

NAME: PETER AVITABILE
FIELD: STRUCTURAL DYNAMICS, VIBRATIONS, DYNAMIC SYSTEMS

A. EDUCATION AND ACADEMIC QUALIFICATIONS

1. Education

- 1998 DEng** Mechanical Engineering, University of Massachusetts Lowell, Lowell, Massachusetts
 Dissertation: *Modal Model Correlation Techniques*; Advisor: Dr. John O’Callahan
- 1982 M.S.** Mechanical Engineering, University of Rhode Island, Kingston, Rhode Island
 Thesis: *Experimental Modal Correlation and Structural Modification*
- 1974 B.S.** Mechanical Engineering, Manhattan College, Bronx, N.Y.; Honors - Pi Tau Sigma

2. Academic Experience

- 2022-Present Research Engineer Mechanical Engineering-Engineering Mechanics**
 Michigan Technological University, Houghton, Michigan
- 2017-Present Professor Emeritus, Mechanical Engineering**
 University of Massachusetts Lowell
- 2008-2017 Professor of Mechanical Engineering**
 University of Massachusetts Lowell, Lowell, Massachusetts
- 2005-Present Co-Director, Structural Dynamics and Acoustic Systems Laboratory**
 University of Massachusetts Lowell, Lowell, Massachusetts
- 2004-2008 Associate Professor of Mechanical Engineering**
 University of Massachusetts Lowell, Lowell, Massachusetts
- 2000-2004 Assistant Professor of Mechanical Engineering**
 University of Massachusetts Lowell, Lowell, Massachusetts
- 2000-Present Director, Modal Analysis and Controls Laboratory**
 University of Massachusetts Lowell, Lowell, Massachusetts
- 1985-2000 Engineering Systems Analyst, Software Applications, Multimedia Applications**
 University of Massachusetts Lowell, Lowell, Massachusetts

3. Industry Experience

- 2017-Present President and Engineering Consultant**
 Dynamic Decisions, Amherst, NH
- 1993-2000 Engineering Consultant**
 Dynamic Decisions, Merrimack, NH
- 1984-1985 Engineer, Test and Analysis**
 General Electric, Turbine Technology Laboratory, Lynn, Massachusetts
- 1976-1983 Project Engineer, Analytical and Dynamic Testing Projects**
 ITT Grinnell, Research, Development & Engineering, Providence, RI
- 1974-1976 Engineer, Reactor Vessel Analysis**
 Westinghouse, Bettis Atomic Power Laboratory, Pittsburgh, PA

B. EDUCATION AND ACADEMIC QUALIFICATIONS

1. Professional Association Participation

- a. Membership in Professional Societies – ASME, SEM**
 Registered Professional Engineer in State of Rhode Island
- b. Membership on Editorial and Peer Review Boards - Reviewer for 21 different journals:**
- c. Other Professional Activities**
 President 2015-2018, Vice-President June 2014-2015, Society for Experimental Mechanics
 Involved in several different national/international scientific committees; heavily involved SEM/IMAC

2. Awards and Honors

- Feb 2022 Elected Fellow in the Society for Experimental Mechanics (highest honor award)
April 2016 UMASS Lowell Pillars of Excellence Award - Innovative Research and Entrepreneurship
May 1996 Recipient of the Dr Irwin Vigness Memorial Award at the IES National conference for outstanding technical guidance in educational programs.

Several best paper awards for engineering and educational related work

C. RESEARCH FUNDING

1. Grants and Contracts

Summary of Grants and Contracts while at UMASS Lowell

Years 2000-2023 \$9,301,568 received total

Years 1990-2000 \$96,000 (prior to faculty appointment)

Hardware and Software Donations while at UMASS Lowell

Hardware \$477,000 Software ~\$520,000

D. ACADEMIC AND PROFESSIONAL PUBLICATIONS

- a. **Journal Articles** – over 60 journal articles as of end of 2022
- b. **Technical Conference Publications** – over 350 conference papers as of end of 2022
- c. **Magazine Publications** – over 20 magazine articles as of end of 2022
- d. **Experimental Techniques published by the Society for Experimental Mechanics “Modal Space – Back to Basics” (series) by Peter Avitabile**
Had 17 continuous years of publication in the Experimental Techniques magazine; the longest running, most popular series ET; there are over 100 articles published.
- e. **Books and Chapters**
 1. SEM Handbook of Experimental Structural Dynamics, Associate Editor, draft available in 2020; published 2022
 2. Modal Testing: A Practitioner’s Guide, author, ISBN: 978-1-119-22289-7, published November 2017
 3. Finite Element Model Correlation, SEM Handbook of Experimental Structural Dynamics
 4. Linear Modal Substructuring with Nonlinear Connections, SEM Handbook of Experimental Structural Dynamics
- f. **Selected Notable Technical Reports (from numerous reports written over the years)**
 1. Nonstationary System State Identification Using Complex Polynomial Representations, Eglin, # L115842, 2019
 2. Fixture Neutralization Methodology, US DOE KCNSC managed by Honeywell, SDASL Report# L117289
 3. Experimental Modal Testing for FCA High Displacement Modal Testing, SDASL Report# L116514, 2017
 4. Collaborative Research: Enabling Non-contact Structural Dynamic Identification with Focused Ultrasound Radiation Force, Project Report for Award 1266019 - NSF Final Report, 2016
 5. Updated Reduced Order Model Development for Forced Response Predictions, SNL, Report #116798, 2017
 6. Development of Dynamic Response Modeling Techniques for Linear Modal Components Interconnected with Non-Linear Connection Elements, Phase 2 Final Summary Report for Eglin AFB, SDASL Report #L111966-2, 2015
 7. Development of Dynamic Response Modeling Techniques for Linear Modal Components Interconnected with Non-Linear Connection Elements, Phase 1 Interim Summary Report for Eglin AFB, SDASL Report #L111966-1, 2012
 8. Small Integrally Bladed Rotors Mistuning Rig Support Effort, Pratt & Whitney, Report # L11217, 2012
 9. DDG 1000 MTG Modal Test, DRS Power Technology, Office of Naval Operations, Fitchburg, MA, 2010
 10. System Modeling Approaches of Helicopter/Wing/Missile Configurations for the US Army Redstone, 2005
 11. Design Optimization by Inverting Targets, P.Avitabile, submitted to General Motors Proving Grounds, Dec 2001
 12. Gemini South 8m Optical Telescope Modal and Operating Tests, AURA, 2000
- g. **Invited Talks (without paper presentation)**

Over 35 live seminar presentations given for Sandia/NOMAD, LANL/LADSS, MTU, UWisc, ATA Engineering, Technische Universität München, TU Delft, NUWC, AFOSR, Northeastern U,

E. INSTRUCTIONAL RELATED ACTIVITIES

1. Teaching (Courses taught, number of years, undergraduate/graduate levels, etc)

a. Undergraduate Courses:

- 22.321 Mechanical Design – Fall 2000, Fall 2001 (Junior)
- 22.451 Dynamic Systems – Fall 2002 to Fall 2015, Spring 2015 to Spring 2017 (Senior)
- 22.457 Vibrations – Spring 2003 to 2010 (Senior)
- 22.302 Mechanical Lab I – Spring 2001 to 2015 (Junior)
- 22.403 Mechanical Lab II – Fall 2001 to Fall 2012 (Senior)
- 22.423 Senior Capstone Project – 2003-2004, 2008, 2010-2012, 2014, 2016-2018

b. Graduate Courses:

Material contained in the courses below is partially the basis for many industry related seminars

- 22.515 Structural Dynamic Modeling Techniques at UML – 19 semesters
- 22.516 Experimental Modal Analysis at UML – 30 semesters
- 22.517 Structural Dynamics at UML – 5 semesters
- 22.550 Vibrations at UML – 20 semesters
- 22.603 Advanced Structural Dynamic Modeling Topics at UML – 7 semesters
- 22.611 Matrix Methods in Structural Dynamics – 4 semesters

c. Engineering Society Seminars Taught

- Society for Experimental Mechanics IMAC - *Modal Model Correlation and Model Updating* -
- Society for Experimental Mechanics IMAC – *Experimental Modal Analysis* – 20 times
- Institute of Environmental Sciences – National/Boston - *Vibration Fixture Design* – 4 times

d. Software Vendor Courses

Over 100 live seminars given on Structural Dynamic Modeling Techniques, Experimental Modal Analysis, Advanced Experimental Modal Analysis, FRF Measurement Techniques, Test/Analysis Correlation for companies such as Leuven Measurement Systems, GenRad, Spectral Dynamics, PCB, Crystal Instruments

e. Customized In-House Seminar Presentations

Over 15 live in-house seminars given on Model Correlation, Basic Experimental Modal Analysis, Advanced Experimental Modal Analysis, Structural Dynamic Modeling Techniques and related topics for companies such as NASA MSC, Bobcat, VSEA, Cummins Engine, CDC-NIOSH, Bosch Braking Systems, NASA Glenn Research Center, Seagate technology, General Motors Truck Davidson, Harley Davidson, GTE Communications, Army Material Testing Lab, General Motors Cadillac

f. University Sponsored Continuing Education Seminars Taught

- UMASS Lowell - *Structural Dynamic Modeling Techniques* - 1987, 1988, 1989, 1990, 1993
- University of Cincinnati - *Advanced Modal Analysis* - 1987, 1988, 1989, 1990, 1992

Other Activity and Accomplishments Related to Instructional Function

Thesis Research – Thesis Advisor: 18 PhD students and 19 MS students (1999-2024)

Thesis Research – Thesis Committee: 9 PhD students and 16 MS students (1999-2024)

International Student Co-op/Visiting Scholar Invitations – 4 international students hosted

OTHER INDUSTRIAL APPLICATIONS DURING & PRIOR TO FACULTY APPOINTMENT RESEARCH, TESTING, AND CONSULTING WORK

- Chromalloy Gas Turbine LLC, Palm Beach Gardens Florida – 2017
Provide consulting support for new FAA certification program
- Acushnet Company/Titleist – Fairhaven, Massachusetts
Provide expert witness support for litigation action for golf club face patent infringement; develop protocol for testing golf club face plate to determine dynamic characteristics; provide comprehensive golf face plate dynamic test data; perform comparative tests on Calloway golf clubs; interface with legal and other expert witnesses support litigation effort.
- Chromalloy Gas Turbine LLC, Atlanta, Georgia – 2008 – 2009
Provide technical guidance in the development and execution of test/analysis/correlation of jet engine replacement blades to be certified for FAA regulation procedures; identify test methodology for certification process; interact with FAA to support certification procedures
- General Motors Proving Grounds, Milford, Michigan - 1999
System modeling analysis; develop component disassembly methodology; utilize analytical model improvement and localization techniques for analysis
- Whirlpool Corporation, St. Joseph, Michigan - 1999
Test and analysis correlation; modeling procedures for flimsy configurations; dryer cabinet configurations studied for best modeling practices
- SUN Microsystems, Inc., Mountain View, California - 1996
Test and analysis correlation for computer chassis; impedance modeling for disk drive system model inclusion; force estimation from measured data for drop load
- GE Turbine Business Group, Fitchburg, Massachusetts - 1995
Test and analysis correlation; system modeling tools; operating data evaluation; large propulsion system model used for assessment
- Canadian Space Agency, Ottawa, Canada - 1993
Experimental modal test of RADARSAT satellite for correlation with analytical model; testing performed on full scale prototype configuration with 5 simultaneous inputs and 250 responses measured
- GTE Communication Systems, Taunton, Massachusetts - 1993
Experimental modal testing; MIMO acquisition applications; correlation with model; typical component substructure used for assessment
- Martin Marietta Space Systems, Orlando, Florida - 1993
Modal data extraction for "Starwars" prototype satellite; correlation with model
- Apple Computer, Cupertino, California - 1992
Experimental modal tests of a notebook configuration; testing performed on prototype configuration using SISO and MIMO approaches
- LMS International, Leuven, Belgium - 1992
Study of effects of model updating; develop tutorial material for Link software
- Newport News Shipbuilding, Cambridge Acoustical Associates, Cambridge, Mass - 1986
Reduce experimental data of large foundation for correlation with model
- Emhart CTC, Salem, Massachusetts - 1986
Vibration and modal testing for a new composite shaft golf club design
- GE Steam Turbine Division, Lynn, Massachusetts - 1986
Nonlinear dynamic shock analyses for generic shipboard mounting configuration
- Hammel Dahl/Jamesbury, Warwick, Rhode Island – 1982-86
Structural, seismic and ASME analysis of valve components and assemblies
- ITT Grinnell, Providence, Rhode Island – 1982-86
Static, dynamic, thermal analyses for a wide variety of piping components