KRISTEN M. BELLISARIO

Curriculum Vitae

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EDUCATION

Ph.D 2018, Purdue University, Department of Forestry and Natural Resources, *Bilsland Fellow*

"Using Computational Musicological Approaches and Informatics to Characterize Soundscapes in Diverse Natural and Human-dominated Ecosystems"

MFA 1998, University of California, Irvine, CA, *Regents Fellow*

BMus 1996, California State University, Long Beach, CA, *Magna cum laude*

ACADEMIC AND PROFESSIONAL APPOINTMENTS

2018-current	Postdoctoral Research Associate, Center for Global Soundscapes
	Purdue University, West Lafayette, IN - Dept. of Forestry & Natural Resources
2017	Co-Founder, Coze Health LLC, Coze Holdings LLC - Health Informatics &Technology
2014-18	Research Assistant, Center for Global Soundscapes
	Purdue University, Department of Forestry and Natural Resources
2002-2013	Contract Adjunct Lecturer
	Indiana University, Bloomington, Jacobs School of Music
2001	Adjunct Professor: Humanities and Fine Arts
	Oakland City College, Bedford

PUBLICATIONS

Gottesman, B., Sprague, J., Kushner, D., Bellisario, K., Savage, D., McKenna, M., Conlin, D., DiDonato, E., Barkaszi, M., Halvoresen, M., and Pijanowski, B. (*2020*) "Soundscapes Indicate Kelp Forest Condition." Marine Ecology Progress Series 654, 35-52

Salazar, K., Utley, L., Pijanowski, B.C., Walker, D., Doucette, J., Bellisario, K. Miller, B., Wiley, M., and Rutherford, E.. (2020). With GIS, Communities See How Land-Use Changes May Affect Local Water Quality. Esri ArcNews. Winter Issue.

Ulybyshev, D., Bare, C., Bellisario, K, Kholodilo, V., Northern, B., Solanki, A., and O'Donnell, T. (*2020*) "EHR Protection in Transit and at Rest." *IEEE 33rd International Symposium on Computer Based Medical Systems (CBMS), Mayo Clinic, Rochester, MN. June 2020 (postponed due to COVID-19).*

Robinson, K., Bellisario, K., and Pijanowski, B.C. (2020). "Tipping Points: What Are They and Why Are They Important?" FNR-602-W, Purdue University Extension.

Robinson, K., Bellisario, K., and Pijanowski, B.C. (2020). "Informing the Development of the Great Lakes Region Decision Support System." FNR-601-W, Purdue University Extension.

Ghadiri, M., Gasc, A., Francomano, D., Bellisario, K., Pijanowski, B.C., and Shepardson, D.P. (2020). "Your Ecosystem Listening Labs (YELLS): The Science of Soundscape Ecology Instructor's Guide, Grades 5-8." FNR-600-W Purdue University Extension

Ghadiri, M., Bellisario, K., Savage, D., Gottesman, B.,, Francomano, D., Gasc, A., Oliver, D., Pijanowski, B.C. (2020). "Your Ecosystem Listening Labs (YELLS): The Science of Soundscape Ecology Student's Guide, Grades 5-8." FNR-607-W Purdue University Extension

Bellisario, K., Savage, D., Gottesman, B.,, Francomano, D., Ghadiri, M., Harris, M., Pijanowski, B.C. (2020). "iListen Guide: Skills and Missions*."* FNR-605-W Purdue University Extension.

Pijanowski, B.C., Bellisario, K., Lenzi, J., Walker, D., Savage, D., and Salazar, K. (2020). "Community Soundscape Planning Guide: Controlling Noise & Protecting Natural and Cultural Sonic Spaces." FNR-603-W, Purdue University Extension.

Yildirim, A., Grant, J. C., Song, G., Yook, S., Mutlu, Z., Peana, S., ... & Cakmak, M. (2020). "Roll-to-Roll Production of Novel Large-Area Piezoelectric Films for Transparent, Flexible, and Wearable Fabric Loudspeakers." Advanced Materials Technologies, 5(7), 2000296.

Zhao, Z., Zhi-yong Xu, K. Bellisario, R. Zeng, N. Li, W. Zhou, B.C. Pijanowski (2019). "Effect of sound unit shape, vocalization intensity, and frequency of vocalization occurrence on acoustic indices." *Ecological Indicators.*

Bellisario, K., B.C. Pijanowski (2019). "Contributions of Music Information Retrieval (MIR) to Soundscape Ecology. Part 1: Potential Methodological Synergies." *Ecological Informatics.*

Bellisario, K., J. VanSchaik, Z. Zhao, H. Omrani, A. Gasc, B. Pijanowski (2019). "Contributions of MIR to Soundscape Ecology. Part 2: Spectral timbral analysis for discrimination of soundscape components." *Ecological Informatics.*

Bellisario, K., T. Broadhead, Z. Zhao, H. Omrani, H. Zhang, D. Savage, J. Springer, B.C. Pijanowski (2019). "Contributions of MIR to Soundscape Ecology. Part 3: Tagging and classifying audio features using a multi-label k-nearest neighbor approach." *Ecological Informatics.*

Omrani, H., Bellisario, K., Zhao, Z. and B.C. Pijanowski (2019). A scalable modeling framework for massive machine learning-based land change simulations: Applying the k-means clustering scheme and the Spark cluster computing environment for model calibration. *Environmental Modelling and Software*.

Gottesman, B, D. Francomano, Z. Zhao, K. Bellisario, M. Ghadiri Khanaposhtani, T. Broadhead, A. Gasc, B. Pijanowski (2018). "Acoustic monitoring reveals diversity and surprising dynamics in tropical freshwater soundscapes." *Freshwater Biology.* Vol 63: Issue 5. 10.1111/fwb.13096

Zhao, Z., S.H. Zhang, Z.Y. Xu, K. Bellisario, N.H. Dai, H. Omrani, and B.C. Pijanowski. (2017). Automated bird acoustic event detection and robust species classification for field recording analysis. *Ecological Informatics*, 39, 99-108.

Ghadiri Khanaposhtani, M. D. Francomano, K. Bellisario, B. Pijanowski (2018) "Promoting STEM interest and connections to nature through soundscape ecology summer camp experiences for students with visual impairments." *Connected Science Learning*. February.

Zhang, S., Z. Zhao, Z. Xu, K. Bellisario, B. Pijanowski (2018) "Automatic bird vocalization identification based on fusion of spectral pattern and texture features." *Proceedings of the IEEE Signal Processing Society*. February.

VanSchaick, J., K. Bellisario, A. Gasc, and B. Pijanowski. (2017) "Spatial autocorrelation of soundscapes in old growth and disturbed paleotropical forests of Borneo." *Journal of Purdue Undergraduate Research*.

In Prep 2021

Wagner, R., Kong N., Bellisario K. (*in prep*) "Changes in PhD expertise in forest resources in the US from 1978 to 2017." *Proceedings of Society of American Foresters National Conference, 2021*

Flaherty, L., Archer, A., Bellisario K. (*in prep*) "Using automated signal recognition algorithm to detect flying squirrel calls in a northern temperate forest." *Wildlife Ecology and Habitat Management*

Rutherford, E., Pijanowski, B., Bellisario K. (*in prep*) "Connecting Science, Technology and Engagement to Improve Water Quality for Great Lakes Communities: Motivational Framework and Lessons Learned of the Tipping Point Planner Program," *Journal of Great Lakes Research.*

Bellisario, K, L.H. Jessup, J. B. Dunning, J. VanSchaik, L. D'Acunto, B. Gottesman, C. Graupe, B.C. Pijanowski (*in prep*) "A rapid assessment monitoring method using ARIMA modeling to characterize vocalizing bird community changes to a loud sound event stressor in a US Midwestern prairie." *Ecological Indicators*

GRANTS AND AWARDS

Funded

2021-2024	Co-PI: NASA Multi-sensor biodiversity framework developed from bioacoustics and space-based sensor platforms (approx. $900,000)
2020-2021	College of Agriculture TEAM Award recipient, Tipping Point Planner Project (my role: scientist for CART model validation)
2020-2021	Pijanowski, B.C . and K.M. Bellisario. Assistance with the automated call detection of waterbird species at an Air Force Base in Central Florida. *US Fish and Wildlife Service*, ($45,895)
2020-2021	Pijanowski, B.C. and K.M. Bellisario. Use of acoustic sensors to detect mosquitoes in India. *Shah Family Global Innovation Lab*, Purdue University. ($40,000)
2020-2021	Pijanowski, B.C . and K.M. Bellisario. Assistance with the automated call detection of waterbird species at an Air Force Base in Central Florida. *US Fish and Wildlife Service*, ($79,978)
2018-2019	Pijanowski, B.C. and K.M. Bellisario. Customer discovery for selling audio files and a museum exhibit for science. *NSF iCorps Program* ($50,000)
2018	Bilsland Dissertation Fellowship, Purdue University ($10,500)
2018	Purdue Travel Grant, Eco-acoustics Congress, Brisbane, Australia
2018	Purdue FNR Symposium, PhD Research, 1st Place
2017	Purdue FNR Symposium, PhD Research, Honorable Mention
2015	NSF Travel Grant, International Symposium on Sustainable Systems Symposium
2015	Purdue FNR Symposium, PhD Research, 2nd Place
2015	Travel & Participant Grant: Arizona State University
2008	Indiana University, Podcast Innovators Award
2004	Indiana Arts Commission: Individual Artist Award Designer (Quadrivium)
2003	Indiana Arts Commission: Individual Artist Award Performer (Performance Series)

RESEARCH CONTRIBUTIONS

INVITED TALKS

1. "Sensor technologies for real time monitoring of mosquito populations through heat maps," Forestry and Natural Resources Seminar Series, April 2021.
2. "A new interdisciplinary research platform aims to optimize acoustic monitoring outcomes using AI methods," Acoustical Society of America, May 2020 (*postponed due to COVID-19*)
3. "Tipping Point and Indicator Project: Theoretical Background and Model," Saginaw Bay community, July 2018.
4. "A rapid assessment monitoring framework to characterize a loud sound event stressor on a vocalizing bird community in a US Midwestern prairie," International Society of Ecoacoustics, Brisbane, Australia, June 2018.
5. "Using data mining to identify patterns in soundscape data." Global Sustainable Soundscape Network (GSSN) Workshop, La Selva Biological Research Station, Costa Rica, July 2016.
6. "iListen portal - Component to interactive theatre show." Connecticut Science Center, April 2016.
7. "Using sound to monitor the Earth." University of Central Florida, via Skype, November 2016.
8. TEDxPurdueU, "Mission to Record the Earth." Purdue University, Indiana, April 2016.
9. "How sound can help monitor our environment." EarthShift Global, Webinar, May 2016.
10. "Musicological metrics." GSSN Workshop, The Field Station, Nebraska and South Dakota State University, July 2015.2016 - Mission to Record the Earth. TedX Talk, Purdue University. (April)
11. "Using computational musicology approaches for soundscape analysis." International Symposium on Sustainable Systems (ISSST), Michigan, May 2015.
12. "Music and soundscape intersections." Arizona State University, SciComm Retreat, July 2014.
13. "Human musical connection with natural soundscapes." Penn State University, Sound/Science/Environment, April 2014.
14. "Time-series MODIS-NDVI and Cropland Data Layers in the Midwest: Phenological Relationships in Corn." Purdue University, FNR Symposium, Poster Presentation. April, 2014.
15. "Using music analysis in soundscapes." GSSN Workshop, Sonoran Desert, Arizona, July 2014.
16. "Sound walks." GSSN Workshop, Sonoran Desert, Arizona, July 2013.

POSTER PRESENTATIONS [+ MENTOR FOR UNDERGRADUATE POSTER]

1. +Liam Quaas, K. Bellisario, D. Savage, D.G. Morales, B.C. Pijanowski. "Using convolutional neural networks to identify sound sources in audio recordings for biodiversity research." Virtual Purdue Undergraduate Research Conference, April 2020.

2. Bellisario, K., T. Broadhead, Z. Zhao, H. Omrani, H. Zhang, D. Savage, J. Springer, B.C. Pijanowski. "Tagging and classifying audio features using a multi-label k-nearest neighbor approach." Purdue University, FNR Symposium, April 2018, 1st Place - PhD Research

3. Bellisario, K., J. VanSchaik, Z. Zhao, H. Omrani, A. Gasc, B.C. Pijanowski. "Musicological indices for soundscape ecological analysis." American Acoustical Society of America, July 2017.

4. Bellisario, K., J. VanSchaik, L. D'Acunto, B.C. Pijanowski. "Grassland acoustic community affected by Civil War reenactment." Purdue University, FNR Symposium, April 2017, Honorable Mention - PhD Research

5. +VanSchaick, Jack, K. Bellisario, A. Gasc, B.C. Pijanowski. "Spatial autocorrelation of soundscapes in old growth and disturbed paleotropical forests of Borneo." American Acoustical Society of America, July 2017.

6. +Graupe, Cristian, K. Bellisario, A. Gasc, B.C. Pijanowski. "Computer applications for soundscape ecology (CASE)." American Acoustical Society of America, July 2017.
7. +Amorocho, Veronica, D. Francamano, K. Bellisario, B. Gottesman, B.C. Pijanowski. "Acoustic signatures of habitat types in the Miombo woodlands of western Tanzania." Purdue University. The Summer Undergraduate Research Fellowship Symposium, August 2017.
8. Bellisario, K., J. VanSchaik, Z. Zhao, H. Omrani, A. Gasc, B.C. Pijanowski "Computational musicology approaches identify patterns in soundscape data (DA)." Purdue University, FNR Symposium, April 2016.
9. Bellisario, K., A. Gasc, C. Bedoya, B.C. Pijanowski. "Using computational musicological approaches in soundscape analysis (HPCP)." Purdue University, FNR Symposium, April 2015, 2nd Place – PhD Research
10. Madurapperuma, B., K. Bellisario, and B. Pijanowski. "Time-series MODIS-NDVI and cropland data layers in the Midwest: phenological relationships in corn." Purdue University, FNR Symposium, April 2014.
11. Bellisario, K. "Community mapping." GSSN Workshop, Aldo Leopold Nature Center, Wisconsin, July 2012.

PROFESSIONAL DEVELOPMENT AND EXTENSION WORK

1. 2021 –National Scenic Visitors Center / Earthwalk US, Consulting Crew
2. 2020-21 – Purdue Postdoctoral Association (PPDA) Council Member, Social Coordinator
3. 2020 – Video editor: Birck Nanotechnology Futures Conference, Purdue University
4. 2020 - Exhibit Content Developer: Wood on Wheels (WoW) travel exhibit: Department of Forestry & Natural Resources and Indiana Department of Natural Resources
5. 2019 - Exhibit Designer and Sound Design: Borneo Interactive Exhibit with Augmented Reality App, Birck Nanotechnology Futures Conference, Purdue University
6. 2017-18: Member: Acoustic Society of America, Purdue Campus
7. 2017 - Trainee: Purdue University: Policy Brief Workshop
8. 2017 – ISSST Abstract Review Committee
9. 2017 - Great Smoky Mountain National Park: Solar Eclipse, *deployment of SM4 acoustic sensors, hydrophone and bat sensors*
10. 2017 - Fort Wayne, IN Zoo: Solar Eclipse, *monitoring of animal behavior before, during, and after total eclipse (field notes, light sensor)*
11. 2016-17 - Indiana Dunes State Park: Successional Stage Study, *deployment of SM3 sensors*
12. 2016 - Indiana State Museum. Soundscape Design Lead for permanent exhibit.
13. 2016-17 – Purdue Visiting Scientist Seminar Series Committee Member
14. 2016 – Purdue Forestry & Natural Resources Sustainability Committee
15. 2016-18 - Reviewer, International Symposium on Sustainable Systems
16. 2016 - Field Ecology Practicum, *measurements and quantification of species (quadrats, transects, richness and diversity* measures), aquatic insect collection and classification
17. 2016 - Disturbance Ecology Practicum (Great Smoky Mountain National Park), *deployment of SM3 acoustic sensors for pilot study in successional forest stages*

18. 2016 - Urban Soundscape Project, *collection of samples for urban soundscapes (Handy zoom, dB), environmental measurements* (anemometer), co-editor of noise pollution community booklet
19. 2015-17 - Tippecanoe County, Center for Global Soundscape: Climate Change Research Project, data collection and maintenance of deployed sensors
20. 2015 - Advanced Ornithology Practicum, bird banding, foraging and aggression behavior study, site visit to heron rookery
21. 2015-16 - ACRES Preserves Natural History Soundscapes, *deployment of SM3 sensors; vegetation survey*
22. 2015-18 - Member, American Association for the Advancement of Science
23. 2015-17 - Middle School Science Fair Judge: Battlefield, Indiana
24. 2015/16 – Purdue Forestry & Natural Resources Compass Co-Editor
25. 2015 – Earth Day Festival Coordinator (Discovery Park)
26. 2014-17 – Mentor, FNR Graduate Students (three students)
27. 2014-16 – Board Treasurer, Musical Arts Youth Organization
28. 2014-16 - Conner Prairie Historical Park: Dissertation Research, *deployment of SM2+ acoustic sensors and bat sensor*
29. 2014 - Wells National Estuarine Research Reserve: Vanishing Soundscape Project, *deployment of SM2+ acoustic sensors*
30. 2014 - Perkins School for the Blind, *deployment of SM2+ urban acoustic sensors*
31. 2014-16 – Series of 20 web-based videos on soundscape biomes.
32. 2014-16 – Technical Director & Media Producer: Indiana University – Music and Culture of Tatar for iPad/HTML5 (Russian, Tatar and English versions)
33. 2012-2013 - Technical Director and Co-Editor: MJ Publishing Interactive modules: *Vhaya Kadhimba*, *Ake Tonu*, *Juan Pirulero*, Harry Mandela Tribute, and Learn About Appalachia
34. 2008-2010 - Technical Director and Asst. Editor: Music and Culture of Mongolia, Music and Culture of Kyrgyzstan, Music and Culture of Azerbaijan, and Music and Culture of Appalachia (funded in part by the US Department of Education)
35. 2006-2009 – Mj Publishing: Multimedia Developer. Established new interface for product line produced and distributed by McGraw-Hill to K-12 schools nationally.
36. 2006-2013 – Staff Liaison, Board Member, Musical Arts Youth Orchestra
37. 2010 – Indiana University. Teaching and Learning Workshop: summer course development
38. 2005-2006 – Executive Director, New World Youth Orchestras, Indianapolis, IN
39. 2004 – Special Projects Director, IUPUI School of Science, duties included coordinating Indiana State Science Fair, Computer Science competition for high school students, and the Math Bee
40. 2003-2006 – Faculty Sponsor, Individualized Major Program, Indiana University, Bloomington
41. 2002-2003 – VISTA Volunteer, Americorps: Area 10 Agency on Aging – Arts & Humanities
42. 2000 – Founder, Southern Indiana Youth Symphony, Inc.
43. 1999-2001- Education Director, Bloomington Symphony Orchestra, Bloomington, IN
44. 1998 – University of California, Irvine: MFA Thesis (George Crumb Recital & Analysis).
45. 1996-1999 – Executive Director, Four Seasons Symphony, Irvine, CA

COMMUNITY OUTREACH

Consultant and Maintenance of Interactive Sound Board for Celery Bog Community Center, West Lafayette, 2017-current

Project Lead: Indianapolis Symphony Orchestra, "Music of the Earth." Soundscape Education Outreach presentation, September 2017

Project Lead: Center for Global Soundscapes, "200 Years of Indiana Sounds." Indiana State Fair Kiosk, August 2017

Flutist: Hendricks Symphony Orchestra, Philharmonic Orchestra of Indianapolis, 2007-2017

Team Member: Global Soundscapes: Mission to Record the Earth, Giant Screen Movie (www.soundscapeshow.com/team.html), 2014-2016

Project Lead: Discovery Park Open House. Interactive soundscape kiosk design and construction in collaboration with FNR Wood Products Team, November 2016

Soundscape Exhibit Design Lead: Natural Regions Gallery, Indiana State Museum, November 2016 Opening Co-Producer and Performer: Center for Global Soundscapes, "Earth Day Festival."Purdue University, April 2016

Treasurer: Musical Arts Youth Organization, 2014-16

Video Editor and Storyboard Co-Editor: Web-series of soundscape videos: "Learn," "Discover," "Listen" for four habitats, 2014-16

Technical Director and Media Producer: iPad/HTML5 product titled, "Music and Culture of Tatar" in Russian, Tatar and English. Indiana University, Bloomington, with funding supported by the US Dept. of Education, Mj Publishing, 2016.

Technical Director and Co-editor: Interactive iPad modules titled "Vhaya Kadhimba," "Ake Tonu," "Juan Pirulero," "Harry Mandela Tribute," and DVD "Learn About Appalachia," Mj Publishing, 2012-13.

Technical Director: DVDs titled "Music and Culture of Mongolia," "Music and Culture of Kyrgyzstan," "Music and Culture of Azerbaijan," and "Music and Culture of Appalachia." Indiana University, Bloomington, with funding supported by the US Dept. of Education, Mj Publishing, 2008-2010.

Multimedia Developer: K-6 Product line (set of six DVDs), published by Mj Publishing and distributed by McGraw-Hill, 2006-09.

VISTA Volunteer: Americorps. Area 10 Agency on Aging, 2002-03

Founder: Southern Indiana Youth Symphony, Inc., 2000 (alias Musical Arts Youth Orchestra)

MEDIA COVERAGE

Radio Interview: WBAA, "New Science Takes Visitors on Sonic Tour Through State Fair." wbaa.org/post/new-sciencetakes-visitors-sonic-tour-through-states-history#stream/0, 2017

Television Interview: ABC6, "Listening to the History of the Indiana Prairie." www.stgec-ausc.uplynk.com/80C078/ausc/slices/73d/53c3dfd52290407986694c1471cfa82a/

73dba6c7c30746e3a46f8d4afde8f887/73dba6c7c30746e3a46f8d4afde8f887_g.mp4, 2017

Video Interview: The Center for Global Soundscapes at Purdue University, WebsEdgeEducation. www.youtube.com/watch?v=VwbM1Myv0I0, 2017

Blog: Sustainability BootCamp: Sound in Environment. www.earthshiftglobal.com/resources/newsletter/sustainabilitybootcamp-sound-environment-events#story2, 2016

Video Presentation: Mission to Record the Earth, TedX Talk. www.youtube.com/watch?v=RG0_jwelsCc, 2016

Newspaper Coverage: Purdue Exponent, TedxPurdueU 2016 recap. www.purdueexponent.org/campus/article_e2dc03aefff2-11e5-92d4-2f522d72d8ab.html, 2016

Magazine Interview: Audubon Magazine, "Recording Our Planet's Acoustic Heritage- Before It's Gone." www.audubon.org/news/recording-our-planets-acoustic-heritage-its-gone, 2013

Magazine Spotlight: ACRES Land Trust: "I Love This Place: Sound Saving Science," Quarterly Newsletter, 2013

TECHNICAL SKILLS

Ecological and quantitative statistics and modeling

Regression (linear, logistic, multivariate, stepwise, polynomial), data transformation and distributions (standardization, normality tests, null and permutation distributions), anova (interactions, effects), species communities and distributions (dissimilarity matrices, metric/non-metric multidimensional scaling, adonis and SIMPER analysis), cluster analysis (UPGMA, hierarchical, different linkages, cophenetic correlations), PCA, canonical correspondence/redundancy analysis, factor analysis, discriminant analysis (linear, quadratic), spatial analysis (variograms - spherical and cubic models, jittering, kriging) in R and in ArcGIS (limited), species distribution modeling (including population movement corridors/buffer zones, and random walks), geoprocessing and terrain analysis (supervised and unsupervised clustering in ESRI, raster and shape files), and life history tables and survivorship curves (predator-prey models)

Data mining and informatics

Multi-threading (parallelization using OS X parallel, High performance computing), data mining using unsupervised methods e.g. k-means, k-nearest neighbor, multi-label k-nearest neighbor, supervised methods e.g. neural networks (artificial neural network, convolutional neural network), python tensorflow/keras environments, clustering discriminant analysis, support vector machines, classification and regression trees, neural networks, Naive Bayes network, random forest), game theory (e.g., gamblers ruin), spectral and acoustic analysis (specialized R packages e.g. tuneR, seewave, soundscape ecology, warblR), and time-series analysis (ARIMA modeling)

Visualization

R visualization for scientific interpretation using tools (i.e., base plots, ggplot, tanglegrams, alluvial and bump charts, circlize), materials design and visualization tools (Sonic Visualiser, Kaleidoscope, Adobe Creative Suite InDesign and Fireworks, DVD Studio Pro, Final Cut Pro / iMovie, and Audacity), and intermediate website development (HTML5, javascript)

Other Technical Skills

Software - Electronic Health Record systems (Hl7); Adobe Creative Suite, MX Director, Raiser's Edge, FundMaster, DVD Studio Pro, Soundtrack, Final Cut, Motion, Pulp Motion, beta tester for Digital Publishing Suite for Adobe InDesign, multi-track recording and soundtrack creation, Zoho platform for centralized office systems, Dreamweaver and online website providers, basic programming in object-oriented languages Director and Flash (now defunct), HTML5, R, Sonic Visualiser Batch Annotation (unix-based)

Performer - flutist, vocalist, symphony, pit orchestra, woodwind chamber ensembles, conductor

Educator – developed university and primary-level school curriculum; produced manuals for volunteers, educators, and staff