DR. STEPHEN A. HAMBRIC

Consultant in Vibration, Acoustics, Flow Noise, Signal Processing, and Noise Control

Hambric Acoustics, LLC

hambricacoustics@gmail.com

www.hambricacoustics.com

EDUCATION

B.S. Mechanical Engineering, Virginia Polytechnic Institute and State University, 1986.
M.S. Mechanical Engineering, Virginia Polytechnic Institute and State University, 1987.
D.Sc. Mechanical Engineering, George Washington University, 1995.

WORK EXPERIENCE

Consultant, Hambric Acoustics, LLC, December 2012 to present.

- Subject Matter Expert for the US Nuclear Regulatory Commission (NRC). Evaluate flow-induced vibration and fatigue assessments for commercial reactor design and power uprate applications.
- Subject Matter Expert for the US Navy. Support NAVSEA and NAVAIR vibration and acoustic efforts for marine vehicles and aircraft.
- Instructor, Institute for Noise Control Engineering (INCE-USA). Teach the third advanced course in INCE-USA's Noise Control Engineering series to practicing engineers.
- Instructor, develop and teach customized short courses on vibro-acoustics, signal processing, and flow-induced vibration and noise, including online interactive demonstrators.
- PCB Piezotronics. Teach online webinars and write white papers on advanced acoustic and vibration instrumentation. See https://www.pcb.com/about/training for recent webinars.
- Various small businesses. Provide subject matter expertise in acoustics, vibration, and noise control in vehicles, buildings, turbomachinery, mechanical systems, and communities; including measurements (modal analysis, flow-induced vibration and noise, sound and vibration in buildings) and computational methods (finite element analysis, boundary element analysis, statistical energy analysis, hybrid methods).
- Expert Witness. Provide expert opinion papers and testimony on various topics in acoustics and vibration.

Penn State University, December 1996 to September 2022.

- Research Professor at Applied Research Lab (ARL). Acquired funding for and directed large computational and experimental structural-acoustic and hydro-acoustic projects funded by the U.S. Navy, NASA, and private industry. Main projects focused on propulsor, pump, compressor, and other turbomachinery dynamics and acoustics; fatigue life; noise transmission and vibration in aerospace and automotive vehicles, machinery, and piping systems; vibro-acoustics of composite structures; and passive noise control treatments.
- Director of Penn State's Center for Acoustics and Vibration (CAV), a campus-wide industry-sponsored consortium of faculty and students working in all aspects of sound and vibration. Responsible for recruiting and maintaining corporate sponsors and international liaisons, and directing the annual CAV spring workshop and short course (www.cav.psu.edu)
- Professor, Graduate Program in Acoustics. Taught *ACS 519 - Sound Structure Interaction*, and *ACS 597 – Research and Writing for Acousticians* – on campus and in Penn State's distance education program. Directed graduate students pursuing M.S. and Ph.D. degrees. Periodically taught short courses to private industry in structural-acoustics and noise control.

Mechanical Engineer: Computational Mechanics Office, Naval Surface Warfare Center, Carderock Division (NSWCCD), Bethesda, MD, September 1987 to December 1996.

PROFESSIONAL ACTIVITIES

- *Fellow of the American Society of Mechanical Engineers (ASME)*: Former Chair of Noise Control and Acoustics Division (NCAD).
- *Fellow of the Institute of Noise Control Engineering (INCE)*: Technical Chair of 2004 Noise-Con conference; INCE Board of Directors, 2005-2007; General Chair of Noise-Con 2007 conference, Vice President for Technical Activities 2007-2010; Vice President for Conferences, 2010-2013; General Chair of Internoise 2012, Vice President for Publications 2023 – present.
- *International INCE*, Vice President for the Americas Region, 2013-2019; Vice President for Rules and Governance, 2019 to 2024; Distinguished board member, 2025.
- Associate Editor, *ASME Journal of Vibration and Acoustics*, October 2005 – September 2011.
- Member, *ASME Standards Committee PTC-36 (Measurement of Industrial Sound)*, 2008-2016.
- Member, *ASTM Committee E33 – Building and Environmental Acoustics*, 2025-present.

HONORS AND AWARDS

- Sigma Xi Research Award in Recognition of original developments of power flow techniques in low frequency computational structural acoustics, June 1993.
- Martin Hirschorn IAC Prize for best paper on new and/or improved cost-effective noise control and/or acoustical conditioning products, October 2007.

GRADUATE STUDENTS

Graduated 12 PhD students and 24 Masters degree students in the Penn State Graduate Program in Acoustics and College of Engineering.

PATENTS

- *Expandable Impeller Pump*, McBride, Mallison, Dillon, Campbell, Boger, Hambric, Kunz, Runt, Walsh, and Leschinsky, US Patent 10865801, 15 December 2020.
- *Heart Assist Device with Expandable Impeller Pump*, McBride, Boger, Campbell, Dillon, Hambric, Kunz, Leschinsky, Mallison, Runt, and Walsh, US Patent 10864309, 15 December 2020.

PUBLICATIONS (Refereed Journals)

1. Hambric, S.A., "Power Flow and Mechanical Intensity Calculations in Structural Finite Element Analysis," *ASME Journal of Vibration and Acoustics*, 112 (4), 542-549, October 1990, https://doi.org/10.1115/1.2930140
2. Hambric, S.A., and Taylor, P.D., "Comparison of Experimental and Finite Element Structure-Borne Flexural Power Measurements for a Straight Beam," *Journal of Sound and Vibration*, 170 (5), 595-605, March 1994, https://doi.org/10.1006/jsvi.1994.1089
3. Dai, C., and Hambric, S.A., "A Prototype Marine Propulsor Design Tool Using Artificial Intelligence and Numerical Optimization Techniques," *Transactions of The Society of Naval Architects and Marine Engineers (SNAME)*, 102, 57-69, November 1994.
4. Hambric, S.A., "Approximation Techniques for Broad-Band Acoustic Radiated Noise Design Optimization Problems," *ASME Journal of Vibration and Acoustics*, 117 (1), 136-144, January 1995, https://doi.org/10.1115/1.2873857
5. Hambric, S.A., "Sensitivity Calculations for Broad-Band Acoustic Radiated Noise Design Optimization Problems," *ASME Journal of Vibration and Acoustics,* 118 (3), 529-532, July 1996, https://doi.org/10.1115/1.2888219
6. Dirlik, S., Hambric, S., Azarm, S., Marquardt, M., Hellman, A., Bartlett, S., and Castelli, V., "Developing a Prototype Concurrent Design Tool for Composite Topside Structures," *Naval Engineers Journal*, 109 (3), 279-292, May 1997, https://doi.org/10.1111/j.1559-3584.1997.tb03211.x
7. Hambric, S.A., and Szwerc, R.P., "Predictions of Structural Intensity Fields using Solid Finite Elements," *Noise Control Eng. J.*, Vol 47, No. 6, pp. 209-217, (Nov-Dec 1999), https://doi.org/10.3397/1.599317
8. Szwerc, R.P, Burroughs, C.B., Hambric, S.A., and McDevitt, T.E., "Power Flow in Coupled Bending and Longitudinal Waves in Beams," *Journal of the Acoustical Society of America,* 107 (6), 3186-3195, June 2000, https://doi.org/10.1121/1.429346

9. Pray, C.M., Hambric, S.A., McDevitt, T.E., and Burroughs, C.B., "Characterization of Folded Beam Waveguide Absorbers for Damping of Flexural Vibrations in a Thick Plate," *Noise Control Engineering Journal,* 48 (6), 185-192, Nov-Dec 2000, https://doi.org/10.3397/1.2827958
10. Hambric, S.A., Cuschieri, J.M., Halkyard, C.R., Mace, B.R., and Szwerc, R.P., "Low-frequency measurements and predictions of the structural-acoustic properties of the INCE standard T-beam structure," *Noise Control Engineering Journal*, 50 (3), 90-99, May-June 2002, https://doi.org/10.3397/1.2839681
11. Conlon, S.C., and Hambric, S.A., "Predicting the vibro-acoustic response of satellite equipment panels," *Journal of the Acoustical Society of America*, 113 (3), 1455-1474, March 2003, https://doi.org/10.1121/1.1553462
12. Hambric, S.A., Hwang, Y.F., and Bonness, W.K., "Vibrations of plates with clamped and free edges excited by low- speed turbulent boundary layer flow," *Journal of Fluids and Structures*, 19, 93-110, January 2004, https://doi.org/10.1016/j.jfluidstructs.2003.09.002
13. Yang, M.Y., Lesieutre, G. A., Hambric, S.A., and Koopmann, G.H., "Development of a Design Curve for Particle Impact Dampers," *Noise Control Engineering Journal*, 53 (1), (January-February 2005), https://doi.org/10.3397/1.2839240
14. Daley, M., and Hambric, S.A., "Simulating and Measuring Structural Intensity Fields in Plates Induced by Spatially and Temporally Random Excitation," *ASME Journal of Vibration and Acoustics*, 127, 451-457, October 2005, https://doi.org/10.1115/1.2013299
15. Kankey, A.T., Koopmann, G.H., Hambric, S.A., and Fahnline, J.B., "Proposed Piezoceramic Excitation for Translational and Rotational Mobility Measurements," *Noise Control Engineering Journal*, 54 (4) 271-281, Jul-Aug 2006, https://doi.org/10.3397/1.2219898
16. Hambric, S.A., Jarrett, A.W., Lee, G.F., and Fedderly, J.J., "Inferring Viscoelastic Dynamic Material Properties from Finite Element and Experimental Studies of Beams with Constrained Layer Damping," *ASME Journal of Vibration and Acoustics*, 129, 158-168, April 2007, https://doi.org/10.1115/1.2424984
17. Peltier, L.J., and Hambric, S.A., "Estimating Turbulent-Boundary-Layer Wall-Pressure Spectra from CFD RANS Solutions," *Journal of Fluids and Structures*, 23, 920-937, August 2007, https://doi.org/10.1016/j.jfluidstructs.2007.01.003
18. Anderson, B.E., Hughes, W.J., and Hambric, S.A., "On the Steering of Sound Energy Through a Supercritical Plate by a Near-Field Transducer Array," *Journal of the Acoustical Society of America*, 123 (5), 2613-2619, May 2008, https://doi.org/10.1121/1.2890738
19. Hambric, S.A., Hughes, W.J., Campbell, R.L., and Fahnline, J.B., "Numerical Modeling of the Flow-Induced Self Noise of Torpedo Array Sensors," *Journal of Underwater Acoustics,* 58 (3), 435-464, 2008.
20. Hwang, Y.F., Bonness, W.K., and Hambric, S.A., "Comparison of semi-empirical models of turbulent boundary layer pressure spectra," *Journal of Sound and Vibration*, 319, pp. 199-217, January 2009, https://doi.org/10.1016/j.jsv.2008.06.002
21. Daley, M.J., and Hambric, S.A., "A Method to Simulate Structural Intensity Fields in Plates and General Structures Induced by Spatially and Temporally Random Excitation Fields," *ASME Journal of Vibration and Acoustics*, 131, February 2009, https://doi.org/10.1115/1.2980381
22. Conlon, S.C. and Hambric, S.A., "Damping and induced damping of a lightweight sandwich panel with simple and complex attachments," *Journal of Sound and Vibration*, 322, 901-925, 2009, https://doi.org/10.1016/j.jsv.2008.12.006
23. Anderson, B.E., Hughes, W.J., and Hambric, S.A., "Grating Lobe Reduction in Transducer Arrays through Structural Filtering of Supercritical Plates," *Journal of the Acoustical Society of America*, 126 (2), 612-619, August 2009, https://doi.org/10.1121/1.3159366
24. Hambric, S.A., Boger, D.A., Fahnline, J.B., and Campbell, R.L., "Structure- and fluid-borne acoustic power sources induced by turbulent flow in 90 degree piping elbows," *Journal of Fluids and Structures*, 26, 121-147, 2010, https://doi.org/10.1016/j.jfluidstructs.2009.10.001
25. Bonness, W.K., Capone, D.E., and Hambric, S.A., "Low-wavenumber turbulent boundary layer wall pressure measurements from vibration data on a cylinder in pipe flow," *Journal of Sound and Vibration*, 329, 4166-4180, 2010, https://doi.org/10.1016/j.jsv.2010.04.010
26. Barnard, A.R. and Hambric, S.A., "Design and implementation of a shielded underwater vector sensor for laboratory environments," *Journal of the Acoustical Society of America*, 130 (6), EL387-EL391, December 2011, https://doi.org/10.1121/1.3658483
27. Barnard, A.R., Porter, S., Bostron, J., terMeulen, R., and Hambric, S.A., "Evaluation of crowd noise levels during college football games," *Noise Control Engineering Journal*, 59 (6), 667-680, Nov-Dec 2011, https://doi.org/10.3397/1.3654144

28. Barnard, A.R., Hambric, S.A., and Maynard, J.D., "Underwater measurement of narrowband sound power and directivity using supersonic intensity in reverberant environments," *Journal of Sound and Vibration*, 331, 3931-3944, May 2012, https://doi.org/10.1016/j.jsv.2012.04.011
29. Shepherd, M.R., Conlon, S.C., Semperlotti, F., and Hambric, S.A., "Structural intensity modeling and simulations for damage detection," *ASME Journal of Vibration and Acoustics*, 134, October 2012, https://doi.org/10.1115/1.4006376
30. Shepherd, M.R., and Hambric, S.A., "Comment on plate modal wavenumber transforms in Sound and Structural Vibration," *Journal of the Acoustical Society of America*, 132 (4), 2155-2157, October 2012, https://doi.org/10.1121/1.4747012
31. Hambric, S.A., Shepherd, M.R., Campbell, R.L, and Hanford, A.D., "Simulations and measurements of the vibroacoustic effects of replacing rolling element bearings with journal bearings in a simple gearbox," *ASME Journal of Vibration and Acoustics*, 135, June 2013, https://doi.org/10.1115/1.4024087
32. Lee, A.H., Campbell, R.L., and Hambric, S.A., "Coupled delayed-detached-eddy simulation and structural vibration of a self-oscillating cylinder due to vortex shedding," *Journal of Fluids and Structures*, 48, 216-234, July 2014, https://doi.org/10.1115/1.4036453
33. Shepherd, M.R., Hambric, S.A., and Wess, D.B., "The effects of wood variability on the free vibration of an acoustic guitar top plate," *Journal of the Acoustical Society of America*, 136 (5), EL357-EL361, Nov 2014, https://doi.org/10.1121/1.4898740
34. Shepherd, M.R., and Hambric, S.A., "Minimizing the acoustic power radiated by a fluid-loaded curved panel excited by turbulent boundary layer flow," *Journal of the Acoustical Society of America*, 136 (5), 2575-2585, Nov 2014, https://doi.org/10.1121/1.4896823
35. Robin, O., Berry, A., Atalla, N., Hambric, S., and Shepherd, M., "Experimental evidence of modal wavenumber relation to zeros in the wavenumber spectrum of a simply supported plate," J. Acoust. Soc. Am., 137 (5), 2978-2981, May 2015, https://doi.org/10.1121/1.4919334
36. Cai, L.W., and Hambric, S.A., "Multiple scattering of flexural waves on thin plates," *ASME J. Vib. Acoust*., 138 (1), 011009-1-10, Oct 2015, https://doi.org/10.1115/1.4031535
37. Shepherd, M.R., Fahnline, J.B., Dare, T.P., Hambric, S.A., and Campbell, R.L., "A hybrid approach for simulating fluid-loading effects on structures using experimental modal anlaysis and the boundary element method," J. Acoust. Soc. Am., 138 (5), 3073-3080, Nov 2015, https://doi.org/10.1121/1.4934959
38. Cai, L.W., and Hambric, S.A., "Movable rigid scatterer model for flexural wave scattering on thin plates," *ASME J. Vib. Acoust.*, 138 (3), 031016, April 2016, https://doi.org/10.1115/1.4033060
39. Barnard, A.R., and Hambric, S.A., "Development of a set of structural-acoustic teaching demonstrations using a simply supported rectangular plate," *Noise Control Engineering Journal*, 64 (4), 500-510, Jul-Aug 2016, https://doi.org/10.3397/1/376396
40. Hambric, S.A., Shepherd. M.R., Schiller, N.H., Snider, R., and May, C., "Quieting a rib-framed honeycomb core sandwich panel for a rotorcraft roof," *Journal of the American Helicopter Society*, 62, 012009, 2017, https://doi.org/10.4050/jahs.62.012009
41. Lee, A.H., Campbell, R.L., Craven, B.A., and Hambric, S.A., "Fluid-Structure Interaction Simulation of Vortex-Induced Vibration of a Flexible Hydrofoil," *ASME J. Vib. Acoust*., 139, Aug 2017, https://doi.org/10.1115/1.4036453
42. Hambric, S.A., Ziada, S., and Morante, R., "Boiling water reactor steam dryer alternating stress assessment procedures," *ASME Journal of Nuclear Engineering and Radiation Science*, 4, April 2018, https://doi.org/10.1115/1.4037898
43. Shepherd, M.R., Campbell, R.L., and Hambric, S.A., "A parallel computing framework for performing structural-acoustic optimization with stochastic forcing," *Structural and Multidisciplinary Optimization*, Aug 2019, https://doi.org/10.1007/s00158-019-02389-2
44. Cody, K.L., Jonson, M.L., Pollack, M.L., and Hambric, S.A., "Fluid-elastic lock-in of a cavity shear layer instability with the modes of a submerged cantilevered beam," *ASME J. Vib. Acoust.,* 141, Dec 2019, https://doi.org/10.1115/1.4044302
45. Hambric, S.A., Shaw, M.D., and Campbell, R.L., "Wavenumber analyses of panel vibrations induced by transonic wall-bounded jet flow from an upstream high aspect ratio rectangular nozzle," *Advances in Aircraft and Spacecraft Science*, 6 (6), 515-528, 2019, https://doi.org/10.12989/aas.2019.6.6.515
46. Jerome, T.W., Shepherd, M.R., and Hambric, S.A., "Ultrasonic investigation of the pressure profile on the faying surface of fastened aluminum plates," *Mechanical Systems and Signal Processing*, 150, 2021, https://doi.org/10.1016/j.ymssp.2020.107260

47. Wells, S.M., Hambric, S.A., and Brungart, T.A., "Simulating and measuring the vibration and radiated sound of a large industrial chiller," *Noise Control Engineering Journal*, 70 (3), May 2022, https://doi.org/10.3397/1/377017

PUBLICATIONS (Books)

1. Ciappi, E., De Rosa, S., Franco, F., Guyader, J-L., and Hambric, S.A., (editors), *Flinovia – Flow Induced Noise and Vibration Issues and Aspects*, Springer, ISBN 978-3-319-09712-1, 2015.
    a. Chapter: Hambric, S.A., Shaw, M., Campbell, R.L., and Conlon, S.C., "Calculating structural vibration and stress from turbulent flow induced forces," pp. 343-356.
2. Hambric, S.A., Sung, S.H., and Nefske, D.J., *Engineering Vibroacoustic Analysis: Methods and Applications*, Wiley, 2016, doi:10.1002/9781118693988.
3. Ciappi, E., De Rosa, S., Franco, F., Guyader, J-L., Hambric, S.A., and Hanford, A.D., (editors), *Flinovia – Flow Induced Noise and Vibration Issues and Aspects - II*, Springer, ISBN 978-3-319-76779-6, 2018.
    a. Chapter: Hambric, S.A., Shaw, M., and Campbell, R.L., "Panel vibrations induced by supersonic wall-bounded jet flow from an upstream high aspect ratio rectangular nozzle," pp. 197-216, https://doi.org/10.1007/978-3-319-76780-2_13
4. Ciappi, E., De Rosa, S., Franco, F., Guyader, J-L., Hambric, S.A., Leung, R.C.K., Clair, V., Maxit, L., Totaro, N., (editors), *Flinovia – Flow Induced Noise and Vibration Issues and Aspects - III*, Springer, ISBN 978-3-030-64807-7, 2021.
    a. Chapter: Hambric, S.A., and Lysak, P.D., Validation of a Simple Empirical Model for Calculating the Vibration of Flat Plates Excited by Incompressible Homogeneous Turbulent Boundary Layer Flow," pp. 61-86, https://doi.org/10.1007/978-3-030-64807-7_4
5. Doolan, C., Moreau, D., and Wills, A., (editors), *Flinovia – Flow Induced Noise and Vibration Issues and Aspects - IV*, Springer, ISBN 978-3-031-73935-4, 2025.
    a. Chapter: Hambric, S.A., "Calculating Uncertainty of Flow-Induced Vibration Simulations – Demonstration for Turbulence Ingestion on Blake's Strut," pp. 205-222, https://doi.org/10.1007/978-3-031-73935-4_11

PUBLICATIONS (Magazines)

1. Hambric, S.A., "Structural Acoustics Tutorial – Part 1: Vibrations in Structures," *Acoustics Today*, Vol. 2, Issue 4, October 2006.
2. Hambric, S.A., "Structural Acoustics Tutorial – Part 2: Sound-Structure Interaction," *Acoustics Today*, Vol. 3, Issue 2, April 2007.

PUBLICATIONS (Conference Proceedings)

1. Hambric, S.A., "Power Flows and Mechanical Intensities in NASTRAN," *Proceedings of the Seventeenth NASTRAN Users' Colloquium*, pp. 262-289 (April 1989).
2. Hambric, S.A., "Transitioning of Power Flow in Beam Models with Bends," *Proceedings of the Eighteenth NASTRAN Users' Colloquium*, pp. 135-149 (April 1990).
3. Moyer, E.T., and Hambric, S.A., ``Adaptive Mesh Design with Quadrilateral and Brick Elements," *Proceedings of the International Conference on Advances in Structural Testing, Analysis and Design (ICSTAD)*, (July 1990).
4. Hambric, S.A., "Influence of Different Wave Motion Types on Finite Element Power Flow Calculations," *Proceedings of the Third International Congress on Intensity Techniques*, pp. 215-223, Senlis - France (August 1990).
5. Everstine, G.C., Cheng, R.S., and Hambric, S.A., "Finite Element Solution of Transient Fluid-Structure Interaction Problems," *Proceedings of the Nineteenth NASTRAN Users' Colloquium*, pp. 162-173 (April 1991).
6. Hambric, S.A., "General Matrix Methods for Finite Element Structure-Borne Power Calculations," *Proceedings of the Seventh FRG/USA Hydroacoustics Symposium*, pp. 30.1-30.16, Munich - Germany (September 1991).
7. Hambric, S.A., and Everstine, G.C., "Acoustic Intensity Calculations for Axisymmetrically Modeled Fluid Regions," *Proceedings of the 20th NASTRAN User's Colloquium*, pp. 166-183 (May 1992).
8. Hambric, S.A., and Everstine, G.C., "Acoustic Intensity Calculations for Finite Element Fluid-Structure Interaction Problems," *ASME PVP-Vol. 231: Fluid-Structure Interaction, Transient Thermal Hydraulics, and Structural Mechanics*, pp. 23-30 (June 1992).
9. Hambric, S.A., "Visualization of Structure-Borne Power in Finite Element Plate Models," *Proceedings of Inter-Noise '92*, pp. 533-536, (July 1992).

10. Hambric, S.A., "Structural-Acoustic Optimization of a Point-Excited, Submerged Cylindrical Shell," *Proceedings of the 4th AIAA/USAF/NASA/OAI Symposium on Multidisciplinary Analysis and Optimization*, pp. 1096-1103, (September 1992).
11. Hambric, S.A., and Quezon, A.J., "Structure-Borne Noise Predictions for a Simple T-Shaped Beam," *Proceedings of Noise-Con 94*, pp. 591-596, (May 1994).
12. Hambric, S.A., and Dai, C., "A Prototype Artificial Intelligence Driven Marine Propulsor Design Tool," *Proceedings of the AIAA/NASA/USAF/ISSMO Symposium on Multidisciplinary Analysis and Optimization*, pp. 334-343, (September 1994).
13. Hambric, S.A., and Dai, C., "Minimization of Propeller Induced Vibration Using Artificial Intelligence and Numerical Optimization Techniques," *Proceedings of the First World Congress of Structural and Multidisciplinary Optimization*, (May 1995).
14. Hambric, S.A., "Comparison of Finite Element Predictions and Experimental Measurements of Structure-Borne Powers in a T-Shaped Beam," *Proceedings of Inter-Noise 95,* pp. 685-688 (July 1995).
15. Hambric, S.A., "Optimization Methods for Minimizing Acoustic Radiation from Vibrating Structures," *Proceedings of the Society of Engineering Science 32nd Annual Technical Meeting*, pp. 207-208 (October 1995).
16. Hambric, S.A., "Verification of an Analytic Sensitivity Capability for the Finite Element Structural-Acoustic Program SARA-2D," *Proceedings of InterNoise 96*, pp. 2985-2989 (August 1996).
17. Hambric, S.A. and Szwerc, R.P., "Effects of Joint Modeling Deficiencies on Numerical Structure-Borne Power Predictions in the Round-Robin T-Shaped Beam," *Proceedings of NoiseCon 96,* pp. 461-466, (October 1996).
18. Szwerc, R.P. and Hambric, S.A., "The Measurement of Intensity of Longitudinal and Flexural Waves in Intersecting Beams," *Proceedings of NoiseCon 96*, pp. 473-478, (October 1996).
19. Hambric, S.A. and Szwerc, R.P., "Power Dissipations in a Vibrating Lexan T-Shaped Beam," *Proceedings of NoiseCon 97*, pp. 227-232, (June 1997).
20. Hambric, S.A., Erickson, M.J., Capone, D.E., and Burroughs, C.B., "Finite Element Mode Shapes of an Aluminum Ribbed Panel," *Proceedings of NoiseCon 97*, pp. 245-250, (June 1997).
21. Hambric, S.A., Burroughs, C.B., and Szwerc, R.P., "Improved Comparisons Between Experimental and Finite Element Input Power Levels on the Lexan T-Shaped Beam," *Proceedings of NoiseCon 98*, pp. 321-324 (April 1998).
22. Szwerc, R.P., Hambric, S.A., and Erickson, M.J., "A Comparison of Experimental and Finite Element Structural Intensities on an Aluminum Ribbed Panel," *Proceedings of NoiseCon 98*, pp. 359-364 (April 1998).
23. Pray, C.M., Hambric, S.A., and McDevitt, T.E., "Folded Beam Waveguide Absorber Characterization of the Damping of Flexural Vibrations in a Thick Plate," *Proceedings of Internoise 99*, pp. 891-896 (December 1999).
24. Conlon, S.C., and Hambric, S.A., "SEA Prediction of the Injected Power and Response of Panels with Multiple Attachments," *Proceedings of Internoise 99*, pp. 1707-1712 (December 1999).
25. Hambric, S.A., and Hwang, Y.F., "Vibrations of flat plates excited by highly subsonic turbulent boundary layers," *Proceedings of Internoise 2000*, Nice, France, (August 2000).
26. Daley, M.J., and Hambric, S.A., "Structural Intensity in Plates Excited by Turbulent Boundary Layer Pressure Fields," *Proceedings of NOVEM 2000*, Lyon, France, (September 2000).
27. Banks, J.C., Hambric, S.A., and Byington, C.S., "Characterizing Mechanical System Integrity using Structural Surface Intensity," *Proceedings of NOVEM 2000*, Lyon, France, (September 2000).
28. Hwang, Y.F., and Hambric, S.A., "Forcing function models for structures excited by low-speed flow," *Proceedings of Noise-Con 2000*, Newport Beach, CA, (December 2000).
29. Conlon, S.C., Hambric, S.A., and Manning, J.E., "Computational evaluation of satellite equipment panel modal densities and radiation efficiencies," *Proceedings of Noise-Con 2000*, Newport Beach, CA, (December 2000).
30. Hambric, S.A., Yocum, A.M., Cawley, T., and Willits, S.M.., "ARL/Penn State Pump Test Loop," *ASME IMECE2001/NCA-23504*, (November 2001).
31. Pray, C.M., Hambric, S.A., and Munro, A.D., "Modeling of folded beam waveguide absorber behavior using finite element analysis," *Proceedings of NoiseCon 2001*, (October 2001).
32. Hambric, S.A. and Munro, A.D., "Predicted and measured mobilities of the INCE standard ribbed panels," *Proceedings of NoiseCon 2001*, (October 2001).
33. Conlon, S.C., and Hambric, S.A., "Order from disorder: a case study of the effects of structural inhomogeneity on structural-acoustic interaction," *Proceedings of NoiseCon 2001*, (October 2001).
34. Bonness, W.K., Pray, C.M., and Hambric, S.A., "Efficient experimental modal analysis of symmetric structures," *Proceedings of IMAC-XX*, Los Angeles, CA (February 2002).

35. Hambric, S.A., Hwang, Y.F., and Chyczewski, T.S., "Noise Sources and Transmission in Piping Systems," ASME IMECE 2002/NCA-32682, *Proceedings of 2002 ASME IMECE*, New Orleans, Louisiana, (November 2002).
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