

# Herman Kamper

## Curriculum Vitae

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### Positions Held

- Sep. 2016 – **Research Scholar**, *Toyota Technological Institute at Chicago*, United States.  
present Working with Karen Livescu on multi-modal signal processing of speech and images. Toyota Technological Institute at Chicago is a computer science institute affiliated with the University of Chicago. I am currently here on a contract position.
- Jan. 2013 – **Lecturer** of Applied Mathematics, *Stellenbosch University*, South Africa.  
Jun. 2013 Lectured the Applied Mathematics B124 first-year engineering course on static mechanics. Language of instruction: English. No. of students: 199. Student feedback: 96%.
- 2012 **Research Associate**, *Department of Electrical and Electronic Engineering, Stellenbosch University*, South Africa.  
Continued the work from the University of Sheffield (below), and worked on automatic proficiency assessment for second-language English speakers with Thomas Niesler.
- Jul. 2011 – **Visiting Researcher**, *Department of Computer Science, University of Sheffield*, UK.  
Sep. 2011 Worked with Thomas Hain and Thomas Niesler on the development and evaluation of automatic speech recognition systems for South African broadcast news.

### Education

- 2013 – 2016 **PhD Candidate in Informatics**, *University of Edinburgh*, United Kingdom.  
(expected) Submitted: 7 Sep. 2016. Examination: 2 Dec. 2016.  
Thesis: *Unsupervised neural and Bayesian models for zero-resource speech processing*.  
Supervisors: Sharon Goldwater (UoE), Aren Jansen (Google), Simon King (UoE).  
Funding: Commonwealth Scholarship.
- Jun. 2015 – **PhD Intern**, *Toyota Technological Institute at Chicago*, United States.  
Aug. 2015 Worked with Karen Livescu on convolutional neural networks for speech processing.
- 2010 – 2011 **MScEng, Electronic (cum laude)**, *Stellenbosch University*, South Africa.  
Thesis: *Speech recognition of South African English accents*.  
Supervisor: Thomas Niesler. Grade: 88%.
- 2006 – 2009 **BEng, Electrical and Electronic (cum laude)**, *Stellenbosch University*, SA.  
Achieved distinctions for all 46 course modules over the four years. Overall average: 92%.

### Student Supervision

- 2016 **Tan Pengfei**, *MSc in Informatics, University of Edinburgh*, United Kingdom.  
Thesis: *Cross-lingual representation learning for unsupervised speech technology*.  
Co-supervised with Sharon Goldwater as main supervisor.
- 2015 **Flo Bremner**, *MSc in Informatics, University of Edinburgh*, United Kingdom.  
Thesis: *The encoding of linguistic and speaker information in unsupervised neural network based feature extraction*.  
Co-supervised with Sharon Goldwater as main supervisor.

2015 **Dan Wells**, *MSc in Informatics, University of Edinburgh*, United Kingdom.  
Thesis: *Unsupervised speech segmentation for zero-resource applications*.  
Co-supervised with Sharon Goldwater as main supervisor.

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## Other Experience and Skills

Tutorial assistant	<ul style="list-style-type: none"><li>Accelerated Natural Language Processing, University of Edinburgh, 2015.</li><li>Machine Learning and Pattern Recognition, University of Edinburgh, 2014.</li><li>Mathematical Statistics 214, Stellenbosch University, 2012.</li><li>Engineering Mathematics 114, Stellenbosch University, 2012.</li><li>Systems and Signals 344, Stellenbosch University, 2011.</li><li>Systems and Signals 414, Stellenbosch University, 2010.</li></ul>
Duties as reviewer	<ul style="list-style-type: none"><li>IEEE/ACM Transactions on Audio, Speech and Language Processing, 2015 – 2016.</li><li>Annual Symposium of the Pattern Recognition Association of South Africa (PRASA), 2011, 2012, 2016.</li></ul>
Reading group organizer	Machine Learning for Natural Language Processing at the University of Edinburgh, 2015 – 2016.
Programming	Python, Matlab, C, Java.
Operating systems & tools	Unix/Linux, Windows, L <sup>A</sup> T <sub>E</sub> X, Beamer, High Performance Computing, HTK, Kaldi, Theano, TensorFlow.
Languages	English, Afrikaans (speak, read, write fluently).

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## Invited Talks

- Nov. 2016 Computer Science and Artificial Intelligence Laboratory, MIT.  
Sep. 2016 Spotlight Invited Speaker at the Workshop on Machine Learning in Speech and Language Processing, satellite workshop of Interspeech 2016, San Francisco.

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## Selected Awards

- 2016 Top five finalist for Taylor & Francis Commonwealth Scholar Best Journal Article Prize for [2] (see publication references below).  
2015 IBM travel grant for Interspeech 2015 awarded for [7].  
2014 Best poster presentation award at SLT 2014 for [10].  
2013 – 2016 Commonwealth Scholarship for pursuing a PhD in the United Kingdom.  
2013 S<sub>2</sub>A<sub>3</sub> Medal for best Master's student in natural sciences, agri-sciences, engineering and health sciences at Stellenbosch University.  
2012 Best paper award at PRASA 2012 for [13].  
2011 South African National Research Foundation (NRF) Innovation Scholarship.  
2010 Engineering Council of South Africa (ECSA) Medal for best undergraduate engineering student at Stellenbosch University.  
2009 Stellenbosch University Rector's Award for Academic Excellence.  
2009 South African National Research Foundation (NRF) Final Year Fellowship.  
2009 – present Member of the Golden Key International Honour Society.

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## Publications

All publications are available at [www.kamperh.com/publications/](http://www.kamperh.com/publications/).

### Journal Publications

- [1] H. Kamper, A. Jansen, and S. J. Goldwater, "A segmental framework for fully-unsupervised large-vocabulary speech recognition," in *Submission*, 2016.
- [2] H. Kamper, A. Jansen, and S. J. Goldwater, "Unsupervised word segmentation and lexicon discovery using acoustic word embeddings," *IEEE/ACM Transactions on Audio, Speech and Language Processing*, vol. 24, no. 4, pp. 669–679, 2016.
- [3] H. Kamper, F. de Wet, T. Hain, and T. R. Niesler, "Capitalising on North American speech resources for the development of a South African English large vocabulary speech recognition system," *Computer Speech and Language*, vol. 28, no.6, pp. 1255–1268, 2014.
- [4] H. Kamper and T. R. Niesler, "The impact of accent identification errors on speech recognition of South African English," *South African Journal of Science*, vol. 110, no. 1, 6 pages, 2014.
- [5] H. Kamper, F. J. Muamba Mukanya, and T. R. Niesler, "Multi-accent acoustic modelling of South African English," *Speech Communication*, vol. 54, no. 6, pp. 801–813, 2012.

### International Conference Proceedings

- [6] H. Kamper, W. Wang, and K. Livescu, "Deep convolutional acoustic word embeddings using word-pair side information," in *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2016.
- [7] H. Kamper, A. Jansen, and S. J. Goldwater, "Fully unsupervised small-vocabulary speech recognition using a segmental Bayesian model," in *Proceedings of Interspeech*, 2015.
- [8] D. Renshaw, H. Kamper, A. Jansen, and S. J. Goldwater, "A comparison of neural network methods for unsupervised representation learning on the Zero Resource Speech Challenge," in *Proceedings of Interspeech*, 2015.
- [9] H. Kamper, M. Elsner, A. Jansen, and S. J. Goldwater, "Unsupervised neural network based feature extraction using weak top-down constraints," in *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2015.
- [10] H. Kamper, A. Jansen, S. King, and S. J. Goldwater, "Unsupervised lexical clustering of speech segments using fixed-dimensional acoustic embeddings," in *Proceedings of the IEEE Spoken Language Technology Workshop (SLT)*, 2014. [[best poster presentation award](#)]
- [11] H. Kamper, F. de Wet, T. Hain, and T. R. Niesler, "Resource development and experiments in automatic South African broadcast news transcription," in *Proceedings of the Workshop on Spoken Language Technologies for Under-Resourced Languages (SLTU)*, 2012.
- [12] H. Kamper and T. R. Niesler, "Multi-accent speech recognition of Afrikaans, Black and White varieties of South African English," in *Proceedings of Interspeech*, 2011.

### National Conference Proceedings

- [13] H. Kamper and T. R. Niesler, "Optimisation of acoustic models for a target accent using decision-tree state clustering," in *Proceedings of the Annual Symposium of the Pattern Recognition of South Africa (PRASA)*, 2012. [[best paper award](#)]
- [14] H. Kamper and T. R. Niesler, "Accent reclassification and speech recognition of Afrikaans, Black and White South African English," in *Proceedings of the Annual Symposium of the Pattern Recognition of South Africa (PRASA)*, 2011.
- [15] H. Kamper, F. J. Muamba Mukanya, and T. R. Niesler, "Acoustic modelling of English-accented and Afrikaans-accented South African English," in *Proceedings of the Annual Symposium of the Pattern Recognition of South Africa (PRASA)*, 2010.
- [16] H. Kamper and T. R. Niesler, "Characterisation and simulation of telephone channels using the TIMIT and NTIMIT databases," in *Proceedings of the Annual Symposium of the Pattern Recognition of South Africa (PRASA)*, 2009.

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## References

- Supervisor for **Dr. Sharon Goldwater**  
PhD degree Reader, School of Informatics  
University of Edinburgh, United Kingdom  
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✉ sgwater@inf.ed.ac.uk
- Supervisor for **Dr. Aren Jansen**  
PhD degree Senior Research Scientist, Machine Hearing Group, Google Inc.  
Mountain View, CA, USA  
✉ arenjansen1@gmail.com
- Supervisor at **Prof. Karen Livescu**  
TTI-Chicago Assistant Professor, Toyota Technological Institute  
Chicago, IL, USA  
✉ klivescu@ttic.edu