Ethan Manilow

CONTACT INFORMATION	2233 Tech Drive, Seeley Mudd, Rm 3202
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		ethanm@u.northwestern.edu
		`http://github.com/ethman`

EDUCATION

Ph.D. in Computer Science and Communication

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

RESEARCH EXPERIENCE

Graduate Researcher — 2015 - Present
Interactive Audio Lab
P.I.: *Bryan Pardo*
EECS Department, Northwestern University, Evanston, IL.

Research Consultant (Remote) — May 2019 - Present
Speech and Audio Group
Mentors: *Jonathan LeRoux* and *Gordon Wichern*
Mitsubishi Electric Research Lab (MERL), Cambridge, MA.

Research Intern — Sept 2018 - April 2019
Speech and Audio Group
Mentors: *Jonathan LeRoux* and *Gordon Wichern*
Mitsubishi Electric Research Lab (MERL), Cambridge, MA.

Research Assistant — 2011 - 2013
ATLAS Group, Large Hadron Collider (LHC), CERN
P.I.: *Daniel Levin*
Physics Department, University of Michigan, Ann Arbor, MI.

Research Assistant — Summer 2012
Mechanosynthesis Group
P.I.: *John Hart*
Deptartment of Mechanical Engineering, University of Michigan,
Ann Arbor, MI.

PROFESSIONAL EXPERIENCE	**Software Engineer** $\qquad$ 2013 - 2015

PROFESSIONAL EXPERIENCE

Software Engineer   2013 - 2015
National Instruments
- 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.
- Full stack web developer for internal webapp that tracked user crash data.

Professional Freelance Musician
Guitar, Bass   2008 - Present
- Professional guitarist performing around U.S. and Mexico.
- Played in pit orchestras, jazz combos, rock groups, and with dance ensembles.
- Studio and live settings. Composed music for short films.

HONORS

Segal Design Cluster Fellowship
Northwestern University   Winter 2017

Merit-Based Travel Grant
WASPAA   Oct 2017

REFEREED CONFERENCE PROCEEDINGS

Ethan Manilow, Prem Seetharaman, Bryan Pardo. Simultaneous Separation and Transcription of Mixtures with Multiple Polyphonic and Percussive Instruments. In *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* (2020). (Forthcoming)
https://interactiveaudiolab.github.io/demos/cerberus

Ethan Manilow, 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 *Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, 2019. www.slakh.com

Gordon Wichern, Joe Antognini, Michael Flynn, Licheng Richard Zhu, Emmett McQuinn, Dwight Crow, **Ethan Manilow**, Jonathan Le Roux. WHAM!: Extending Speech Separation to Noisy Environments. In *Proceedings of the 20th Annual Conference of the International Speech Communication Association (InterSpeech)*, 2019. http://wham.whisper.ai/

Ethan Manilow, Prem Seetharaman, and Bryan Pardo. The Northwestern University Source Separation Library. In *Proceedings of the International Society of Music Information Retrieval (ISMIR)*, 2018.
https://interactiveaudiolab.github.io/demos/nussl.html

Ethan Manilow*, Prem Seetharaman*, Fatemeh Pishdadian*, and Bryan Pardo. Predicting Algorithm Efficacy for Adaptive Multi-Cue Source Separation. In *Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, 2017. (*Authors contributed equally.) **Merit-based Travel Grant Recipient** https://interactiveaudiolab.github.io/demos/multicue.html

Ethan Manilow and Bryan Pardo. Leveraging Repetition to Do Audio Imputation. In *Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, 2017.

JOURNAL PUBLICATIONS

N. Amram, et al. (**ATLAS Group**). Streamlined Calibrations of the ATLAS Precision Muon Chambers for Initial LHC Running. In *Nuclear Instruments and Methods in Physics Research Section A*, April 2012.

UNREFEREED PRESENTATIONS	Cutting Music Source Separation Some Slakh: A Dataset to Study the Impact of Training Data Quality and Quantity. *Speech and Audio in the Northeast (SANE)*, 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`

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`

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`

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)

Conference Reviewer — 2017 - 2019
IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)

Reviewer — 2018
IEEE Signal Processing Magazine

Conference Reviewer — 2018
European Signal Processing Conference (EUSIPCO)

Conference Reviewer — 2018
ACM International conference on Tangible, Embedded and Embodied Interaction (TEI)

Organizing Staff — 2017
Midwest Music and Audio Day (MMAD), Evanston, IL

Student Volunteer — 2012
New Interfaces for Musical Expression (NIME), Ann Arbor, MI

TEACHING
EXPERIENCE

Teaching Assistant
Machine Learning, EECS 349 — Spring 2019
Northwestern University

Course Designer and Teaching Assistant
Digital Luthier, EECS 397/SAI 402 — Spring 2018
Course Evaluations: Mean 5.67/6.00, Median 6.00/6.00
Article/Video: `http://bitly.com/2A9jprL`
Northwestern University

Teaching Assistant
Machine Learning, EECS 349 — Fall 2016
Course Evaluations: Mean 5.07/6.00, Median 5.00/6.00
Northwestern University

SELECTED
COURSEWORK

- Theories and Practices of HCI, NU, *Darren Gergle*
- Deep Learning, NU, *Bryan Pardo*
- Machine Learning, NU, *Bryan Pardo*
- Digital Signal Processing, NU, *Thrasos Pappas*
- Human Perception and Electronic Media, NU, *Thrasos Pappas*
- Digital Sound Synthesis, UM *Georg Essl*
- Mobile Phone Ensemble, UM *Georg Essl*
- Mathematical and Scientific Perspectives on Music Theory, UM, *R. Satyendra*
- Computational Physics, UM, *Mark Newman*

Recordings	The Voluptuous Neighbors	Apr 2015
	Technicolor EP — Lead Guitar	
	https://thevoluptuousneighbors.bandcamp.com/album/technicolor	
	Lou Breed	Feb 2013
	Stoned Out Two: Morning of the Way to Love — Guitar	
	https://loubreed.bandcamp.com/album/stoned-out-two-morning-of-the-way-to-love	
	Senior Recital	Feb 2013
	http://ethanmanilow.bandcamp.com/	
	AAURAL II	July 2012
	Composer — http://grlmtn.com/album/aaural-ii	

As a Performer   Michigan Mobile Phone Ensemble   Apr 2013
Designed and implemented three iPhone instruments with urMus API by Georg Essl. Composed and performed one piece for each instrument. (lua)

Senior Recital   Feb 2013
In partial fufillment of a BFA in Jazz Studies. With a live, custom computer visualization and bassist Joe Fee.

Dance Related Arts   Dec 2011
Composed, performed, and danced. A multimedia dance piece inspired by documentary Man on Wire. http://youtu.be/5biW_YI8CH4

Puerta Vallarta Jazz Festival   Feb 2010
Guitar player for the Downbeat-award winning high school vocal jazz group Take One.

OTHER NOTABLE PERFORMANCES

SXSW Showcase (TNM Theater) with VNeighbs, Guitar	Mar 2015
University of Michigan Jazz Lab Band, Guitar	Dec 2012
University of Michigan Jazz Lab Band, Guitar	Mar 2012
Junior Recital, Guitar	Mar 2011
Dancing Americas, chor. Diane MacIntyre, Guitar	Jan 2011

MUSICALS
Rent, Dr. Horrible's Sing Along Blog, Bye Bye Birdie, Altar Boyz, University of Michigan CRLT Players, Gibson Fleck

Skills   *Programming Languages (and Frameworks)*: Python (Numpy, Scipy, Scikit Learn, Keras, PyTorch, Flask, Django, Chainer), JavaScript (JQuery), C#, C++, LabVIEW, MATLAB, Objective-C, PHP, LaTeX, PostgreSQL, Lua, ChuCK, Max/MSP, PureData.
Software: Apple Logic Pro, Adobe Creative Suite, PyCharm, Docker, WebStorm, Emacs, Xcode, Visual Studio, Perforce, Raspberry Pi, Arduino, Git, vim, redis, nginx.