Abigail Anne Kressner

Nickname: Abbie
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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

Research and work experience

Assistant Professor · Technical University of Denmark and Rigshospitalet · Copenhagen, Denmark · 3/2019 to present

  ► Assistant Professor in Audiology and Hearing Rehabilitation with a joint appointment at the Hearing Systems Group, Department of Health Technology, Technical University of Denmark and at the Ear, Nose and Throat (ENT) & Audiology Clinic at Rigshopitalet, Copenhagen University Hospital, Denmark

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 3/2019

  ► Investigated speech in noise for cochlear implant recipients, both in the areas of speech intelligibility prediction and psychoacoustic experimentation

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

Graduate Research Assistant · Georgia Institute of Technology · 8/2009 to 5/2015

  ► Evaluated the generalizability of the Hearing Aid Speech Quality Index (HASQI)
  ► Investigated the effect of statistical structure in the gains applied during noise reduction by conducting listener experiments with both normal-hearing listeners and cochlear implant recipients

Research Assistant · Vanderbilt University · Nashville, Tennessee, USA · 1/2009 to 7/2009

  ► Developed Graphical User Interface in Matlab for implementing principal component analysis on event-related potentials of speech process

Research Intern · Widex A/S · Værløse, 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

National Science Foundation's Research Experiences for Undergraduates · Baltimore, Maryland, USA · 6/2005 to 8/2005

  ► Developed computational model of autoassociative neural network as part of the University of Maryland Baltimore County's Summer Program in Computational Biology

Research Assistant · Washington University in St. Louis · St Louis, Missouri, USA · 2/2005 to 5/2007

  ► Investigated the influence of auditory cues on self-orientation

Teaching education

Young Researcher Training Programme · Technical University of Denmark · Spring 2018 to present

> ► Series of workshops focused on paving the way towards excellence in an academic career

University Teaching Module 1 (UDTU) · Technical University of Denmark · Spring 2016

> ► Education in university teaching with a focus on how to educate engineers

Teaching experience

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 speaker identification in Auditory Signal Processing and Perception (Course 31236)

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 Malik Thaarup Høegh · 2019-present

> ► Industrial PhD: *Probabilistic deep learning for hearing aid speech separation*

Wiebke Lamping · 2018-present

> ► PhD thesis: *Improving music perception and voice pitch in cochlear implant users*

Rasmus Bendsen · 2018

> ► MSc thesis: *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*
> ► Project coordinated in collaboration with Bose Corporation

Rasmus Malik Thaarup Høegh and Kristine Juhl · 2016

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

Technical Audiology and Experimental Hearing Science · 2016

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

Thomas Bentsen · 2015-2018

- ▶ PhD thesis: *Computational speech segregation inspired by principles of auditory processing*
- ▶ External research stay coordinated in collaboration with Cochlear Ltd.

Skills

Languages	English (mother tongue), Danish (basic fluency, CEFR B2)
Programming	Matlab, Python, R, C++

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, Journal of the Acoustical Society of America, 145(2):818-821, February 2019 [paper].

Abigail Anne Kressner, Tobias May, and Torsten Dau. The effect of noise reduction gain errors on simulated cochlear implant speech intelligibility, Trends in Hearing, 23:1-12, February 2019 [paper].

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, May 2018. [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

Rasmus Østergaard Bendsen, Abigail Anne Kressner, and Torsten Dau. Effect of linked and "spatially aware" cochlear-implant compression on spatial perception in a reverberant room. In Conference on Implantable Auditory Prostheses (CIAP), Lake Tahoe, California, July 2019.

Wiebke Lamping, Tobias Goehring, Abigail Anne Kressner, Jeremy Marozeau, and Robert P. Carlyon. A coding strategy to remove temporally masked pulses and its effect on speech perception by CI listeners. In Conference on Implantable Auditory Prostheses (CIAP), Lake Tahoe, California, July 2019.

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]

Professional activities

2019-present	Reviewer for the Journal of the Association for Research in Otolaryngology
2019-2020	Technical Committee for the Baltic-Nordic Acoustic Meeting 2020
2019-present	Editor for the Proceedings of the International Symposium on Auditory and Audiological Research
2019-present	Organizing committee for the International Symposium on Auditory and Audiological Research
2018-present	Reviewer for Trends in Hearing
2017-present	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

Outreach

Volunteer · Technical University of Denmark's Diversity and Gender Equality · 2018-present

► Developing a technology camp for girls, which will have the primary goal of recruiting more women applicants to the university

Speaker · Virum Gymnasium Visit at the Technical University of Denmark · 11/2017

► Spoke at a recruitment event for the Department of Electrical Engineering about what it is like to be a researcher at DTU and how I prepared for a career in science

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

► Grassroots group which aimed at improving the city of Atlanta by leading efforts to transform underutilized spaces into valuable community assets