

Curriculum Vitae

Joe Thornhill, PhD, PE, CSHO

Thornhill, Ramirez & Associates, Inc.

550 Heritage Grove Road, Leander, Texas 78641

(512) 259-1120 Fax: (512) 259-4667 Cell: (512) 656-1120

Registered Professional Engineer: Texas License No. 48105

Fields of Specialization:

Machine Design, Dynamics, Mechanical Vibrations, Instrumentation, Vehicular Accident Reconstruction

Education:

Ph.D., Mechanical Engineering, The University of Texas at Austin, 1980

Dissertation Title: "Impact Force Prediction Using Measured Frequency Response Functions"

M.S., Engineering, Stanford University, 1973

B.S., Mechanical Engineering, With Highest Honors, The University of Texas at Austin, 1972

Forensic Engineering education:

- ◆ Advanced Accident Reconstruction.
- ◆ Advanced Commercial Vehicle Accident Investigation and Reconstruction.
- ◆ Motorcycle Accident Reconstruction.
- ◆ Work Zone Traffic Control (certified)
- ◆ Train-the-Trainer Flagger (certified)
- ◆ OSHA Southwest Education Center series in construction and general industry workplace safety topics, including hazardous materials, machinery and machine guarding standards, confined space, excavation and trenching, electrical standards, fall arrest, and other topics.

All of the above courses taught by Texas Engineering Extension Service (TEEX), Texas A&M University System.

- ◆ Numerous T.A.A.R.S. Courses.
- ◆ EDCRASH taught by Engineering Dynamics Corporation.
- ◆ Society of Automotive Engineers Low Speed TOPTEC.
- ◆ Low-Speed Automobile Accidents – From Collision to Trial, Lawyers & Judges Publishing Co.
- ◆ Attended and taught numerous courses in kinematics, dynamics, and vibrations.
- ◆ Role of Warnings and Instructions, University of Wisconsin, 2009

Product experience:

- ◆ Sixteen years experience in IBM Austin Engineering Analysis Laboratory.
- ◆ Consulting at numerous IBM Development Laboratories.

Additional technical short courses attended (in relevant technical areas):

Finite Element Methods, ANSYS & CAEDS Finite Element Programs, Vibration Damping, Digital Filters, Random Data Analysis, Structural Excitation and Analysis, Introduction to Computer Methods in Structural Dynamics, Dynamic Analysis.

Honorary Scholastic Fraternities/Organizations:

Tau Beta Pi, Phi Kappa Phi, Pi Tau Sigma, Phi Eta Sigma

Professional Society Memberships & Accreditations:

American Society of Mechanical Engineers (ASME); Society of Automotive Engineers (SAE); Texas Association of Accident Reconstruction Specialists (TAARS); Accredited Traffic Accident Reconstructionist (ACTAR) No. 1144, Certified Safety & Health Official (CSHO) in both Construction and General Industry, American Society of Agricultural & Biological Engineers (ASABE).

Academic/Industrial Employment History:

<u>Company/University</u>	<u>Dates</u>	<u>Fields of Specialization and Experience</u>
Thornhill, Ramirez & Associates	6/95-present	<ul style="list-style-type: none"> ◆ vehicular accident reconstruction ◆ product liability cases involving machinery
The University of Texas Austin, Texas Associate Professor of Mechanical Engineering (tenured) Lecturer in Mechanical Engineering	(part time appointment) 1/87-8/00 1/81-12/86	<ul style="list-style-type: none"> ◆ kinematics and dynamics ◆ engineering mathematics ◆ mechanical vibrations ◆ digital signal processing
Applied Research Laboratories The University of Texas Austin, Texas Research Engineer (Faculty)	8/93-12/95	<ul style="list-style-type: none"> ◆ CBM (Condition Based Maintenance) ◆ structural dynamics ◆ digital signal processing time-scale, time-frequency techniques
IBM Corporation Austin, Texas Advisory Engineer	3/75-7/93	<ul style="list-style-type: none"> ◆ mechanical design, analysis, & instrumentation ◆ kinematic & dynamic analysis ◆ experimental modal analysis ◆ digital signal processing & system identification ◆ Finite Element Analysis (FEA) ◆ speech recognition algorithm development ◆ automated electronic mfg. equip. design ◆ Manager, Engineering Analysis Laboratory
Tracor Instruments, Inc. Austin, Texas Engineer/Scientist II	3/74-3/75	<ul style="list-style-type: none"> ◆ system design analytical instruments ◆ transfer of products from Development to Manufacturing Engineering
Bell Telephone Laboratories Whippany, New Jersey Member of Technical Staff	5/72-3/74	<ul style="list-style-type: none"> ◆ mechanical vibrations ◆ machine design ◆ design of a large plow for underground cable
Tracor, Inc. Austin, Texas Electrical/Mechanical Technician	6/66-9/68	<ul style="list-style-type: none"> ◆ commercial instrument development ◆ transfer of products from Development to Manufacturing Engineering
Astro Mechanics Austin, Texas Instrument Machinist	2/63-6/66	<ul style="list-style-type: none"> ◆ engine lathe, screw machines ◆ vertical & horizontal milling machines ◆ This company designed & built large telescopes & associated astronomical instruments.

Publications:

- Ciro Ramirez and R. Joe Thornhill, "Modeling a Pothole Impact of an Agricultural Tractor Using HVE and SIMON," HVE White Paper HVE-WP-2011-1, presented at the HVE Forum, Scottsdale, 2011.
- Joe Thornhill, Ciro Ramirez, and C. L. "Marty" Long, "Night-time Visibility Studies and Digital Photography," presented at the F³T² Conference, Houston, Texas, September 2006.
- R. J. Thornhill, C. N. Ramirez, and C. L. Long, Jr., "Forensic Engineering Case Studies of Machinery Product Designs," to be presented and published at the ASME 2002 International Congress & Exposition, New Orleans, Louisiana, November, 2002.
- Roberson, D., R. Barr, C. B. Schrader and R. J. Thornhill, "Experimental Correlation of the Electroneurogram, The Surface Electromyogram, and the Generated Muscle Force", Proceedings of the 3rd International Workshop on Biosignal Interpretation, Chicago, Illinois, June 12-14, 1999, p. 166-169.

- Smith, Craig C., J. F. Dahl, and R. Joe Thornhill, "The Duality of Leakage and Aliasing and Improved Digital Spectral Analysis Techniques", *ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 118, No. 4, pp. 741-747, December, 1996.
- Travis, Jeffrey and R. Joe Thornhill, "Wavelet Analysis of Transient-Evoked Otoacoustic Emissions", Acoustical Society of America Meeting, November 28 - Dec. 2, 1994, Austin, Texas.
- Smith, Craig C. and R. Joe Thornhill, "The Dual Nature of Leakage and Aliasing in Digital Signal Processing", *Proceedings of the ASME International Mechanical Engineering Congress and Exposition*, Chicago, Illinois, Nov. 6-11, 1994.
- Smith, Craig C., R. Joe Thornhill, and Ryan H. Holmes, "Time Aliasing to Reduce Frequency Leakage When Digitally Processing Acoustic, Shock, and Vibration Signals", *Proceedings of the Conference Proceedings at the Third International Congress on Air-Space and Structure-Borne Sound and Vibration*, Montreal, Canada, June 13-15, 1994.
- Constable, Roxanne and R. Joe Thornhill, "Time-Frequency Analysis of the Surface EMG During Maximum Height Jumps Under Altered-G Conditions", *Proceedings of the 31st Annual Rocky Mountain Bioengineering Symposium and 31st International ISA Biomedical Sciences Instrumentation Symposium*, Manhattan, Kansas, April 22-23, 1994, Vol. 30, pp. 69-74.
- Pasanen, Edward, Jeffrey Travis and R. Joe Thornhill, "Wavelet Type Analysis of Transient-evoked Otoacoustic Emissions", *Proceedings of the 31st Annual Rocky Mountain Bioengineering Symposium and 31st International ISA Biomedical Sciences Instrumentation Symposium*, Manhattan, Kansas, April 22-23, 1994, Vol. 30, pp 75-80.
- Barker, Richard, Melvin Hinich, Georgia Ann-Klutke, Ciro Ramirez, and R. Joe Thornhill, "Development and Application of a Statistically Based Feature Extraction Algorithm for Monitoring Tool Wear in Circuit Board Assembly", *Circuits, Systems, and Signal Processing*, 1994, Vol. 13, No. 4, pp. 411-433.
- Constable, Roxanne and R. Joe Thornhill, "Using the Continuous Discrete Wavelet Transform for Time-Frequency Analysis of the Surface EMG Signal", *Proceedings of the Biomechanics XIVth I.S.B. Congress*, July 4-8, 1993, Paris, France.
- Hinich, M., R. W. Barker, G-A. Klutke, C. N. Ramirez, and R. J. Thornhill, "Time Series Pattern Recognition for Monitoring Rotating Machinery Condition," The University of Texas, Applied Research Laboratories Technical Paper No. 91-21 (ARL-TP-91-21), 1993.
- Constable, Roxanne and R. Joe Thornhill, "Using the Discrete Wavelet Transform for Time-Frequency Analysis of the Surface EMG Signal", *Proceedings of the 30th Annual Rocky Mountain Bioengineering Symposium and 30th International ISA Biomedical Sciences Instrumentation Symposium*, San Antonio, Texas, April 2-3, 1993, Vol. 29, pp 121-127.
- Ramirez, Ciro and R. Joe Thornhill, "Drill Wear Monitoring in Circuit Board Manufacturing Using Drilling Forces and Their Spectra", *ASME Journal of Electronic Packaging*, Vol. 114, No. 3, pp. 342-348, Sept., 1992.
- Ramirez, Ciro and R. Joe Thornhill, "Drill Wear Monitoring In Circuit Board Manufacturing: An Experimental Study", *ASME Journal of Electronic Packaging*, Vol. 114, No. 3, pp. 360-364, Sept., 1992.
- Ramirez, Ciro and R. Joe Thornhill, "Automated Measurement of Flank Wear of Circuit Board Drills", *ASME Journal of Electronic Packaging*, Vol. 114, No. 1, pp. 93-96, March, 1992.
- Ramirez, Ciro and R. Joe Thornhill, "On Estimating Rotational Speed and Torque From the Period of an Encoder", *ASME WAM Conference Proceedings*, ASME Publication PED-Vol. 55, pp. 121-133, Dec., 1991.
- Rangel, Robert and R. Joe Thornhill, "Prediction of Impact Forces Using Hertzian Contact Theory and Measured Structural Data", *Mechanical Systems and Signal Processing*, Vol. 4, No. 4, pp. 287-294, 1990.
- Thornhill, R. Joe and Craig C. Smith, "Impact Force Prediction Using Measured Frequency Response Functions", *ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 105, No. 4, pp. 227-231, Dec., 1983.
- Thornhill, R. Joe and Craig C. Smith, "Time Aliasing: A Digital Data Processing Phenomenon", *ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 105, No. 4, pp. 232-237, Dec., 1983.