Jon Gudnason

School of Science and Engineering,
Reykjavik University,
Menntavegur 1,
IS-101 Reykjavik,
Iceland
+354 599 6435
+354 825 6425

Asholt 22,
IS-105 Reykjavik
Iceland

jg@ru.is
http://staff.ru.is/jg/

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 Gudnason
  Assessment of voice quality using model-based speech analysis methods.
- **Free and Open Speech Recognition for Icelandic (2015-2017)**
  PI: Jon Gudnason and Trausti Kristjansson
  Developing open source software for Icelandic speech recognition.
- **Cognitive Workload Monitoring for Air Traffic Control using Speech (2012-2015)**
  PI: Kamilla Run Johannsdottir, Jon Gudnason and Hannes Hogni Vilhjalmsson
  Using voice source analysis to monitor cognitive workload.
- **Voice source extraction and modeling (2009-2011)**
  PI: Jon Gudnason
  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 Analsyis and Design of Intelligent Agents
- **Assistant Professor**
  Reykjavik University (2009 - Present)
  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.

Journal Publications

- 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

- Manuela Meier, Michal Borsky, Eydis H. Magnusdottir, Kamilla R. Johannsdottir 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., Johannsdottir, 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., Carstensdottir, E., Vilhjalmsson, H., Loftsson, H., Helgadottir, S., Johannsdottir, K. and Rognvaldsson, E. "Almannaromur: 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