

## SCOTT H. HAWLEY

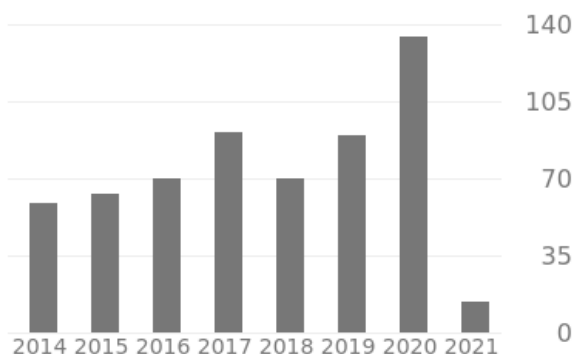
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Birthdate: Oct. 18, 1972  
Birthplace: Hong Kong, B.C.C.  
Citizenship: U.S.A.  
Languages: English, German.

Recent Citation History (via [Google Scholar](https://scholar.google.com/)):

	All	Since 2016
Citations	1765	474
h-index	9	8
i10-index	9	7



## EDUCATION

- Ph.D. in Physics. Under the supervision of Matthew W. Choptuik. University of Texas at Austin (UT-Austin), Austin, TX, August 2000. Dissertation entitled “Scalar Analogues of Compact Astrophysical Systems.”
- B.S. with Honors in Physics. College of William & Mary, Williamsburg, VA, May 1994.

## EMPLOYMENT

- Professor of Physics, Chemistry & Physics Dept, Belmont University, August 2019 to present.
- Associate Professor of Physics (with Tenure). Chemistry & Physics Dept, Belmont University. August 2013 to 2019.
- Assistant Professor of Physics. Chemistry & Physics Dept, Belmont University. August 2006 to 2013.
- Postdoctoral Research Assistant. Center for Relativity, Department of Physics, UT-Austin. October 2002 to July 2006.
- Postdoctoral Fellow. Numerical Relativity Group, Astrophysical Relativity Division, Max-Planck-Institut für Gravitationsphysik / Albert Einstein Institute (AEI), Golm, Germany. October 2000 to 2002.
- Graduate Research Assistant. Center for Relativity, Department of Physics, UT-Austin. Summer 1997, Summer 1998 to Summer 2000.
- Teaching Assistant. Department of Physics, UT-Austin. Fall 1995, Spring 1996, Fall 1996 to Spring 1998.
- Astrophysicist. Solar-Terrestrial Relationships Branch, Space Sciences Division, Naval Research Laboratory, Washington, DC. April 1995 to August 1995, Summer 1996.
- Physicist. Contracted to Army Research Laboratory, Ft. Belvoir, VA by Telectronics Inc. June 1994 to Mar. 1995.

## PEER-REVIEWED PUBLICATIONS

- “Exploring Quality and Generalizability in Parameterized Neural Audio Effects,” W. Mitchell and S.H. Hawley, Accepted for *AES 149* (2020).
- “Synthesis of Musical Instrument Sounds: Physics-based Modeling or Machine Learning?” S.H. Hawley, V. Chatziioannou and A. Morrison. *Acoustics Today*, (March 2020).
- “Profiling Audio Compressors with Deep Neural Networks” by S.H. Hawley, B. Colburn and S.I. Mimitakis, Full paper for 147th AES Conference, (2019). Demo page: <http://www.signaltrain.ml>
- “Theopolis Monk: Envisioning a Future of A.I. Public Service,” S.H. Hawley, in *The Transhumanism Handbook*, Newton Lee, ed., Springer Nature (2019.)
- “Challenges for an Ontology of Artificial Intelligence,” in *Perspectives on Science and Christian Faith, special edition on A.I.*, Derek Schuurman, ed., Journal of the American Scientific Affiliation, 71,2 (2019).
- “Visualizing Sound Directivity via Smartphone Sensors,” S.H. Hawley and R.E. McClain Jr., *The Physics Teacher*, **56**:72 (2018).
- “Online music learning: informal, formal and STEAM contexts,” C. Johnson and S. Hawley, *International Journal on Innovations in Online Education*, Begel House, July 25 (2017).
- Spin Dependence in Computational Black-Hole Data,” S.H. Hawley, R.A. Matzner and M. Vitalo. *General Relativity and Quantum Cosmology E-print Archive*, [gr-qc/0604100](https://arxiv.org/abs/gr-qc/0604100) (2006).
- “Dynamical evolution of quasi-circular binary black hole data,” M. Alcubierre, B. Bruegmann, P. Diener, F.S. Guzman, I. Hawke, S.H. Hawley, F. Herrmann, M. Koppitz, D. Pollney, E. Seidel, and J. Thornburg. *Phys. Rev.* **D72**:044004 (2005).
- “Evolutions in 3D Numerical Relativity Using Fixed Mesh Refinement,” E. Schetter, S.H. Hawley and I. Hawke. *Class. Quant. Grav.***21**:1465-1488 (2004).
- “Tips for Implementing Multigrid Methods on Domains Containing Holes,” S.H. Hawley and R. A. Matzner. *Class. Quant. Grav.***21**:805-822 (2004).
- “Towards Standard Testbeds for Numerical Relativity,” M. Alcubierre, G. Allen, T. W. Baumgarte, C. Bona, D. Fiske, T. Goodale, F. S. Guzmán, I. Hawke, S.H. Hawley, S. Husa, M. Koppitz, C. Lechner, D. Pollney, D. Rideout, M. Salgado, E. Schnetter, E. Seidel, H.-A. Shinkai, D. Shoemaker, B. Szilágyi, R. Takahashi and J. Winicour. *Class. Quant. Grav.***21**:589-613 (2004).
- “Numerical Evidence for ‘Multi-Scalar Stars’,” S.H. Hawley and M.W. Choptuik. *Phys. Rev.* **D67**:024010 (2003).
- “Boson Stars Driven to the Brink of Black Hole Formation,” S.H. Hawley and M.W. Choptuik. *Phys. Rev.* **D62**:104024 (2000).
- “The Green Line Corona and Its Relation to the Photospheric Magnetic Field,” Y.-M. Wang, N.R. Sheeley, Jr., S.H. Hawley, J.R. Kraemer, G.E. Brueckner, R.A. Howard, C.M. Korendyke, D.J. Michels, N.E. Moulton, D.G. Socker and R. Schwenn, *Astrophysical Journal* **485**:419-429 (1997).
- “Measurements of Flow Speeds in the Corona Between 2 and 30 R,” N.R. Sheeley, Jr., Y.-M. Wang, S.H. Hawley, G.E. Brueckner, K.P. Dere, R. A. Howard, M. J. Koomen, C. M. Korendyke, D.J. Michels, S.E. Paswaters, D.G. Socker, O.C. St. Cyr, D. Wang,

P.L. Lamy, A. Llebaria, R. Schwenn, G.M. Simnett, S. Plunkett and D.A. Biesecker, *Astrophysical Journal* **484**:472-478 (1997).

- “The Magnetic Nature of Coronal Holes,” Y.M. Wang, S.H. Hawley and N.R. Sheeley, Jr. *Science* **271**:464-469 (1996).

#### NON-PEER-REVIEWED OR POPULAR-LEVEL PUBLICATIONS

- “[What Do Technology and Artificial Intelligence Mean Today](#),” S.H. Hawley and E. Kruger, book chapter in *Sociedad Tecnológica y Futuro Humano, vol. 1: Desafíos conceptuales*, Héctor Velázquez Fernández, ed., Tirant Le Blanch, Santiago de Chile, 2021. (in press)
- “[Who “Makes” The Rules? Whose Labels to Use?: Living By the Spirit in the Age of Machine Learning](#),” Winner of 2020 FaithTech Writing Contest, FaithTech Institute (Oct. 2020).
- Book review of *The Creativity Code* by Marcus du Sautoy, in *Perspectives on Science and Christian Faith, The Journal of the American Scientific Affiliation*, 72:1, p.52 (2020).
- “[A.I. Creeds and Confessions](#),” A. Mourelatos and S.H. Hawley, *AI and Faith Newsletter* (Jan. 2020).
- “[Getting Started in ML-Audio](#),” S.H. Hawley and R. Miller, *GitHub.com*, Dec. 2019-present.
- “[Principal Component Analysis \(PCA\) from Scratch](#),” S.H. Hawley. Tutorial blog post, [drscotthawley.github.io](#), Dec. 21, 2019.
- “[My First NN Part 3. Multi-Layer Networks and Backpropagation](#),” S.H. Hawley. Tutorial blog post, [drscotthawley.github.io](#), Feb. 8, 2019.
- “[My First Neural Network, Part 2. Bias and CE Loss](#),” S.H. Hawley. Tutorial blog post, [drscotthawley.github.io](#), Feb. 4, 2019.
- “[My First Neural Network, Part 1](#),” S.H. Hawley. Tutorial blog post, [drscotthawley.github.io](#), Jan. 30, 2019.
- “[Parallelizing Python, Simplified](#),” S.H. Hawley. Tutorial blog post, [drscotthawley.github.io](#), Dec. 16, 2018.
- “[Resolving Mac OS X Aliases in Python](#),” S.H. Hawley. Tutorial blog post, [drscotthawley.github.io](#), Dec. 16, 2018.
- “Theopolis Monk: Envisioning a Future of A.I. Public Service,” serialized in 5 parts in *SuperPositionMagazine.com*, Aug-Dec (2018).
- “Portal Bouncing and Oscillations,” *Teach With Portals*, Leslie Redd, editor, Valve Corporation, Publisher. [www.teachwithportals.com](#). July 24 (2012).
- “Simple Harmonic Motion and Hooke’s Law,” *Teach With Portals*, Leslie Redd, editor, Valve Corporation, Publisher. [www.teachwithportals.com](#). July 24 (2012).
- “Interactive Transistor Amplifier Applet,” *MERLOT: Multimedia Educational Resource for Learning and Online Teaching*, [www.merlot.org](#). August 5 (2012).
- “Interactive Simple Harmonic Oscillator Applet,” *MERLOT: Multimedia Educational Resource for Learning and Online Teaching*, [www.merlot.org](#). August 5 (2012).
- “Interactive Series RLC Circuit Applet,” *MERLOT: Multimedia Educational Resource for Learning and Online Teaching*, [www.merlot.org](#). August 5 (2012).

## SOFTWARE RELEASES / CODE PUBLISHED

- “Vibratory: A Consumer-Trainable Music Tagging Utility,” S.H. Hawley and Art+Logic, Inc. (March 2020).
- “Avoid CLOP by Removing Unwrap,” S.H. Hawley, Pull Request #1610, merged into Tensorflow/Magenta, GitHub, Oct. 2019.
- “SignalTrain” (Learning audio effects with neural networks), S.H. Hawley and S.I. Mimitilakis, [GitHub.com](https://github.com), August 2019.
- “Panotti” (Neural network multichannel audio classifier), S.H. Hawley, [GitHub.com](https://github.com), May 2017, updates through January 2019.
- “Words in the Moment” (Mediations, affirmations, reminders), S.H. Hawley, [iOS App Store](https://apps.apple.com), October 2016.
- “Polar Pattern Plotter,” (Sound directivity measurement & visualization), S.H. Hawley, [iOS App Store](https://apps.apple.com), June 2016.
- “SHAART Acoustic Tools” (Audio analysis suite) v0.6, [GitHub.com](https://github.com), February 2016, updates through 2018.
- “Knobility: An App for Audio Session Documentation,” S.H. Hawley, [iOS App Store](https://apps.apple.com), October 2015.

## DATASETS CURATED

- “SPNet Dataset Release,” S.H. Hawley, <https://zenodo.org/record/4445434>, doi: 10.5281/zenodo.4445433, Jan. 2021.
- “SignalTrain LA2A Dataset,” B. Colburn and S.H. Hawley, <https://zenodo.org/record/3348083>, doi: 10.5281/zenodo.3348083, Jan. 2019.

## OTHER SCHOLARLY PUBLICATIONS

- *PHY2010: Physics for Audio Engineering Technology Laboratory Manual*, S.H. Hawley (2007-2017). New editions each semester to present. Developed, tested and illustrated all laboratory exercises.
- *PHY2250: Electronics & Circuit Theory Laboratory Manual*, S.H. Hawley (2007-2017). New editions each semester to present. Developed, tested and illustrated all laboratory exercises.

## AWARDS, GRANTS, PRIZES AND RECOGNITION

- Winner, 2020 FaithTech Writing Contest, Oct. 22, 2020.
- “Deep Learning Applications for Musical Acoustics and Audio,” S.H. Hawley, R. Muehleisen and A. Morrison, Grant allocation of 5,000 CPU-hours, Argonne National Laboratory, Jan. 17, 2019.
- Winner, Art+Logic Incubator Lab competition. for my submission of a DeepNeural Network audio classifier app prototype to help music composers and producers, July 12, 2018. Valued at \$50,000 value of development work. Final software product to be released at NAMM conference, 2019.

- Selected for Cohort 2 of Oxford program/grant, “Bridging the Two Cultures of Science and the Humanities II,” a grant project run by Scholarship and Christianity in Oxford (SCIO), the UK subsidiary of the Council for Christian Colleges and Universities (CCCU), with funding by Templeton Religion Trust, The Blankemeyer Foundation, and Belmont University. For my project, “Christian Responses to the Ascendancy of Artificial Intelligence.” (2017-2019)
- Finalist, Spring 2017 AI Grant competition [AIGrant.org](http://AIGrant.org). 45 finalists selected from over 450 applicants. For proposal by S.H. Hawley, T. Baird & F. Baird, “Free Heart & Lung Sound Dataset, for A.I. and Human Diagnosis Training.” May 2017.
- Finalist, Les Paul Music Innovation Award. Presented by Gibson, Inc. For S.H. Hawley & J. Dowse, “Machine Learning Applications Poised to Revolutionize the Music Industry.” January 2017.
- Director’s Discretionary Allocation, National Institute for Computational Sciences, Oak Ridge National Laboratories, Oak Ridge, TN, July 11, 2012. Awarded 250,000 Service Units (processor-hours), valued at \$0.45/SU for a total of \$112,500 worth of computer time on the machine known as Nautilus. Intended for “production”-level use of the machine for large, highly accurate parameter surveys of using binary black hole simulation computer code.
- Startup Allocation, National Institute for Computational Sciences, Oak Ridge National Laboratories, Oak Ridge, TN, September 15, 2011. Awarded 25,000 Service Units (processor-hours), valued at \$0.45/SU for a total of \$12,500 worth of computer time on the machine known as Nautilus. Intended for preliminary studies using binary black hole simulation computer code.
- Professional Development Award. Presented by the Office of Graduate Studies, UT-Austin, Nov. 1999.
- Finalist, Student Competition. Presented by the Texas Section of the American Physical Society, Oct. 1998.
- Research Publication Award. Presented by the Naval Research Laboratory, Mar. 1997.
- Student Award for Outstanding Achievement in Physics. Presented by the Society of the Alumni, College of William & Mary, May 1994.
- Graduated Cum Laude with High Honors in Physics, College of William & Mary.

## INVITED TALKS

- “SPNet: Object Detection of Antinode Regions in Oscillating Steelpan Drums,” Acoustical Society of America – Special Session on Machine Learning for Musical Acoustics, Dec 4, 2019.
- “Classification and its Discontinuities,” invited evening address at Wheaton University, Oct 14, 2019.
- “Envisioning a Future of A.I. Public Servants,” Faith, Technology and the Future conference, Lipscomb University, Nashville TN, Aug. 25, 2018.
- “Experiments in 3D Sound Field Visualization,” Circuit Benders Ball, Nashville TN, Aug 26, 2017.
- “Idea to App: 4 Examples,” DevFest Nashville, January 28, 2017.
- “The Eve of Gravitational Wave Astronomy,” Meeting of Bernard-Seyfert Astronomical Society, Adventure Science Center, Nashville TN, Aug 15, 2012.

- “Black Holes and Gravity Waves,” Tennessee Star Party, a gathering of professional and amateur astronomers, Lynchburg, TN, Sept 8, 2007.
- “Heavy Duty Astrophysics: Black Holes and Gravity Waves,” Meeting of Bernard-Seyfert Astronomical Society, Adventure Science Center, Nashville TN, Jan 18, 2007.
- “Spin-Spin Effects in Binary Black Hole Systems”, New Frontiers in Numerical Relativity Conference, Albert Einstein Institute, Potsdam Germany, July 2006.
- “Spin Interactions in Binary Black Hole Initial Data”, Numerical Relativity 2005 Conference, Goddard Space Flight Center, Nov 4, 2005.
- “Overview of a few General Relativistic Solitons”, 4th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, April 13, 2005.
- “Gravitating Globes of Multiple Scalar Fields,” Third International IMACS conference on “Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory”, Athens GA, April 8, 2003.

#### CONTRIBUTED TALKS (MEETINGS AND CONFERENCES)

- “Learning Tunable Audio Effects via Neural Networks with Self-Attention,” S.H. Hawley, AES Virtual Symposium on Machine Learning in Audio, Sep 28, 2020.
- “Profiling Audio Compressors with Deep Neural Networks” by S.H. Hawley, B. Colburn and S.I. Mimitakis, 147th AES Conference, Oct 16, 2019.
- “Profiling Musical Audio Processing Effects with Deep Neural Networks,” S.H. Hawley, B.L. Colburn and S.I. Mimitakis, 176th Acoustical Society of America conference, Victoria, BC, Nov 6, 2018.
- “Because Nobody Wants to Edit Drums: Building Trainable Audio Production Tools via Machine Learning,” Music City Data conference (sub-conference of Music City Tech 2018), Vanderbilt University, Nashville TN, June 2, 2018.
- “Sound Fields Forever: Mapping Sound Fields via Position-Aware Smartphones,” S.H. Hawley, S. Alegre & B. Yonker, Engineering Brief for 143rd Meeting of the Audio Engineering Society, New York, NY, Oct 21, 2017.
- “Crowdsourcing the creation of an audio dataset for human and machine medical diagnosis training,” S.H. Hawley, T. Baird and F. Baird, 174th Meeting of the Acoustical Society of America, New Orleans, LA, Dec 2017.
- “Sound Fields Forever: Mapping 3D Sound Fields Using Position-Aware Smartphone Technology,” S.H. Hawley, S. Alegre, and B. Yonker, 174th Meeting of the Acoustical Society of America, New Orleans, LA, Dec 2017.
- “Visualizing Sound Directivity via Smartphone Sensors,” 5th Joint Meeting of the Acoustical Society of America and the Japanese Acoustical Society, Honolulu, HI, Nov 28, 2016.
- “Fourier Transforms, Audio Engineering, and the Quantum Nature of Reality,” S.H. Hawley, 135th Meeting of the Audio Engineering Society, New York, NY, Oct 16, 2013.
- “Spin-Spin Effects in Binary Black Hole Systems AND Involving Undergraduates in Numerical Relativity Research”, American Physical Society April Meeting, Atlanta GA, April 2, 2012.

- “Spin-Spin Effects in Models of Binary Black Hole Systems,” S.H. Hawley, Tennessee Academy of Science Annual Meeting, Cookeville TN, Nov 10, 2010.
- “Study of Spin-Spin Interaction in Binary Black Hole Initial Data,” S.H. Hawley, 3rd Gulf Coast Gravity Meeting, Mar. 23, University of Alabama at Huntsville, Mar. 23 2007.
- “4 Tips for Implementing Multigrid Methods on Domains with Holes” S.H. Hawley and R.A. Matzner, American Physical Society meeting, April 2003.
- “Evolving Black Holes with Mesh Refinement,” Caltech TAPIR seminar, April 18, 2003.
- “Update on Using FMR/AMR for GR”, S.H. Hawley, Workshop on Formulations of Einstein Equations for Numerical Relativity Mexico City-UNAM, May 21, 2002.
- “Progress in Adaptive Mesh Refinement Techniques for Numerical Relativity,” S.H. Hawley and M.W Choptuik, Workshop on Numerical Relativity, Krugersdorp, South Africa, July 26, 2001.
- “Multi-Scalar Stars: Families of Relativistic ‘Solitons’,” S.H. Hawley and M.W Choptuik, at GR16: 16th Conference of the International Society on General Relativity, Durban, South Africa, July 19, 2001.
- “Critical Phenomena Associated with Boson Stars,” S.H. Hawley and M.W Choptuik, Proceedings of the 20th Texas Symposium on Relativistic Astrophysics, Dec. 14, 2000
- “Minimal Development of Parallel Adaptive Mesh Refinement Applications,” S.H. Hawley and M.W Choptuik, High Performance Parallel Computing Symposium, Applied Research Laboratories, UT-Austin, Dec. 2, 1999.
- “Toward Automatic Parallel Adaptive Mesh Refinement,” S.H. Hawley and M.W Choptuik, Meeting of the American Physical Society, Texas Section, Oct. 29, 1999.
- “Toward Automatic Parallel Adaptive Mesh Refinement,” S.H. Hawley and M.W Choptuik, High Performance Computing and Cactus Workshop, National Center for Supercomputing Applications (NCSA), University of Illinois at Urbana-Champaign, Oct. 1, 1999.
- “Multi-Scalar Stars and Their Relation to Critical Phenomena of Perturbed Boson Stars,” S.H. Hawley and M.W Choptuik, Meeting of the American Physical Society, Texas Section, Oct. 1998.
- “Measurements of Flow Speeds in the Corona Between 2 and 30 R,” N.R. Sheeley, Jr., Y.-M. Wang and S.H. Hawley, Meeting of the American Geophysical Union, Fall 1996.
- “Relation Between the Large-Scale Photospheric Field and LASCO/EIT Coronal Structures During 1996,” Y.M. Wang, N.R. Sheeley, Jr., S.H. Hawley and J.R. Kraemer, Meeting of the American Geophysical Union, Fall 1996.
- “Changes to the Global Solar Coronal Structure Associated with an Active Region,” R. Howard, N.R. Sheeley, S.H. Hawley, J.R. Kraemer, Y.M. Wang, G.E. Brueckner, K.P. Dere, M.J. Koomen, C.M. Korendyke, D.J. Michels, J.D. Moses, D.G. Socker, M.D. Andrews, J.W. Cook, J.S. Morrill, N.E. Moulton, C.M. Korendyke, J.W. Cook, S.E. Paswaters, D. Wang, O.C. St. Cyr, S.E. Paswaters, D. Wang, P.L. Lamy, A.L. Lleberia, M.V. Bout, R. Schwenn, G.M. Simnett, S. Plunkett and D.A. Biasecker, Meeting of the American Geophysical Union, Fall 1996.

- “Vibratory: A Consumer-Trainable Music Tagging Utility,” S.H. Hawley, J. Bagley, B. Porter, and D. Trayham, Engineering Brief for 147th Meeting of the Audio Engineering Society, New York, NY, Oct 19, 2019.
- “Sound Fields Forever: Mapping sound fields via position-aware smartphones,” S.H. Hawley, S. Alegre & B. Yonker, Engineering Brief for 143rd Meeting of the Audio Engineering Society, New York, NY, Oct 21, 2017.
- “Fourier Transforms, Audio Engineering, and the Quantum Nature of Reality,” S.H. Hawley, Engineering Brief for 135th Meeting of the Audio Engineering Society, New York, NY, Oct 16, 2013.
- Report on “Numrel 2005,” S.H. Hawley and R.A. Matzner, in *Matters of Gravity*, J. Pullin, editor, **27**, Spring 2006. [gr-qc/0602119](#).
- “Multi-Scalar Stars: Families of Relativistic ‘Solitons’,” S.H. Hawley and M.W. Choptuik, Proceedings of GR16: 16th Conference of the International Society on General Relativity, Durban, South Africa.
- “Critical Phenomena Associated with Boson Stars,” S.H. Hawley and M.W. Choptuik, Proceedings of 20th Texas Symposium on Relativistic Astrophysics, 2001. [gr-qc/0103019](#).

#### OTHER CONFERENCE PARTICIPATION

- “Fast Elliptic Solves for Constrained Evolution and BBH Initial Data,” poster at 17th International Conference on General Relativity and Gravitation (GR17), Dublin, Ireland, July 23, 2004.
- Participant at month-long “Visitors Program on the Initial Data Problem,” hosted by the California Institute of Technology, Spring 2003.

#### MEDIA APPEARANCES

- “Narratives of Artificial Intelligence (with Scott Hawley and John Wyatt),” *The Afterword Podcast* (March 2020).
- “The Great American Eclipse,” CNN with Wolf Blitzer, August 21, 2017.
- “The Great American Eclipse,” MSNBC Squawk Box, August 21, 2017.
- “Sacred Space interview with Scott Hawley: Science, Faith and Creativity,” <https://www.youtube.com/watch?v=VdV69Xz2Pqk> (2016).
- “Music, Science and Religion,” Ben Moody (formerly of band Evanescence) podcast with Scott Hawley and Jason Charles Miller (formerly of band Godhead) (2013).



## PUBLIC SEMINARS

- “The Imitation Scam: Faking Online Personalities via A.I. Synthesis of Language, Images, and Video,” National Association of Science Teachers (Belmont Chapter), Mar. 1, 2019.
- “Challenges for an Ontology of Artificial Intelligence,” Computer Science Department, University of Bath, Bath, UK, Aug. 2, 2018.
- “Machine Learning Approaches for Musical and Medical Acoustics,” College of Sciences and Mathematics Faculty Research Seminar and MAACM Student Club Meeting, Belmont University, Oct 6, 2017.
- “Celestial Mechanics & Solar Physics,” address for Eclipse 2017 event at Belmont University, Aug. 21, 2017.
- “Science Teaching & Machine Learning,” National Association of Science Teachers (Belmont Chapter), Mar. 15, 2017.
- “Experiments with Machine Learning & Audio,” Nashville Music Programmers Meetup, Mar. 27, 2017.
- “Smartphone Apps for Acoustics Education,” College of Sciences and Mathematics Research Seminar, Belmont University, Sept. 19, 2016
- “Reflections on the Development of Interactive Learning Tools,” Scholarship of Teaching and Learning Symposium, Belmont University, May 11 2016.
- “Web Audio Basics,” Nashville Music Programmers Meetup, Mar. 21, 2016.
- “Hearing the Still, Small Voice: STEM+AET Features of Gravitational Wave Detection,” College of Sciences & Mathematics Colloquium, Belmont University, Mar. 2, 2016.
- “A New Mobile App for Session Documentation”, Belmont Audio Engineering Society, Nov 19 2015
- “Practical Home Studio Construction in the Nashville Area,” Student Section of the Audio Engineering Society, Belmont University, Nov. 18, 2014.
- “Bayesian Analysis for Audio Engineers,” Student Section of the Audio Engineering Society, Belmont University, Oct. 10, 2014.
- Spoke on “The Eve of Gravitational Wave Astronomy,” hosted by Bernard-Seyfert Astronomical Society, Nashville’s amateur & professional astronomy club, August 15, 2012.
- “Parallel Adaptive Mesh Studies of Black Hole Spin-Spin Interactions,” Center for Computation and Technology, Louisiana State University, May 17, 2012.
- “Fast Elliptic Solves for Constrained Evolution and Initial Data,” Joint seminar for Physics Dept. and Center for Computation and Technology, Louisiana State University, Feb. 16, 2005.
- “Evolving Black Holes with Mesh Refinement”, Albert Einstein Institute (AEI), Golm, Germany, Sept. 3, 2002.
- “Report on the 1st Mexico Meeting on Formulations of Einstein’s Equations,” Relativity Seminar, UT-Austin, May 27, 2002.
- “Progress in Adaptive Mesh Refinement Applications in Numerical Relativity,” AEI, Mar. 12, 2002.
- Review of Shinkai and Yoneda, “Adjusted ADM systems and their expected stability properties” (gr-qc/0110008), Numerical Relativity Journal Club, AEI, Dec. 17, 2001.

- “Boson Stars Driven to the Brink of Black Hole Formation,” Institute Seminar, AEI, Oct. 15, 2000.
- “Critical Phenomena Associated with Boson Stars,” Department of Physics and Astronomy, University of British Columbia, Mar. 2, 2000.
- “Cactus: Get Used to It,” Relativity Seminar, Department of Physics, UT-Austin, Oct. 21, 1999.
- “Boson Stars and Other Scalar Objects,” High-Gravity Journal Club, Department of Astronomy, UT-Austin, Feb. 16, 1999.
- “New Compact Objects in Einstein-Klein-Gordon Systems,” Relativity Seminar, Department of Physics, UT-Austin, Oct. 8, 1998.
- “Compact Objects in Einstein-Klein-Gordon Systems,” Qualifier Defense and Relativity Seminar, Department of Physics, UT-Austin, Nov. 20, 1997.
- “Instabilities in Spiral Disks,” Theory Journal Club, Department of Astronomy, UT-Austin, Nov. 1997.

## TEACHING EXPERIENCE

- Physics 2895.02 - Machine Learning and Neural Networks, Belmont University. Developed new general education course combining theory, programming and embedded ethics curriculum.
- Physics 2010 - Physics for Audio Engineering, Belmont University. Fall 2006 to present. Developed a unique course to teach applied acoustics at a technical level appropriate for Audio Engineering Technology (AET) majors. Developed laboratory manual (see “Other Scholarly Work”).
- Physics 2250 - Electronics & Circuit Theory, Belmont University. Spring 2007 to present. Developed a unique course to teach electronics at a technical level appropriate for Audio Engineering Technology (AET) majors. Developed laboratory manual (see “Other Scholarly Work”).
- Physics 4410 - Survey of Advanced Physics, Belmont University. Spring 2011, 2013. Developed a unique course to teach concepts of hamiltonian dynamics, relativity, computational physics and statistical mechanics to physics majors.
- Physics 3110 - Analytical Mechanics, Belmont University. Fall 2006 and alternate years through 2016, Spring 2019. Second-year physics course in classical mechanics, using text by Fowles & Cassiday.
- Physics 1140 - Introduction to Physics, Belmont University. Summer 2008. A one-semester class encompassing mechanics, electricity and magnetism for AET majors.
- Physics 2110 & 2120 - General College Physics I & II, Belmont University. Fall 2006 through Spring 2007. A year-long calculus-based introductory physics course for science majors.
- Physics 301K - Classical Mechanics, UT-Austin. Substitute lecturer on several occasions during Fall 2005.
- Physics 387M - General Relativity I (graduate course), UT-Austin. Substitute lecturer on several occasions during Fall 2004, Fall 2003.
- Physics 306 - Elementary Physics Methods, UT-Austin. Substitute lecturer on several occasions during Spring 2004.

- Physics 375R - General Relativity I (undergraduate course), UT-Austin. Substitute lecturer on several occasions during Spring 2003.
- Physics 303K - Classical Mechanics and Thermodynamics (for Engineering students), UT-Austin, Fall 1997. Assistant to Professor C. Fred Moore. Ran discussion sections, held office hours, administered homework via the Physics Homework Service (a web-based interactive learning and grading platform, created by Prof. Moore and used by UT, local high schools, and other universities in the U.S.), was responsible for selecting problems for tests and homework and maintaining the database of problems, performed some assignment and grading of non-online work and assisted with administrative tasks.
- Physics 303L - Electromagnetism and Optics (for Engineering students), UT-Austin, Spring 1997, Spring 1998. Assistant to Professor C. Fred Moore. As above.
- Supervising graduate student for the Physics Homework Service, Fall 1997 and Spring 1998. Supervised the work of five other graduate students.
- Physics 103N - Laboratory for Physics 303L, UT-Austin, Fall 1995, Spring 1996, Fall 1996. Instructor. Gave lectures, developed curriculum, tested equipment, assigned and graded homework (lab reports), held office hours, was responsible for roughly 70 students in three class sections per semester.
- Various courses: Served one to two hours per week at the “coaching tables” in the UT Physics department building, where students from any course could come for help. Fall 1995 to Spring 1998 (excluding summers).
- Private Tutor, Fall 1994 and Spring 1995. Tutored in calculus and high school physics.

#### INSTITUTIONAL SERVICE

- Chair, University Educational Technology Advisory Community (ETAC), Fall 2017 to 2019.
- Chair, College of Sciences & Mathematics (CSM) Technology Committee, Spring 2016.
- Chair, Standing Committee for General Education Assessment, Chemistry & Physics Department, 2009 to present.
- Coordinator/Liaison for physics requirements in the ABET accreditation proceedings of the AET program. Spring 2009 to present.
- Standing Committee on Assessment of the Chemistry & Physics Program, 2009 to present.
- University Instructional Technology Committee, Fall 2013 to Spring 2017. (Committee renamed “ETAC.”)
- University Religion and Ethics Committee, Fall 2009 to Spring 2011.
- University Appointments Committee, Spring 2010 to Fall 2010.
- Served on two tenure-track faculty search committees for Audio Engineering Technology department, in Spring 2008 and 2010
- College of Arts & Sciences (CAS) Professional Development Committee, Fall 2012 to Fall 2014.
- CAS Student Life Committee, Fall 2007 to Spring 2009.
- CAS Committee on Policy and Procedures, 2009-2010.
- Representative for School of Sciences speaker series, and Chair of Speaker Series for Chemistry & Physics Department.

- Technical Computer Committee, AEI, Oct. 2000 to Sept. 2002.
- Graduate Welfare Committee, Department of Physics, UT-Austin, Aug. 1995 to May 1996.

#### SERVICE TO PROFESSIONAL COMMUNITY

- Expert panelist for review of “[Citizenship in a Networked Age](#),” D. Burbidge and A. Briggs, PI’s, Templeton World Charity Foundation, Catholic University, Washington, D.C., Nov. 6, 2019.
- Founding Member and Contributing Editor, [AI and Faith](#), 2019-present.
- Session chair for Signal Processing at 147th Audio Engineering Society Conference, Oct. 16, 2019.
- Co-chair (with Bozena Kostek, Gdansk University of Technology) for session on “Machine Learning in Musical Acoustics,” Fall 2019 meeting of the Acoustical Society of America, San Diego, CA, Dec. 4, 2019.
- Founder and facilitator of ASPIRE: A Research Co-op, “A loose collective of scientists, engineers, artists and developers who collaborate on bringing their innovative audio ideas to life,” @aspirecoop on [GitHub](#) and [Twitter](#). Planned and led 18 meetings(/workshops) from Jan. 2017 to present.
- Co-chair (with Vasileios Chatziioannou, U. of Vienna) for session on “Musical Acoustics and Signal Processing in Acoustics: Modeling Musical Instruments and Effects,” Fall 2018 meeting of the Acoustical Society of America, Victoria, BC, Nov. 6, 2018.
- Acoustical Society of America, Music City Chapter, President (2016-2017), Vice President (2014-2016).

#### COMMUNITY SERVICE

- The physics of loudspeakers, microphones and guitar pickups for “Tennessee Teens Rock’n’Roll Camp,” University School of Nashville, June 22, 2012.
- Prayer Intercessor, on Pastoral Care Team, Siloam Family Health Clinic, June 2012 to present.
- Flood relief, with Hands on Nashville and City Church of East Nashville, May 2010.
- Volunteer with Nashville Humane Association, 2007 to present.
- Gave a public lecture on “Heavy Duty Astrophysics: Black Holes and Gravitational Waves” at Adventure Science Center, Nashville TN. January 18, 2007.
- Initiator and leader of a reading/discussion group on the philosophy of science, for professional scientists and other interested persons in the Berlin area. May 2001 to May 2002.
- Creator and maintainer of a guide for new international scientists at the Max Planck Campuses in Golm, Germany. This guide has now been expanded upon and adopted by the AEI administration, who are circulating it among other Max Planck Institutes in Germany.

#### MEMBERSHIP IN PROFESSIONAL SOCIETIES

- Audio Engineering Society
- American Scientific Affiliation

## REFERENCES

- Dr. Robert Magruder (current supervisor), Chair, Chemistry & Physics Dept, Belmont University. `robert.magruder@belmont.edu`
- Dr. Thomas Spence, Dean, College of Sciences & Mathematics, Belmont University. `thom.spence@belmont.edu`
- Dr. William Hooper, Professor of Computer Science, Belmont University. `william.hooper@belmont.edu`