

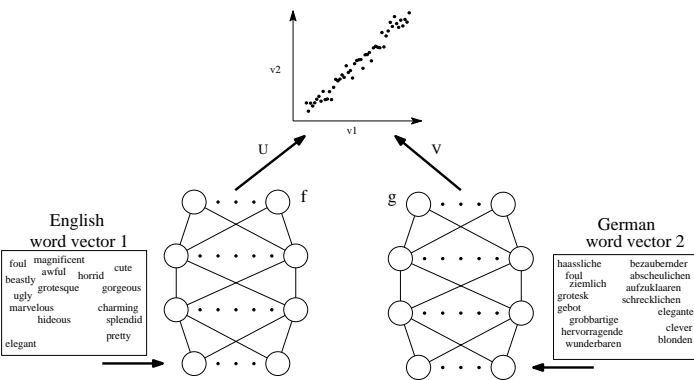


# Toyota Technological Institute at Chicago

## Qualifications

- An integrated **speech, NLP, and ML** group
- **ASR**: low-resource settings, end-to-end models, RNNs, acoustic word embeddings
- **NLP**: translation, word/phrase embeddings, character-based/multilingual embeddings

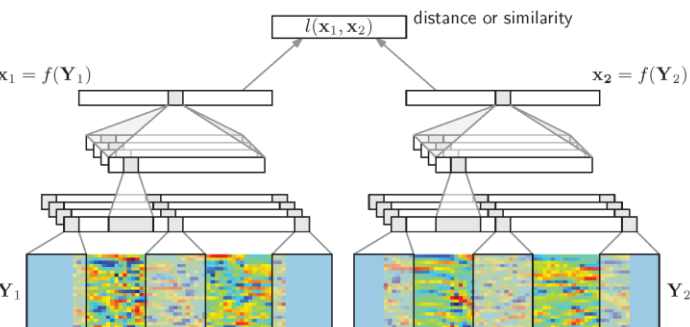
**Deep multilingual correlation for improved word embeddings**  
A. Lu, W. Wang, M. Bansal, K. Gimpel, K. Livescu, *NAACL 2015*



**Discriminative acoustic word embeddings: Recurrent neural network-based approaches** S. Settle, K. Livescu, *SLT 2016*

**Deep convolutional acoustic word embeddings using word-pair side information** H. Kamper, W. Wang, K. Livescu, *ICASSP 2016*

Embed acoustic word segments into fixed-dimensional vectors; same-word embeddings are close together, different-word embeddings are far apart; well-suited to search applications



## Capabilities we seek

- **Information retrieval**
- **Text summarization**
- **Large-scale machine translation**

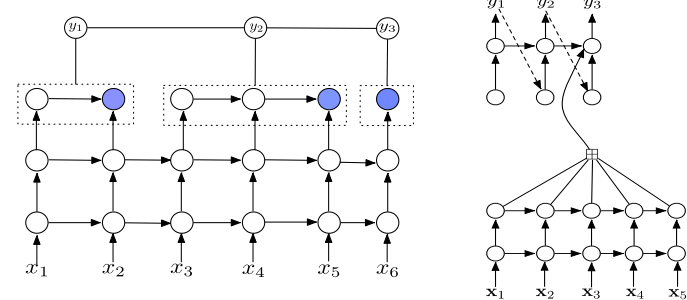
**Segmental RNNs for end-to-end speech recognition**

L. Lu, L. Kong, C. Dyer, N. Smith, S. Renals, *Interspeech 2016*

**On training the RNN encoder-decoder for large vocabulary end-to-end speech rec.** L. Lu, X. Zhang, S. Renals, *ICASSP 2016*

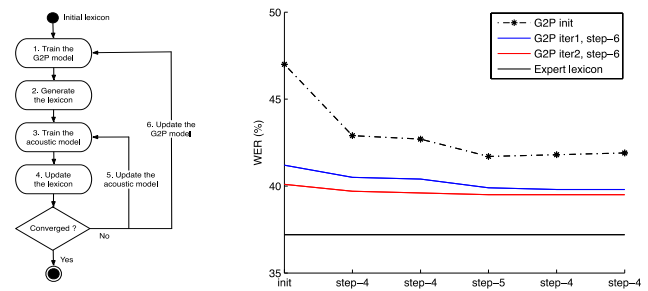
**Discriminative segmental cascades for feature-rich phone rec.** H. Tang, W. Wang, K. Gimpel, K. Livescu, *ASRU 2015*

High-quality recognition with segmental RNNs and attention models; efficient training/decoding with segmental cascades



**Acoustic data-driven pronunciation lexicon for LVCSR**

L. Lu, A. Ghoshal, S. Renals, *ASRU 2013*

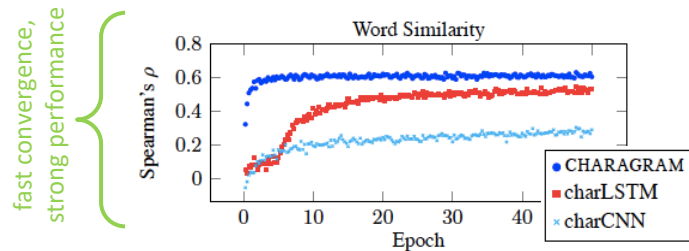


**CHARAGRAM: Embedding words & sentences via character  $n$ -grams**

J. Wieting, M. Bansal, K. Gimpel, K. Livescu, *EMNLP 2016*

**Towards universal paraphrastic sentence embeddings**

J. Wieting, M. Bansal, K. Gimpel, K. Livescu, *ICLR 2016*



fast convergence, strong performance

handles misspellings, morphology, synonyms

word	CHARAGRAM nearest neighbors
refunding	refunds, refunded, refund, repayment
professors	professor, professorships, professorship
huge	enormous, tremendous, large, big, vast
babyyyyyy	babyyyyyyy, baby, babys, babe, baby.i
vehicals	vehical, vehicles, vehicels, vehicular, cars

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<http://ttic.edu/livescu/SLATTIC>