

Christopher M. White

CONTACT INFORMATION

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RESEARCH INTERESTS

Human language technology, automatic speech recognition, machine learning, language identification, language modeling, confidence estimation, statistical methods for large data sets

EDUCATION

Johns Hopkins University, Baltimore, Maryland USA

Ph.D. Candidate, Electrical Engineering, Expected graduation date: May 2009
Human Language Technology Center of Excellence (HLTCOE) Graduate Fellow
Department of Homeland Security Graduate Fellow

- Advisor: Sanjeev Khudanpur (HLTCOE Fellow under Jim Baker)

M.S.E., Electrical Engineering, 2006

Oklahoma State University, Stillwater, Oklahoma USA

B.S., Electrical Engineering, 2004
Minor: Mathematics, French

RESEARCH EXPERIENCE

Johns Hopkins University, Baltimore, Maryland USA

Fellow, Research Assistant (Advisor: S. Khudanpur)

Aug., 2004 - Present

The Center for Language and Speech Processing

Investigate issues in human language technology including speech recognition, language modeling, language identification, etc. Develop and implement algorithms using statistical modeling techniques to learn model parameters from large data sets (e.g. log-linear models, support vector machines, hidden Markov models). Recent Projects: confidence estimation, detecting out-of-vocabulary segments, pronunciation validation, spoken term detection using query-by-example.

Massachusetts Institute of Technology, Boston, Massachusetts USA

Visiting Scholar (Collaborators: W. Shen, T. Hazen)

Fall 2008

M.I.T. Lincoln Laboratory

Examine an alternative interface for phonetic search using query-by-example that avoids out-of-vocabulary issues associated with both standard word-based and phonetic search methods. Develop methods that compare query lattices derived from example audio against a standard ngram-based phonetic index. Analyze factors contributing to performance despite high phone recognition error rates without use of pronunciation or letter-to-sound resources.

Johns Hopkins University Summer Workshop 2008, Baltimore, Maryland USA

Researcher (Leader: R. Sproat)

Summer 2008

Participate in the JHU WS08 group 'Multilingual Spoken Term Detection: Finding and Testing New Pronunciations'. Using state-of-the-art recognition, indexing, and retrieval systems, develop an unsupervised method for selecting between candidate pronunciations for out-of-vocabulary words in speech processing tasks. Analyze performance using word error rates, decision error tradeoff curves, and phone error rates.

RESEARCH
EXPERIENCE
CONTINUED

Johns Hopkins University Summer Workshop 2007, Baltimore, Maryland USA
Researcher (Leader: H. Hermansky) **Summer 2007**
Participate in the JHU WS07 group 'Recovering from Model Inconsistency in Multi-lingual Speech Recognition'. Using a competitive automatic speech recognition system, examine how to predict the probability that a word is incorrect to prevent errors from propagating and allow system recovery. Address the problem with phone-level comparison using multi-stream alignment and word-level comparison using phone-to-word transduction. Extend to detecting accented English.

Microsoft Research, Redmond, Washington USA
Summer researcher (Advisors: J. Droppo, A. Acero) **Summer 2006**
Speech Group
Build generative and discriminative classifiers for variable length vocabulary, lexicon and task independent automatic speech recognition confidence scoring. Gauge the benefit of new features and feature processing within the discriminative framework including quantization for classification.

Department of Defense, Fort Meade, Maryland USA
Summer researcher (Advisors: W. Andrews, J. Godfrey, S. Dennis) **Summer 2005**
Department of Defense, Speaker Identification Group
Department of Homeland Security S&T, Threat and Vulnerability Portfolio
Conduct a Voice Biometrics Needs Assessment: Characterize application scenarios under which voice biometric technology is or could be deployed by the U.S. Government. Describe requirements of agencies within the Intelligence Community to promote inter-agency cooperation. Identify representative scenarios, directing data collection and community research.

Oklahoma State University, Stillwater, Oklahoma USA
Research Assistant (Advisor: K. Teague) **2002 - 2004**
Speech and Audio Communications Laboratory
Design, development, and implementation of a prototype real-time secure multimedia communication system for operation over multiple heterogeneous communications networks (internet, cellular, wireless, etc.). Investigating performance issues and feasibility of secure multimedia communication with the Future NarrowBand Digital Terminal (FNBDT) and VoIP through characterizing mixed network behavior, model development, computer simulations, and FNBDT system quality analysis. Other duties include grant proposal writing, reporting to the contracting agency, and supervising students with undergraduate research scholarships.

HONORS AND
AWARDS

Human Language Technology Center of Excellence Graduate Fellowship, 2007
Department of Homeland Security Graduate Fellowship, 2004
Oklahoma EPSCoR Fellowship, 2004
Eta Kappa Nu, Electrical Engineering Honor Society, 2003
OSU Lew-Wentz Scholarship Research Award, 2002, 2003
Oklahoma State Regents for Higher Education Regents Scholar, 2000
OSU College of Engineering, Architecture, and Technology Research Scholar, 2000
Eagle Scout, 2000

LEADERSHIP AND
TEACHING
EXPERIENCE

Co-Chair ECE Graduate Student Body **Aug. 2005 - May 2007**
Student Teacher Info Theory and Statistics, Johns Hopkins University **Fall 2005**
Student Teacher Intro to Engineering, Oklahoma State University **Fall 2003**
Teaching Assistant Info Theory, Johns Hopkins University **Fall 2005**
Research Mentor U.S. F.I.R.S.T Robotics Competition Team 476 **2004**

PEER-REVIEWED
PUBLICATIONS

- C.M. White, A. Sethy, B. Ramabhadran, P. Wolfe, E. Cooper, M. Saraclar, J. K. Baker, "Unsupervised Pronunciation Validation," International Conference on Acoustics, Speech and Signal Processing, April, 2009. (Accepted)
- W. Shen, C.M. White, T.J. Hazen, "A Comparison of Query-by-Example Methods for Spoken Term Detection," International Conference on Acoustics, Speech and Signal Processing, April, 2009. (Accepted)
- T.J. Hazen, W. Shen, C.M. White, "Query-by-Example Spoken Term Detection Using Phonetic Posteriorgram Templates," International Conference on Acoustics, Speech and Signal Processing, April, 2009. (Accepted)
- D. Can, E. Cooper, A. Sethy, B. Ramabhadran, M. Saraclar, C.M. White, "Effect of Pronunciations on OOV Queries in Spoken Term Detection," International Conference on Acoustics, Speech and Signal Processing, April, 2009. (Accepted)
- C. White, S. Khudanpur, J. Baker, "An Investigation of Acoustic Models for Multilingual Code-Switching," Interspeech, Sept. 2008.
- C. White, G. Zweig, L. Burget, P. Schwarz, H. Hermansky, "Confidence Estimation, OOV Detection, and Language ID using Phone-to-Word Transduction and Phone-Level Alignments," IEEE International Conference on Acoustics, Speech and Signal Processing, April 2008.
- D. Farris, C. White, S. Khudanpur, "Sample Selection for Automatic Language Identification," IEEE International Conference on Acoustics, Speech and Signal Processing, April 2008.
- L. Burget, P. Schwarz, P. Matejka, M. Hannemann, A. Rastrow, C. White, S. Khudanpur, H. Hermansky, J. Cernocky, "Combination of Strongly and Weakly Constrained Recognizers for Reliable Detection of OOVs", IEEE International Conference on Acoustics, Speech and Signal Processing, April 2008.
- C. White, J. Droppo, A. Acero, J. Odell, "Maximum Entropy Confidence Estimation for Speech Recognition," IEEE International Conference on Acoustics, Speech and Signal Processing, April 2007.
- C. White, I. Shafran, J-L. Gauvain, "Discriminative Classifiers for Language Recognition," IEEE International Conference on Acoustics, Speech and Signal Processing, May 2006.
- C. White, E. Daniel, K. Teague, "A real-time network analysis tool to aid in characterizing VoIP system performance," International Journal for Electrical Engineering Education, Vol. 42, Issue 2, April 2005.
- C. White, K. Teague, E.J. Daniel, "Packet Loss Concealment in a Secure Voice over IP Environment," 38th Asilomar Conference on Signals, Systems, and Computers, Nov. 2004.
- C. White, K. Teague, E. Daniel, "A Real-Time Network Simulation Application for Multimedia over IP," 38th Asilomar Conference on Signals, Systems, and Computers, Nov. 2004.
- C. White, G. Yen, "A Hybrid Evolutionary Algorithm for Traveling Salesman Problem," 2004 Congress on Evolutionary Computation, June 2004.
- C. White, E. Stein, J. Raymond, J. Miller, "Wireless Midi Merge Apparatus," U.S. Provisional Patent Serial No. 60/665,452. May 2004.
- C. White, E. Daniel, K. Teague, "A Network Performance Application for Modeling, Simulation, and Characterization of Packet Network Behavior," 37th Asilomar Conference on Signals, Systems, and Computers, Nov. 2003. **Fourth Place Paper**
- E. Daniel, C. White, K. Teague, "An Inter-Arrival Delay Jitter Model using Multi-Structure Network Delay Characteristics for Packet Networks," 37th Asilomar Conference on Signals, Systems, and Computers, Nov. 2003.

PAPERS IN
PREPARATION

C. White, K. Outland, "Voice Biometric Needs Assessment", DHS/DOD Technical Report, CLSP Technical Note.

PRESENTATIONS /
COMPETITIONS

HLTCOE SCALE Planning, Baltimore, MD, February 2009
DoD Scientific Advisory Board, Fort Meade, MD, January 2009
HLTCOE Quarterly Technical Exchange, Baltimore, MD, January 2009
DoD Speech Group, November, Fort Meade, MD, November 2008
M.I.T. Lincoln Laboratory, Boston, MA, November 2008
Harvard Statistics and Information Sciences Laboratory, Boston, MA, November 2008
Nuance, Boston, MA, November 2008
Department of Defense, Fort Meade, MD, October 2008
Interspeech, Brisbane, Australia, September 2008
M.I.T. Lincoln Laboratory, Boston, MA, September 2008
JHU WS08 Workshop Closing, Baltimore, MD, August 2008
International Conference on Acoustics, Speech, and Signal Processing, Las Vegas, USA, April 2008
Human Language Technology Center of Excellence, Baltimore, MD, March 2007
Reviewer for Association for Computational Linguistics 2008 Student Research Workshop
Center for Language and Speech Processing, Baltimore, MD, September 2007
JHU WS07 Workshop Closing, Baltimore, MD, August 2007
JHU WS07 Summer School, Baltimore, MD, August 2007
International Conference on Acoustics, Speech, and Signal Processing, Hawaii, USA, April 2007
Center for Language and Speech Processing, Baltimore, MD, May 2006
Microsoft Research, Redmond, WA, August 2006
International Conference on Acoustics, Speech, and Signal Processing, Toulouse, FR, May 2006
M.I.T. Lincoln Laboratory, Boston, MA, March 2006
Department of Homeland Security S&T, Washington, DC, Aug. 2005
Department of Defense, Fort Meade, MD, July 2005
Center for Language and Speech Processing, Baltimore, MD, May 2005
Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, November 2004
Congress on Evolutionary Computation, Portland, OR, June 2004
Travel Grant Award Winner, Congress on Evolutionary Computation, Portland, OR, June 2004
Advanced Networking Technology Workshop, Stillwater, OK, May 2004
Department of Defense, FANX, MD, May 2004
Oklahoma State Universitys Lou-Wentz Research Scholar Awards Banquet, April 2004
Department of Defense, Fort Meade, MD, March 2004
First Place Winner, Overall Presentation,
Oklahoma Experimental Program to Stimulate Competitive Research (EPSCoR), March 2004
First Place Winner, Overall Presentation,
First Place Winner, Physical Sciences and Technology Presentation,
First Place Winner, Physical Sciences and Technology Poster,
Oklahoma State University 15th Annual Student Research Symposium, March 2004
Asilomar Conference on Signals, Systems, and Computers, November 2003
Fourth Place Paper, Asilomar Conference on Signals, Systems, and Computers, November 2003
Oklahoma State University Lou-Wentz Research Scholar Awards Banquet, April 2003
Oklahoma State University Research Proposal Writing Workshop, January 2003