

# Jón Guðnason

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- OBJECTIVES** To develop new knowledge in the field of speech processing, signal processing and machine learning.
- RESEARCH INTERESTS** Acoustic speech processing, voice analysis, statistical pattern recognition and machine learning, nonlinear signal processing and neural networks, speech recognition, affective speech computing.
- EDUCATION**
- ◇ **Imperial College**, London, UK
    - Ph.D. in Signal Processing, March 2007
    - Thesis title: Voice Source Cepstrum Processing for Speaker Identification
    - Advisor: Mike Brookes
  - ◇ **University of Iceland**, Reykjavik, Iceland
    - M.Sc. in Signal Processing, June 2000
    - Thesis title: Nonlinear System Identification of Speech with Recurrent Neural Networks
    - Advisor: Jon Atli Benediktsson
    - B.Sc. in Electrical Engineering, June 1999
  - ◇ **Akureyri Junior College**, Akureyri, Iceland
    - Matriculation with emphasis on physics and mathematics, June 1995
- AWARDS**
- ◇ **Icelandic Language Board (October 2012)**  
Project: Developing speech recognition for Icelandic  
To build an open database of spoken Icelandic and the subsequent development of speech recognition for Icelandic by Google.
  - ◇ **Royal Academy of Engineering - Global Research Award (October 2008)**  
Project: Speech Analysis for High Performance Phoneme Recognition  
To visit and work with Professor Dan Ellis at LabROSA, Columbia University for 12 months
- RESEARCH PROJECTS**
- ◇ **Model-based speech analysis and voice quality assessment(2015-2017)**  
PI: Jon Guðnason  
Assessment of voice quality using model-based speech analysis methods.
  - ◇ **Free and Open Speech Recognition for Icelandic (2015-2017)**  
PI: Jon Guðnason and Trausti Kristjánsson  
Developing open source software for Icelandic speech recognition.
  - ◇ **Cognitive Workload Monitoring for Air Traffic Control using Speech (2012-2015)**  
PI: Kamilla Run Johannsdóttir, Jon Guðnason and Hannes Hogni Vilhjálmsson  
Using voice source analysis to monitor cognitive workload.
  - ◇ **Voice source extraction and modeling (2009-2011)**  
PI: Jon Guðnason  
Voice source prototype clustering for speech synthesis and coding.
  - ◇ **Speech Analysis for Phoneme Recognition at Columbia University (2008-2009)**  
PI: Daniel P. W. Ellis  
Glottal flow and vocal tract analysis for speech feature extraction

- WORK EXPERIENCE
- ◇ **Director of CADIA**  
Reykjavik University (2016 - Present)  
Center for Analysis and Design of Intelligent Agents
  - ◇ **Associate Professor**  
Reykjavik University (2017 - Present)  
Research and teaching in the field of speech and language technology, signal processing and machine learning
  - ◇ **Chairman of the board**  
Laeknaromur (2016 - Present)  
Medical dictation services in Icelandic
  - ◇ **Board member**  
Almannaromur (2013 - 2017)  
Association for Icelandic Language Technology
  - ◇ **Assistant Professor**  
Reykjavik University (2009 - 2017)  
Research and teaching in the field of speech and language technology, signal processing and machine learning
  - ◇ **Research Assistant**  
Communications and Signal Processing Group, Imperial College London (2003-2009)  
Signal Processing Laboratory, University of Iceland (1999 - 2000)  
Hydrology Service, Iceland National Energy Authority (Summers, 1996 - 1998)
  - ◇ **Teaching Assistant**  
Imperial College (2001 - 2008) Undergraduate and Postgraduate courses  
University of Iceland (1998 - 2000) Undergraduate courses  
Courses: Signal Processing, Probabilistic Methods, Control Systems, Linear Algebra, Adaptive Signal Processing, Spectrum Estimation
  - ◇ **Software Engineer** DeCode Genetics  
Reykjavik, Iceland (Summer 2000)
- IT - SKILLS
- ◇ Matlab, C, Perl, Python, bash, HTK, LaTeX, Windows, Linux, MacOS
- TRANSFERABLE SKILLS
- ◇ Native spoken/written Icelandic and English; fair German and Danish
  - ◇ Courses taken in: Technical writing, presentation methods, time management
- REVIEWER
- ◇ Elsevier Speech Communications
  - ◇ European Signal Processing Conference (EUSIPCO)
  - ◇ IEEE Transactions on Audio, Speech and Language Processing
  - ◇ IEEE International Conference on Acoustics, Speech and Signal Processing
- PRESENTATIONS
- ◇ Talk at Icelandic Mathematical Society on supervised training of neural networks, 2016
  - ◇ Talk at University of New South Walse on using speech for cognitive workload analysis, 2015
  - ◇ Talk at UTMessan on Automatic Speech Recognitino for Icelandic, 2015
  - ◇ Talk at MIT Lincoln Labs on voice source analysis, 2013
  - ◇ Talk at Surrey University on cognitive workload monitoring, 2013
  - ◇ Talk at the ICE TCS on speech recognition, 2011

- BOOK CHAPTER ◇ Gudnason, J., “Speech Production Modeling and Analysis”. In: *Rama Chellappa and Sergios Theodoridis, editors, Academic Press Library in Signal Processing. Vol 4, Image, Video Processing and Analysis, Hardware, Audio, Acoustic and Speech Processing*, Chennai: Academic Press, 2014, pp. 985-1018.
- SPECIAL REPORT ◇ A.B. Nikulásdóttir, J. Guðnason, S. Steingrímsson. “Máltækni fyrir íslensku 2018-2022: verkáætlun.” *Mennta-og menningarmálaráðuneytið* (National Programme for Language Technology for Icelandic).
- JOURNAL PUBLICATIONS ◇ K.R. Jóhannsdóttir, E.H. Magnúsdóttir, S. Sigurjónsdóttir, J. Guðnason “The role of working memory capacity in cardiovascular monitoring of cognitive workload.”, *Biological psychology* 132, 154. 2017
- ◇ Y.R. Chien, D. Mehta, J. Gudnason, M. Zanartu and T.F. Quatieri “Evaluation of Glottal Inverse Filtering Algorithms Using a Physiologically Based Articulatory Speech Synthesizer”, *IEEE/ACM Trans on Audio, Speech & Language Processing*, Vol PP(99), 2017.
- ◇ E.H. Magnúsdóttir, M. Borsky, M. Meier, K. Jóhannsdóttir, J. Gudnason “Monitoring Cognitive Workload Using Vocal Tract and Voice Source Features”, *Periodica Polytechnica Electrical Engineering and Computer Science*, 2017.
- ◇ Drugman, T., Thomas, M.R.P., Gudnason, J., Naylor, P.A. and Dutoit, T. “Detection of Glottal Closure Instants from Speech Signals: a Quantitative Review”, *IEEE Trans on Audio, Speech & Language Processing*, Vol 20(3), pp 994 - 1006, March 2012.
- ◇ Gudnason, J., Thomas, M. R. P., Ellis, D. P. W., and Naylor, P. A., “Data-driven Voice Source Analysis and Synthesis”, *Speech Communication*, Vol 54(2), pp 199 - 211, February 2012.
- ◇ Thomas, M. R. P., Gudnason, J., and Naylor, P. A., “Estimation of Glottal Closing and Opening Instants in Voiced Speech using the YAGA Algorithm”, *IEEE Trans on Audio, Speech & Language Processing*, Vol 20(1), pp 82 - 91, January 2012.
- ◇ Gudnason, J., Cui, J. and Brookes, M. , “HRR Automatic Target Recognition from Super-Resolution Scattering Center Features”, *IEEE Trans on Aerospace and Electronic Systems*, Vol 45(4) pp 1512–1524, November 2009.
- ◇ Naylor, P.A., Kounoudes, A., Gudnason, J. and Brookes, M., “Estimation of Glottal Closure Instants in Voiced Speech using the DYPSA Algorithm”, *IEEE Trans on Audio, Speech & Language Processing*, Vol 15(1), pp 34-43, January 2007.
- ◇ Brookes, M., Naylor, P.A. and Gudnason, J., “A Quantitative Assessment of Group Delay Methods for Identifying Glottal Closures in Voiced Speech”, *IEEE Trans on Audio, Speech & Language Processing*, Vol 14(2), pp 456-466, March 2006.
- CONFERENCE PUBLICATIONS ◇ Anna Björk Nikulásdóttir, Inga Rún Helgadóttir, Matthías Pétursson and Jón Guðnason. “Open ASR for Icelandic: Resources and a Baseline System.” *Language Resources and Evaluation Conference (LREC)*, Miyazaki, May 2018
- ◇ Steinþór Steingrímsson, Sigrún Helgadóttir, Eiríkur Rögnvaldsson, Starkaður Barkarson, Jón Guðnason. “Risamálheild: A Very Large Icelandic Text Corpus.” *Language Resources and Evaluation Conference (LREC)*, Miyazaki, May 2018
- ◇ S. Steingrímsson, J. Guðnason, S. Helgadóttir, E. Rögnvaldsson. “Málrómur: A Manually Verified Corpus of Recorded Icelandic Speech.” *Proceedings of the 21st Nordic Conference on Computational Linguistics, NoDaLiDa*, 131. pp 237–240. Gothenburg, May 2017.
- ◇ J. Gudnason, M. Petursson, R. Kjaran, Simon Klupfel, A.B. Nikulasdóttir. “Building ASR corpora using Eyra.” *Interspeech*, Stockholm. 2017.
- ◇ I.R. Helgadóttir, R. Kjaran, A. B. Nikulasdóttir, J. Gudnason “Building an ASR corpus using Althingi’s Parliamentary Speeches.” *Interspeech*, Stockholm. 2017.
- ◇ Y.R. Chien, M. Borsky, J. Gudnason “Objective Severity Assessment From Disordered Voice Using Estimated Glottal Airflow.” *Interspeech*, Stockholm. 2017.

- ◇ M. Borsky, M. Cocude, D. D. Mehta, M. Zanartu, J. Gudnason. “Classification of voice modes using neck-surface accelerometer data,” *Proc. International Conf. Acoustics, Speech and Signal Processing. (ICASSP)*, New Orleans 2017.
- ◇ Manuela Meier, Michal Borsky, Eydis H. Magnúsdóttir, Kamilla R. Johannsdóttir and Jon Gudnason. “Vocal tract and voice source features for monitoring cognitive workload,” *IEEE CogInfoCom*, 2016.
- ◇ Michal Borsky, Daryush D Mehta, Julius P Gudjohnsen, Jon Gudnason, et al. “Classification of Voice Modality Using Electroglottogram Waveforms.” *Interspeech*, San Francisco. pp-3166-3170. 2016.
- ◇ Petursson, Matthias, Simon Klupfel, and Jon Gudnason. “Eyra-Speech Data Acquisition System for Many Languages,” *Procedia Computer Science*, 81: pp-53-60. 2016.
- ◇ van der Werff, L., Gudnason, J., Johannsdóttir, K. R., “Detection of Cardiovascular Reactivity in Speech,” *Interspeech*, Dresden 2015.
- ◇ Gudnason, J., Mehta, D.D., Quatieri, T.F., “Evaluation of Speech Inverse Filtering Techniques using a Physiologically-Based Synthesizer,” *Proc. International Conf. Acoustics, Speech and Signal Processing. (ICASSP)*, Brisbane 2015.
- ◇ Gudnason, J., Mehta, D.D., Quatieri, T.F., “Closed Phase Estimation for Inverse Filtering the Oral Airflow Waveform,” *Proc. International Conf. Acoustics, Speech and Signal Processing. (ICASSP)*, Florence 2014.
- ◇ Gudnason, J., Kjartansson, O., Johannsson, J., Carstensdóttir, E., Vilhjálmsson, H., Loftsson, H., Helgadóttir, S., Johannsdóttir, K. and Rognvaldsson, E. “Almannarómur: an open Icelandic speech corpus,” *Spoken Language Technologies for Under-resourced Languages.*, Cape Town 2012.
- ◇ Thomas, M. R. P., Gudnason, J., Naylor, P. A., Geiser, B. and Vary, P., “Voice Source Waveform Analysis and Synthesis using Principal Component Analysis and Gaussian Mixture Modelling,” *Proc. International Conf. Acoustics, Speech and Signal Processing. (ICASSP)*, Dallas 2010.
- ◇ Gudnason, J., Thomas, M. R. P., Naylor, P. A. and Ellis, D. P. W., “Voice Source Waveform Analysis and Synthesis using Principal Component Analysis and Gaussian Mixture Modelling,” *Interspeech*, (Brighton 2009).
- ◇ Thomas, M. R. P., Gudnason, J. and Naylor, P. A., “Detection of Glottal Closing and Opening Instants using an Improved DYPSA Framework,” *Proc. European Signal Processing Conf. (EUSIPCO)*, (Glasgow 2009).
- ◇ Thomas, M. R. P., Gudnason, J. and Naylor, P. A., “Data-Driven Voice Source Waveform Modelling,” *Proc. International Conf. Acoustics, Speech and Signal Processing. (ICASSP)*, Taipei, 2009.
- ◇ Thomas, M. R. P., Gudnason, J. and Naylor, P. A., “Application for the DYPSA Algorithm to Segmented Time Scale Modification of Speech,” *Proc. European Signal Processing Conf. (EUSIPCO)*, Lausanne, 2008.
- ◇ Cui, J., Gudnason, J. and Brookes, M., “Hidden Markov Models for Multi-Perspective Radar Target Recognition,” *Proc. IEEE Int. RADAR Conference*, Rome, 2008.
- ◇ Gudnason, J. and Brookes, M., “Voice Source Cepstrum Coefficients for Speaker Identification,” *Proc. International Conf. Acoustics, Speech and Signal Processing. (ICASSP)*, pp. 4821 - 4824, Las Vegas, 2008
- ◇ Gaubitch, N. D., Thomas, M. R. P., Gudnason, J. and Naylor, P. A., “A Practical Multichannel Dereverberation Algorithm using Multichannel DYPSA and Spatiotemporal Averaging,” *Proc Workshop on App. of Signal Processing to Audio and Acoust. (WASPAA)*, New Platz, 2007.
- ◇ Maqsood, H., Gudnason, J. and Naylor, P. A., “Enhanced Robustness to Unvoiced Speech and Noise in the DYPSA Algorithm for Identification of Glottal Closure Instants,” *Proc. European Signal Processing Conf. (EUSIPCO)*, Poznan, 2007.

- ◇ Cui, J., Gudnason, J. and Brookes, M., “Maximum A-Posteriori Adaptive Masking for Clutter Suppression in Automatic Radar Target Recognition,” *Proc. IEEE RADAR Conference*, Verona, 2006.
- ◇ Cui, J., Gudnason, J. and Brookes, M., “Radar shadow and superresolution features for automatic recognition of MSTAR targets,” *Proc. IEEE Int. RADAR Conference*, pp.534 - 539, Arlington, 2005
- ◇ Cui, J., Gudnason, J. and Brookes, M., “Automatic recognition of MSTAR targets using radar shadow and superresolution features,” *Proc. International Conf. Acoustics, Speech and Signal Processing. (ICASSP)*, pp.V-589 - V-592, Philadelphia, 2005