

Daniel Allen Russell

Physics Department, Kettering University
1700 W. University Ave, Flint, MI 48504

Birth Date: 9/9/66

Academic Rank: Associate Professor of Applied Physics (Acoustics) – full time

Degrees, with fields, institution, and dates:

Ph.D.	Acoustics	Pennsylvania State University	1995
M.S.	Applied Physics	Northern Illinois University	1991
B.S.	Physics	Bradley University	1988
B.Mus.	Piano Performance	Bradley University	1988

Years on this faculty: 14 years

Appointment(s): Associate Professor 7/99
Assistant Professor 7/95

Other related experience:

Teaching:

Teaching Assistant, Pennsylvania State University, Spring 1995
Physics Instructor, Bradley University, Spring 1991
Teaching Assistant, Northern Illinois University, 1989-1990

Industrial:

Research Consultant, Exxon Research & Engineering Corp., 6/91 - 8/91
Research Assistant, Exxon Research & Engineering Corp., 6/89 - 8/89

Publications and Presentations

Papers published in peer-reviewed archived journals:

- D.A. Russell, "Basketballs as spherical acoustic cavities," submitted to *Am. J. Phys.*, (8/12/2009)
D.A. Russell and L. Hunt, "Spring Constants for Hockey Sticks," submitted to *Phys. Teach.* (6/2/2009).
D.A. Russell, "Swing Weight of Softball Bats," *Phys. Teach.* (accepted for publication on 9/29/2009, to be printed in Spring 2010).
D.A. Russell, D.E. Parker, and Russell S. Hughes, "Analysis of standing sound waves using holographic interferometry," *Am. J. Phys.*, **77** (8), 678-682 (2009).
D.A. Russell and N.P. Weibull, "Table-top thermoacoustic refrigerator for demonstrations," *Am. J. Phys.*, **70**(12), 1231-1233 (2002).
D.A. Russell, "On the sound field radiated by a tuning fork," *Am. J. Phys.*, **68**(12), 1139-1145 (2000).
D.A. Russell, J.P. Titlow, Y.J. Bemmen., "Acoustic monopoles, dipoles, and quadrupoles: An experiment revisited," *Am. J. Phys.*, **67**(8), 660-664 (1999).
D.A. Russell, T.D. Rossing, "Testing piano hammer nonlinearity using residual shock spectra," *Acustica—acta acustica*, **84**(5), 967-975 (1998).
D.A. Russell, V.W. Sparrow, "Backscattering from a baffled finite plate strip with fuzzy attachments," *J. Acoust. Soc. Am.*, **98** (3), 1527-1533 (1995).
A.D. Pierce., V.W. Sparrow, D.A. Russell, "Fundamental Structural-Acoustic Idealizations for Structures with Fuzzy Internals," *J. Vib. Acoust.*, **117**, 339-348 (1995).
V.W. Sparrow, D.A. Russell, J.L. Rochat, "Implementation of discrete fuzzy structure models in *Mathematica*," *Int. J. Numer. Methods Eng.*, **37** (17), 3005-3014 (1994).
T.D. Rossing, D.A. Russell, and D.E. Brown, "On the Acoustics of Tuning Forks," *Am. J. Phys.*, **60** (7), 620-626 (1992).
T.D. Rossing and D.A. Russell, "Laboratory observation of elastic waves in solids," *Am. J. Phys.*, **58** (12), 1153-1162 (1990).

Papers published in peer-reviewed conference proceedings

- D.A. Russell, "Bending Modes, Damping, and the Perception of Sting in Baseball Bats," *Engineering of Sport 6, Vol.1 Developments for Sports*, pp. 11-16 (International Sports Engineering Association, 2006).
L.V. Smith, C. Cruz, A.M. Nathan, and D.A. Russell, "How bat modifications can affect their response," in *Proceedings of the Asia-Pacific Congress on Sports Technology – APCST 2005*, September 12-14, Tokyo Institute of Technology, Tokyo, Japan (2005)
D.A. Russell, "Hoop frequency as a predictor of performance for softball bats," *Engineering of Sport 5, Vol. 2*, pp. 641-647 (International Sports Engineering Association, 2004).
A.M. Nathan, D.A. Russell, and L.V. Smith, "The physics of the trampoline effect in baseball and softball bats," *Engineering of Sport 5, Vol. 2*, pp. 38-44 (International Sports Engineering Association, 2004).

Invited papers presented before professional societies (with printed abstracts)

- D. A. Russell, "Sweet spot of a hollow baseball or softball bat," Invited paper for the 148th Meeting of the Acoustical Society of America, November 15-19, 2004, San Diego, CA. Paper 4aSA in special session: Structural Acoustics and Vibration: Vibration of Sports Equipment. *J. Acoust. Soc. Am.*, **116** (4) Pt. 2, 2602 (2004).
D. A. Russell, "Acoustics and vibration animations: A surprisingly successful website," Invited paper for the

- 146th Meeting of the Acoustical Society of America, November 10-14, 2003, Austin, TX. Paper 1pED1 in special session: Education in Acoustics and Musical Acoustics Neat Acoustics Websites and Software for Teaching Acoustics. *J. Acoust. Soc. Am.*, **114** (4) Pt. 2, 2308 (2003).
- D. A. Russell, "Integration of a full co-op job experience (and direct job placement) with an applied physics curriculum." Invited paper for American Physical Society March Meeting 2002, March 18-22, Indianapolis, IN. Paper D7-3 in special session on Educating Physicists for Industrial Careers: Bachelor's to Ph.D. (2002)
- D. Russell, "Animations for teaching more advanced acoustics topics," 138th meeting of Acoustical Society of America, Columbus, OH, November 1-5, 1999. *J. Acoust. Soc. Am.*, **106** (4) Pt. 2, 2197 (1999).
- D. Russell, "Implementing a 'Just-In-Time' Approach to Engineering Physics Courses," AAPT Summer Meeting, Lincoln, NE, August 3-8, 1998.
- V. Sparrow and D. Russell, "Animations created in *Mathematica* for Acoustics Education," 16th International Congress on Acoustics and 135th meeting of the Acoustical Society of America, Seattle, WA, June 20-26, 1998. *J. Acoust. Soc. Am.*, **103** (5) Pt. 2, 1454 (1998).
- D. Russell, V. W. Sparrow, C. Soize, "A mathematical formulation for modeling the type I fuzzy parameters for a continuous line fuzzy attachment," *J. Acoust. Soc. Am.*, **95** (5) Pt. 2, S2846 (1994).

Principal presentations before professional societies (with printed abstracts):

- D. Russell, W. Haveman, W. Broden, N. P. Weibull, and P. Pedersen, "Effect of body shape on the vibration of electric guitars," 145th meeting of the Acoustical Society of America, Nashville, TN, April 28 - May 2, 2003, *J. Acoust. Soc. Am.*, **113**(4) Pt 2., 2316, (2003).
- D. Russell and W. Haveman, "Acoustic and modal analysis of an African djembe drum," 140th meeting of the Acoustical Society of America, Newport Beach, CA, December 4-8, 2000, *J. Acoust. Soc. Am.*, **108**(5) Pt 2., 2591, (2000).
- D. Russell, "Musical instruments of antiquity as illustrated in *The Adventures of Asterix the Gaul*," 140th meeting of the Acoustical Society of America, Newport Beach, CA, December 4-8, 2000, *J. Acoust. Soc. Am.*, **108**(5) Pt 2., 2618, (2000).
- D. Russell, "Comparing the vibrational behavior of wood and aluminum baseball bats," 138th meeting of Acoustical Society of America, Columbus, OH, November 1-5, 1999. *J. Acoust. Soc. Am.*, **106** (4) Pt. 2, 2292 (1999).
- D. Russell, "New experiments on an old NeXT computer," 138th meeting of the Acoustical Society of America, Columbus, OH, November 1-5, 1999. *J. Acoust. Soc. Am.*, **106** (4) Pt. 2, 2140 (1999).
- R. Hughes, D. Russell, and D. Parker, "Holographic analysis of standing waves in a resonance tube," 133rd meeting of the Acoustical Society of America, State College, PA, June 16-20, 1997. *J. Acoust. Soc. Am.*, **101**(5) Pt. 2, 3033 (1997).
- D. Russell, "Making Waves on the World Wide Web," Fall 1996 meeting of the Ohio Section, American Physical Society, Athens, OH, Nov. 1-2, 1996.
- D. Russell and T. Cameron, "Laboratory Instruction in Acoustics and Vibration," ASEE Annual Meeting, June 23-26, 1996, Washington DC, session 2526.
- D. Russell and T. Cameron, "Coupling Computer Simulation and Experiment," ASEE Annual Meeting, June 23-26, 1996, Washington DC, session 3226.
- D. Russell and V. W. Sparrow "An asymptotic analysis of the added damping effect of a distribution of fuzzy attachments with steady state excitation," 129th meeting of the Acoustical Society of America, Washington DC, May 30 - June 3, 1995. *J. Acoust. Soc. Am.*, **97** (5) Pt. 2, 3414 (1995). [winner of best student paper award].
- D. Russell and V. W. Sparrow, "Coupling Between Flexural and Membrane Wave Types due to Multi-degree of Freedom and Rotational Fuzzy Attachments," 129th meeting of the Acoustical Society of America, Washington DC, May 30 - June 3, 1995. *J. Acoust. Soc. Am.*, **97** (5) Pt. 2, 3415 (1995).
- D. Russell, J. L. Rochat, A. D. Pierce, and V. W. Sparrow, "Scattering from a finite width panel with attached internal resonances in an infinite baffle," 125th meeting of the Acoustical Society of America, Ottawa, Canada, May 17-21, 1993. *J. Acoust. Soc. Am.*, **93** (4) Pt. 2, S2412 (1993).
- T. Rossing and D.A. Russell, "Simple demonstrations with tuning forks," 124th meeting of the Acoustical Society of America, New Orleans, LA, Oct. 31-Nov. 4, 1992. *J. Acoust. Soc. Am.*, **92**(4) Pt. 2, 2401 (1992)
- D. Russell and V. W. Sparrow, "Acoustic scattering from a fluid loaded plate with an attached structural fuzzy," 123rd meeting of the Acoustical Society of America, Salt Lake City, UT, May 11-15, 1992. *J. Acoust. Soc. Am.*, **91**(4) Pt. 2, S2440 (1992).
- D. Russell and T. D. Rossing, "Shock spectra of piano hammers," 120th meeting of the Acoustical Society of America, San Diego, CA, Nov. 26-30, 1990. *J. Acoust. Soc. Am.*, **88**, Suppl. 1, S186 (1990)
- D. Russell and R.R. Korte, "Demonstrating modes of vibration in bars and plates with simple apparatus," 119th meeting of the Acoustical Society of America, State College, PA, May 21-25, 1990. *J. Acoust. Soc. Am.*, **87** Suppl. 1, S33 (1990).

Other presentations before professional societies:

- D. Russell, "Indirect methods of assessing bat performance," invited presentation before the Sporting Goods & Manufacturers Association Baseball & Softball Council Fall Meeting, Dallas, TX, September 29 - October 1, (2005).
- D. Russell, "Correlation between hoop frequency and performance," invited presentation before the Sporting Goods & Manufacturers Association Baseball & Softball Council Fall Meeting, Dallas, TX, October 1-3, (2004).
- D. Russell, "Progress report on hoop frequency and a portable pendulum test," presented at the annual meeting of

- the Baseball/Softball Equipment Subcommittee F08.26 of the ASTM, Salt Lake City, UT, May 18-20, (2004).
D. Russell, "Tuning a bat to optimize the trampoline effect," presented at the Sporting Goods & Manufacturers Association Baseball & Softball Council Fall Meeting, Dallas, TX, October 2-4, (2003).
D. Russell, "Making Waves on the World Wide Web," paper CF-7 presented at the Fall meeting of the Ohio Section of the American Physical Society, Athens OH, November 1-2 (1996).

Scientific and professional societies of which a member:

American Society of Testing Materials (ASTM International) – since 2005
Acoustical Society of America (ASA) – since 1990
American Association of Physics Teachers (AAPT) – since 1997
American Society for Engineering Education (ASEE) – 2001-2004
Society of Physics Students (SPS) – since 1996 (Faculty Advisor for Kettering University chapter)
Sigma Pi Sigma, Physics Honor Society ($\Sigma\Pi\Sigma$) – since 1987 (Faculty Advisor for Kettering University chapter)
Sigma Xi, Scientific Research Society – since 1991

Society committee membership

ASTM Subcommittee F08.26: Baseball and Softball Equipment, 2005-2009
Committee on Education in Acoustics - Acoustical Society of America, 1997-2006
Committee on Online Education - Acoustical Society of America, 2000-2006
Musical Acoustics Technical Committee - Acoustical Society of America, 2000-2006
Selection Committee for Rossing Award in Acoustics Education - ASA, 2004-2008

Honors and awards:

Rodes Professor – Kettering University – 2007
Educational Scholar Award – Kettering University Center for Excellence in Teaching and Learning – 2001
Outstanding Teacher of the Year – Kettering University Alumni Association – 2000
Faculty Member of the Year Award – $\Phi\Delta\Theta$ Fraternity, Kettering University – 1996
ASA Structural Acoustics and Vibration Best Student Paper Award – 1995
Eugen J. Skudrzyk Memorial Award, Pennsylvania State University – 1995
Kenneth T. Simowitz Memorial Citation, Pennsylvania State University – 1995
Acoustical Society of America Fellowship, Physical Acoustics Summer School – 1994
College of Engineering Dean's Fellowship, Pennsylvania State University – 1991-1994
A.I.P. Summer Internship Program Finalist – 1989
Bradley University Academic Hall of Fame – 1989
Sigma Pi Sigma Physics honor society – 1987
Phi Kappa Phi honor society, Bradley University – 1986

Subjects or courses taught:

PHYS-114, Newtonian Mechanics
PHYS-115, Newtonian Mechanics Laboratory
PHYS-224, Electricity and Magnetism
PHYS-225, Electricity and Magnetism Laboratory
PHYS-302, Vibration, Sound and Light
PHYS-382, Acoustics I: Sounds and Sources
PHYS-388, Acoustics in the Human Environment
PHYS-412, Theoretical Mechanics
PHYS-482, Acoustics II: Sound and Vibration
PHYS-484, Acoustical Measurements
PHYS-485, Acoustic Testing & Modeling

Proposals to or grants from NSF or other similar agencies or foundations:

Sporting Goods Manufacturers Association --- Indirect Methods of Testing Softball Bats for SGMA & bat manufacturers – 2005-2009 (\$25,000)
Gibson Guitars – "Proposal to Gibson Musical Instruments for Developing an Acoustics Laboratory at GMI Engineering & Management Institute," (total donation of \$58,500 includes donated equipment, musical instruments, and \$36,000 non-recurring retainer) – 1998
GMI Research Initiative / Improvement grant – "Experimental methods for determining the mass-frequency distribution of a fuzzy substructure," – (\$5,000.00) – 1997
NSF (ILI-IP) – D. A. Russell and T. M. Cameron, "Applied Physics Acoustics Laboratory," proposal #DUE-9751029 for \$32,571.00 – November 1996 – not funded.
GMI New Faculty Professional Development Grant (NFPDG) (2/9ths) proposal for start-up research funds.

Consulting, patents, etc.:

Vibrational Analysis of Field Hockey Sticks – STX Field Hockey – 2009 (\$1,950)
Vibration Analysis of Baseball & Softball Bats, and fishing rods – PowerMetal Inc. – 2007 (\$2,150)
Vibration Analysis of Baseball/Softball Bats - various bat manufacturers – 2004-2008 (\$13,000)
Analysis and Optimization of Albin Harmonic Damper for Rensi Marketing – 2004-2005 (\$8,500)
Modal Analysis of Baseball/Softball Bats for CE Composites Baseball Inc. – 2002-2003 (\$7,500)
Modal analysis of golf club shafts for Gallaway Golf – 1997 (\$2,000)

Senior Thesis supervised (need to update this)

- Bemis, Jeremy, "Absorption Coefficients: Design and Simulation of Test Equipment," Cascade Engineering, Grand Rapids, MI
- Wazbinski, Bryan, "Brake Pad Properties and their Influence upon the Noise Performance of Automotive Brake Systems," Robert Bosch Corp., Farmington Hills, MI
- Weber, Rachel, "Automation of Sound Transmission Measurement Process," LEAR Corporation, Southfield, MI
- Jared Perez, "Relating Sound Transmission Loss in Flat Steel to that in a Contoured Automotive Dash," Cascade Engineering, Grand Rapids, MI.
- Hodge, Benjamin H., IV, "Incorporating Load Sensing into an Electric Parking Brake System," DURA Automotive, Rochester Hills, MI
- Ban, Faunel, "Application of Sound Quality Metrics to Dynamic Vehicle Interior Acoustic Measurements," Lear Corporation, Southfield, MI
- VandenBerg, Thomas, "Design & Implementation of a Nondestructive Weld Analysis, Delphi Automotive, Coopersville, MI
- Babian, Andrew, "Analysis of the Use of Ultrasound for Leak Detection in the Vehicle Production Process," General Motors Truck Group, Dayton, OH
- Dau, Nate, "Analysis of Resonant Frequencies of the 500 Switch to Determine Reliability of Switch Firing," First Technology, Grand Blanc, MI
- Blong Xiong, "Evaluation of Laminated Dash Concept in Automotive NVH Applications," Lear Corp., Dearborn, MI
- Pedersen, Paul, "Design of an Acoustic Predictive Process for Air Intake of the Twin Cam 88 Engine," Harley-Davidson Motor Company, Milwaukee, MI
- Michael Szczepniak, "Mirror Vibration: Correlating Objective Data with Visual Perception," Britax Vision Systems, Marysville, MI
- Weibull, Pontus, "Characterization of the effects of Aerosols on M.O.A.D.S," Michigan Aerospace Corporation, Ann Arbor, MI
- Dave, Sujay, "Development and validation of noise and vibration test system for transmission assembly line," GM Powertrain Division, Warren, MI
- LeSarge, James, "Analysis of the noise produced by package conveyor," Mannesmann Dematic Rapistan Systems, Grand Rapids, MI
- Gulich, Kenneth, "Predicting the Acoustic Design Performance of Weatherstrips Based on Design Parameters," BTR Sealing Systems, NAD, Madison Heights, MI
- Xu, Helen, "SEA Analysis of Automobile Interior," Lear Corporation, Plymouth, MI
- Husic, Jeremy M., "Dynamic Analysis of a Super Plug™ Door Module During a Door Slam," [Master's Committee Member]
- Wittmer, Marianne E., "Investigation and evaluation of the signature analysis system for use in detecting faulty seals in the 4T65-E transmission," GM Powertrain Division, Warren, MI. (Coadvisor: R. Bolander)
- Taylor, Chad G., "Acoustic Analysis of a Truck Air Induction System and Coupling to the Vehicle Structure," GM TG, Pontiac MI. (Co-advisor: T. Cameron)
- Ring, Bradley D., "The Use of Vector Intensity Technology to Identify Exhaust Structure-Borne Noise Characteristics," AP Parts Company, Toledo, OH. (Co-advisor: T. Cameron)

Specific programs in which faculty member has participated to improve teaching and professional competence**Attended professional society meetings:**

- SGMA and Baseball USA annual meeting, Dallas, TX, September 29 – October 1, 2005
- ASTM annual meeting, Reno, NV, May 17-19, 2005
- 148th meeting of the ASA, San Diego, CA, Nov. 15-19, 2004
- SGMA Baseball and Softball Council annual meeting, Dallas, TX, October 1-3, 2004
- ASTM annual meeting, Salt Lake City, UT, May 18-20, (2004)
- 146th meeting of the ASA, Austin, TX, Nov. 10-14, 2003
- SGMA Baseball and Softball Council annual meeting, Dallas, TX, October 2-4, 2003
- 145th meeting of the ASA, Nashville, TN, April 28 - May 3, 2002
- 140th meeting of the ASA, Newport Beach, CA, Dec. 4-8, 2000
- 138th meeting of the ASA, Columbus, OH, Nov. 1-5, 1999
- AAPT Summer Meeting, Lincoln NE, August 3-8, 1998
- 135th meeting of the ASA, Seattle, WA, June 22-28, 1998
- 133rd meeting of the ASA, State College, PA, June 20-26, 1997
- Ohio Section APS Fall meeting, Athens, OH, Nov. 1-2, 1996
- ASEE Annual Conference and Exposition, Washington, D.C., June 1996
- 130th meeting of the ASA, St. Louis, MO, Nov. 27-Dec. 1, 1995
- 129th meeting of the ASA, Washington DC, May 30 - June 3, 1995

Attended workshops/short courses:

- Pacific Crest Teaching Institute, Kettering University, Dec. 18-20, 2006.
- New Physics Faculty Workshop, AAPT / NSF, Washington DC, Oct. 30–Nov. 1, 1997.
- Turbomachinery Noise, Center for Acoustics and Vibration, Penn State Univ., July 18-20, 1994
- Physical Acoustics Summer School, Office of Naval Research, Acoustical Society of

America, National Center for Physical Acoustics, June 24 - July 1, 1994

Ongoing Research Projects:

Vibration and acoustic analysis of wood, aluminum and composite softball/baseball bats to relate hoop frequency to bat performance and to assess what vibrational characteristics contribute to the perception of "feel" or "sting"

Vector acoustic intensity (using p-p and p-u probes) in the sound field surrounding a tuning fork.

Development of animations illustrating acoustics / waves phenomena

<http://www.kettering.edu/~drussell/demos.html>

The physics of guitar pickups (optical, magnetic, piezoelectric) and the differences in the measured time signals and sound spectra

Current Course Development Activities:

Writing a textbook for use in teaching PHYS-382, Acoustics I: Sounds & Sources and PHYS-482, Acoustics II: Sound & Vibration.

Development of the advanced laboratory course: PHYS-484, Acoustical Measurements — developing laboratory experiments and student projects.

29-Sep-09