

# Abbie Kressner

Abigail Anne Kressner Postdoctoral Researcher Hearing Systems Group Technical University of Denmark aakress@elektro.dtu.dk <http://cv.abbiekressner.com>

## Education

2011-2015	Ph.D. • Electrical and Computer Engineering • Georgia Institute of Technology  Thesis: Structure in time-frequency binary masking Advisor: Dr. Christopher John Rozell
2009-2011	M.S. • Electrical and Computer Engineering • Georgia Institute of Technology  Thesis: Auditory models for evaluating algorithms Advisor: Dr. Christopher John Rozell
2008	Audiology • Vanderbilt University
2004-2007	B.S. • Biomedical Engineering • Washington University in St. Louis

## Research support

2015-2017	Postdoctoral grant from Det Frie Forskningsråd (DFF; Danish Council for Independent Research)
2014-2015	National Science Foundation (NSF) Graduate Research Opportunities Worldwide (GROW)
2010-2015	National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP)
2010-2013	National Defense Science & Engineering Graduate (NDSEG) Fellowship

## Awards

2014	International Hearing Aid Conference (IHCON) Scholarship
2014	Chih Foundation Research Award
2009-2013	President's Fellowship • Georgia Institute of Technology
2011	ISAAR and GN Foundation Young Scientist Conference Scholarship
2010	21st Annual SAIC Student Paper Competition • First place
2004-2007	Jeffrey & Nancy Balter Biomedical Engineering Scholar • Washington University in St. Louis
2004-2005	Society of Women Engineers Scholar

## Experience

Visiting Postdoctoral Researcher · Cochlear, Ltd · Melbourne, Australia · 01/2017 to 04/2017

- ▶ Investigated models for cochlear implant speech intelligibility prediction

Postdoctoral Researcher · Technical University of Denmark · Copenhagen, Denmark · 10/2015 to present

- ▶ Investigating cochlear implant speech coding errors

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

- ▶ Investigated the influence of binary time-frequency gain manipulation errors in cochlear implant recipients

Consultant · United Sciences, LLC · Atlanta, Georgia, USA · 6/2013 to 3/2014

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

Research Intern · Widex A/S · Vaerloese, Denmark · 1/2008 to 7/2008

- ▶ Investigated the influence of earmold venting on hearing aid feedback to facilitate better vent placement

Research 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

Research Intern · AuSIM, Inc · Palo Alto, California, USA · 5/2006 to 8/2006

- ▶ Aided in the design of a field communication system that maintains 3D spatial relationships among users

## Professional activities

2018-present    Reviewer for Trends in Hearing

2017            Reviewer for the Proceedings of the International Symposium on Auditory and Audiological Research

2017-present   Reviewer for Speech Communication

2016-present   Reviewer for Journal of the Acoustical Society of America

2016-present   Reviewer for Journal of the Acoustical Society of America Express Letters

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

2013-2014      Member of American Auditory Society

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

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

## Teaching activities

Guest lecturer · Technical University of Denmark · Spring 2018

- ▶ Lecture on signal processing in Auditory Signal Processing and Perception (Course 31236)

Teacher's assistant · Technical University of Denmark · Spring 2018

- ▶ Laboratory exercise on basilar membrane models in Auditory Signal Processing and Perception (Course 31236)

Guest lecturer · Technical University of Denmark · Fall 2017

- ▶ Lecture on noise reduction techniques in Signals and Linear Systems in Discrete Time (Course 31606)

Teacher's assistant · Technical University of Denmark · Spring 2016

- ▶ Laboratory exercise on signal processing in Auditory Signal Processing and Perception (Course 31236)

Course development · Georgia Institute of Technology · 5/2013 to 6/2014

- ▶ Development of signal processing laboratory assignment based on psychoacoustic masking

Teacher's assistant · Washington University in St. Louis · 8/2007 to 12/2007

- ▶ Department of Biomedical Engineering · Quantitative Physiology

Tutor · Washington University in St. Louis · 8/2005 to 5/2007

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

## Student supervision

Rasmus Bendsen · 2018

- ▶ MSc thesis project: *Spatial perception in reverberant environments with cochlear implant recipients*

Rasmus Malik Thaarup Høegh · 2017

- ▶ MSc-level special course: *Neural networks for improved hearing loss compensation*

Rasmus Malik Thaarup Høegh and Kristine Juhl · 2016

- ▶ BSc thesis project: *Analysis of estimated binary mask errors*

Technical Audiology and Experimental Hearing Science · 2016

- ▶ MSc-level course project: *Perceptual evaluation of noise reduction algorithm errors*

Thomas Bentsen · 2015-2018

- ▶ PhD thesis project: *Computational speech segregation inspired by principles of auditory processing*

## Publications

### Journal publications

Thomas Bentsen, Stefan J. Mauger, Abigail Anne Kressner, Tobias May, and Torsten Dau. The impact of noise power estimation on speech intelligibility in cochlear-implant speech coding strategies, *JASA*, in review.

Abigail Anne Kressner, Tobias May, and Torsten Dau. The effect of noise reduction gain errors on simulated cochlear implant speech intelligibility, *Trends in Hearing*, in review.

Abigail Anne Kressner, Adam Westermann, and Jörg Matthias Buchholz. The impact of reverberation on speech intelligibility in cochlear implant recipients, *Journal of the Acoustical Society of America*, 144(2):1113-1122, August 2018. [paper]

Thomas Bentsen, Tobias May, Abigail Anne Kressner, and Torsten Dau. The benefit of combining a deep neural network architecture with ideal ratio mask estimation in computational speech segregation to improve speech intelligibility, *PLOS ONE*, 13(5):e0196924. [paper]

Thomas Bentsen, Abigail Anne Kressner, Torsten Dau, and Tobias May. The impact of exploiting spectro-temporal context in computational speech segregation. *Journal of the Acoustical Society of America*, 143(1):248-259, January 2018. [paper]

Abigail Anne Kressner, Tobias May, and Christopher John Rozell. Outcome measures based on classification performance fail to predict the intelligibility of binary-masked speech. *Journal of the Acoustical Society of America*, 139(6):3033-3036, June 2016. [paper]

Abigail Anne Kressner, Adam Westermann, Jörg Matthias Buchholz, and Christopher John Rozell. Cochlear implant speech intelligibility outcomes with structured and unstructured binary mask errors. *Journal of the Acoustical Society of America*, 139(2):800-810, February 2016. [paper]

Abigail Anne Kressner and Christopher John Rozell. Structure in time-frequency binary masking errors and its impact on speech intelligibility. *Journal of the Acoustical Society of America*, 137(4):2025-2035, April 2015. [paper, code]

Abigail Anne Kressner, David V. Anderson, and Christopher John 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

Abigail Anne Kressner, Tobias May, Rasmus Malik Thaarup Høegh, Kristine Aavild Juhl, Thomas Bentsen, and Torsten Dau. Investigating the effects of noise-estimation errors in simulated cochlear implant speech intelligibility. In *International Symposium on Auditory and Audiological Research (ISAAR)*, Nyborg, Denmark, August 2017. [paper]

Thomas Bentsen, Tobias May, Abigail Anne Kressner, and Torsten Dau. Comparing the influence of spectro-temporal integration in computational speech segregation. In *Proceedings of Interspeech*, San Francisco, California, September 2016. [paper]

Abigail Anne Kressner and Christopher John 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, New York, October 2013. [paper]

Abigail Anne Kressner, David V. Anderson, and Christopher John Rozell. Causal binary mask estimation for speech enhancement using sparsity constraints. In *Proceedings of Meetings on Acoustics (POMA)*, Montreal, Canada, June 2013. [paper]

Abigail Anne Kressner, David V. Anderson, and Christopher John 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]

Abigail Anne Kressner, David V. Anderson, and Christopher John 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, New York, October 2011. [paper]

Adam S. Charles, Abigail Anne Kressner, and Christopher John Rozell. A Causal Locally Competitive Algorithm for the Sparse Decomposition of Audio Signals. In Proceedings of the IEEE Digital Signal Processing (DSP) Workshop, Sedona, Arizona, January 2011. [paper]

### Conference abstracts

Abigail Anne Kressner, Stefan J. Mauger, and Torsten Dau. Predicting the impact of noise and noise reduction algorithms on speech intelligibility in cochlear implant recipients. In 2017 Audiological Research Cores in Europe (ARCHES), Leuven, Belgium, November 2017.

Abigail Anne Kressner, Stefan J. Mauger, Adam A. Hersbach, and Torsten Dau. Multi-study evaluation of objective measures that predict cochlear implant speech intelligibility. In 2017 Conference on Implantable Auditory Prostheses (CIAP), Lake Tahoe, California, July 2017.

Abigail Anne Kressner, Adam Westermann, Jörg Matthias Buchholz, and Christopher John Rozell. Speech coding errors in cochlear implants and their impact on speech intelligibility in noise. In 2016 International Hearing Aid Research Conference (IHCON), Lake Tahoe, California, August 2016.

Thomas Bentsen, Tobias May, Abigail Anne Kressner, and Torsten Dau. The effect of spectro-temporal context on computational speech segregation. In 2015 Audiological Research Cores in Europe (ARCHES), Groningen, Netherlands, November 2015.

Abigail Anne Kressner and Christopher John Rozell. The influence of structure in binary mask estimation error on speech intelligibility. In 2014 International Hearing Aid Research Conference (IHCON), Lake Tahoe, California, August 2014.

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

Abigail Anne Kressner, Adam S. Charles, and Christopher John 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.

Abigail Anne Kressner, David V. Anderson, and Christopher John 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.

Abigail Anne Kressner, Christopher John Rozell, and David V. Anderson. Predicting speech quality using a computational auditory model. In IHCON 2010 International Hearing Aid Research Conference, Lake Tahoe, California, August 2010.

Mads J. Jensen, Morten P. Linkenkaer, and Abigail Anne 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, California, August 2008.

### Other reports

Abigail Anne Kressner. Structure in time-frequency binary masking. PhD thesis. Georgia Institute of Technology, Atlanta, Georgia, May 2015. [thesis]

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