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## **Invited Speaker: Dan Jurafsky, Stanford University** **"Does This Vehicle Belong to You"? Processing the Language of Policing for Improving Police-Community Relations"**

**Abstract:** Police body-cameras have the potential to play an important role in understanding and improving police-community relations. In this talk I describe a series of studies conducted by our large interdisciplinary team at Stanford that use speech and natural language processing on body-camera recordings to model the interactions between police officers and community members in traffic stops. We use text and speech features to automatically measure linguistic aspects of the interaction, from discourse factors like conversational structure to social factors like respect. I describe the differences we find in the language directed toward black versus white community members, and offer suggestions for how these findings can be used to help improve the fraught relations between police officers and the communities they serve.

**Bio:** Dan Jurafsky is Professor and Chair of Linguistics and Professor of Computer Science, at Stanford University. His research has focused on the extraction of meaning, intention, and affect from text and speech, on the processing of Chinese, and on applying natural language processing to the cognitive and social sciences. Dan's deep interest in NLP education led him to co-write with Jim Martin the widely-used textbook "Speech and Language Processing" (whose 3rd edition is in (slow) progress) and co-teach with Chris Manning the first massive open online class on natural language processing. Dan was the recipient of the 2002 MacArthur Fellowship and is a 2015 James Beard Award Nominee for his book, "The Language of Food: A Linguist Reads the Menu".

## **Invited Speaker: Sharon Goldwater, University of Edinburgh** **Towards more universal language technology: unsupervised learning from speech**

**Abstract:** Speech and language processing has advanced enormously in the last decade, with successful applications in machine translation, voice-activated search, and even language-enabled personal assistants. Yet these systems typically still rely on learning from very large quantities of human-annotated data. These resource-intensive methods mean that effective technology is available for only a tiny fraction of the world's 7000 or so languages, mainly those spoken in large rich countries.

This talk describes our recent work on developing unsupervised speech technology, where transcripts and pronunciation dictionaries are not used. The work is inspired by considering both how young infants may begin to acquire the sounds and words of their language, and how we might develop systems to help linguists analyze and document endangered languages. I will first present work on learning from speech audio alone, where the system must learn to segment the speech stream into word tokens and cluster repeated instances of the same word together to learn a lexicon of vocabulary items. The approach combines Bayesian and neural network methods to address learning at the word and sub-word levels.

**Bio:** Sharon Goldwater is a Reader at the University of Edinburgh's School of Informatics, where she is a member of the Institute for Language, Cognition and Computation. She received her PhD in 2007 from Brown University and spent two years as a postdoctoral researcher at Stanford University before moving to Edinburgh. Her research interests include unsupervised learning for speech and language



processing, computer modelling of language acquisition in children, and computational studies of language use. Dr. Goldwater co-chaired the 2014 Conference of the European Chapter of the Association for Computational Linguistics and is Chair-Elect of EACL. She has served on the editorial boards of the Transactions of the Association for Computational Linguistics, the Computational Linguistics journal, and OPEN MIND: Advances in Cognitive Science (a new open-access journal). In 2016, she received the Roger Needham Award from the British Computer Society, awarded for "distinguished research contribution in computer science by a UK-based researcher who has completed up to 10 years of post-doctoral research."

## **Invited Speaker: Nando de Freitas, Google Deepmind** **Physical simulation, learning and language**

**Abstract:** Simulated physical environments, with common physical laws, objects and agents with bodies, provide us with consistency to facilitate transfer and continual learning. In such environments, research topics such as learning to experiment, learning to learn and emergent communication can be easily explored. Given the relevance of these topics to language, it is natural to ask ourselves whether research in language would benefit from the development of such environments, and whether language can contribute toward improving such environments and agents within them. This talk will provide an overview of some of these environments, discuss learning to learn and its potential relevance to language, and present some deep reinforcement learning agents that capitalize on formal language instructions to develop disentangled interpretable representations that allow them to generalize to a wide variety of zero-shot semantic tasks. The talk will pose more questions than answers in the hope of stimulating discussion.

**Bio:** I was born in Zimbabwe, with malaria. I was a refugee from the war in Mozambique and thanks to my parents getting in debt to buy me a passport from a corrupt official, I grew up in Portugal without water and electricity, before the EU got there, and without my parents who were busy making money to pay their debt. At 8, I joined my parents in Venezuela and began school in the hood; see City of God. I moved to South Africa after high-school and sold beer illegally in black-townships for a living until 1991. Apartheid was the worst thing I ever experienced. I did my BSc in electrical engineering and MSc in control at the University of the Witwatersrand, where I strived to be the best student to prove to racists that anyone can do it. I did my PhD on Bayesian methods for neural networks at Trinity College, Cambridge University. I did a postdoc in Artificial Intelligence at UC Berkeley. I became a Full Professor at the University of British Columbia, before joining the University of Oxford in 2013. I quit Oxford in 2017 to join DeepMind full-time, where I lead the Machine Learning team. I aim to solve intelligence so that future generations have a better life. I have been a Senior Fellow of the Canadian Institute for Advanced Research for a long time. Some of my recent awards, mostly thanks to my collaborators, include: Best Paper Award at the International Conference on Machine Learning (2016), Best Paper Award at the International Conference on Learning Representations (2016), Winner of round 5 of the Yelp Dataset Challenge (2015), Distinguished Paper Award at the International Joint Conference on Artificial Intelligence (2013), Charles A. McDowell Award for Excellence in Research (2012), and Mathematics of Information Technology and Complex Systems Young Researcher Award (2010).