Abbie Kressner

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Education

Ph.D. Electrical and Computer Engineering · Georgia Institute of Technology · 2015

Thesis: *Structure in time-frequency binary masking*
Advisor: Dr. Christopher J. Rozell

M.S. Electrical and Computer Engineering · Georgia Institute of Technology · 2011

Thesis: *Auditory models for evaluating algorithms*
Advisor: Dr. Christopher J. Rozell

Graduate studies in Audiology · Vanderbilt University · 2008

B.S. Biomedical Engineering · Washington University in St. Louis · 2007

Awards

National Science Foundation (NSF) Graduate Research Opportunities Worldwide (GROW) · 2014-2015

Chih Foundation Research Award · 2014

National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP) · 2010-2015

National Defense Science & Engineering Graduate (NDSEG) Fellowship · 2010-2013

President's Fellowship · Georgia Institute of Technology · 2009-2013

ISAAR and GN Foundation Young Scientist Conference Scholarship · 2011

21st Annual SAIC Student Paper Competition · First place · 2010

Jeffrey & Nancy Balter Biomedical Engineering Scholar · Washington University in St. Louis · 2004-2007

Society of Women Engineers Scholar · Chicago Chapter · 2004-2005

Publications

Journal publications

A.A. Kressner and C.J. Rozell. Structure in time-frequency binary masking errors and its impact on speech intelligibility. Journal of the Acoustical Society of America, in press.

A.A. Kressner, D.V. Anderson, and C.J. Rozell. Evaluating the generalization of the Hearing Aid Speech Quality Index (HASQI). IEEE Transactions in Audio, Speech and Language Processing, 21(2):407-415, February 2013. [paper, code]

Conference publications

A.A. Kressner and C.J. Rozell. Speech understanding in noise provided by a simulated cochlear implant processor based on matching pursuit. In Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA), New Paltz, NY, October 2013. [paper]

A.A. Kressner, D.V. Anderson, and C.J. Rozell. Causal binary mask estimation for speech enhancement using sparsity constraints. In Proceedings of Meetings on Acoustics (POMA), Montreal, Canada, June 2013. [paper]

A.A. Kressner, D.V. Anderson, and C.J. Rozell. A novel binary mask estimator based on sparse approximation. In Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Vancouver, Canada, May 2013. [paper]

A.A. Kressner, D.V. Anderson, and C.J. Rozell. Robustness of the Hearing Aid Speech Quality Index (HASQI). In Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA), New Paltz, NY, October 2011. [paper]

A. Charles, A.A. Kressner, and C.J. Rozell. A Causal Locally Competitive Algorithm for the Sparse Decomposition of Audio Signals. In Proceedings of the IEEE Digital Signal Processing (DSP) Workshop, Sedona, AZ, January 2011. [paper]

Conference abstracts

A.A. Kressner and C.J. Rozell. The influence of structure in binary mask estimation error on speech intelligibility. In IHCON 2014 International Hearing Aid Research Conference, Lake Tahoe, CA, August 2014.

A.A. Kressner and C.J. Rozell. Speech separation using Matching Pursuit for time-frequency masking. In Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop, Lausanne, Switzerland, July 2013.

A.A. Kressner, A.S. Charles, and C.J. Rozell. Causal Locally Competitive Algorithm for the sparse decomposition of audio signals. In IEEE Women's Workshop on Communications and Signal Processing, Banff, Canada, July 2012.

A.A. Kressner, D.V. Anderson, and C.J. Rozell. Computational auditory models validate the intelligibility benefit of efficient filters. In International Symposium on Auditory and Audiological Research (ISAAR) 2011, Nyborg, Denmark, August 2011.

A.A. Kressner, C.J. Rozell, and D.V. Anderson. Predicting speech quality using a computational auditory model. In IHCON 2010 International Hearing Aid Research Conference, Lake Tahoe, CA, August 2010.

M.J. Jensen, M.P. Linkenkaer, and A.A. Kressner. Using FEM to estimate the influence of pinna when calculating hearing aid relevant transfer functions. In IHCON 2008 International Hearing Aid Research Conference, Lake Tahoe, CA, August 2008.

Other reports

A.A. Kressner. Structure in time-frequency binary masking. PhD thesis. Georgia Institute of Technology, Atlanta, GA, May 2015.

A.A. Kressner. Auditory models for evaluating algorithms. MS thesis. Georgia Institute of Technology, Atlanta, GA, August 2011. [thesis]

Work experience

Visiting scholar · National Acoustic Laboratories · Sydney, Australia · 6/2014 to 2/2015

- National Science Foundation Graduate Research Opportunities Worldwide (GROW) experience
- Developing a system that facilitates evaluation of signal processing algorithms with cochlear implant recipients in a realistic virtual environment

Audio signal processing consultant · 3DM Systems · Atlanta, Georgia, USA · 6/2013 to 3/2014

- Advised in the areas of acoustics and signal processing for new product development

Audiological research trainee · Widex A/S · Vaerloese, Denmark · 1/2008 to 7/2008

- Investigated the influence of earmold venting on hearing aid feedback to identify a better protocol for vent placement
- Completed measurements on physical model of pinna for comparison with an FEM model

R&D intern · Knowles Electronics, LLC · Itasca, Illinois, USA · 5/2007 to 8/2007

- Investigated the use of two directional microphones for sound source separation in the ear canal
- Built a microphone in the prototype lab
- Completed extensive literature review on extended bandwidth hearing aids

Audio engineering intern · AuSIM, Inc · Palo Alto, California, USA · 5/2006 to 8/2006

- Collaborated with engineering team in designing a field communication system that creates true 3D spatial relationships among users by merging multi-channel voice with global positioning and head orientation data

Teaching experience

Course development · Georgia Tech · Atlanta, Georgia, USA · 5/2013 to 6/2014

- Development of signal processing laboratory assignment based on psychoacoustic masking

Teacher's assistant · Washington University · St. Louis, Missouri, USA · 8/2007 to 12/2007

- Department of Biomedical Engineering · Quantitative Physiology

Tutor · Washington University · St. Louis, Missouri, USA · 8/2005 to 5/2007

- Subjects included Advanced Engineering Mathematics, Calculus, Differential Equations, and Engineering & Scientific Computing

Professional activities

Reviewer for IEEE Transactions on Audio, Speech, and Language Processing · 2014-present

Member of American Auditory Society · 2013-2014

Member of Institute of Electrical and Electronics Engineers (IEEE) and IEEE Signal Processing Society · 2010-2014

Community activities

Board member of Revive Atlanta Initiative, Inc. · 2010-2012