

Senior Lecturer, Department of Computing
Goldsmiths, University of London
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2017.08.03

RESEARCH INTERESTS

New technologies for music composition, performance, and scholarship; enabling people to apply machine learning more efficiently and effectively to real-world problems; supporting end-user design of interactive systems for accessibility, entertainment, and the arts; creating new gesture- and sound-based interaction techniques; designing and studying technologies to support creative work and humanities scholarship; human-computer interaction; computer music performance; new pedagogical approaches to computational arts, STEM, and machine learning.

EDUCATION

<u>Degree</u>	<u>Institution</u>	<u>Date</u>	<u>Field</u>
Ph.D.	Princeton University Advisor: Perry R. Cook Recipient of National Science Foundation Graduate Research Fellowship and the Upton Fellowship in Engineering	2011	Computer Science
M.A.	Princeton University Advisor: Perry R. Cook	2008	Computer Science
M.A.	McGill University Advisor: Ichiro Fujinaga	2006	Music Technology
B.S., B.A.	The Ohio State University Minor in Women's Studies Summa cum laude	2004	Computer Science and Engineering; Music

ACADEMIC POSITIONS HELD

- Goldsmiths, University of London** 10/13–present London, UK
Senior Lecturer, Department of Computing
- Full-time teaching and research (similar to Associate Professor with tenure in North America)
 - Promoted from Lecturer to Senior Lecturer in July 2017
- Princeton University** 7/11–7/14 Princeton, New Jersey
Assistant Professor, Department of Computer Science; Affiliated Faculty in Music
- Full-time teaching and research.
- University of Washington** 1/11–7/11 Seattle, Washington
Postdoctoral Researcher, Department of Computer Science and Engineering
- Conducted research in human-computer interaction related to music and end-user machine learning.

PUBLICATIONS

2017

- Bernardo, F., M. Zbyszyński, R. Fiebrink, and M. Grierson. 2017. “Interactive machine learning for end-user innovation.” *Proceedings of the AAAI Symposium Series: Designing the User Experience of Machine Learning Systems*, 27–29 March 2017.
- Birnbaum, D., R. Fiebrink, J. Malloch, and M. M. Wanderley. 2017. “Towards a Dimension Space for Musical Devices.” In A. R. Jensenius and M. Lyons, Editors, *A NIME Reader: Fifteen Years of New Interfaces for Musical Expression*. Springer International Publishing. ISBN 978-3-319-47213-3.
This volume is a compilation of 30 historically significant papers—chosen from more than 1200 published papers—from the International Conference on New Interfaces for Musical Expression. The original conference paper was published at NIME 2005.
- Deterding, S., J. Hook, R. Fiebrink, M. Gillies, J. Gow, M. Akten, G. Smith, A. Liapis, and K. Compton. 2017. “Mixed-initiative creative interfaces.” *CHI’17 Extended Abstracts on Human Factors in Computing Systems*. (Workshop held at CHI 2017)
- Fiebrink, R. 2017. “Machine Learning as Meta-Instrument: Human-Machine Partnerships Shaping Expressive Instrumental Creation.” In T. Bovermann et al., Editors, *Musical Instruments in the 21st Century*. pp. 137–151. Springer. ISBN 978-981-10-2950-9.
- Fiebrink, R., and B. Caramiaux. 2017. “The Machine Learning Algorithm As Creative Musical Tool.” In A. McLean and R. Dean, Editors, *The Oxford Handbook of Algorithmic Music*. Oxford University Press. (In press, to appear 2017.)

Fiebrink, R., G. Wang, and P. R. Cook. 2017. “Don’t forget the laptop: Using native input capabilities for expressive musical control.” In A. R. Jensenius and M. Lyons, Editors, *A NIME Reader: Fifteen Years of New Interfaces for Musical Expression*. Springer International Publishing. ISBN 978-3-319-47213-3. *This volume is a compilation of 30 historically significant papers—chosen from more than 1200 published papers—from the International Conference on New Interfaces for Musical Expression. The original conference paper was published at NIME 2007.*

Niehaus, K. H., and R. Fiebrink. 2017. “Creative diversity: Expanding software for 3D human avatar design.” *Proceedings of Digital Games Research Association (DiGRA) Conference*. 2–6 July 2017. (Extended abstract)

Shapiro, R. B., A. Kelly, M. Ahrens, B. Johnson, H. Politi, and R. Fiebrink. 2017. “BlockyTalky: Tangible Distributed Computer Music for Kids.” *Computer Music Journal*, 41(2) (Summer 2017). ISSN 01489267.

2016

Gillies, M., R. Fiebrink, A. Tanaka, J Garcia, S. Amershi, B. Lee, F. Bevilacqua, A. Heloir, F. Nunnari, W. Mackay, T. Kulesza, B. Caramiaux, N. d’Alessandro, and J. Tilmanne, 2016. “Human-Centered Machine Learning”. *CHI’16 Extended Abstracts on Human Factors in Computing Systems*, pp. 3558–3565. (Workshop held at CHI 2016)

Oda, R., and R. Fiebrink. 2016. “The Global Metronome: Absolute tempo sync for networked musical performance.” *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, July 11–15. (paper)

Scurto, H. and R. Fiebrink. 2016. “Grab-and-play mapping: Creative machine learning approaches for musical inclusion and exploration.” *Proceedings of the International Computer Music Conference (ICMC)*, September 12–16. (paper)

Shapiro, B., A. Kelly, M. Ahrens, and R. Fiebrink. 2016. “BlockyTalky: A physical and distributed computer music toolkit for kids.” *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, July 11-15. (paper)

2015

Deitrick, E, R. B. Shapiro, M. P. Ahrens, R. Fiebrink, P. D. Lehrman, and S. Farooq. 2015. “Using distributed cognition theory to analyze collaborative computer science learning.” *Proceedings of the International Conference on International Computing Education Research (ICER)*, August 9–13, pp. 51–60. (paper)

Jin, Z., R. Oda, A. Finkelstein, and R. Fiebrink. 2015. “MalLo: A distributed synchronized musical instrument designed for internet performance.” *Proceedings of New Interfaces for Musical Expression (NIME)*, May 31–June 1, pp. 293–298. (paper with oral presentation and poster presentation)

Katan, S., M. Grierson, and R. Fiebrink. 2015. “Using interactive machine learning to support interface development through workshops with disabled people.” *Proceedings of ACM CHI*, April 18–23. (Note)

- Wolf, K. E., G. Gliner, and R. Fiebrink. 2015. "A model for data-driven sonification using soundscapes." *Proceedings of ACM Conference on Intelligent User Interfaces (IUI)*, March 29–April 1.
- Wolf, K. E., G. Gliner, and R. Fiebrink. 2015. "End-user development of sonifications using soundscapes." *Proceedings of the International Conference on Auditory Display (ICAD)*, July 6–10. (paper)
- Zayaruznaya, A., and R. Fiebrink. 2015. "The Roman de Fauvel as synthetic digital object." *The IAML/IMS (International Association of Music Libraries, Archives, and Documentation Centres / International Musicological Society) Congress*, New York City, June 21–26. (oral presentation with published abstract)

2014

- B. Caramiaux, K. Tahiroglu, R. Fiebrink, and A. Tanaka (eds.). 2014. *Proceedings of the International Conference on New Interfaces for Musical Expression*. London, United Kingdom: Goldsmiths, University of London. ISBN: 978-1-906897-29-1.
- Hipke, K., M. Toomim, R. Fiebrink, and J. Fogarty. 2014. "BeatBox: End-user interactive definition and training of recognizers for percussive vocalizations." *Proceedings of AVI 2014: International Working Conference on Advanced Visual Interfaces*, Como, Italy, May 27–30. (paper)
- Laguna, C., and R. Fiebrink. 2014. "Improving data-driven design and exploration of digital musical instruments." *CHI'14 Extended Abstracts*, 26 April–1 May. (Work in Progress)
- Zayaruznaya, A., and R. Fiebrink. 2014. "Reimagining the facsimile: Project report on The Digital Fauvel" *Early Music* 42(4): 599-604.

2013

- Fried, O., and R. Fiebrink. 2013. "Cross-modal sound mapping using deep learning." *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, Daejeon, South Korea, May 27–30. (paper)
- Oda, R., A. Finkelstein, and R. Fiebrink. 2013. "Towards note-level prediction for networked music performance." *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, Daejeon, South Korea, May 27–30. (poster with paper in proceedings)
- Sarwate, A., and R. Fiebrink. 2013. "Expansion on description-based design of melodies." *Proceedings of the 2nd International Workshop on Musical Metacreation (MUME 2013)*, Boston, Massachusetts, October 14–15. (paper)
- Sarwate, A., and R. Fiebrink. 2013. "Variator: A creativity support tool for music composition." *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, Daejeon, South Korea, May 27–30. (poster with paper in proceedings)
- Wolf, K. E., and R. Fiebrink. 2013. "SonNet: A code interface for sonifying computer network data." *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, Daejeon, South Korea, May 27–30. (paper)

Zhang, E., and R. Fiebrink. 2013. "KIB: Simplifying gestural instrument creation using widgets." *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, Daejeon, South Korea, May 27–30. (poster with paper in proceedings)

2012

Fiebrink, R., and D. Trueman. 2012. "End-user machine learning in music composition and performance." Presented at the CHI 2012 Workshop on End-User Interactions with Intelligent and Autonomous Systems. Austin, Texas, May 6. (workshop paper)

Morris, D., and R. Fiebrink. 2012. "Using machine learning to support pedagogy in the arts." *Personal and Ubiquitous Computing*, April 2012.

Xu, Z., R. Fiebrink, and Y. Matsuoka. 2012. "Virtual Therapist: A Phantom robot-based haptic system for personalized post-surgery finger rehabilitation." *Proceedings of the IEEE International Conference on Robotics and Biometrics (ROBIO 2012)*, Guangzhou, China, December 11–14. (paper)

2011

Fiebrink, R. 2011. "Real-time human interaction with supervised learning algorithms for music composition and performance." PhD thesis, Princeton University.

Fiebrink, R., P. R. Cook, and D. Trueman. 2011. "Human model evaluation in interactive supervised learning." *Proceedings of ACM CHI*, Vancouver, Canada, May 7–12. 147–156. (paper)

Morris, D., and R. Fiebrink. 2011. "Using machine learning to support pedagogy in the arts." Presented at the CHI 2011 Child-Computer Interaction Workshop at CHI 2011, Vancouver, Canada, May 7. (workshop paper and presentation)
One of three papers to win best workshop paper award

Schedel, M., P. Perry, and R. Fiebrink. 2011. "Wekinating 000000Swan: Using machine learning to create and control complex artistic systems." *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, Oslo, Norway, May 30–June 1. (poster with paper in proceedings)

Schedel, M., and R. Fiebrink. 2011. "A demonstration of bow articulation recognition with Wekinator and K-Bow." *Proceedings of the International Computer Music Conference (ICMC)*, Huddersfield, UK, July 31–August 5. (demo with paper in proceedings)

2010

Fiebrink, R. 2010. "Real-time interaction with supervised learning." *ACM CHI Extended Abstracts*, Atlanta, April 10–15. 2935–2938. (extended abstract)

Fiebrink, R., M. Schedel, and B. Threw. 2010. "Constructing a personalizable gesture-recognizer infrastructure for the K-Bow." *3rd International Conference on Music and Gesture (MG3)*, Montreal, March 5–6. (oral presentation with published abstract)

Fiebrink, R., D. Trueman, C. Britt, M. Nagai, K. Kaczmarek, M. Early, M.R. Daniel, A. Hege, and P. R. Cook. 2010. "Toward understanding human-computer interactions in composing the instrument." *Proceedings of the International Computer Music Conference (ICMC)*, New York City, June 1–5. (paper)

2009

Fiebrink, R., P. R. Cook, and D. Trueman. 2009. "Play-along mapping of musical controllers." *Proceedings of the International Computer Music Conference (ICMC)*, Montreal, August 4–9. (demo with paper in proceedings)

Fiebrink, R., D. Trueman, and P. R. Cook. 2009. "A meta-instrument for interactive, on-the-fly learning." *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, Pittsburgh, June 4–6. (paper)

Fiebrink, R., D. Morris, and M. R. Morris. 2009. "Dynamic mapping of physical controls for tabletop groupware." *Proceedings of ACM CHI*, Boston, April 4–9. (paper)

2008

Fiebrink, R., G. Wang, and P. R. Cook. 2008. "Foundations for on-the-fly learning in the Chuck programming language." *Proceedings of the International Computer Music Conference (ICMC)*, Belfast, August 24–29. (paper)
Tied for winner of ICMC 2008 "Best Presentation" award

Fiebrink, R., G. Wang, and P. R. Cook. 2008. "Support for MIR prototyping and real-time applications in the Chuck programming language." *Proceedings of the International Conference on Music Information Retrieval (ISMIR)*, Philadelphia, PA, September 14–18. (paper)

2007

DeCoro, C., Z. Barutcuoglu, and R. Fiebrink. 2007. "Bayesian aggregation for hierarchical genre classification." *Proceedings of the International Conference on Music Information Retrieval (ISMIR)*, Vienna, Austria, September 23–27. (paper)

Fiebrink, R., G. Wang, and P. R. Cook. 2007. "Don't forget the laptop: Using native input capabilities for expressive musical control." *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, New York City, USA, June 6–10. (paper)

Wang, G., and R. Fiebrink. 2007. "Introduction to Chuck and livecoding." *Electro-music 2007*, Philadelphia, PA, June 1–3. (talk)

Wang, G., R. Fiebrink, and P. R. Cook. 2007. "Combining Analysis and Synthesis in the Chuck Programming Language." *Proceedings of the International Computer Music Conference (ICMC)*, Copenhagen, Denmark, August 27–31. (paper)

2006

Fiebrink, R. 2006. "An exploration of feature selection as an optimization tool for musical genre classification." MA thesis, McGill University.

Fiebrink, R., and I. Fujinaga. 2006. “Feature selection pitfalls and music classification.” *Proceedings of the International Conference on Music Information Retrieval (ISMIR)*, Victoria, Canada, October 8–12. (poster with paper in proceedings)

2005

Birnbaum, D., R. Fiebrink, J. Malloch, and M. M. Wanderley. 2005. “Towards a Dimension Space for Musical Devices” *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME)*, Vancouver, Canada, May 26–28. (poster with paper in proceedings)

Fiebrink, R., C. McKay, and I. Fujinaga. 2005. “Combining D2K and JGAP for Efficient Feature Weighting For Classification Tasks in Music Information Retrieval.” *Proceedings of the International Conference on Music Information Retrieval (ISMIR)*, London, September 11–15. (poster with paper in proceedings)

McKay, C., R. Fiebrink, D. McEnnis, B. Li, and I. Fujinaga. 2005. “ACE: A Framework for Optimizing Music Classification.” *Proceedings of the International Conference on Music Information Retrieval (ISMIR)*, London, September 11–15. (paper)

McKay, C., D. McEnnis, R. Fiebrink, and I. Fujinaga. 2005. “ACE: A General-Purpose Classification Ensemble Optimization Framework.” *Proceedings of the International Computer Music Conference (ICMC)*, Barcelona, Spain, September 5–9. (poster with paper in proceedings)

Sinyor, E., C. McKay, R. Fiebrink, D. McEnnis, and I. Fujinaga. 2005. “Beatbox Classification Using ACE.” *Proceedings of the International Conference on Music Information Retrieval (ISMIR)*, London, September 11–15. (poster with paper in proceedings)

SOFTWARE

The Wekinator: www.wekinator.org

- Creator and sole developer of this software for using machine learning to build real-time interactive systems.
- The software was downloaded over 7500 times in 2016.
- Selected press describing work that artists, musicians, and designers have built using Wekinator:
 - “Wanna stop staring at screens? Try on these glasses.” *Motherboard*, June 1, 2016. <https://motherboard.vice.com/read/wanna-stop-staring-at-screens-try-on-these-glasses>
 - “Now you can play the world’s tiniest violin: Google sensors detect tiny movements to play music.” *Daily Mail*, 10 June 2016. <http://www.dailymail.co.uk/sciencetech/article-3635870/Now-play-world-s-tiniest-violin-Google-sensors-detect-tiny-movements-play-music.html>
 - “NIME pioneering electronic music.” *Click on BBC Radio*, 9 July 2014. <http://www.bbc.co.uk/programmes/p021y33d>

GRANTS AWARDED

Supporting Feature Engineering for End-User Design of Gestural Interactions

- Principal Investigator
- **£123,787**, 18 months, beginning June 2017
- Funded by the Engineering and Physical Sciences Research Council (EPSRC), UK
- This project aims to address a common challenge for end-user designers creating new interactions with audio and sensors, namely the translation of raw data into a feature representation suitable for further processing or machine learning.

Learn to Play: Computational Assessment of Musical Playability for Users' Practice

- Co-Investigator
- **£159,280**, 18 months, beginning February 2017
- Funded by the Arts and Humanities Research Council (AHRC), UK
- This project investigates machine learning-based mechanisms to model the “playability” of instrumental music scores, and to automatically generate exercises from passages extracted from pieces of music.

Digital Fauvel

- Named collaborator, with Principal Investigator Anna Zayaruznaya of Yale University
- **\$20,000**, 12 months, beginning January 2017
- Funded by the Yale University Digital Humanities Laboratory
- This project ports the “Digital Fauvel” created with Zayaruznaya in 2013–14 to a responsive web-based implementation, improving accessibility to a wider community of scholars and students.

Sound Control

- Named collaborator, project led by the Northamptonshire Musical Inclusion Project
- **£27,280**, 24 months, beginning 2016
- Funded by the Paul Hamlyn Foundation
- This project involves collaboration with children with special needs and disabilities—as well as music therapists and music teachers—to design, develop, and build bespoke digital musical instruments.

RAPID-MIX: Realtime Adaptive Prototyping for Industrial Design of Multimodal Interactive eXpressive technology

- Co-Investigator
- **€2,330,004**, 36 months, beginning February 2015
- Innovation Action funded by the European Commission (H2020-ICT-2014-1 Project ID 644862)
- Partner institutions include Goldsmiths University of London, Institut de Recherche et de Coordination Acoustique Musique (IRCAM; Paris), Universitat Pompeu Fabra (Barcelona), Plux (Portugal), Reactable Systems SL (Barcelona), Somethin' Else Sound Directions Ltd. (UK), ROLI Ltd (UK), and ORBE (France).
- This technology transfer project aims to (1) bring to market innovative interface products for music, gaming, and e-Health applications, and (2) produce better

software APIs for developers and “makers” to employ machine learning and signal processing in their own projects.

Predicting the Future to Enable Musical Collaboration Over the Internet

- Principal Investigator
- Awarded **\$149,963** by the Project X fund at Princeton University, February 2013
- Grant supported investigation of computational methods to significantly reduce or even remove latency for networked percussion performance by analyzing a musician’s motion to predict each new drum hit before it occurs, sending information about the predicted gesture over the Internet in advance, and synthesizing the sound of the drum hit for the remote collaborator in real-time.

The Digital Fauvel: An Experiment in Computer-Aided Human-Manuscript Interaction

- Principal Investigators: Rebecca Fiebrink and Anna Zayaruznaya, Princeton University
- **\$30,400**, awarded January 2013
- Funded by the David A. Gardner '69 Magic Project in the Humanities Council at Princeton University
- Grant supported design and implementation of an interactive digital version of the 14th century multimedia manuscript, the *Roman de Fauvel*.

Computer-Aided Human-Manuscript Interaction

- Principal Investigators: Rebecca Fiebrink and Anna Zayaruznaya, Princeton University
- **\$15,000** awarded May 2012
- Funded by the David A. Gardner '69 Magic Project in the Humanities Council at Princeton University
- Grant supported one summer of work to establish a new university-wide research and education program focusing on the use of digital technology to enhance scholarship and teaching of medieval era manuscripts.

TEACHING

UG = Undergraduate; MA = Masters of Arts; MFA = Masters of Fine Art

2013–Present

Lecturer, Department of Computing, Goldsmiths, University of London

Spring 2017:

Module convener & lecturer: Perception & Multimedia Computing II,
Audio Track (UG)

Major project supervisor for Music Computing, Creative Computing,
Business Computing student projects (UG)

Project supervisor: Software Projects in Computer Science (UG)

Autumn 2016:

Module convener & lecturer: Perception & Multimedia Computing I (UG)

Lecturer: Introduction to Programming (UG)

Project Supervisor: Software Projects in Computer Science (UG)
Spring 2016:
Module convener & lecturer: Perception & Multimedia II (UG)
Major project supervisor for Music Computing, Creative Computing (UG)
Autumn 2015:
Module convener & lecturer: Introduction To Digital Media (UG)
Module convener and lecturer: Perception & Multimedia Computing I (UG)
Lecturer: Introduction to Web Programming (UG)
Spring 2015:
Lecturer: Workshops in Creative Coding II (MA/MFA)
Module convener & lecturer: Perception & Multimedia II (UG)
Autumn 2014:
Module convener and lecturer: Introduction To Digital Media (UG)
Module convener and lecturer: Perception & Multimedia I (UG)
Spring 2014:
Lecturer, Perception and Multimedia Computing II (UG)
Major project supervisor for Music Computing (UG)
Autumn 2013:
Lecturer, Perception and Multimedia Computing I (UG)
Project supervisor for Introduction to Digital Media (UG)

2016–Present

Goldsmiths, University of London, with Kadenze Inc.

Designed and taught online course, *Machine Learning for Musicians and Artists*

2011–2013

Assistant Professor, Princeton University

Departments of Computer Science and Music

Autumn 2011: COS 323, Computing for the Physical and Social Sciences (UG)

Spring 2012: COS/MUS 314, Computer and Electronic Music (UG)

Autumn 2012: COS 597B, Graduate Seminar on Interactive Music Systems (PhD)

Spring 2013: COS 436 / ELE 469, Human-Computer Interface Technology (UG)

Recipient of the Princeton Undergraduate & Graduate Engineering

Council Award for Excellence in Teaching in Spring 2013

2010, 2011

Summer Workshop Instructor, Stanford University

Center for Computer Research in Music and Acoustics (CCRMA)

Summer 2010: Music Information Retrieval, with Jay LeBoeuf

Summer 2011: Music Information Retrieval, with Jay LeBoeuf, Douglas Eck, Stephen Pope, Steve Tjoa, Leigh Smith, and George Tzanetakis

2008–2010

Assistant in Instruction, Princeton University

Departments of Computer Science and Music

Spring 2008, 2009, 2010: COS/MUS 314, Computer and Electronic Music (UG)

- Lead bi-weekly lectures on topics in computer programming, digital audio, and computer music.
- Helped to plan and lead rehearsals of the Princeton Laptop Orchestra.

Autumn 2007: COS 436, Human-Computer Interface Technology (UG)

- Assisted students with hardware controller design and construction and with written work.

SUPERVISION OF STUDENT RESEARCH

Graduate Students

- Reid Oda, Princeton Computer Science PhD, 2011–2017
Thesis: “Tools and Techniques for Rhythmic Synchronization in Networked Musical Performance”
- Katie Wolf, Princeton Computer Science PhD Candidate, 2011–Present
- Francisco Bernardo, Goldsmiths Computer Science PhD Candidate, 2015–Present
- Kiona Hagen Niehaus, Goldsmiths Arts & Computational Technology PhD Candidate, 2016–Present
- Esben Sørig, Goldsmiths Computer Science PhD Candidate, 2017–Present

Undergraduate Students

- Tom Lavin, Goldsmiths, Third year project, 2017
- Mohammed Hassan Ahmed, Goldsmiths, Third year project, 2017
- William Primett, Goldsmiths, Third year project, 2017
- Joshua Akinsola, Goldsmiths, Third year project, 2016
- Dean Cooksey, Goldsmiths, Third year project, 2016
- Jack Woodward, Goldsmiths, Third year project, 2016
- Jack Goodwin, Goldsmiths, Third year project, 2016
- Nikolay Nikolov, Goldsmiths, Third year project, 2016
- Fearn Bishop, Goldsmiths, Third year project, 2014
- Edward Fitzmaurice, Goldsmiths, Third year project, 2014
- Lugh O’Neill, Goldsmiths, Third year project, 2014
- Christina Funk, Princeton University, Junior independent work, 2013
- Christopher Laguna, University of California San Diego, Summer research, 2013
- Andrew Callahan, Princeton University, Senior independent work, 2013
- Alison Chang, Columbia University, Summer research, 2013
- Jamie Chong, Princeton University, Summer research, 2013

- Brendan Chou, Princeton University, Summer research, 2013
- Bonnie Eisenman, Princeton University, Junior independent work, 2013
- Avneesh Sarwate, Princeton University, Junior independent work, 2013
- Alan Thorne, Jr., Princeton University, Senior independent work, 2013
- Andrew Boik, Princeton University, Senior thesis advisor, 2012–13
- Nikitas Tampakis, Princeton University, Junior independent work, 2012
- Clayton Whetung, Princeton University, Senior independent work, 2012
- Robert Timpe, Princeton University, Senior thesis advisor, 2011–2012
- Jeffrey Hodes, Princeton University, Senior thesis advisor, 2011–2012
(with Dmitri Tymoczko)
- Jeffrey A. Snyder, Princeton University, Junior independent work, 2012
(with Jeffrey O. Snyder)
- Adam Stasiw, Princeton University, Junior independent work, 2012
- Eric Weiser, Princeton University, Junior independent work, 2012
- Edward Zhang, Princeton University, Junior independent work, 2011
- Kyle Hipke, University of Washington, Summer research, 2011
(with James Fogarty)
- Lalithra Fernando, Princeton University, Senior independent work, 2010
(with Brian Kernighan)
- Arthi Ramachandran, Princeton University, Senior thesis, 2007–2008
(with Perry Cook)

KEYNOTE ADDRESSES

August 2017: AudoMostly, London, UK

April 2017: NextM Copenhagen, Denmark

March 2017: NextM Stockholm, Sweden

November 2016: Audio Developers Conference, London, UK

July 2016: Audio and Music Technology Research Symposium, York University, UK

August 2015: eNTERFACE, CUTE Masterclass Series on Culture and Technology,
Mons, Belgium

July 2015: International Conference on Auditory Display, Graz, Austria

OTHER INVITED TALKS

Titles & Topics: *Real-time Human-Computer Interaction with Supervised Learning Algorithms for Music Composition and Performance; A Bicycle Built for Two: Humans and Computers Making Music Together; Chuck Audio Analysis and Machine Learning; Music and Computer Science.*

September 2017: Ars Electronica, Linz, Austria

September 2017: Google, Inc., Cambridge, MA, USA
July 2017: Microsoft Research AI Summer School, Cambridge UK
June 2017: Y Conf (hosted by Y Combinator)
March 2017: London Creative AI
January 2017: INST-INT digital arts festival, New Orleans
November 2016: University of St Andrews, HCI Research Group, Scotland
October 2016: Distinguished Lecturer Seminar, Electrical Engineering & Computer Science, Queen Mary University of London
October 2016: Music Technology Seminar, Georgia Tech University
September 2016: Music Technology Seminar, Carnegie Mellon University
July 2016: Louisiana State University
June 2016: London Crossmodalism
May 2016: Google Music, Art, and Machine Intelligence Conference
May 2016: alt-AI, School for Poetic Computation, New York City
May 2016: Facets Conference, New York University
April 2016: EIM-Live, De Montfort University
April 2016: Resonate digital arts festival, Belgrade, Serbia
March 2016: Birmingham City University
January 2016: Microsoft Research
October 2015: Ableton Loop Festival, Berlin
October 2015: University College London
May 2015: IRCAM, Paris
January 2015: Music Research Forum, Goldsmiths University of London
November 2014: Human Interactive Conference, Goldsmiths University of London
September 2014: Music Tech Fest London
June 2014: California Institute of the Arts
June 2014: Cambridge University, Evolution of Innovation Conference
April 2014. The Open University, Computing and Communications Department
December 2013. City University London, Centre for Human Computer Interaction Design
October 2013. The Ohio State University, Department of Computer Science & Engineering.
October 2013. Dartmouth College, E. E. Just Symposium.
September 2013. MIT Media Lab, Graduate Seminar on Interactive Machine Learning
October 2012. University of Wisconsin “WID-DOW” talk series.
April 2012. Tufts University.
March 2012. Music Technology Research Group, New York University.
February 2012. Encountering Data, Stony Brook University.
November 2011. CSAIL HCI Seminar Series, Massachusetts Institute of Technology.
June 2011. Brown University.
May 2011. New York University in Abu Dhabi.

April 2011. Tableau Software.
April 2011. DXARTS Center for Digital Art and Experimental Media, University of Washington.
March 2011. Center for Computation and Technology, Louisiana State University.
January 2011. “Dub” HCI Seminar Series, University of Washington.
July 2010. Google, Inc.
March 2010. University of Alberta.
October 2009. 127th Annual Convention of the Audio Engineering Society (AES):
Invited panelist, “Interacting with Semantic Audio: Bridging the Gap Between Humans and Algorithms.”
April 2009. Harvestworks Digital Media Arts Center, New York City.
October 2008. The Ohio State University.
April 2008. Alberta College of Art and Design. Calgary, Canada. (with Ge Wang)
June 2007. Electro-music 2007 Festival, Philadelphia. (with Ge Wang)

PUBLIC ENGAGEMENT & BROADENING PARTICIPATION IN COMPUTING

March 2017: Speaker, Google Women Techmakers, London
November 2016: Speaker, Out Thinkers / Pride in STEM, London
October 2016: Speaker, Girl Geek Meetup, London
October 2016: Machine learning demos for policymakers and non-profits, Future Advocacy, London
September 2016: Speaker, Women in Tech WOW Talks, London
June 2016: Organised machine learning workshop for Lewisham schoolchildren at Goldsmiths
May 2016: Hands-on machine learning demos for schoolchildren, BBC Radio 1 Academy, Exeter UK
March 2016: Speaker, “Creativity in the Age of Tech,” Barbican, London
November 2015: Musical machine learning demos, “Soundlab Play Space,” Nesta, London
October 2014: Speaker, Digital Frontiers: Inclusion, Young People, and Music Technology. Northamptonshire Music Education Hub’s Musical Inclusion Programme, Northampton, UK
May 2012: Computer music workshop for girls, Springside Chestnut Hill Academy, Philadelphia
Spring 2008, 2009, 2010, 2012: Speaker and co-organiser, New York City Girls Computer Science and Engineering Conference

WORKSHOP TEACHING

- “Sensing + Perception Design”, with Yasaman Sheri
June 2017, Copenhagen Institute of Interaction Design
- “Designing Sensor-Based Interactions with Machine Learning”
June 2017, Women In Sound / Women On Sound (WISWOS), London, UK
- “AI for Synths”
May 2017, Moogfest, Durham, NC, USA
- “Building creative interactions with machine learning”
January 2017, INST-INT digital arts festival, New Orleans, USA
- “Machine Learning for Artists & Designers”
September 2016, Carnegie Mellon University
- “The Neural Aesthetic: Machine Learning for Artists”
July 2016, School of Machines, Making & Make Believe, Berlin, Germany
(co-taught with Gene Kogan)
- “Interactive Machine Learning for Building New Musical Instruments and Real-time
Controllers”
Louisiana State University, July 2016
- “Machine learning for Artists, Musicians, Gamers, and Makers”
Facets, New York University, May 2016
- “Machine learning for Artists, Musicians, Gamers, and Makers”
alt-AI, New York City, May 2016
- “Machine Learning for Artists, Musicians, Gamers, and Makers”
April 2016, Resonate digital arts festival, Belgrade, Serbia
(co-taught with Phoenix Perry)
- “Sensing & Analysis Technologies for Expressive Human Movement”
June 2014, Beijing Dance Academy (1-week workshop with undergraduates)
- “Interactive Machine Learning for Building New Musical Instruments and Real-time
Controllers”
May 2014, Institut für Elektronische Musik und Akustik, Graz
- “A Hands-On Workshop on Gesture Recognition and Machine Learning for Real Time
Musical Interaction”
May 2012, International Conference on New Instruments for Musical Expression
With Nicholas Gillian
- “Computer Music and Live-Coding Workshop”
May 2011, New York University in Abu Dhabi (invited)
- “Music Information Retrieval for Music Composition and Performance”
June 2010, International Computer Music Conference
With Ben Lacker and Gabriel Vigliensoni
- “Introduction to Musical Audio Analysis”
March 2010, The College of New Jersey (invited)
- “Chuck @ NYU”
April 2009, New York University Music Technology Program (invited)
- “Chuck! Audio Programming, Interactivity, Machine Learning, and Laptop
Orchestras.”
January 2009, Hong Kong Arts Centre (invited)

- “PICASso Machine Learning Workshop Using Weka and D2KToolkit”
February 2008, Princeton University
- “Music Information Retrieval in ChucK: Real-time Prototyping for MIR Systems and Performance”
2008 International Conference on Music Information Retrieval (ISMIR)
With Ge Wang and Perry Cook
- “ChucK Programming + Laptop Orchestras”
2008 Alberta College of Arts of Design, Calgary, Canada (invited)
With Ge Wang
- “ChucK + On-the-fly Programming”
June 2007, Electro-Music Festival, Philadelphia
With Ge Wang
- “ChucK Programming Language”
November 2006, International Computer Music Conference
With Ge Wang, Perry Cook, Ananya Misra, and Spencer Salazar

PATENTS

- Fiebrink, R., and P. Lamere. “System and method for media fingerprint indexing.”
U.S. patent number 8275177. Issued September 25, 2012.
- Fiebrink, R., D. Morris, and M. R. Morris. “Mapping of physical controls for surface computing.” U.S. patent number 8264455. Issued September 11, 2012.
- Salazar, S., R. Fiebrink, G. Wang, M. Ljungstrom, J. C. Smith, and P. R. Cook. “Continuous pitch-corrected vocal capture device cooperative with content server for backing track mix.” U.S. patent number 9058797. Issued June 16, 2015.
- Salazar, S., R. Fiebrink, G. Wang, M. Ljungstrom, J. C. Smith, and P. R. Cook. “Continuous score-coded pitch correction.” U.S. patent number 9147385. Issued September 29, 2015.
- Salazar, S., R. Fiebrink, G. Wang, M. Ljungstrom, J. C. Smith, and J. Yang. “World stage for pitch-corrected vocal performances.” U.S. patent number 8682653. Issued March 25, 2014.

SELECTED MUSICAL AND ARTISTIC PROJECTS

Sideband

Founding member of Princeton- and New York City-based professional laptop performance ensemble. First performed at the 2010 International Computer Music Conference.
<http://sidebandband.com/>

Princeton Laptop Orchestra (PLOrk)

Co-Director, 2011–present.

Performer, instructor, and composer, 2006–present. Assistant director, 2008–2010.
<http://plork.cs.princeton.edu/>

The Third Pixel (with Samson Young and collaborators)

Presented at the HKICC Lee Shau Kee School of Creativity, Hong Kong, August 2010. Turns old-school video games into a multi-sensory chamber concert experience and an installation project that comments on the darker side of urban childhood.

<http://www.thismusicisfalse.com/?portfolio=2010-the-third-pixel>

blinky

Original composition for laptop orchestra. A meditation on light, sound, and webcam-driven performance. Performed at Princeton 2009 with guest shakuhachi artist Riley Lee; also performed at 2009 MMiX Festival of Interactive Music Technology (New York) and HASTAC 2009 (Chicago).

nets0

Original composition for 8 laptops, in which performers dynamically modify the mapping from gestural controllers to sounds using interactive, real-time machine learning. Performed at Princeton, January 2009.

PLOrk Beat Science: An Adventure for Flute and HyPLOrkussion! (with Ge Wang)

Performances include: National Academy of Science Museum Washington DC, Electro-music 2007 Festival in Philadelphia, Princeton 2007, New Interfaces for Music Expression 2009, Pittsburgh.

<http://plork.cs.princeton.edu/beatscience/>

Box of Revelation (with Samson Young)

Interactive digital multimedia installation. Social network data, local sensing of human movement, internet vlogs, algorithmically generated computer music, and a live performance of Messaien's Quartet for the End of Time come together in one commentary on the meanings of God in the age of digital omniscience. Hong Kong Arts Centre, 2009.

Joy of Chant (with Ge Wang and Perry Cook)

A scored and improvisatory work for laptop ensemble, using joystick- and keyboard-controlled real-time singing synthesis. Performed 2007.

ADDITIONAL MUSICAL ACTIVITIES

Squirrel in the Mirror, London, UK

One half of an experimental laptop-violin duet, 2014–Present.

Timmins Symphony Orchestra, Timmins, ON, Canada

Principal Flutist, September–December 2010.

The Parody Bits, Seattle, Washington

Keyboardist in computer science parody band, January–August 2011.

<http://www.youtube.com/cseband>

Silicon/Carbon: An Anti-Concerto Grosso

Laptop performer in Dan Trueman's composition for the American Composers Orchestra. Performed in Zankel Hall at Carnegie Hall, April 2008.

PROFESSIONAL ACTIVITIES AND SERVICE

General Co-Chair

International Conference on New Interfaces for Musical Expression, 2014

Steering Committee Member

New Interfaces for Musical Expression, 2014–Present

Executive Committee Member

First International Symposium on Laptop Ensembles and Orchestras, 2012

International Computer Music Association (ICMA)

Research Coordinator, 2013–2017

Member, 2007–Present

Associate Chair / PC Member / Metareviewer

ACM SIGCHI Conference 2012

ACM Creativity & Cognition Conference 2015, 2017

New Interfaces for Musical Expression (NIME) 2015–17

Workshop on Functional Art, Music, Modeling & Design (FARM) 2016

International Society for Music Information Retrieval (ISMIR) 2014

Computer Music Journal

News and Announcements Editor, 2010–2013

Grant Reviewer

Engineering and Physical Sciences Research Council, UK

National Science Foundation, Human-Centered Computing

Natural Sciences and Engineering Research Council of Canada

Social Sciences and Humanities Research Council of Canada

US Air Force Office of Scientific Research

Conference Reviewer

ACM CHI Multimedia showcase 2010

ACM Designing Interactive Systems (DIS) 2010, 2017

ACM Human Factors in Computing Systems (CHI) 2009–2017

ACM Multimedia 2013

ACM User Interface Software and Technology (UIST) 2008–2010, 2012–2016

ACM Tangible and Embodied Interaction (TEI) 2012

ACM Workshop on Music Information Retrieval with User-Centered and
Multimodal Strategies, in conjunction with ACM MM 2012

f(MIR) 2009–2010

Grace Hopper Celebration of Women in Computing 2012

INTERACT 2011

International Computer Music Conference (ICMC) 2008–2016

International Conference on Intelligent User Interfaces (IUI) 2014, 2015

International Conference on Music Information Retrieval (ISMIR) 2006–2013
International Conference on New Interfaces for Musical Expression (NIME)
2009–2017
International Conference on Movement Computing (MOCO) 2017
International Workshop on Musical Metacreation (MUME), in association with
AIIDE 2012, 2014
Music, Mind, and Invention Workshop at The College of New Jersey 2012
Sound and Music Computing 2012

Journal Reviewer

ACM Transactions on Applied Perception
ACM Transactions on Interactive Intelligent Systems
Computer Music Journal
EURASIP Journal on Advances in Signal Processing
EURASIP Journal on Audio, Speech, and Music Processing
IEEE Transactions on Audio, Speech, and Language Processing
IEEE Journal of Selected Topics in Signal Processing
IEEE Transactions on Multimedia
International Journal of Human-Computer Studies
Journal of Pattern Recognition Research
Journal of New Music Research

Thesis Examiner & Committee Member

Christian Heinrichs, Queen Mary University of London, Department of Electronic
Engineering and Computer Science
PhD Internal Examiner, 2017
Diana Siwiak, Victoria University of Wellington, Sonic Arts & Engineering
PhD Examiner, 2017
Zheng Ma, Queen Mary University of London, Department of Electronic
Engineering and Computer Science
PhD Internal Examiner, 2016
Robert Tubb, Queen Mary University of London, Department of Electronic
Engineering and Computer Science
PhD Internal Examiner, 2016
Charles Martin, Australian National University
PhD Thesis Examiner, 2016
Jules Françoise, Université Pierre & Marie Curie / IRCAM (France)
PhD Examiner, 2015
Jérémie Garcia, in|situ / LRI / INRIA (FRANCE)
PhD Examiner, 2014
Holger Kirchoff, Queen Mary University of London, Department of Electronic
Engineering and Computer Science
PhD Internal Examiner, 2014
Cameron Britt, Princeton University Department of Music
PhD Thesis Reader, 2013
Will Clarkson, Princeton University Department of Computer Science
PhD Thesis Committee, Non-Reader, 2012
Avinash Sastry, Georgia Tech Department of Music Technology

MA Thesis Committee, Reader, 2011
Benjamin Swift, Australian National University
PhD Thesis Examiner, Reader, 2012

Undergraduate Academic Advising, Princeton University

Freshman Advisor, School of Engineering and Applied Science, 2011–13

Association for Computing Machinery (ACM)

Member, 2003–Present

Affiliations: SIG Multimedia, SIGCHI

Electronic Music Foundation

Member, 2009–Present

Advisory Board Member

FAST IMPACT, EPSRC-funded research project

music21, Software toolkit for computer-aided musicology

Smule, Inc.: Industry-leading creator of mobile music apps

Centre for Interdisciplinary Studies in Rhythm, Time and Motion: Research

Council of Norway Centre of Excellence

GOLDSMITHS ADMINISTRATIVE RESPONSIBILITIES

Academic Director of Technical Resources, Goldsmiths Computing Department

January 2017–July 2017

- Line-manage the Creative Facilities Manager (and previously oversaw definition of this role, as well as recruitment and hiring of this person)
- Coordinate academic and technical staff to ensure specialised resources (e.g., for fabrication, electronics) meet the needs of students, instructors, and researchers in the department

Computing Dev Ops, Goldsmiths Computing Department

January 2017–Present

I manage the new “Computing Dev Ops” programme for providing bespoke in-house software solutions to other departments, the university, and third parties. Responsibilities include:

- Strategic planning of Dev Ops project portfolio
- Project proposal preparation and budgeting
- Project management
- Coordination with Computing’s Head of Department, Computing Department technical staff, IT&IS, and other university personnel and consultants to identify potential new projects and achieve successful project outcomes

Personal Tutor, Goldsmiths Computing Department

September 2014–Present

- Responsible for pastoral and procedural care for 23 undergraduate students

Postgraduate Programme Convener, Goldsmiths Computing Department

October 2013–January 2017

- Oversaw PhD admissions for Department of Computing
- Coordinated internal fellowship application and review procedures

- Coordinated induction of new PhD students
- Managed and improved processes for PhD admissions, supervisor allocation, annual student progress reports, departmental record-keeping, student upgrade and vivas, student desk space policies
- Provided pastoral care and advocacy for PhD students in the department

Chair of Postgraduate Research Committee, Goldsmiths Computing Department

October 2013–January 2017

- Received PhD student research ethics applications
- Received and evaluated PhD student funding requests
- Participated in department Research Committee
- Evaluated student annual progress reports and made recommendations to students and supervisors as necessary

OTHER EMPLOYMENT HISTORY

Imagine Research (now iZotope, Inc.) 12/08–3/12 San Francisco, California
Consultant

- Performed research and prototyping related to music information retrieval, machine learning, and machine listening systems.

Smule 5/09–7/09 Palo Alto, California
Senior Engineer Contractor

- Participated in design and software implementation of iPhone music and gaming applications.
- Worked on audio programming for “I am T-Pain” application, ranked #1 in the iTunes App Store, which allows users to re-tune their voices in real-time.

Microsoft Research 6/08–8/08 Redmond, Washington
Intern, Visualization and Interaction for Business and Entertainment (VIBE) group

- Studied the problem of supporting precise user control in the context of collaborative, multi-touch surface computing environments.
- Designed and implemented a collaborative audio editor for a large multi-touch tabletop.

Sun Microsystems Labs 6/06–8/06 Burlington, Massachusetts
Intern, Search Inside the Music Project

- Participated in the development, implementation, and evaluation of a scalable, robust method for audio fingerprinting. Work resulted in successful filing of US Patent #8275177.

McGill University 1/06–4/06 Montreal, Quebec
Research Assistant, Music Perception and Cognition Lab

- Assisted in the preparation of teaching materials for an undergraduate course in music perception and cognition.

- Sun Microsystems Labs** 9/05–12/05 Burlington, Massachusetts
Intern, Search Inside the Music Project
- Designed and evaluated optimized feature extraction, feature selection, and classification techniques in the context of a Java digital music recommendation system.
- McGill University** 5/05–9/05 Montreal, Quebec
Research Assistant, Music Technology, Distributed Digital Music Archives and Libraries Lab
- Performed empirical investigation of classification techniques for music information retrieval, with a focus on feature selection algorithms.
 - Experimented with the use of ad hoc cluster computing to reduce processing time for music classification tasks.
- The Ohio State University** 8/01–8/04 Columbus, Ohio
Assistant, Computer & Information Science Diversity Program
- Collaborated with faculty, staff, and students on other projects to recruit and retain women and minorities in computer science.
 - Oversaw peer tutor programs and managed the program website and mailing lists.
- Self-Employed** 2/96–8/04 Central Ohio
Piano Accompanist
- Accompanied vocalists and instrumentalists from middle school through graduate levels in studio classes, performances, and competitions.
- Ohio Supercomputer Center** 6/03–9/03 Columbus, Ohio
Undergraduate Researcher, High Performance Computing
- Investigated the problems of providing user support on secure, nationally distributed networks of computing resources.
 - Designed and implemented software to assist support personnel in tracking and solving problems of grid users.
- Ohio Supercomputer Center** 8/03 Columbus, Ohio
Chaperone, Young Women's Summer Institute
- Mentored and supervised middle school girls participating in a science research camp.
- Nationwide Insurance** 6/00–8/00 Columbus, Ohio
Intern, Financial Systems Department
- Designed and implemented software to automate error report handling.
- Information Control Corporation** 5/99–8/99 Westerville, Ohio
Intern, Software development
- Developed web applications for client projects and company intranet.

SELECTED PRESS

- Featured in “Micro Bit Makes Strange-Sounding Music,” *BBC News*, 22 March 2016
- Interviewed by BBC Radio Northampton, 4 January 2016
- Sideband’s UnPlay Festival performance reviewed by the *New York Times* as “paradoxically visceral, endlessly engaging,” 13 June 2013
- Profiled in *Princeton Alumni Weekly*, “Musical Machines,” 16 January 2013.
- Profiled in *Princeton Engineering News*, “Coaxing the ‘Inherently Musical,’” 13 December 2012
- Work with the Princeton Laptop Orchestra highlighted in the *Financial Times*, “Ctrl-Alt-Concerto,” 2 January 2012
- Profiled in the United Arab Emirates’ *The National*, “Humans and Computers Making Music Together,” 11 May 2011
- Profiled in “Electric Influence,” *New Music Box*, by Julianne Klein, 7 April 2010
- Work with Microsoft Research highlighted in “Microsoft Tests Custom Hardware Controls on Surface-Style Device,” *TechFlash* blog, by Todd Bishop, 6 April 2009
- Performance with American Composer’s Orchestra reviewed in “Music in Review: American Composers Orchestra Adds Electronics to Zankel Hall Program,” *New York Times*, 28 April 2008
- Interviewed in “Princeton Sextet Performs Laptop Symphonies,” *National Public Radio’s All Things Considered*, 8 November 2007

ADDITIONAL INFORMATION

Languages: English (native), French (intermediate), Spanish (basic)

U.S. Citizen, Canadian Permanent Resident, UK Tier 2 General Visa Holder

Musician with experience in flute (24 years), piano (33 years), electronics (13 years)