Aaron M. Mueller

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RESEARCH INTERESTS

- Morphology in neural machine translation
- Endangered and low-resource language varieties
- Pragmatics and sociolinguistics

EDUCATION

Johns Hopkins University, Baltimore, MD
PhD student, Computer Science (Whiting School of Engineering). **August 2018 - Present**
M.S.E., Computer Science (Whiting School of Engineering). Expected **May 2020**
Affiliation: Center for Language and Speech Processing.
Advisor: David Yarowsky.

University of Kentucky, Lexington, KY
B.S., Computer Science (College of Engineering). Honors. **May 2018**
B.S., Linguistics (College of Arts & Sciences), Honors. **May 2018**
GPA: 4.0. *Summa cum laude*.
Thesis: Neural Machine Translation for Canadian French.

RESEARCH EXPERIENCE

Institutional Research & Advanced Analytics, University of Kentucky, Lexington, KY
Research Assistant **May 2018 - August 2018**
Supervisors: Nathan Jacobs, Craig Rudick
- Designed a system that, given a student's prior performance, would predict their future grades course-by-course.
- Implemented deep LSTMs and NLP techniques (e.g., learning word embeddings on course descriptions) to learn student and course profiles.
- Designed an ordinal loss function that observed not just whether the grade was correct, but how close the prediction was to the real grade.

University of Massachusetts Amherst, Amherst, MA
Research Assistant **May 2017 - August 2017**
Supervisor: Brendan O'Connor
- Collaborated with graduate students and faculty to improve an entity-event extraction system that, given news articles, uses distant supervision to extract the names of American citizens who have been killed by police.
- Integrated existing entity mention and relation systems into pre-existing sentence-level model.
- Integrated document-level information (e.g., noun coreference) as features in our system.

University of Kentucky, Lexington, KY
Juried Project **August 2016 - May 2017**
Jurors: Hilaria Cruz, Raphael Finkel, Phil Harling
- Preservation and revitalization of a low-resource indigenous language—Chatino—spoken natively by approximately 40,000 individuals.
- Automatic speech recognition system creation and training with Sphinx.
- Promotion and creation of Chatino language-learning resources, including open-source speech data, a speech corpus, and a website.

Directed Independent Research **September 2015 - May 2016**
Supervisor: Mark Richard Lauersdorf
- Exploration of the manner in which societal perceptions and opinions of social gender and LGBT communities are expressed linguistically.
- Application of corpus-based statistical methods to the analysis of diachronic sociolinguistic data.

Johns Hopkins University, Baltimore, MD

Research Assistant   **May 2016 - August 2016**

Supervisor: David Yarowsky

– Collaborated with undergraduate and graduate students, post-doctoral researchers, and faculty to create automatic translation systems for low-resource languages under the specifications of DARPA's Low-Resource Languages for Emergent Incidents (LORELEI) program.
– Assisted in the creation of a lemma-based translation model between English and Uyghur.
– Built a morphological generator for Crimean Tatar.
– Tokenized Uyghur-English parallel and monolingual corpora; created histograms for each.
– Created parsers to extract translation tables from foreign editions of Wiktionary.

FELLOWSHIPS AND AWARDS

National Science Foundation Graduate Fellowship   **August 2018 - May 2023**

Awarded in recognition and support of graduate students in NSF-supported disciplines who are pursuing research-based Master's and doctoral degrees at U.S. institutions. ($102,000+)

Gaines Fellow   **August 2016 - May 2018**

Two-year fellowship awarded in recognition of undergraduates with outstanding academic performance, demonstrated ability to conduct undergraduate research, an interest in public issues, and a desire to enhance understanding of the human condition through the humanities. Requires the completion of a juried project, a major thesis project, and a seminar in the humanities. ($5,000)

Raymond F. Betts Scholar   **November 2017**

Awarded to rising seniors conducting thesis research, especially if travel is necessary. Used funds to study Québec French and in Montréal and Québec City during winter of 2017–2018. ($2,500)

Patterson Scholar   **August 2014 - May 2018**

Granted to University of Kentucky students who have earned National Merit Finalist standing and who maintain a 3.300 cumulative GPA. ($80,000+)

Goldwater Scholarship (Honorable Mention)   **March 2017**

Awarded to outstanding college sophomores and juniors intending to pursue research careers in the natural sciences, mathematics, and engineering. Awardees and honorable mentions must have demonstrated excellence in and a clear commitment to research in their undergraduate studies, as well as clear plans to pursue research in the future.

Phi Beta Kappa   **March 2017**

Selective national academic honors society promoting excellence in the liberal arts and sciences. Membership is typically awarded to less than the top 10% of a university's class.

National Merit Scholar   **May 2014**

Nationally competitive scholarship awarded to high school students with exceptional PSAT scores. ($2,000)

SELECTED PRESENTATIONS

Mueller, Aaron; Keith, Katherine; Handler, Abe; Blodgett, Su Lin; and O'Connor, Brendan. The Identification of Civilians Killed by Police with Supervised Entity-Event Extraction. *2017 UMass Amherst Research Experience for Undergraduates (REU) Showcase*, Amherst, MA, August 9, 2017.

Mueller, Aaron; Finkel, Raphael; and Cruz, Hilaria. Documenting and Promoting the Chatino Language and Orthography. *Juried Presentation in Satisfaction of the Requirements of the Gaines Fellowship*, Lexington, KY, February 21, 2017.

Mueller, Aaron. A Lemma-Based Approach for English-Uyghur Statistical Machine Translation. *9th Annual Conference of the Illinois Language and Linguistics Society (ILLS9)*, Urbana, IL, March 31–April 1, 2017.

Mueller, Aaron. Lexical and Semantic Shifts in the Linguistic Construction of Social Gender: A Corpus-Based Analysis of Written U.S. English. Poster. *9th Annual Toronto Undergraduate Linguistics Conference (TULCON9)*, Toronto, ON, March 4–6, 2016.

PROFESSIONAL
EXPERIENCE

Chellgren Center for Undergraduate Excellence, Lexington, KY
Student Outreach Team   **August 2017 - May 2018**
- Promote the importance of programs within the Chellgren Center, including the Office of Undergraduate Research and the Chellgren Fellowship.
- Organize panel discussions, workshops, and lectures on abstract writing, research poster design, and academic presentations.
- On the review committee for our Showcase of Undergraduate Scholars, an annual conference where University of Kentucky undergraduates present their research to other students and faculty. Typically features 200+ presenters across all disciplines.

UK Special Collections Research Center, Lexington, KY
Archiving Intern   **September 2015 - May 2016**
- Made accessible an archival collection that highlights Lexington's architectural history—the Frankel and Curtis blueprints and papers.
- Cooperated on a multiformat project that layered GIS technology, city government data, archival photos, and digital humanities tools.
- Created a diachronic corpus of Lexingtonian architectural documentation which includes zoning ordinances and Lexington Planning Committee meeting minutes.

VOLUNTEER
SERVICE

Amnesty International   **2012 - Present**
- International organization dedicated to the protection of human rights worldwide.
- Member of Amnesty International at Johns Hopkins and Washington, D.C.
- *Founder* and former *Co-President* of Amnesty International at the University of Kentucky.
- Organize fundraisers and informational events: concerts featuring local bands, panel discussions on contemporary issues, faculty debates, petitions, protests, and more.
- Attendee at Amnesty's national Human Rights Conference.

Oxfam International   **2014 - Present**
- International organization dedicated to poverty eradication, disaster relief, and political advocacy for those facing harsh living conditions and injustice worldwide.
- Member of Oxfam in Washington, D.C.
- *Founder* and former *Co-Coordinator* of Oxfam at the University of Kentucky.
- Plan awareness-raising, fundraising, and petitioning events for Oxfam's GROW campaign with a distinct focus on food inequality in impoverished and war-stricken countries.

Society for the Promotion of Undergraduate Research   **2014 - 2017**
- University-of-Kentucky-based organization founded to assist undergraduates in finding research opportunities and in bettering their research.
- *Co-President* and former *Director of Events*.
- Plan and execute the Showcase of Undergraduate Scholars.
- Plan research workshops to help undergraduates improve their abstracts, presentations, and papers.
- Organize faculty panel discussions, promotional events, and information sessions on getting involved in undergraduate research and on scholarship and summer research opportunities.
- Merged with the Student Outreach Team in May 2017 (joined upon merge).

COMPUTING
SKILLS

Computer Programming:
- Languages: Python, C, C++, Java, HTML, CSS, Javascript, MATLAB, R, UNIX shell scripting, GNU make.
- Development Environments: Vim, Emacs, Eclipse.
- Version Control: DVCS (Git, Bitbucket).
- Machine Learning Toolkits: TensorFlow, Sockeye, Keras, PyTorch, OpenNMT.
- Operating Systems: Linux (Debian, Ubuntu, CentOS, Arch), Microsoft Windows family, macOS, Android, iOS.

Linguistic Tools:
     Praat, AntConc, QGIS, Audacity.

Desktop Editing and Productivity Software:
- TEX (LATEX, BIBTEX).
- GIMP, Inkscape.
- Microsoft Office, OpenOffice.org, LibreOffice, G Suite.

LANGUAGES   Fluent in English and French (Canadian). Rudimentary Inuktitut and Dutch.

INTERESTS AND
HOBBIES
- Music: guitar (acoustic, classical, electric), bass, banjo, synthesizer, MaxMSP, Ableton Live.
- Athletics: contra, swing dance, cold-weather hiking.
- Hobbies: natural language learning, reading (philosophy, politics), city exploration.
- Cooking: Thai, French, German, Southern.