Characterization of Material Nonlinearities*. **(Received Sigma Xi Outstanding M.S. Thesis Award)**. Current Position: Graduate Student, ETH.
32. Mr. Florian Kerber (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2006). Thesis Title: *Dispersive Wave Analysis using the Chirplet Transform*. Current Position: Graduate Student, University of Groningen.
33. Mr. Jürgen Koreck (co-advised with Drs. Jianmin Qu and Christine Valle) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2006). Thesis Title: *Computational Characterization of Adhesive Bond Properties using Guided Waves in Adhesive Bonded Plates*.
34. Mr. Thorsten Muller (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2005). Thesis Title: *Nonlinear Ultrasonics: Signal Processing Considerations and a Nonlinear Parameter for Rayleigh Waves*.

35. Mr. Jan Hermann (co-advised with Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2005). Thesis Title: *Generation and Detection of Higher Harmonics in Rayleigh Waves using Laser Ultrasound*. Current Position: Graduate Student, University of Stuttgart.
36. Mr. Helge Kuttig (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2005). Thesis Title: *Model-based Signal Processing of Dispersive Waves with Chirplets*. Current Position: Graduate Student, University of Stuttgart.
37. Mr. Johannes Maess (co-advised with Dr. Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2004). Thesis Title: *Investigation of Damage in Polycrystal Materials using Ultrasonic Attenuation*. Current Position: Graduate Student, University of Stuttgart.
38. Mr. Oliver Kotte (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2004). Thesis Title: *Application of Image Processing Techniques for Lamb Wave Characterization*. Current Position: Graduate Student, ETH.
39. Mr. Tobias Kreuzinger (co-advised with Dr. Jennifer Michaels) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2004). Thesis Title: *Digital Signal Processing Methods for Source Function Extraction of Piezoelectric Elements*.
40. Mr. Frank Blum (co-advised with Dr. Jacek Jarzynski) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2003). Thesis Title: *A Focused, Two Dimensional, Air-Coupled Ultrasonic Array for Non-Contact Generation*. Current Position: Engineer in Stuttgart Germany.
41. Mr. Michael Junge (co-advised with Dr. Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2003). Thesis Title: *Characterization of Residual Stress using Rayleigh Surface Waves*. Current Position: Graduate Student, University of Stuttgart.
42. Mr. Jens Becker (co-advised with Dr. Jianmin Qu) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2002). Thesis Title: *Investigation of the Microstructure of Heterogeneous Materials using Ultrasonic Waves*. (**Received Sigma Xi Outstanding M.S. Thesis Award**). Current Position: Graduate Student, University of Stuttgart.
43. Mr. Ruediger Benz (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2002). Thesis Title: *Localization of Notches with Lamb Waves*. Current Position: Graduate Student, Bosch Company.
44. Mr. Marc Dressler (co-advised with Dr. Jacek Jarzynski) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2002). Thesis Title: *Theoretical and Experimental Modeling of Ultrasonic Waves in Multi-Layered Media*. Current Position: Research Engineer, Bosch Company.
45. Dr. Matthias Maess (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2001). Thesis Title: *Characterization of Nonlinear Materials*. Current Position: Doctoral Student, University of Stuttgart.
46. Mr. Christian Stolzenburg (co-advised with Dr. Jacek Jarzynski) (Diplomarbeit Student from University of Stuttgart on DAAD Program) (2001). Thesis Title: *Wave Propagation in Layered Media*. Current Position: Doctoral Student, University of Stuttgart.

47. Dr. Robert Seifried (Studienarbeit Student from University of Stuttgart on DAAD Program) (2000). Thesis Title: *Propagation of Guided Waves in Adhesive Bonded Components*. Current Position: Academic Faculty, University of Stuttgart.
48. Dr. Thomas Meurer (co-advised with Dr. Jianmin Qu) (Studienarbeit Student from University of Stuttgart on DAAD Program) (2000). Thesis Title: *Wave Propagation in Hysteretic Media*. **(Received Sigma Xi Outstanding M.S. Thesis Award)**. Current Position: Academic Faculty, Technical University of Vienna.
49. Dr. Marc Niethammer (Studienarbeit Student from University of Stuttgart on DAAD Program) (1999). Thesis Title: *Application of Time Frequency Representations to Characterize Ultrasonic Signals*. Current Position: Assistant Professor, University of North Carolina, Chapel Hill.
50. Mr. Christoph Eisenhardt (Studienarbeit Student from University of Stuttgart on DAAD Program) (1999). Research Title: *Characterization of the Effect of Cracks on Laser Generated and Detected Lamb Waves*. Current Position: Staff Engineer, John Deere, Germany.
51. Mr. Kai Heller (Studienarbeit Student from University of Stuttgart on DAAD Program) (1999). Research Title: *Laser Generated and Detected Lamb Waves to Characterize Adhesive Bond Properties*. Current Position: Staff Engineer, Daimler-Chrysler, Stuttgart.
52. Mr. Markus Kley (Studienarbeit Student from University of Stuttgart on DAAD Program) (1998). Thesis Title: *Development of Dispersion Relationships for Layered Cylinders using Laser Ultrasonics*. Current Position: Doctoral Student, University of Stuttgart.
53. Dr. Friedrich Moser (Diplomarbeit Student from University of Stuttgart on DAAD Program) (1997). Research Title: *Application of Finite Element Methods to Study Transient Wave Propagation in Elastic Wave Guides*. Current Position: Research Engineer, Bosch Company, Stuttgart, Germany.
54. Dr. Stefan Hurlebaus (Diplomarbeit Student from University of Stuttgart on DAAD Program) (1996). Thesis Title: *Laser Generation and Detection Techniques for Developing Transfer Functions to Characterize the Effect of Geometry on Elastic Wave Propagation*. **(Received Sigma Xi Outstanding M.S. Thesis Award)**. Current Position: Associate Professor, Texas A&M University, College Station, TX.
55. Mr. Felix Bast (Diplomarbeit Student from University of Stuttgart on DAAD Program) (1996). Thesis Title: *Feasibility Study and Optimization of the Design of an Injection Molded Plastic Bike Frame*. Current Position: Staff Engineer, BMW, Munich, Germany.
56. Mr. Dirk Streitenberger (Diplomarbeit Student from University of Stuttgart on DAAD Program) (1996). Thesis Title: *Analysis and Optimization of a New Design of a Bicycle Frame*. Current Position: Staff Engineer, BMW, Munich, Germany.
57. Mr. Raymond Q. Raparelli (1996). Thesis Title: *Modal Analysis Applied to the Characterization of Pile Lengths*. Current Position: High school math and physics teacher/track and cross-country coach.

58. Mr. Daniel Carlin (1994). Thesis Title: *Experimental and Numerical Characterization of Damage in FRP Beams*. Current Position: Staff Engineer, Lockheed-Martin.
59. Mr. Richard Whitcomb (1993). Thesis Title: *Quantitative Ultrasonic Evaluation of Concrete*. Current Position: Computer Consultant.
60. Dr. Jerrol W. Littles, Jr. (1993). Thesis Title: *Scattering of Longitudinal Waves from a Distribution of Cracks*. Current Position: Program Manager, Pratt and Whitney Aircraft Engines, West Hartford, Connecticut.
61. Dr. Douglas A. Bruttomesso (1992). Thesis Title: *Development of a Heterodyne Interferometer with Applications for Acoustic Emission Testing*. Current Position: Research Engineer, Lockheed Martin, Princeton, New Jersey.

**PATENTS:**

1. Method for Measuring Reactor Bed Level from Active Acoustic Measurement and Analysis, RDH-0715, USSN 61/132,647.
2. Air Void Characterization in Cement Based Materials, Provisional Disclosure GTRC 4938 7/18/2009.

**PROFESSIONAL AFFILIATIONS:**

Acoustical Society of America  
American Society for Engineering Education  
American Society of Civil Engineers  
American Society of Mechanical Engineers  
American Society for Nondestructive Testing  
Tau Beta Pi  
RILEM

**EDITORIAL DUTIES:**

Associate Editor, *ASCE Journal of Engineering Mechanics*, October 2000- November 2002  
Advisory Board, *NDT&E International*, November 2001 – Present  
Reviewer: *ASCE Journal of Engineering Mechanics*, *ASCE Journal of Structural Engineering*, *ASCE Journal of Composites for Construction*, *ASCE Journal of Aerospace Engineering*, *Journal of Nondestructive Evaluation*, *ASME Journal of Applied Mechanics*, *SEM Journal of Experimental Mechanics*, *Journal of the Acoustical Society of America*, *Journal of Applied Physics*, *NDT&E International*, *Smart Materials and Structures*, *Ultrasonics*, *International Journal of Solids and Structures*, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, *Mechanical Systems and Signal Processing*, *Pure and Applied Geophysics*

**CAMPUS SERVICE (SELECTED):**

Faculty Advisor (one of three), Georgia Tech Student Chapter of Tau Beta Pi Engineering Honor Society, 1996-Present.  
Faculty Advisor, Georgia Tech Student Chapter of the Order of the Engineer, 2008-Present.  
Member, Student Center Governing Board, 1993-1996; 2004-2009.  
Member, Campus Recreation Center Advisory Board, 2002- 2006.  
Member, Institute Rules and Regulations, 2002-2008.



Member, Institute Review Committee (IRC), 2004-2008.

Chair, Provost's Taskforce for Excellence: Defining Undergraduate Technological Education for the 21<sup>st</sup> Century, 2007.

Chair, Ad-hoc Dean of Engineering's Committee to evaluate undergraduate mechanics classes, 2004

Volunteer Lecturer, Tau Beta Pi Review Sessions (campus wide review sessions for the E.I.T./F.E. Exam), two, one hour and a half review sessions, twice each year, 1992-present

#### **RESEARCH GRANTS FUNDED:**

1. **National Science Foundation (NSF):** "Nonlinear Ultrasonic Wave Mixing Techniques," 2014, \$150,000. for 36 months.
2. **Electric Power Research Institute (EPRI):** "Equipment for Nonlinear Ultrasound Measurements for Radiation Damage," 2013, \$40,000. for 4 months.
3. **Electric Power Research Institute (EPRI):** "Nonlinear Ultrasound Measurements for Radiation Damage," 2012, \$30,000. for 4 months.
4. **Electric Power Research Institute (EPRI):** "Detection and Characterization of Carbonation," 2012, \$50,000. for 12 months.
5. **University Transportation Center (UTC):** "Next-Generation Wireless Bridge Weigh-in-Motion (WIM) System Integrated with Nondestructive Evaluation (NDE) Capability for Transportation Infrastructure Safety," 2012, \$177,949. For 18 months (co-principal investigator with three other faculty members).
6. **Department of Energy Nuclear Energy University Program (NEUP):** "Nonlinear Ultrasonic Techniques to Monitor Radiation Damage in RPV and Internal Components," 2012, \$877,000. For 36 months (principal investigator with 3 other faculty members).
7. **Department of Energy Nuclear Energy University Program (NEUP):** "Nonlinear Ultrasonic Diagnosis and Prognosis of ASR Damage in Dry Cast Storage," 2012, \$885,000. For 36 months (co-principal investigator with 3 other faculty members).
8. **Georgia Department of Transportation (GDOT):** "Assessment of Crack Depth in Reinforced concrete Bridge elements by Ultrasonic Methods," 2011, \$302,518. For 36 months (co-principal investigator with one other faculty member).
9. **Electric Power Research Institute (EPRI):** "Travel for Nonlinear Ultrasound Measurements," 2011, \$4,713. for 4 months.
10. **Electric Power Research Institute (EPRI):** "Nonlinear UT Case Study," 2011, \$6,284. for 4 months.
11. **Federal Highway Administration (FHWA):** "Accelerated determination of ASR susceptibility during concrete prism testing through nonlinear resonance spectroscopy," 2009, \$299,000. for 48 months plus \$24,965 extension (co-principal investigator with 2 other faculty members).

12. **Air Force Office of Scientific Research (AFOSR):** “A Multi-scale Structural Health Monitoring Approach for Damage Detection, Diagnosis and Prognosis in Aerospace Structures,” 2008, \$410,000. for 36 months (co-principal investigator with 4 other faculty members).
13. **National Science Foundation (NSF):** “InTEL: Interactive Toolkit for Engineering Learning,” 2007, \$899,791. for 36 months (co-principal investigator with 3 other faculty members)
14. **National Science Foundation (NSF):** “Nonlinear Ultrasonic Techniques for Nondestructive Evaluation and Fatigue Life Prediction,” 2007, \$270,000. for 36 months (co-principal investigator with 2 other faculty members).
15. **Georgia DOT:** “Feasibility Study for the Global Evaluation of Segregation in Flexible Pavements with Ultrasound,” 2006, \$339,128. for 36 months (co-principal investigator with one other faculty member).
16. **Georgia DOT:** “Rapid Assessment of Alkali Reactivity of Aggregate and Aggregate/Paste Combinations,” 2006, \$319,501. for 36 months (co-principal investigator with one other faculty member).
17. **Georgia DOT:** “In Situ Measurement of Air Content in Rigid Pavements,” 2006, \$319,102. for 36 months (co-principal investigator with one other faculty member).
18. **Corning:** “Linear and Nonlinear Ultrasound to Characterize Cordierite Plate,” 2006, \$30,000. for 3 months (co-principal investigator with one other faculty member).
19. **Exxon:** “Ultrasonic Techniques for Condition Monitoring of Reactors and Pipes,” 2005, \$85,000. for 18 months (co-principal investigator with one other faculty member).
20. **Defense Advanced Research Projects Agency (DARPA):** “Application of Advanced Ultrasonic Techniques to Characterize Microstructural Evolution in High Temperature Alloys” from Pratt and Whitney, 2004, \$398,000 for 2 years (co-principal investigator with one other faculty member).
21. **DARPA:** “Structural Integrity Prognosis System (SIPS),” sub-contract titled “Prognosis for Structural Health” from Northrop Grumman, 2003, \$761,684. for 18 months (co-principal investigator with three other faculty members).
22. **National Science Foundation (NSF):** “Guided Ultrasonic Wave Methodology to Characterize the Performance of FRP Patches in Repaired and Rehabilitated Concrete Components,” 2002, \$154,995 for three years (co-principal investigator with one other faculty member).
23. **General Electric Power Systems:** “Dynamic Pressure Measurements,” 2001, \$109,969. for 6 months (co-principal investigator with two other faculty members).
24. **General Electric Power Systems:** “Non-contact Ultrasonic MEMS Sensors for the Performance of Gas Turbine Engine Components,” 2000, \$136,000. for 1 year (co-principal investigator with two other faculty members).
25. **Air Force Office of Scientific Research (AFOSR):** “Multi-channel Data Acquisition System for Nondestructive Evaluation of Airport Facilities,” Equipment grant, 1998, \$110,083 (co-principal investigator with one other faculty member).

26. **Georgia Tech Research Corporation (GTRC):** “Equipment Funds for Laser Generation and Detection of Ultrasound in Concrete,” 1997, \$46,000.
27. **NASA:** “Ultrasonic Nondestructive Characterization of Adhesive Bonds,” 1996, \$150,000 (for three years, co-principal investigator with one other faculty member).
28. **Office of Naval Research (ONR) M-URI:** “Integrated Diagnostics,” two projects under a \$5.969 million project. Co-principal investigator on two projects: “Study of acoustic emission and acoustic transmission from incipient fatigue failure,” and “Crack detection by piezoelectric and laser generated ultrasonic guided waves,” 1995, for 5 years.
29. **American Telephone and Telegraph, Equipment Grant:** “Detection of Transient Elastic Waves,” 1995, \$15,000.
30. **Georgia DOT:** “Nondestructive Assessment of Pile Tip Elevation,” 1994, \$55,539 (for one year, co-principal investigator with one other faculty member).
31. **National Science Foundation: Combined Research Curriculum Development Program,** “Infrastructure Assessment, Rehabilitation and Reconstruction,” 1994, \$395,156 (for three years, co-principal investigator with four other faculty members).
32. **National Science Foundation: Research Experience for Undergraduates,** 1993, \$7,500 (for eight months).
33. **National Science Foundation: Instrumentation and Laboratory Improvement Program,** “Equipment for Nondestructive Evaluation of Infrastructure,” 1993, \$55,174 (co-principal investigator with one other faculty member).
34. **Federal Highway Administration:** “Accelerated Test Methods to Determine the Long-term Behavior of FRP Composite Structures,” 1993, \$1.45 Million (for three years, co-principal investigator with four other faculty members).
35. **National Science Foundation: Research Experience for Undergraduates,** 1992, \$7,450 (for ten months).
36. **American Telephone and Telegraph, Equipment Grant:** “Application of Optical Techniques to Quantitative Nondestructive Evaluation,” 1992, \$15,000.
37. **Cobb County Department of Transportation,** “Program Management for Cobb County's Transportation Program,” March 1, 1991, \$32,000 (contributor with five other investigators).
38. **Georgia Institute of Technology Instructional Grant,** April 1, 1991, \$500.
39. **Engineering Foundation/Air Force Engineering Research Initiation Grant,** “Modeling of Acoustic Emission Signals,” 1991, \$23,000 (for one year).
40. **National Science Foundation: Research Initiation Award,** “Analytical and Experimental Modeling of Acoustic Emission Signals,” 1991, \$69,970 (for two years).

41. **Lilly Foundation Teaching Fellowship**, September 1, 1990, \$7,000.

**HONORS AND AWARDS:**

<b>Fellow of the American Society of Mechanical Engineers</b>	January, 2014
<b>Georgia Tech Chapter of Sigma Xi, Best Faculty Paper Award</b>	April, 2007
<b>Freshman Partner of the Year Award, Freshmen Experience</b>	May, 2005
<b>Faculty Excellence Award, Women in Engineering</b> Awarded by the Women in Engineering Program, and voted on by the women undergraduate students in the College of Engineering	May, 2003
<b>ANAK Award</b> Awarded to a faculty member at Georgia Tech who has demonstrated outstanding service to the Institute and to the student body through teaching, research, advisement, and general involvement in campus life	May, 1998
<b>Class of 1940 W. Roane Beard Outstanding Teacher Award</b> Outstanding teacher at Georgia Tech	May, 1993
<b>Amoco/CETL Junior Faculty Teaching Excellence Award</b> Outstanding teacher among un-tenured faculty at Georgia Tech	July, 1991
<b>Lilly Teaching Fellowship</b>	July, 1990
<b>Grumman Aerospace Masters Fellowship</b>	April, 1980