

# Keith Vertanen

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## EDUCATION

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- Doctor of Philosophy** **2004-2009**  
University of Cambridge, Cambridge, UK.  
Thesis supervised by David J.C. MacKay, "Efficient Correction Interfaces for Speech Recognition."
- Master of Philosophy, Computer Speech, Text & Internet** **2003-2004**  
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."
- Master of Science, Computer Science** **1997-1999**  
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."
- Bachelor of Arts, Computer Science (honors) and Mathematics** **1992-1997**  
University of Minnesota-Morris, Morris, Minnesota, USA. GPA 3.9/4.0  
Research supervised by Dian Lopez, "Scheduling Problems in a Practical Allocation Model."

## RESEARCH INTERESTS

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My main research interest lies at the intersection of speech recognition and human-computer interaction (HCI). In particular, I am interested in how multiple input modalities can be combined to efficiently correct errors in speech recognition. My goal is to utilize the rich information available to the recognizer to better enable user-guided correction.

I am also interested in improving the performance, usability, and accessibility of text entry interfaces. My research frequently involves user evaluations and I have extensive experience conducting and analyzing human factors experiments.

Recent research projects include:

- Parakeet, a system for speech recognition on a touch-screen mobile device.
- Speech Dasher, a correction interface using speech and navigation by pointing.
- A system to recognize and correct spoken web search queries on a mobile device.

## REFEREED PUBLICATIONS

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### **Intelligently Aiding Human-Guided Correction of Speech Recognition**

Keith Vertanen and Per Ola Kristensson

*AAAI '10: Proceedings of the 24th AAI Conference on Artificial Intelligence*, to appear.

Acceptance rate: 25%

### **Speech Dasher: Fast Writing using Speech and Gaze**

Keith Vertanen and David J.C. MacKay

*CHI '10: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2010.

Acceptance rate: 22%

### **Automatic Selection of Recognition Errors by Respeaking the Intended Text**

Keith Vertanen and Per Ola Kristensson

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

Acceptance rate: 42%

### **Recognition and Correction of Voice Web Search Queries**

Keith Vertanen and Per Ola Kristensson

*Interspeech '09: Proceedings of the Conference on Spoken Language Processing*, 2009.

Acceptance rate: 58%

### **Parakeet: A Continuous Speech Recognition System for Mobile Touch-Screen Devices**

Keith Vertanen and Per Ola Kristensson

*IUI '09: Proceedings of the 14<sup>th</sup> International Conference on Intelligent User Interfaces*, 2009.

Acceptance rate: 25% (papers submitted and accepted as long papers)

### **On the Benefits of Confidence Visualization in Speech Recognition**

Keith Vertanen and Per Ola Kristensson

*CHI '08: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2008.

Acceptance rate: 22%

### **Combining Open Vocabulary Recognition and Word Confusion Networks**

Keith Vertanen

*ICASSP '08: Proceedings of the IEEE Conference on Acoustics, Speech, and Signal Processing*, 2008.

Acceptance rate: 50%

### **Speech and Speech Recognition during Dictation Corrections**

Keith Vertanen

*Interspeech '06: Proceedings of the International Conference on Spoken Language Processing*, 2006.

Acceptance rate: 64%

### **Scheduling Problems in a Practical Allocation Model**

Lisa Hollermann, Tsan-sheng Hsu, Dian Lopez, and Keith Vertanen

*Journal of Combinatorial Optimization*, 1997.

## **THESES**

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### **Efficient Correction Interfaces for Speech Recognition**

*PhD thesis, University of Cambridge*, 2009.

### **Efficient Computer Interfaces using Continuous Gestures, Language Models, and Speech**

*M.Phil thesis, University of Cambridge*, 2004.

### **A Parallel Implementation of a Fluid Flow Simulation using Smoothed Particle Hydrodynamics**

*Master's thesis, Oregon State University*, 1999.

## **TECHNICAL REPORTS & NOTES**

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### **Baseline WSJ Acoustic Models for HTK and Sphinx: Training Recipes and Recognition Experiments**

Keith Vertanen

*Technical Report, Cavendish Laboratory*, 2006.

### **Genetic Adventures in Parallel: Towards a Good Island Model under PVM**

Keith Vertanen

*Oregon State University*, 1998.

## **WORK EXPERIENCE**

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### **Postdoctoral Research Associate, University of Cambridge**

Research into novel speech and eye-tracking based user interfaces.

**2009-present**

### **Software Consultant, Wildfire Communications**

Designed and built new features for Wildfire's voice-driven virtual assistant.

**2002-2003**

**Software Engineer, etrieve, Inc.** **1999-2002**  
Lead architect and designer for voice-driven application providing mobile access to enterprise email, contact, and calendar information.

- Designed all dialog flow, prompts and grammars for the application.
- Created hardware and software architecture for scalable and high availability 24x7 service.
- 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.

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

- Created and maintained company web site.
- Designed, built, and documented new accounting system.

## TEACHING EXPERIENCE

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

**Teaching Assistant, Oregon State University** **1997-1999**  
Performed teaching and grading tasks for undergraduate and graduate courses in computer science. Consistently received outstanding written reviews from students.

**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.

## GRANTS & AWARDS

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

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

*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 a year 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.

*Eagle Scout, Boy Scouts of America.*

## SELECTED TALKS

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*Efficient Correction Interfaces for Speech Recognition*

Google Tech Talk, April 2010. MIT Computer Science and Artificial Intelligence Lab, May 2010.

*Speech Dasher: Fast Writing using Speech and Gaze*

CHI '10: SIGCHI Conference on Human Factors in Computing Systems, April 2010.

*Automatic Selection of Recognition Errors by Respeaking the Intended Text*

University of Cambridge, Inference Group, February 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: International Conference on Intelligent User Interfaces, February 2009.

*On the Benefits of Confidence Visualization in Speech Recognition*

CHI '08: SIGCHI Conference on Human Factors in Computing Systems, April 2008.

*Open Vocabulary Confusion Networks for Speech Recognition*

University of Cambridge, Inference Group, June 2007.

*Getting it Right the Second Time: Recognition of Spoken Corrections*

University of Cambridge, Inference Group, August 2006.

*Speech Recognition during Dictation Corrections*

University of Cambridge, Inference Group, March 2006.

*Efficient Computer Interfaces using Continuous Gestures, Language Models, and Speech*

University of Cambridge, Astrophysics Seminar, June 2005.

## PROFESSIONAL SERVICE

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*Reviewer:* SIGCHI Conference on Human Factors in Computing Systems, BCS Conference on Human Computer Interaction, Computer Speech and Language.

*Program committee:* HCI 2010.

*Member:* Association for Computing Machinery, IEEE.

## TECHNICAL SKILLS

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*Languages:* C/C++, Java, C#, Perl

*Speech:* VoiceXML, HTK/Sphinx/Nuance/Dragon/Microsoft ASR, L&H/AT&T TTS, VoiceGenie, VOS

*Web:* PHP, ASP, HTML, JavaScript, Apache, IIS

*Database:* MySQL, Microsoft SQL Server

*Networking and tools:* COM, XML, SOAP, TCP/UDP communication, Visual Studio, gcc

*Operating systems:* Windows, Linux, DOS, Nokia Maemo

## REFERENCES

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Furnished upon request.