JOSH MEYER

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I'm a Developer-Scientist passionate about Machine Learning and open-source language technologies. My educational background is in Computational Linguistics, Theoretical Linguistics, Natural Language Processing, Statistics, and Cognitive Science. My PhD thesis focuses on Speech Technology, and Automatic Speech Recognition in particular. I work to develop approaches for training more robust Deep Neural Networks for Speech Recognition, using Multi-Task Learning and Transfer Learning. My research is linguistically informed, but rooted in Machine Learning methods.

Currently based in California.

EDUCATION

University of Arizona July 2019
Ph.D. in Linguistics (focus: *Computational Linguistics*) *Tucson, AZ*
Thesis: *Multi-Task and Transfer Learning in Low-Resource Speech Recognition*

University of Arizona May 2015
M.A. in Linguistics *Tucson, AZ*

Seton Hall University May 2012
B.A. in Liberal Studies *South Orange, NJ*

INDUSTRY EXPERIENCE

Mozilla Foundation January 2020 — Present
Machine Learning Fellow
Advising, building, and iterating on Voice technologies for East African languages.

Artie, Inc. July 2019 — Present
Lead Scientist, Speech Technology
Directing and developing all Speech technologies used at Artie.

Mozilla (Machine Learning Research Group) October 2018 — May 2019
NSF-Sponsored Internship
Developing end-to-end multilingual Automatic Speech Recognition techniques based on Transfer Learning and Deep Neural Networks (i.e. DeepSpeech).

Various Companies 2016 — 2018
Kaldi & ASR Consultant
Optimized Automatic Speech Recognition pipelines for various companies using the Kaldi toolkit.

TECHNICAL STRENGTHS

Computer Languages	Python, Bash, MATLAB, Perl, R, C++ (*some knowledge*)
Other	TensorFlow, PyTorch (*some knowledge*), Kaldi, scikit-learn, pandas, nltk, matplotlib, kenlm, Linux, AWS, git, GitHub

OPEN SOURCE WORK

Mozilla DeepSpeech	*Added Transfer Learning*	**[Code]**
Multi-Task Kaldi	*Multi-Task Acoustic Modeling with Neural Networks*	**[Code]**
NVDA	*Added Kyrgyz language to screen reader*	**[Code]**
eSpeak NG	*Added Kyrgyz language to speech synthesizer*	**[Code]**
Autotrace	*Created visualization tools for ultrasonic imaging*	**[Code]**

RESEARCH EXPERIENCE

National Science Foundation July 2015 — July 2019
Graduate Research Fellow

Conducting PhD thesis research on Multi-Task Learning and Deep Learning techniques for Automatic Speech Recognition in low-resource data scenarios.

CNRS-LIMSI July 2016 — July 2017
Chateaubriand Research Fellow *Orsay, France*

Conducted research on Neural Network Acoustic Model adaptation, and Recurrent Neural text augmentation techniques for language modeling in Speech Recognition.

American University of Central Asia June 2015 — August 2015
Visiting Research Scholar *Bishkek, Kyrgyzstan*

Created a spoken corpus of conversational speech for the Kyrgyz language.

Arizona Phonological Imaging Lab Spring 2015
Research Assistant *Tucson, AZ*

Developed software to visualize and statistically analyze ultrasonic images of tongue contours for articulatory-phonetics research.

American University of Central Asia August 2013 — March 2014
Visiting Research Fellow *Bishkek, Kyrgyzstan*

Conducted acoustic-phonetic and phonological research on the Kyrgyz language, using paradigms from Cognitive Science.

Arizona Scottish Gaelic Project September 2012 - July 2013
Research Assistant *Tucson, AZ*

Conducted fieldwork with speakers of Scottish Gaelic; Aided in online grammar compilation

Language Acquisition Research Center at Hunter CUNY November 2011 — August 2012
Research Assistant *New York, NY*

Designed text corpus-based research, transcribed spontaneous child speech, and designed the laboratory's website.

KIT/NYU MEG Lab at NYU May 2012 — August 2012
Research Assistant *New York, NY*

Aided in analysis and processing of Magnetoencephalography (MEG) brain imaging data from cognitive science research.

Language Acquisition and Neurolinguistics Lab at Rutgers May 2012 - August 2012
Research Assistant *New Brunswick, NJ*

Aided in experimental design of Neurolinguistic research studies.

GRANTS & AWARDS

Graduate Research Fellowship 2015-2019
Approx. $102,000 + $36,000 (tuition) *National Science Foundation*

NSF INTERN Grant 2018
Approx. $50,000 *National Science Foundation*

Chateaubriand STEM Fellowship 2016
€5.000 *French Embassy to the United States of America*

GROW Travel Award 2016
$5,000 *National Science Foundation*

Visiting Research Fellowship August 2013 — March 2014
$5,000 *American University of Central Asia*

Regents Scholarship August 2008 — May 2012
$111,140 (tuition) *Seton Hall University*

PUBLICATIONS

(2020) Ardila, Rosana, and Branson, Megan, and Davis, Kelly, and Henretty, Michael, and Kohler, Michael, and Meyer, Josh, and Morais, Reuben, and Saunders, Lindsay, and Tyers, Francis M., and Weber, Gregor. **Common Voice: A Massively-Multilingual Speech Corpus.** Proceedings of the 12th Conference on Language Resources and Evaluation (LREC 2020). [Link]

(2020) Meyer, Josh, and Rauchenstein, Lynn, and Eisenberg, Joshua D., and Howell, Nicholas. **Artie Bias Corpus: An Open Dataset for Detecting Demographic Bias in Speech Applications.** Proceedings of the 12th Conference on Language Resources and Evaluation (LREC 2020). [Link]

(2019) Meyer, Josh. **Multi-Task and Transfer Learning in Low-Resource Speech Recognition.** PhD Dissertation. Univeristy of Arizona. [Link]

(2018) Meyer, Josh. **Unsupervised Task Discovery for Multi-Task Acoustic Modeling.** Proceedings of the Machine Learning in Speech and Language Processing Workshop. [Poster] [Link]

(2018) Meyer, Joshua, and Kloehn, Nick, and Carnie, Andrew. **The Field is not the Lab, and the Lab is not the Field: Experimental linguistics and endangered language communities.** *Insights from Practices in Community-Based Research: From Theory To Practice Around The Globe, ISBN: 978-3-11-052701-8* Edited by Shannon Bischoff and Carmen Jany. *Mouton De Gruyter* [Link]

(2018) Bekmurzaev, Nurbek, and Lottholz, Philipp, and Meyer, Joshua. **Navigating the safety implications of doing research and being researched in Kyrgyzstan: cooperation, networks and framing.** *Central Asian Survey, 37:1, 100-118, DOI: 10.1080/02634937.2017.1419165* [Link]

(2017) Meyer, Joshua. **Development of a Kyrgyz Speech Synthesizer: A Demonstration of the Ossian Frontend and Merlin Neural Network Speech Synthesis Toolkit.** *Proceedings of The 5th International Conference on Computer Processing of Turkic Languages, Vol. 1, 130-136.*[Link]

(2016) Lottholz, Philipp, and Meyer, Joshua. **'Friend' or 'Foreign Agent'? On the Limits of Field Research in Post-Soviet Kyrgyzstan.** *Exeter Central Asian Studies Network.* [Link]

(2016) Meyer, Joshua. **Conducting Linguistic Fieldwork in Kyrgyzstan.** *Arizona Anthropologist*, Vol. 27. [Link]

PRESENTATIONS

Language Technologies in Central Asia: A Survey. Joint ESCAS-CESS Conference at the American University of Central Asia. *2017, Bishkek*

Predicting Language Dominance in Kyrgyz-Russian Bilinguals. w/ Quam, Carolyn Arizona Linguistics Circle 9. *2015, Tucson*

Phonological processing in Kyrgyz-Russian bilinguals. w/ Quam, Carolyn, and Bever, Thomas The Miniconference on Metrical Structure: Acquisition and processing. *2014, Utrecht*

The Kyrgyzstan corpus project: Building a language resource unique to Kyrgyzstan and available to all. CASI Public Seminar at the American University of Central Asia. *2014, Bishkek*

Now you hear it, now you don't: Phonological processing in Kyrgyz-Russian bilinguals. CASI Public Seminar at the American University of Central Asia. *2013, Bishkek*

Psycholinguistics: Thinking about language differently. Lecture conducted at The Platttform at Werkstatttraum. *2013, Berlin*

EVENT ORGANIZATION

Kyrgyz Voice Technology Hackathon Attended by undergraduate students as well as professional developers. *(2019, American University of Central Asia)* **[Link]**

DeepSpeech & Common Voice Tutorial Delivered to attendees of the Fifth International Workshop on Computational Linguistics for Uralic Languages. *(2019, University of Tartu)* **[Link]**

Speech Synthesis Workshop: Hands-on with Merlin & Ossian Delivered to Computational Linguistics Faculty and Graduate Students. *(2018, Higher School of Economics)* **[Link]**

Speech Recognition Workshop: Hands-on with Kaldi & DeepSpeech Delivered to Computational Linguistics Faculty and Graduate Students. *(2017, Higher School of Economics)* **[Link]**

WRITTEN TUTORIALS

Kaldi Troubleshooting Head-to-Toe **[Link]**

How to Train *practically* any Model from *practically* any Data with TensorFlow **[Link]**

Getting started with the Merlin Speech Synthesis Toolkit **[Link]**

How to Train a Deep Neural Net Acoustic Model with Kaldi **[Link]**

How to add a new language to the eSpeak NG Speech Synthesizer **[Link]**

The Flow of TensorFlow: An Email Classification Tutorial **[Link]**

An Introduction to CMU-Sphinx Speech Recognition Toolkit: First Steps **[Link]**