

## Ethan Manilow

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CONTACT INFORMATION	2233 Tech Drive, Seeley Mudd, Rm 3202 Evanston, IL 60208, USA +1 (847) 710-9902	<a href="http://ethanmanilow.com">http://ethanmanilow.com</a> <a href="mailto:ethanm@u.northwestern.edu">ethanm@u.northwestern.edu</a> <a href="http://github.com/ethman">http://github.com/ethman</a>
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EDUCATION	<b>Ph.D. in Computer Science and Communication</b>
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Northwestern University, Evanston, IL  
Technology and Social Behavior Program  
Advisor: Bryan Pardo  
2015 – Present

**B.S. Physics**

**B.F.A. Jazz Studies** (Guitar)

University of Michigan, Ann Arbor, MI. May 2013  
University Honors (Winter 2008, Winter 2009, Fall 2011)  
2008 – 2013

RESEARCH INTERESTS	audio source separation, music information retrieval, machine learning, human-computer interaction, creativity support tools, digital musical instruments
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RESEARCH EXPERIENCE	<b>Graduate Researcher</b> 2015 - Present Interactive Audio Lab P.I.: <i>Bryan Pardo</i> EECS Department, Northwestern University, Evanston, IL.
	<b>Research Consultant (Remote)</b> May 2019 - Present Speech and Audio Group Mentors: <i>Jonathan LeRoux</i> and <i>Gordon Wichern</i> Mitsubishi Electric Research Lab (MERL), Cambridge, MA.
	<b>Research Intern</b> Sept 2018 - April 2019 Speech and Audio Group Mentors: <i>Jonathan LeRoux</i> and <i>Gordon Wichern</i> Mitsubishi Electric Research Lab (MERL), Cambridge, MA.
	<b>Research Assistant</b> 2011 - 2013 ATLAS Group, Large Hadron Collider (LHC), CERN P.I.: <i>Daniel Levin</i> Physics Department, University of Michigan, Ann Arbor, MI.
	<b>Research Assistant</b> Summer 2012 Mechanosynthesis Group P.I.: <i>John Hart</i> Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI.

PROFESSIONAL EXPERIENCE	<b>Software Engineer</b> National Instruments	2013 - 2015
	<ul style="list-style-type: none"> <li>• On LabVIEW's compiler team fixing bugs and creating new features (C++, and C#), the most substantial of which was a feature for referencing external code.</li> <li>• Full stack web developer for internal webapp that tracked user crash data.</li> </ul>	
	<b>Professional Freelance Musician</b> Guitar, Bass	2008 - Present
	<ul style="list-style-type: none"> <li>• Professional guitarist performing around U.S. and Mexico.</li> <li>• Played in pit orchestras, jazz combos, rock groups, and with dance ensembles.</li> <li>• Studio and live settings. Composed music for short films.</li> </ul>	
HONORS	<b>Segal Design Cluster Fellowship</b> Northwestern University	Winter 2017
	<b>Merit-Based Travel Grant</b> WASPAA	Oct 2017
REFEREED CONFERENCE PROCEEDINGS	<b>Ethan Manilow</b> , Gordon Wichern, Prem Seetharaman, Jonathan Le Roux. Cutting Music Source Separation Some Slakh: A Dataset to Study the Impact of Training Data Quality and Quantity. In <i>Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)</i> , 2019. <a href="http://www.slakh.com">www.slakh.com</a>	
	Gordon Wichern, Joe Antognini, Michael Flynn, Licheng Richard Zhu, Emmett McQuinn, Dwight Crow, <b>Ethan Manilow</b> , Jonathan Le Roux. WHAM!: Extending Speech Separation to Noisy Environments. In <i>Proceedings of the 20th Annual Conference of the International Speech Communication Association (InterSpeech)</i> , 2019. <a href="http://wham.whisper.ai/">http://wham.whisper.ai/</a>	
	<b>Ethan Manilow</b> , Prem Seetharaman, and Bryan Pardo. The Northwestern University Source Separation Library. In <i>Proceedings of the International Society of Music Information Retrieval (ISMIR)</i> , 2018. <a href="https://interactiveaudiolab.github.io/demos/nussl.html">https://interactiveaudiolab.github.io/demos/nussl.html</a>	
	<b>Ethan Manilow*</b> , Prem Seetharaman*, Fatemeh Pishdadian*, and Bryan Pardo. Predicting Algorithm Efficacy for Adaptive Multi-Cue Source Separation. In <i>Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)</i> , 2017. (*Authors contributed equally.) <b>Merit-based Travel Grant Recipient</b> <a href="https://interactiveaudiolab.github.io/demos/multicue.html">https://interactiveaudiolab.github.io/demos/multicue.html</a>	
	<b>Ethan Manilow</b> and Bryan Pardo. Leveraging Repetition to Do Audio Imputation. In <i>Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)</i> , 2017.	
JOURNAL PUBLICATIONS	N. Amram, et al. ( <b>ATLAS Group</b> ). Streamlined Calibrations of the ATLAS Precision Muon Chambers for Initial LHC Running. In <i>Nuclear Instruments and Methods in Physics Research Section A</i> , April 2012.	
UNREFEREED PRESENTATIONS	Cutting Music Source Separation Some Slakh: A Dataset to Study the Impact of Training Data Quality and Quantity. <i>Speech and Audio in the Northeast (SANE)</i> , New York, NY. October 24, 2019 (Poster)	

Libraries and Datasets to Power the Next Generation of Source Separation Research, *Midwest Music and Audio Day (MMAD)*, Bloomington, IN. June 17, 2019. (Talk)

The Northwestern University Source Separation Library, *Speech and Audio in the Northeast (SANE)*, Google, Cambridge, MA. October 18, 2018. (Poster)

WUT? A New Interface for Interactive Audio Source Separation, *Human Computer Interaction Consortium (HCIC)*, Pajaro Dunes, Watsonville, CA. June 24 - June 28, 2018. (Poster)

Leveraging Repetition to Do Audio Imputation, *Speech and Audio in the Northeast (SANE)*, Google, New York, NY. October 19, 2017. (Poster)

nussl: A Flexible Python Audio Source Separation Library, *Midwest Music and Audio Day (MMAD)*. Evanston, IL. June 23, 2017. (Talk)

## PROJECTS

nussl 2015 - Present  
Lead developer of the Northwestern University Source Separation Library (nussl), which is a flexible, object-oriented python audio source separation library containing implementations of common source separation algorithms as well as an easy-to-use framework for prototyping and adding new algorithms. 200+ stargazers on Github.  
[www.github.com/interactiveaudiolab/nussl](http://www.github.com/interactiveaudiolab/nussl)

Web Unmixing Toolbox 2017 - 2018  
Lead developer of the Web Unmixing Toolbox (WUT). WUT is a web-based interactive machine learning platform for audio source separation that incorporates user feedback to enhance the effectiveness of the separation algorithm for the user's goal.  
[www.github.com/interactiveaudiolab/WUT](http://www.github.com/interactiveaudiolab/WUT)

LabVIEW Hack Computer Simulation 2014  
A functional computer simulation built using only primitive NAND gates all in LabVIEW. Implemented: All primitive and compound logic gates, ALU, registers, clock, and RAM. (LabVIEW)

Audio Visualization for Senior Recital 2013  
A full screen program that displays a representation of a live audio stream, and a randomly chosen video. (C++, OpenFrameworks)

Computational Physics Algorithms 2013  
An implementation of a number of historical mathematical and physical algorithms. Originally from Mark Newman's Computational Physics course, Winter 2013. (Python)

SampSyn 2012  
A Mac OSX real-time, granular music synthesizer that creates output based on MIDI input and a user specified audio file. Presented at AES Conference, San Francisco 2012. (Cocoa, Objective-C, C++) [github.com/ethman/SampSyn](http://github.com/ethman/SampSyn)

## SERVICE

**Board Member** 2018 - Present  
Northwestern University Computer Science PhD Advisory Counsel (CSPAC)

**Conference Reviewer** 2017, 2019  
IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WAS-

	PAA)	
	<b>Conference Reviewer</b> IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)	2017 - 2019
	<b>Reviewer</b> IEEE Signal Processing Magazine	2018
	<b>Conference Reviewer</b> European Signal Processing Conference (EUSIPCO)	2018
	<b>Conference Reviewer</b> ACM International conference on Tangible, Embedded and Embodied Interaction (TEI)	2018
	<b>Organizing Staff</b> Midwest Music and Audio Day (MMAD), Evanston, IL	2017
	<b>Student Volunteer</b> New Interfaces for Musical Expression (NIME), Ann Arbor, MI	2012
TEACHING EXPERIENCE	<b>Teaching Assistant</b> Machine Learning, EECS 349 Northwestern University	Spring 2019
	<b>Course Designer and Teaching Assistant</b> Digital Luthier, EECS 397/SAI 402 Course Evaluations: Mean 5.67/6.00, Median 6.00/6.00 Article/Video: <a href="http://bitly.com/2A9jprL">http://bitly.com/2A9jprL</a> Northwestern University	Spring 2018
	<b>Teaching Assistant</b> Machine Learning, EECS 349 Course Evaluations: Mean 5.07/6.00, Median 5.00/6.00 Northwestern University	Fall 2016
SELECTED COURSEWORK	<ul style="list-style-type: none"> <li>• Theories and Practices of HCI, NU, <i>Darren Gergle</i></li> <li>• Deep Learning, NU, <i>Bryan Pardo</i></li> <li>• Machine Learning, NU, <i>Bryan Pardo</i></li> <li>• Digital Signal Processing, NU, <i>Thrassos Pappas</i></li> <li>• Human Perception and Electronic Media, NU, <i>Thrassos Pappas</i></li> <li>• Digital Sound Synthesis, UM <i>Georg Essl</i></li> <li>• Mobile Phone Ensemble, UM <i>Georg Essl</i></li> <li>• Mathematical and Scientific Perspectives on Music Theory, UM, <i>R. Satyendra</i></li> <li>• Computational Physics, UM, <i>Mark Newman</i></li> </ul>	
RECORDINGS	The Voluptuous Neighbors Technicolor EP — Lead Guitar <a href="https://thevoluptuousneighbors.bandcamp.com/album/technicolor">https://thevoluptuousneighbors.bandcamp.com/album/technicolor</a>	Apr 2015
	Lou Breed Stoned Out Two: Morning of the Way to Love — Guitar <a href="https://loubreed.bandcamp.com/album/stoned-out-two-morning-of-the-way-to-love">https://loubreed.bandcamp.com/album/stoned-out-two-morning-of-the-way-to-love</a>	Feb 2013

	Senior Recital <a href="http://ethanmanilow.bandcamp.com/">http://ethanmanilow.bandcamp.com/</a>	Feb 2013
	AAURAL II Composer — <a href="http://grlmtn.com/album/aaural-ii">http://grlmtn.com/album/aaural-ii</a>	July 2012
AS A PERFORMER	Michigan Mobile Phone Ensemble Designed and implemented three iPhone instruments with urMus API by Georg Essl. Composed and performed one piece for each instrument. (lua)	Apr 2013
	Senior Recital In partial fulfillment of a BFA in Jazz Studies. With a live, custom computer visualization and bassist Joe Fee.	Feb 2013
	Dance Related Arts Composed, performed, and danced. A multimedia dance piece inspired by documentary Man on Wire. <a href="http://youtu.be/5biW_YI8CH4">http://youtu.be/5biW_YI8CH4</a>	Dec 2011
	Puerta Vallarta Jazz Festival Guitar player for the Downbeat-award winning high school vocal jazz group Take One.	Feb 2010
	<i>OTHER NOTABLE PERFORMANCES</i>	
	<i>SXSW Showcase (TNM Theater) with VNeighbs</i> , Guitar	Mar 2015
	<i>University of Michigan Jazz Lab Band</i> , Guitar	Dec 2012
	<i>University of Michigan Jazz Lab Band</i> , Guitar	Mar 2012
	<i>Junior Recital</i> , Guitar	Mar 2011
	<i>Dancing Americas, chor. Diane MacIntyre</i> , Guitar	Jan 2011
	<i>MUSICALS</i>	
	Rent, Dr. Horrible's Sing Along Blog, Bye Bye Birdie, Altar Boyz, University of Michigan CRLT Players, Gibson Fleck	
SKILLS	<i>Programming Languages (and Frameworks)</i> : Python (Numpy, Scipy, Scikit Learn, Keras, PyTorch, Flask, Django, Chainer), JavaScript (jQuery), C#, C++, LabVIEW, MATLAB, Objective-C, PHP, L <sup>A</sup> T <sub>E</sub> X, PostgreSQL, Lua, ChuCK, Max/MSP, PureData. <i>Software</i> : Apple Logic Pro, Adobe Creative Suite, PyCharm, Docker, WebStorm, Emacs, Xcode, Visual Studio, Perforce, Raspberry Pi, Arduino, Git, vim, redis, nginx.	