Hynek Bořil

Associate Professor
Electrical & Comp. Eng. Department
University of Wisconsin–Platteville
http://www.utdallas.edu/∼hynek
E-mail: borilh@uwplatt.edu

Office: EGH 320
Tel.: (608)324-1238
320 Busby Hall
1 University Plaza
Platteville, WI 53818

Research Interests

- Digital signal processing, statistical signal modeling, machine learning, deep learning.

- Automatic speech, speaker, language and dialect recognition: normalization of noise, channel, and speech variation mismatch; robust front-ends; online feature equalization; acoustic models for varying environments; limited resource recognition.

- Speech analysis: cognitive load/emotion/talking style assessment; estimation of physiological parameters, longitudinal characteristics of speech production; statistical modeling of prosody, language acquisition in infants.

Education

July 2008	Ph.D. in Electrical Engineering and Information Technology **Czech Technical University**, Prague Dissertation: "Robust Speech Recognition: Analysis and Equalization of Lombard Effect in Czech Corpora"
March 2003 September 1997	M.S. in Electrical Engineering (Includes B.S.) **Czech Technical University**, Prague Master's Thesis: "Guitar MIDI Converter"

Research & Work Experience

Current Aug 2021	Associate Professor Electrical and Computer Engineering Department **University of Wisconsin–Platteville**
July 2021 Aug 2015	Assistant Professor Electrical and Computer Engineering Department **University of Wisconsin–Platteville**
Current Aug 2015	Adjunct Research Faculty Center for Robust Speech Systems Erik Jonsson School of Engineering and Computer Science **The University of Texas at Dallas**
Aug 2015 Aug 2012	Assistant Research Professor Center for Robust Speech Systems Erik Jonsson School of Engineering and Computer Science **The University of Texas at Dallas**

JULY 2012 AUG 2007	RESEARCH ASSOCIATE Center for Robust Speech Systems Erik Jonsson School of Engineering and Computer Science **The University of Texas at Dallas**
AUG 2007 MARCH 2003	GRADUATE RESEARCH ASSISTANT Speech Processing Group Department of Circuit Theory Faculty of Electrical Engineering **Czech Technical University in Prague**

AWARDS

2017	PRINCIPAL INVESTIGATOR (PI), "Pioneer Speech Signal Processing Lab (PSSPL)– Lab Travel Support", Pioneer Academic Center for Community Engagement & CenterPoint, UW–Platteville ($6,975)
2016	PRINCIPAL INVESTIGATOR (PI), "Pioneer Speech Signal Processing Lab (PSSPL)– Research Equipment Acquisition and Lab Travel Support", Pioneer Academic Center for Community Engagement–Spring & Fall '16, UW–Platteville ($9,604)
2015	PRINCIPAL INVESTIGATOR (PI), "Acoustic Analysis for Automatic Speaker Identification, Emotional State/Cognitive Load Assessment, and Audio Event Detection", EMS New Faculty Start-Up Grant, UW-Platteville ($10,000)
2013	ICASSP-13 IBM RESEARCH SPOKEN LANGUAGE PROCESSING STUDENT TRAVEL GRANT FOR OUTSTANDING PAPER IN THE SPOKEN LANGUAGE PROCESSING AREA, *non-student co-author* [T. Hasan, O. Sadjadi, G. Liu, N. Shokouhi, **H. Bořil**, J. H. L. Hansen, "CRSS systems for 2012 NIST Speaker Recognition Evaluation," IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'13), Vancouver, Canada, May 2013]
2010–2012	CO-PI, "Non-Native Speaker Systems: Analysis and Development of Automatic Recognition for Non-Native Speakers", Li Creative Technologies (Florham Park, NJ)/US Army, ($100,000)
JAN–SEPT 2006	PI, "Normalization of Lombard Effect", Siemens Corporate Technology (Munich, Germany), (€10,000)
2006	POSTER'06 – 10th International Student Conference on Electrical Engineering, Prague – Paper Award
2005	INTERSPEECH'05 Student Travel Grant (ISCA)
2005	COMPREHENSIVE DOCTORAL EXAMINATION – Passed with Honors
2003–2007	RESEARCH ASSISTANTSHIP at Department of Circuit Theory, CTU in Prague

PROFESSIONAL SERVICE

External Reviewer:
U.S. DEPARTMENT OF HOMELAND SECURITY'S OFFICE OF UNIVERSITY PROGRAMS–CRIMINAL INVESTIGATIONS AND NETWORK ANALYSIS (CINA)
DUTCH RESEARCH COUNCIL/NETHERLANDS ORGANIZATION FOR SCIENTIFIC RESEARCH (NWO) TALENT PROGRAMME–VENI SCHEME

Ministry of Business, Innovation, and Employment of New Zealand (MBIE) Science Investment Round
Journal of the Acoustical Society of America (JASA)
IEEE Transactions on Audio, Speech and Language Processing (TASLP)
IEEE Transactions on Affective Computing (TAFFC)
IEEE Transactions on Intelligent Transportation Systems (T-ITS)
IEEE Transactions on Mobile Computing (TMC)
IEEE Transactions on Industrial Informatics (TII)
IEEE Signal Processing Letters (SPL)
ACM Computing Surveys (CSUR)
Speech Communication (Elsevier)
Digital Signal Processing (Elsevier)
Computer Speech and Language (Elsevier)
Applied Soft Computing (Elsevier)
Engineering Science and Technology, International Journal (Elsevier)
Knowledge-Based Systems (Elsevier)
EURASIP Journal on Audio, Speech, and Music Processing
International Journal of Tomography & Statistics
IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
IEEE International Conference on Signal Processing and Communications (SPCOM)
IEEE Workshop on Automatic Speech Recognition and Understanding (ASRU)
IEEE Spoken Language Technology Workshop (SLT)
IEEE Workshop on Signal Processing Systems (SiPS)
ISCA INTERSPEECH Conference
Audio Engineering Society (AES) Convention
EURASIP European Signal Processing Conference (EUSIPCO)
Odyssey: The Speaker and Language Recognition Workshop
Workshop on Child Computer Interaction (WOCCI)
International Conference on Affective Computing and Intelligent Interaction (ACII)

Book Reviews for Publishers
Skarnitzl, R. et al. (2015), Phonetic Speaker Identification [Fonetická identifikace mluvčího], FF UK Publishing House, Prague
Machač, P. & Skarnitzl, R. (2009), Principles of Phonetic Segmentation, Epocha Publishing, Prague

Consulting–Independent Expert (IE)
IE in Two Patent Infringement Cases in the Field of Automatic Speech and Speaker Recognition
IE in Two Patent Validity Reexamination Cases in the Field of Automatic Speech Recognition
IE in a Voice Forensics Case
IE in Feasibility/Reliability Study of Gunshot Detection Systems

Service on Committees
Journal Guest Editor: Recent Advances in Audio and Image based HCI on Mobile Devices (Eds. G. Liu, H. Bořil, Z. Zhang, Q. Wang, M. Ding), Advances in Human-Computer Interaction, 2017
Editorial Advisory Board: (Book) Technologies for Inclusive Education: Beyond Traditional Integration Approaches (Eds. D. Griol, Z. Callejas, R. L. Cozar), IGI Global, 2012
Technical Committee: LISTA Workshop on Natural and Synthetic Modification of Speech in Response to Listening Conditions, Edinburgh, UK, May 2–3, 2012

University Service at UW–Platteville

Faculty Senate, 2020–*present*
Institutional Review Board for Human Subjects Research (IRBHSR), 2016–*present*
College of Engineering, Mathematics and Science Curriculum Committee, 2020–*present*
College of Engineering, Mathematics and Science Commencement Committee, 2021–*present*

Research and Ethics Committee, 2019–2021
Engineering, Mathematics and Science Engineering Expo Committee, 2016–*present*
ECE Department Department Salary and Promotion Committee (DSPC) – Chair, 2021–2022
ECE Department Renewal and Tenure Review Body (RTRB), 2021–*present*
ECE Department Curriculum Committee, 2016–*present*
Computer Engineering Program Implementation Committee, 2019–*present*
Search and Screen Committee, Electrical and Computer Engineering Department, 2 x member, 1 x chair
Search and Screen Committee, Computer Science and Software Engineering, member
Search and Screen Committee for the Chair of Computer Science and Software Engineering, member

Conference Session Chair
ISCA INTERSPEECH 2017: Oral session "Multi-Channel Speech Enhancement"
IEEE ICASSP 2018: Poster session "Robust Speech Detection"
ISCA INTERSPEECH 2018: Oral session "Language Identification"
ISCA INTERSPEECH 2019: Poster session "Speaker Recognition 3"
ISCA INTERSPEECH 2021: Oral session "Voice Activity Detection"

Professional Affiliations (Current/Past)

Institute of Electrical and Electronics Engineers (IEEE) (Affiliate Member)
International Speech Communication Association (ISCA)
European Association for Signal Processing (EURASIP)
European Center of Excellence in Speech Synthesis (ECESS)

Teaching/Academic Experience

2015–*Current*	ASSISTANT (2015)/ASSOCIATE (2021) PROFESSOR Electrical Engineering Department **University of Wisconsin–Platteville** Courses: EE1020 Electrical Engineering Projects and Tools, EE1210 Circuit Modeling I, EE3770 Logic and Digital Design, EE3780 Introduction to Microprocessors, EE 4320 Digital Signal Processing, EE4720 Microcomputer Architecture and Interfacing, EE4750 Advanced Digital Design, EE4990 Independent Study (Undergraduate Research); Academic Advising in ECE Program
2015–*Current*	ADJUNCT RESEARCH FACULTY Erik Jonsson School of Engineering and Computer Science **The University of Texas at Dallas** Collaborating with Staff and Students in Research Projects at the Center for Robust Speech Systems (CRSS)
2017–*Current*	INSTRUCTOR JNC Jinan University International Summer School **Jinan University, Guangzhou, China** Courses: 0806C303 Programming in C++, 0701S201 Introduction to Statistics, 0701M340 Linear Algebra, 0806C220 Introduction to Programming (Python)
2012–2015	ASSISTANT RESEARCH PROFESSOR Erik Jonsson School of Engineering and Computer Science **The University of Texas at Dallas** Advising Students in Research Projects at the Center for Robust Speech Systems (CRSS)
2015	ADVISOR IN UNDERGRADUATE RESEARCH Erik Jonsson School of Engineering and Computer Science **The University of Texas at Dallas** Program: Anson L. Clark Summer Research Program
2007–2012	RESEARCH ASSOCIATE Erik Jonsson School of Engineering and Computer Science **The University of Texas at Dallas** Advising Students in Research Projects at the Center for Robust Speech Systems (CRSS)

2008–2014	COURSE SUPPORT Erik Jonsson School of Engineering and Computer Science **The University of Texas at Dallas** Course: EE6366 Speech and Speaker Recognition
2005–2007	COURSE DEVELOPMENT/INSTRUCTOR Institute of Phonetics **Charles University in Prague** Course: Matlab Fundamentals
2003–2007	INSTRUCTOR Faculty of Electrical Engineering **Czech Technical University in Prague** Courses: Circuit Theory I, Circuit Theory II, Electrical Circuits, Fundamentals of Electronic Circuits, Electrical Engineering for Informatics, Electrical Circuits in Communications
	THESIS REVIEWS Service on Thesis Review Committees for 7 Ph.D., M.S. and B.S. Theses

Publications

Journal Articles

1. J. H. L. Hansen, **H. Bořil**, "On the issues of intra-speaker variability and realism in speech, speaker, and language recognition tasks," *Speech Communication*, Elsevier, 101, July 2018, 94–108.

2. S. Ghaffarzadegan, **H. Bořil**, J. H. L. Hansen, "Deep Neural Network Training for Whispered Speech Recognition Using Small Databases and Generative Model Sampling," *International Journal of Speech Technology*, Springer, 20(4), December 2017, 1063–1075.

3. S. Ghaffarzadegan, **H. Bořil**, J. H. L. Hansen, "Generative Modeling of Pseudo-Whisper for Robust Whispered Speech Recognition," *IEEE Transactions on Audio, Speech, and Language Processing*, 24(10), October 2016, pp. 1705–1720.

4. J. H. L. Hansen and K. Williams and **H. Bořil**, "Speaker height estimation from speech: fusing spectral regression and statistical acoustic models," *Journal of the Acoustical Society of America (JASA)*, 138(2), August 2015, pp. 1052–1067.

5. S. Amuda, **H. Bořil**, A. Sangwan, J. H. L. Hansen, T. S. Ibiyemi, "Engineering Analysis and Recognition of Nigerian English: An Insight into Low Resource Languages," *Transactions on Machine Learning and Artificial Intelligence*, 2(3), August 2014, pp. 115–126.

6. T. Hasan, **H. Bořil**, A. Sangwan, J. H. L. Hansen, "Multi-Modal Highlight Generation for Sports Videos using an Information-Theoretic Excitability Measure," *The EURASIP Journal on Advances in Signal Processing*, 2013:173, 2013.

7. J. H. L. Hansen, E. Ruzanski, **H. Bořil**, J. Meyerhoff, "TEO-Based Speaker Stress Assessment using Hybrid Classification and Tracking Schemes," *International Journal of Speech Technology*, Springer, June 2012, DOI 10.1007/s10772-012-9165-1.

8. **H. Bořil** and J. H. L. Hansen, "Unsupervised Equalization of Lombard Effect for Speech Recognition in Noisy Adverse Environments," *IEEE Transactions on Audio, Speech, and Language Processing*, 18(6), August 2010, pp. 1379–1393.

9. **H. Bořil** and P. Fousek, "Influence of Different Speech Representations and HMM Training Strategies on ASR Performance," *Acta Polytechnica, Journal on Advanced Engineering*, 46(6), 2006, pp. 32–35.

Book Chapters

10. **H. Bořil**, P. Boyraz, J. H. L. Hansen, *Digital Signal Processing for In-Vehicle Systems and Safety*, chapter "Towards Multi-modal Driver's Stress Detection," J. H. L. Hansen, P. Boyraz, K. Takeda, H. Abut (Eds.), Springer, New York, 2012, pp. 3–19.

Abstracts and Book Reviews in Journals

11. **H. Bořil**, "Pavel Machač and Radek Skarnitzl (2009). Fonetická segmentace hlásek. Prague: Epocha Publishing House" *Book review, Naše Řeč (Our Speech)*, The Institute of Czech Language, Academy of Sciences of the Czech Republic, in Czech, Prague, 2012.

12. **H. Bořil**, "Pavel Machač and Radek Skarnitzl (2009). Principles of Phonetic Segmentation. Prague: Epocha Publishing House," *Book review, Acta Universitatis Carolinae (AUC) Philologica 1/2009, Phonetica Pragensia XII*, Karolinum Publishing House, Prague, 2010, pp. 63–64.

13. **H. Bořil**, T. Kleinschmidt, P. Boyraz, and J. H. L. Hansen, "Impact of Cognitive Load and Frustration on Drivers," *Abstract, Journal of the Acoustical Society of America*, vol. 127, no. 3, pp. 1996-1996, March 2010.

Conference/Workshop Proceedings

14. J. H. L. Hansen, **H. Bořil**, "Gunshot Detection Systems: Methods, Challenges, and Can they be Trusted?," *151st Audio Engineering Society (AES) Convention*, October 2021, 10 pages.

15. J. H. L. Hansen, **H. Bořil**, "Robustness in Speech, Speaker, and Language Recognition: You've Got to Know Your Limitations," *ISCA INTERSPEECH'16*, San Francisco, USA, September 2016, pp. 2766–2770.

16. M. K. Nandwana, **H. Bořil**, J. H. L. Hansen, "A New Front-End for Classification of Non-Speech Sounds: A Study on Human Whistle," *ISCA INTERSPEECH'15*, Dresden, Germany, September 2015, pp. 1982–1986.

17. S. Ghaffarzadegan, **H. Bořil**, J. H. L. Hansen, "Generative Modeling of Pseudo-Target Domain Adaptation Samples for Whispered Speech Recognition," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'15)*, Brisbane, Australia, April 2015, pp. 5024–5028.

18. **H. Bořil**, Q. Zhang, A. Ziaei, J. H. L. Hansen, D. Xu, J. Gilkerson, J. A. Richards, Y. Zhang, X. Xu, H. Mao, L. Xiao, F. Jiang. "Automatic Assessment of Language Background in Toddlers Through Phonotactic and Pitch Pattern Modeling of Short Vocalizations," *Workshop on Child Computer Interaction (WOCCI)*, Singapore, September 2014.

19. S. Ghaffarzadegan, **H. Bořil**, J. H. L. Hansen, "Model and Feature Based Compensation for Whispered Speech Recognition," *ISCA INTERSPEECH'14*, Singapore, September 2014, pp. 2420–2424.

20. S. Ghaffarzadegan, **H. Bořil**, J. H. L. Hansen, "UT-VOCAL EFFORT II: Analysis and Constrained-Lexicon Recognition of Whispered Speech," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'14)*, Florence, Italy, May 2014, pp. 2563–2567.

21. S.-J. Hahm, **H. Bořil**, P. Angkititrakul, J. H. L. Hansen (2013), "Advanced Feature Normalization and Rapid Model Adaptation For Robust In-Vehicle Speech Recognition," 6th Biennial Workshop on Digital Signal Processing for In-Vehicle Systems (DSP in Vehicles), Seoul, Korea, September 29–October 2, 2013.

22. **H. Bořil**, Q. Zhang, P. Angkititrakul, J. H. L. Hansen, D. Xu, J. Gilkerson, J. A. Richards, "A Preliminary Study of Child Vocalization on a Parallel Corpus of US and Shanghainese Toddlers," *ISCA INTERSPEECH'13*, Lyon, France, August 2013, pp. 2405–2409.

23. V. Hautamaki, K. A. Lee, D. van Leeuwen, R. Saeidi, A. Larcher, T. Kinnunen, T. Hasan, S. O. Sadjadi, G. Liu, **H. Bořil**, J. H.L. Hansen, B. Fauve, "Automatic Regularization of Cross-Entropy Cost for Speaker Recognition fusion," *ISCA INTERSPEECH'13*, Lyon, France, August 2013, pp. 1609–1613.

24. R. Saeidi, K. A. Lee, T. Kinnunen, T. Hasan, B. Fauve, P.-M. Bousquet, E. Khoury, P. L. Sordo Martinez, K. Kua, C. You, H. Sun, A. Larcher, P. Rajan, V. Hautamaki, C. Hanilci, B. Braithwaite, R. Gonzales-Hautamaki, S. O. Sadjadi, G. Liu, **H. Bořil**, N. Shokouhi, D. Matrouf, L. El Shafey, P. Mowlaee, J. Epps, T. Thiruvaran, D. A. van Leeuwen, B. Ma, H. Li, J. H. L. Hansen, J.-F. Bonastre, S. Marcel, J. Mason, E. Ambikairajah, "I4U Submission to NIST SRE 2012: A Large-Scale Collaborative Effort for Noise-Robust Speaker Verification," *ISCA INTERSPEECH'13*, Lyon, France, August 2013, pp. 1986–1990.

25. Q. Zhang, **H. Bořil**, J. H. L. Hansen, "Supervector Pre-Processing for PRSVM-Based Chinese and Arabic Dialect Identification," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'13)*, Vancouver, Canada, May 2013, pp. 7363–7367.

26. G. Liu, T. Hasan, **H. Bořil**, J. H. L. Hansen, "An Investigation on Back-End for Speaker Recognition in Multi-Session Enrollment," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'13)*, Vancouver, Canada, May 2013, pp. 7755–7759.

27. T. Hasan, O. Sadjadi, G. Liu, N. Shokouhi, **H. Bořil**, J. H. L. Hansen, "CRSS Systems for 2012 NIST Speaker Recognition Evaluation," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'13)*, Vancouver, Canada, May 2013, pp. 6783–6787.

28. T. Hasan, G. Liu, S. O. Sadjadi, N. Shokouhi, **H. Bořil**, A. Ziaei, A. Misra, K. W. Godin, J. H. L. Hansen, "UTD-CRSS Systems for 2012 NIST Speaker Recognition Evaluation," *NIST 2012 Speaker Recognition Evaluation Workshop*, Orlando, Florida, USA, 5 pages, Dec. 2012.

29. **H. Bořil**, Sangwan, A., Hansen, J. H. L., "Arabic Dialect Identification ďž″ 'Is the Secret in the Silence?' and Other Observations," *Proc. of ISCA INTERSPEECH'12*, Portland, Oregon, September 2012.

30. **H. Bořil**, O. Sadjadi, J. H. L. Hansen, "A Study on Combined Effects of Reverberation and Increased Vocal Effort on ASR," *Proc. of LISTA'12 Workshop*, Edinburgh, UK, May 2012, pp. 16–19.

31. T. Hasan, **H. Bořil**, A. Sangwan, J. H. L. Hansen, "A Multi-Modal Highlight Extraction Scheme for Sports Videos using an Information-Theoretic Excitability Measure," *Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'12)*, Kyoto, Japan, March 2012, pp. 2381–2384.

32. O. Sadjadi, **H. Bořil**, J. H. L. Hansen, "A Comparison of Front-End Compensation Strategies for Robust LVCSR under Room Reverberation and Increased Vocal Effort," *Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'12)*, Kyoto, Japan, March 2012, pp. 4701–4704.

33. G. Liu, S. O. Sadjadi, T. Hasan, J.-W. Suh, C. Zhang, M. Mehrabani, **H. Bořil**, A. Sangwan, and J. H. L. Hansen, "UTD-CRSS Systems for NIST Language Recognition Evaluation 2011," *NIST 2011 Language Recognition Evaluation Workshop*, Atlanta, Georgia, USA, 3 pages, Dec. 2011.

34. **H. Bořil**, F. Grézl, J. H. L. Hansen, "Front-End Compensation Methods for LVCSR under Lombard Effect," *Proc. of ISCA INTERSPEECH'11*, Florence, Italy, August 2011, pp. 1257–1260.

35. **H. Bořil**, O. Sadjadi, J. H. L. Hansen, "UTDrive: Emotion and Cognitive Load Classification for In-Vehicle Scenarios," *The 5th Biennial Workshop on Digital Signal Processing for In-Vehicle Systems*, September 4–7, 2011 (Kiel, Germany).

36. **H. Bořil**, J. H. L. Hansen, "UT-Scope: Towards LVCSR under Lombard Effect Induced by Varying Types and Levels of Noisy Background," *Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'11)*, Prague, Czech Republic, May 2011, pp. 4472–4475.

37. **H. Bořil**, J. H. L. Hansen, D. Xu, J. Gilkerson, and J. Richards, "A Longitudinal Study of Infant Speech Production Parameters," *LENA Users Conference*, Denver, Colorado, April 2011.

38. **H. Bořil**, A. Sangwan, T. Hasan, and J. H. L. Hansen, "Automatic Excitement-Level Detection for Sports Highlights Generation," *Proc. of ISCA INTERSPEECH'10*, Makuhari, Chiba, Japan, September 2010, pp. 2202–2205.

39. **H. Bořil**, O. Sadjadi, T. Kleinschmidt, and J. H. L. Hansen, "Analysis and Detection of Cognitive Load and Frustration in Driversďž″ Speech," *Proc. of ISCA INTERSPEECH'10*, Makuhari, Chiba, Japan, September 2010, pp. 502–505.

40. Y. Lei, T. Hasan, J.-W. Suh, A. Sangwan, **H. Bořil**, L. Gang, K. Godin, C. Zhang, and J. H. L. Hansen, "The CRSS Systems for the 2010 NIST Speaker Recognition Evaluation," *NIST 2010 Speaker Recognition Evaluation Workshop*, Brno, Czech Rep., 4 pages, 24–25 June 2010.

41. A. Sulyman, **H. Bořil**, A. Sangwan, and J. H. L. Hansen, "Limited Resource Speech Recognition for Nigerian English," in *Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'10)*, Dallas, TX, March 2010, pp. 5090–5093.

42. M. Mehrabani, **H. Bořil**, and J. H. L. Hansen, "Dialect Distance Assessment Method Based on Comparison of Pitch Pattern Statistical Models," in *Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'10)*, Dallas, TX, March 2010, pp. 5158–5161.

43. T. Kleinschmidt, P. Boyraz, **H. Bořil**, S. Sridharan, and J. H. L. Hansen, "Assessment of Speech Dialog Systems using Multi-Modal Cognitive Load Analysis and Driving Performance Metrics," in *Proc. of IEEE International Conference on Vehicular Electronics and Safety (ICVES'09)*, Pune, India, November 2009, pp. 162–167.

44. **H. Bořil** and J. H. L. Hansen, "Reduced Complexity Equalization of Lombard Effect for Speech Recognition in Noisy Adverse Environments," in *Proc. of ISCA INTERSPEECH'09*, Brighton, UK, September 2009, pp. 1243–1246.

45. **H. Bořil**, P. Boyraz, and J. H. L. Hansen, "Towards Multi-Modal Driver's Stress Detection," in *Proc. of 4th Biennial Workshop on Digital Signal Processing for In-Vehicle Systems and Safety*, Dallas, TX, 2009, 9 pages.

46. **H. Bořil**, N. Krishnamurthy, and J. H. L. Hansen, "Online Noise and Lombard Effect Compensation for In-Vehicle Automatic Speech Recognition," in *Proc. of 4th Biennial Workshop on Digital Signal Processing for In-Vehicle Systems and Safety*, Dallas, TX, 2009, 4 pages.

47. **H. Bořil** and J. H. L. Hansen, "Unsupervised Equalization of Lombard Effect for Speech Recognition in Noisy Adverse Environment," in *Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'09)*, Taipei, Taiwan, April 2009, pp. 3937–3940.

48. **H. Bořil**, P. Fousek, and H. Höge, "Two-Stage System for Robust Neutral/Lombard Speech Recognition," in *Proc. of ISCA INTERSPEECH'07*, Antwerp, Belgium, 2007, pp. 1074–1077.

49. **H. Bořil**, T. Bořil, and P. Pollák, "Methodology of Lombard Speech Database Acquisition: Experiences with CLSD," in *Proc. of 5th ELRA Conference on Language Resources and Evaluation (LREC 2006)*, Genova, Italy, 2006, pp. 1644–1647.

50. **H. Bořil**, "Design of Speech Feedback; Comparison of Features for Lombard Speech Recognition," in *Proc. of Analysis and Processing of Speech and Biological Signals*, CTU Publishing House, *in Czech*, Prague, Czech Republic, 2006, pp. 24–30.

51. **H. Bořil**, P. Fousek, and P. Pollák, "Data-Driven Design of Front-End Filter Bank for Lombard Speech Recognition," in *Proc. of ISCA International Conference on Spoken Language Processing (ICSLP'06)*, Pittsburgh, Pennsylvania, 2006, pp. 381–384.

52. **H. Bořil**, P. Fousek, D. Sündermann, P. Červa, and J. Ždánský, "Lombard Speech Recognition: A Comparative Study," in *Proc. of 16th Czech-German Workshop on Speech Processing*, Prague, Czech Republic, 2006, pp. 141–148.

53. **H. Bořil**, P. Fousek, "Influence of Different Speech Representations and HMM Training Strategies on ASR Performance," in *Proc. of POSTER'06 – 10th International Student Conference on Electrical Engineering*, Prague, Czech Republic, 2006, 4 pages.

54. **H. Bořil**, "Automatic Reconstruction of Utterance Boundaries Time Marks in Speech Database Re-Grabbed from DAT Recorder," in *Proc. of International Workshop on Digital Technologies 2005*, Zilina, Slovakia, 2005, pp. 13–16.

55. **H. Bořil** and P. Pollák, "Comparison of Three Czech Speech Databases from the Standpoint of Lombard Effect Appearance," in *Proc. of COST278 Final Workshop and ISCA Tutorial and Research Workshop on Applied Spoken Language Interaction in Distributed Environments (ASIDE) 2005*, Aalborg, Denmark, 2005, 4 pages.

56. **H. Bořil** and P. Pollák, "Design and Collection of Czech Lombard Speech Database," in *Proc. of ISCA INTERSPEECH'05*, Lisboa, Portugal, 2005, pp. 1577–1580.

57. **H. Bořil** and P. Pollák, "Analysis of Lombard Effect in Several Czech Databases," in *Proc. of Joint 16th Conference on Electronic Speech Signal Processing (ESSP 2005) and 15th Czech-German Workshop on Speech Processing*, Prague, Czech Republic, 2005, pp. 253–259.

58. **H. Bořil**, T. Bořil, and P. Pollák, "Design of Lombard Effect Speech Database," in *Proc. of Radioelektronika 2005*, Brno, Czech Republic, 2005, pp. 144–147.

59. **H. Bořil**, "Recognition of Speech under Lombard Effect," in *Proc. of 14th Czech-German Workshop on Speech Processing*, Prague, Czech Republic, 2004, pp. 110–113.

60. **H. Bořil** and P. Pollák, "Direct Time Domain Fundamental Frequency Estimation of Speech in Noisy Conditions," in *Proc. of EURASIP European Signal Processing Conference (EUSIPCO) 2004*, vol. 2, Vienna, Austria, 2004, pp. 1003–1006.

61. **H. Bořil**, "Speech Feature Variations and Speech Recognition under Stress," *Survey*, in *Proc. of Signal Analysis and Processing V*, CTU Publishing House, *in Czech*, Prague, Czech Republic, 2004, pp. 54–65.

62. **H. Bořil**, "Pitch Detector for Guitar MIDI Converter," in *Proc. of POSTER'03 – 7th International Student Conference on Electrical Engineering*, Prague, Czech Republic, 2003, pp. EI1 (2 pages).

LECTURES/ABSTRACTS/REPORTS

63. Skyler Horn, **H. Bořil**, "Gender Classification from Speech Using Convolutional Networks Augmented with Synthetic Spectrograms", *Poster Presentation, 181st Meeting of the Acoustical Society of America*, Seattle, Washington, December 3, 2021.

64. Skyler Horn, Matthew Nigh, Andrew Lueschow, Elizabeth Bohlman, Audrey Kreiling, Kyra Wilger, Matthew Sloey, **H. Bořil**, "Gender Classification and Feature Analysis from Speech Signals", *Poster Presentation, 2020 Virtual Pioneer Creative Activities and Research Day (PCARD)*, University of Wisconsin–Platteville, April 26, 2021.

65. Matthew Sloey, **H. Bořil**, "The Seeder: A Data-Driven Approach to K-Means and Gaussian Mixture Model Seeding", *Poster Presentation, 2020 Virtual Pioneer Creative Activities and Research Day (PCARD)*, University of Wisconsin–Platteville, April 26, 2021.

66. Flock Vang, Jonas Wagner, Daniel Zinnel, Aric Fowler, **H. Bořil**, "Modeling Vowel Formants using K-Means Clustering and Gaussian Mixture Models", *Poster Presentation, 2020 Virtual Pioneer Creative Activities and Research Day (PCARD)*, University of Wisconsin–Platteville, April 27, 2020.

67. Aric Fowler, Emma Mutschelknaus, **H. Bořil**, "Modeling of Natural and Analog Audio Systems", *Poster Presentation, 2020 Virtual Pioneer Creative Activities and Research Day (PCARD)*, University of Wisconsin–Platteville, April 27, 2020.

68. Jonas Wagner, **H. Bořil**, "Implementing E–M Algorithm using Python within WSL", *invited talk*, Center for Robust Speech Systems, The University of Texas at Dallas, November 2019.

69. Flock Vang, Daniel Zinnel, **H. Bořil**, "Vowel Identification using Formants 1 & 2", *invited talk*, Center for Robust Speech Systems, The University of Texas at Dallas, November 2019.

70. Aric Fowler, **H. Bořil**, "Modeling of Natural and Analog Audio Systems", *invited talk*, Center for Robust Speech Systems, The University of Texas at Dallas, November 2019.

71. Kyle Krueger, **H. Bořil**, "Language Modeling and Word Prediction using Statistical Models and Neural Networks", *Poster Presentation, Engagement Grant Poster Session*, University of Wisconsin–Platteville, April 25, 2019.

72. Luke Bielen, Devin Durkee, Hunter Durian, Nick Gorichs, Ryan Henke, Jacob Plapp, Logan Shefchik, Flock Vang, Jonas Wagner, Nathaniel Wronski, Hazem Younis, Daniel Zinnel, **H. Bořil**, "Data Clustering and Stochastic Modeling for Speech Signal Classification", *Poster Presentation, Engagement Grant Poster Session*, University of Wisconsin–Platteville, April 25, 2019.

73. T.J. Millis, James Pelegrin, Max Steele, **H. Bořil**, "Automatic Speech Activity Detection and Pitch Tracking in Audio Streams", *Poster Presentation, Engagement Grant Poster Session*, University of Wisconsin–Platteville, April 25, 2019.

74. Kyle Krueger, **H. Bořil**, "Next Word Prediction Using Neural Network", *invited talk*, Center for Robust Speech Systems, The University of Texas at Dallas, December 6, 2018.

75. Kyle Krueger, **H. Bořil**, "Rubik's Cube in VHDL", *invited talk*, Center for Robust Speech Systems, The University of Texas at Dallas, December 6, 2018.

76. Lucas Goncalves, Danielle Hughes, Brandon Dane, Henry Breaker **H. Bořil**, "Classification using Clustering; K-means and Hierarchical Clustering", *invited talk*, Center for Robust Speech Systems, The University of Texas at Dallas, December 6, 2018.

77. **H. Bořil**, "Equalizing Speaker, Speaking Style and Environment-Induced Variability in Audio Streams for Robust Speech Engines", *invited talk*, SpeechLab at Shanghai Jiao Tong University, Shanghai, China, June 12, 2018.

78. Alec Steel, T.J. Millis, Daniel Erickson, **H. Bořil**, "Speech Activity Detection", *invited talk*, Center for Robust Speech Systems, The University of Texas at Dallas, November 29, 2017.

79. Avamarie Brueggeman, Chelzy Belitz, Jessop Lueschow, **H. Bořil**, "Voice Speaker Identification & Gender Detection", *invited talk*, Center for Robust Speech Systems, The University of Texas at Dallas, November 29, 2017.

80. Thomas Leuenberger, Kyle Krueger, **H. Bořil**, "Neural Networks–Implementation and Applications", *invited talk*, Center for Robust Speech Systems, The University of Texas at Dallas, November 29, 2017.

81. **H. Bořil**, "From Acoustic Waveforms to Text: Digital Signal Processing and Machine Learning for Speech Recognition," *International Technology, Engineering and Innovation Congress (CITII)*, keynote talk, Universidad de San Buenaventura, Sede Bogota, Bogota, Colombia, October 18–20, 2017.

82. **H. Bořil**, "Signal Processing and Machine Learning for Voice Recognition and Beyond," *Data Science and Digital Information Services: The Second Youth Talent Forum in Software Engineering Science*, invited lecture, Dalian University of Technology, School of Software Technology, Dalian, China, July 26–28, 2017.

83. Joseph Adrian, Chelzy Belitz, Thomas Leuenberger, Jessop Lueschow, Sam Rall, Todd Webb, Avamarie Brueggeman, Kyle Kumbier, Eric Cinnamon, Cara Savage, Anran Zheng, **H. Bořil**, "Pioneer Speech Signal Processing Laboratory (PSSPL): Mission and Research Team", *Poster Presentation, Pioneer Academic Center for Community Engagement (PACCE) Poster Day*, University of Wisconsin–Platteville, April 27, 2016.

84. Joseph Adrian, Chelzy Belitz, Thomas Leuenberger, Jessop Lueschow, Sam Rall, Todd Webb, Avamarie Brueggeman, Kyle Kumbier, Eric Cinnamon, Cara Savage, Anran Zheng, **H. Bořil**, "Speech Activity & Speaker Overlap Detection", *Poster Presentation, Pioneer Academic Center for Community Engagement (PACCE) Poster Day*, University of Wisconsin–Platteville, April 27, 2016.

85. Joseph Adrian, Chelzy Belitz, Thomas Leuenberger, Jessop Lueschow, Sam Rall, Todd Webb, Avamarie Brueggeman, Kyle Kumbier, Eric Cinnamon, Cara Savage, Anran Zheng, **H. Bořil**, "Music Signal Processing; Speech Warping", *Poster Presentation, Pioneer Academic Center for Community Engagement (PACCE) Poster Day*, University of Wisconsin–Platteville, April 27, 2016.

86. A. Sangwan, **H. Bořil**, T. Hasan, and J. H. L. Hansen, "A Multimodal System for Automatic Sports Highlights Generation," *2014 IEEE Spoken Language Technology Workshop (SLT 2014)*, demo exhibition, South Lake Tahoe, Nevada, December 7–10, 2014.

87. **H. Bořil**, A. Ziaei, and J. H. L. Hansen, "Prof-Life-Log: Production of Conversational Speech as a Function of Varying Environment," *LENA International Conference*, poster presentation, Denver, Colorado, April 2013.

88. J. H. L. Hansen, **H. Bořil**, A. Sathyanarayana, "Speech Communications–Driving Behavior and Safety: Can They Co-Exist?" *Lecture, CREST Symposium on Human-Harmonized Information Technology*, Kyoto University, Kyoto, Japan, April 2, 2012.

89. **H. Bořil**, A. Sangwan, T. Hasan, and J. H. L. Hansen, "Automatic Excitement-Level Detection for Sports Highlights Generation," *Wireless Long Term Evolution – The Connected World, UT Dallas Research and New Venture Showcase*, poster presentation, Dallas, Texas, October 2010.

90. **H. Bořil**, O. Sadjadi, T. Kleinschmidt, and J. H. L. Hansen, "Analysis and Detection of Cognitive Load and Frustration in Driversďż″ Speech," *Wireless Long Term Evolution – The Connected World, UT Dallas Research and New Venture Showcase*, poster presentation, Dallas, Texas, October 2010.

91. **H. Bořil**, T. Kleinschmidt, P. Boyraz, and J. H. L. Hansen, "Impact of Cognitive Load and Frustration on Drivers," *Invited Lecture, Joint* 159th *ASA Meeting and Noise-Con 2010*, Baltimore, Maryland, 19–23 April 2010.

92. **H. Bořil**, "Attributes and Recognition of Lombard speech," *Invited Lecture, Sound to Sense (S2S) Workshop – Speech in Adverse Conditions* (Prague, Czech Republic), Sept. 2008.

93. **H. Bořil**, "Normalization of Lombard effect," CTU in Prague & Siemens Corporate Technology, Munich, Research Report No. R07-2, 52 pages, 2007.

94. **H. Bořil** and P. Pollák, "Czech Lombard Speech Database (CLSD'05)," CTU in Prague, Research Report No. R07-1, 24 pages, 2006.

95. **H. Bořil** and P. Pollák, "Pitch-Marking Based on the DFE Algorithm," *Lecture,* 6th *Meeting of European Center of Excellence in Speech Synthesis (ECESS) and TC-STAR WP3*, poster presentation, Berlin, Germany, Jan. 2006.

96. **H. Bořil**, "Design and Acquisition of Lombard Speech Database, First Experiments," *Lecture*, Institute of Radio Engineering and Electronics, Czech Academy of Sciences, Prague, Czech Republic, Dec. 2004.