

Keith Vertanen

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EDUCATION

Doctor of Philosophy University of Cambridge, Cambridge, UK. Thesis supervised by David J.C. MacKay, "Efficient Correction Interfaces for Speech Recognition."	2004-2009
Master of Philosophy, Computer Speech, Text & Internet University of Cambridge, Cambridge, UK. Course result A/A+ Thesis supervised by David J.C. MacKay and Steve Young, "Efficient Computer Interfaces Using Continuous Gestures, Language Models, and Speech."	2003-2004
Master of Science, Computer Science Oregon State University, Corvallis, Oregon, USA. GPA 3.8/4.0 Thesis supervised by Michael Quinn, "A Parallel Implementation of a Fluid Flow Simulation using Smoothed Particle Hydrodynamics."	1997-1999
Bachelor of Arts, Computer Science (honors) and Mathematics University of Minnesota - Morris, Morris, Minnesota, USA. GPA 3.9/4.0 Research supervised by Dian Lopez, "Scheduling Problems in a Practical Allocation Model."	1992-1997

RESEARCH INTERESTS

My main research interest lies at the intersection of speech recognition and human-computer interaction (HCI). I am interested in how the rich probabilistic information available from both the recognizer and from the user can be combined to build interfaces that are faster, more natural, and more accessible.

I am also interested in improving the performance, usability, and accessibility of text entry interfaces. In particular I am interested in text entry on mobile devices and text entry for people with disabilities. My research frequently involves user evaluations and I have extensive experience conducting and analyzing human factors experiments.

Recent and current projects include:

- Parakeet, a system for speech recognition on a mobile touch-screen device.
- Speech Dasher, a text entry interface using only speech and an eye tracker.
- A system to recognize and correct spoken web search queries on a mobile device.
- A one-step voice correction method that simultaneously infers the correction location and content.

REFEREED PUBLICATIONS

- [1] Per Ola Kristensson and Keith Vertanen, "The Potential of Dwell-Free Eye-Typing for Fast Assistive Gaze Communication", *ETRA '12: Proceedings of the ACM Symposium on Eye-Tracking Research and Applications*, forthcoming. Acceptance rate (short papers): 65%
- [2] Per Ola Kristensson and Keith Vertanen, "Performance Comparison of Phrase Sets and Presentation Styles for Text Entry Evaluations", *IUI '12: Proceedings of the ACM International Conference on Intelligent User Interfaces*, forthcoming. Acceptance rate: 23%
- [3] Per Ola Kristensson, James Clawson, Mark Dunlop, Poika Isokoski, Brian Roark, Keith Vertanen, Annalu Waller, and Jacob Wobbrock, "Designing and Evaluating Text Entry Methods", *CHI '12: Extended Abstracts of the ACM Conference on Human Factors in Computing Systems*, forthcoming.

- [4] Per Ola Kristensson and Keith Vertanen, "Asynchronous Multimodal Text Entry using Speech and Gesture Keyboards", *Interspeech '11: Proceedings of the International Conference on Spoken Language Processing*, pp. 581-584, 2011. Acceptance rate: 58%
- [5] Keith Vertanen and Per Ola Kristensson, "The Imagination of Crowds: Conversational AAC Language Modeling using Crowdsourcing and Large Data Sources", *EMNLP '11: Proceedings of the ACL Conference on Empirical Methods in Natural Language Processing*, pp. 700-711, 2011. Acceptance rate: 23%
- [6] Keith Vertanen and Per Ola Kristensson, "A Versatile Dataset for Text Entry Evaluations Based on Genuine Mobile Emails", *MobileHCI '11: Proceedings of the ACM International Conference on Human-Computer Interaction with Mobile Devices and Services*, pp. 295-298, 2011. Acceptance rate (short papers): 18%
- [7] Keith Vertanen and Per Ola Kristensson, "Getting it Right the Second Time: Recognition of Spoken Corrections", *SLT '10: Proceedings of the IEEE Workshop on Spoken Language Technology*, pp. 277-282, 2010. Acceptance rate: 52%
- [8] Keith Vertanen and Per Ola Kristensson, "Intelligently Aiding Human-Guided Correction of Speech Recognition", *AAAI '10: Proceedings of the AAAI Conference on Artificial Intelligence*, pp. 1698-1701, 2010. Acceptance rate: 25%
- [9] Keith Vertanen and David J.C. MacKay, "Speech Dasher: Fast Writing using Speech and Gaze", *CHI '10: Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 595-598, 2010. Acceptance rate: 22%
- [10] Keith Vertanen and Per Ola Kristensson, "Automatic Selection of Recognition Errors by Respeaking the Intended Text", *ASRU '09: Proceedings of the IEEE Workshop on Automatic Speech Recognition and Understanding*, pp. 130-135, 2009. Acceptance rate: 42%
- [11] Keith Vertanen and Per Ola Kristensson, "Recognition and Correction of Voice Web Search Queries", *Interspeech '09: Proceedings of the International Conference on Spoken Language Processing*, pp. 1863-1866, 2009. Acceptance rate: 58%
- [12] Keith Vertanen and Per Ola Kristensson, "Parakeet: A Continuous Speech Recognition System for Mobile Touch-Screen Devices", *IUI '09: Proceedings of the ACM International Conference on Intelligent User Interfaces*, pp. 237-246, 2009. Acceptance rate: 25%. **Featured in The Economist's Technology Quarterly, September 2, 2010.**
- [13] Keith Vertanen and Per Ola Kristensson, "On the Benefits of Confidence Visualization in Speech Recognition", *CHI '08: Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 1497-1500, 2008. Acceptance rate: 22%
- [14] Keith Vertanen, "Combining Open Vocabulary Recognition and Word Confusion Networks", *ICASSP '08: Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 4325-4328, 2008. Acceptance rate: 50%
- [15] Keith Vertanen, "Speech and Speech Recognition during Dictation Corrections", *Interspeech '06: Proceedings of the International Conference on Spoken Language Processing*, pp. 1890-1893, 2006. Acceptance rate: 64%
- [16] Lisa Hollermann, Tsan-sheng Hsu, Dian Lopez, and Keith Vertanen, "Scheduling Problems in a Practical Allocation Model", *Journal of Combinatorial Optimization*, pp. 129-149, 1997.

THESES

- [17] "Efficient Correction Interfaces for Speech Recognition", *Ph.D. thesis, University of Cambridge*, 2009.
- [18] "Efficient Computer Interfaces using Continuous Gestures, Language Models, and Speech", *M.Phil thesis, University of Cambridge*, 2004.

[19] "A Parallel Implementation of a Fluid Flow Simulation using Smoothed Particle Hydrodynamics", *Master's thesis, Oregon State University, 1999.*

TECHNICAL REPORTS & NOTES

[20] Keith Vertanen, "Baseline WSJ Acoustic Models for HTK and Sphinx: Training Recipes and Recognition Experiments", *Technical Report, Cavendish Laboratory, 2006.*

[21] Keith Vertanen, "Genetic Adventures in Parallel: Towards a Good Island Model under PVM", *Oregon State University, 1998.*

RESEARCH & TEACHING EXPERIENCE

Assistant Professor, Montana Tech of the University of Montana 2011-present
Teaching and research in the computer science department.

Lecturer, Princeton University 2010-2011
Teaching and advising students in the computer science department.

Postdoctoral Research Associate, University of Cambridge 2009-2010
Research into novel speech and eye-tracking based user interfaces.

Instructor, Oregon State University 1999
Responsible for all aspects of planning and teaching an undergraduate computer science course.

Teaching Assistant, Oregon State University 1997-1999
Performed teaching and grading for undergraduate and graduate courses in computer science. Consistently received outstanding feedback from students on my teaching performance.

English Language Tutor, Oregon State University 1997-1999
Helped international students with their spoken and written English skills.

Morris Academic Partnership, University of Minnesota - Morris 1995
Provided one-on-one and group tutoring of University students, faculty and staff.

Peer Tutor, University of Minnesota - Morris 1993-1996
Served as an academic tutor, helping students with problems in science and mathematics.

WORK EXPERIENCE

Software Consultant, Wildfire Communications 2002-2003
Designed and built new features for Wildfire's voice-driven virtual assistant.

Software Engineer, etrieve, Inc. 1999-2002
Lead designer of voice application for mobile access to email, contact, and calendar information.

- Team leader of the voice application group, including developing and instituting best practices.
- Responsible for reviewing the usability of etrieve's voice, web, and mobile device interfaces.
- Designed the dialog flow, prompts and grammars for the voice application.
- Created hardware and software architecture for scalable and high availability 24x7 service.

Computer Specialist, In Time 1990-present
Responsible for computing and web publishing tasks within the company.

GRANTS & AWARDS

“Creating Enjoyable and Fluid Mobile Phone Touch-Screen Interfaces”, Nokia Corporation
Grant to investigate interaction techniques and language modeling for mobile devices, \$17,700.

Conference Travel Grant, PASCAL Network
Grant to attend ASRU '09 conference, \$1,500.

“A Mobile Speech Recognition Correction Interface”, Nokia Corporation
Grant to investigate speech recognition on the Nokia N800 mobile device, \$9,500.

Conference Travel Grant, International Speech Communication Association
Grant to attend Interspeech '06 conference, \$1,200.

Clerk Maxwell Scholarship, University of Cambridge
Scholarship awarded by the Cavendish Laboratory, \$120,000.

Overseas Research Student Award
Scholarship awarded in UK-wide competition, \$40,000.

Fellow of the Cambridge Overseas Trust, University of Cambridge

Katherine E. Sullivan Scholarship, University of Minnesota
The University's most prestigious study abroad award funding study at a foreign university, \$14,000.

Undergraduate Research Opportunities Program, University of Minnesota
Funded undergraduate research project with faculty mentor, \$1,400.

Freshmen Academic Scholarship, University of Minnesota
Awarded for academic excellence in high school, \$1,000.

INVITED AND CONFERENCE TALKS

Intelligently Aiding Human-Guided Correction of Speech Recognition
AAAI '10: AAAI Conference on Artificial Intelligence, July 2010.

Efficient Correction Interfaces for Speech Recognition
MIT Computer Science and Artificial Intelligence Lab, May 2010.

Efficient Correction Interfaces for Speech Recognition
Google, April 2010.

Speech Dasher: Fast Writing using Speech and Gaze
CHI '10: ACM International Conference on Human Factors in Computing Systems, April 2010.

Recognition and Correction of Voice Web Search Queries
Interspeech '09: Conference on Spoken Language Processing, September 2009.

Parakeet: A Continuous Speech Recognition System for Mobile Touch-Screen Devices
IUI '09: ACM International Conference on Intelligent User Interfaces, February 2009.

On the Benefits of Confidence Visualization in Speech Recognition
CHI '08: ACM International Conference on Human Factors in Computing Systems, April 2008.

POSTERS AND DEMOS

Automatic Selection of Recognition Errors by Respeaking the Intended Text

ASRU '09: IEEE Workshop on Automatic Speech Recognition and Understanding, December 2009.

Parakeet: A Demonstration of Speech Recognition on a Mobile Touch-Screen Device

IUI '09: ACM International Conference on Intelligent User Interfaces, February 2009.

Combining Open Vocabulary Recognition and Word Confusion Networks

ICASSP '08: IEEE International Conference on Acoustics, Speech, and Signal Processing, March 2008.

Speech Dasher – A Novel Interface for Correcting Speech Recognition Errors

ICASSP '08: IEEE International Conference on Acoustics, Speech, and Signal Processing, March 2008.

Speech and Speech Recognition during Dictation Corrections

Interspeech '06: International Conference on Spoken Language Processing, September 2006.

Speech Dasher: An Efficient Interface Using Speech and Gestures

NIPS '04: Conference on Neural Information Processing Systems, December 2004.

PROFESSIONAL SERVICE

Reviewer:

Computer Speech and Language

CHI: ACM International Conference on Human Factors in Computing Systems

IUI: International Conference on Intelligent User Interfaces

MobileHCI: ACM International Conference on Human-Computer Interaction with Mobile Devices and Services

ICASSP: IEEE International Conference on Acoustics, Speech, and Signal Processing

BCS Conference on Human Computer Interaction

SLPAT: Workshop on Speech and Language Processing for Assistive Technologies

Program committee:

CHI 2012 workshop: Designing and Evaluating Text Entry Methods, MobileHCI 2011, HCI 2010.

REFERENCES

Furnished upon request.