GONGPING HUANG

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Google Scholar: https://scholar.google.ca/citations?user=a3x1k7kAAAAJ&hl=en.
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EDUCATION

- **Ph.D., Northwestern Polytechnical University, China**, *[Sep. 2012- June. 2019]*
  Major: *Electronics and Information Engineering*
  Thesis: *Study of Microphone Array Speech Enhancement for Speech Communication and Human-machine Interfaces*
  Advisor: Prof. Jingdong Chen and Prof. Jacob Benesty

- **Visiting Scholar, INRS-EMT, University of Quebec, Canada**, *[Oct. 2015 - Nov. 2017]*
  Major: *Electronic Engineering*
  Advisor: Prof. Jacob Benesty and Prof. Jingdong Chen

- **Visiting Scholar, Technion-Israel Institute of Technology, Israel**, *[July. 2014- Aug. 2014]*
  Study area (summer school): *Image processing* (Mentor: Prof. Israel Cohen).

- **B.Sc., Northwestern Polytechnical University, China**, *[Sep. 2008 - Jun. 2012]*
  Major: *Electronic Engineering* (Rank in class: 1st out of 31 students)

PROFESSIONAL EXPERIENCE

- **Postdoctoral Research Fellow in Technion-Israel Institute of Technology** [From June 2019]
  - Audio and acoustic signal processing, Graph signal processing.

- **Teaching/Research Assistant at CIAIC** [Jan. 2016 - May 2019]
  - Co-supervise students worked on audio and speech signal processing.
  - Led projects on audio and speech signal processing.

- **Internship at Research institute of CVTE Co., Ltd.** [April 2017 - Sep. 2017]
  - Led a project on microphone array speech enhancement for video conferencing system.

- **Internship/Researcher at CIAIC-IFLYTEK Joint Laboratory** [Jan. 2015 - May 2015]
  - Co-developed front-end enhancement system on vehicle for automotive speech recognition.
  - Co-developed the source localization and speech enhancement algorithms for intelligent speaker.

Selected Prizes and Awards

- Andrew and Erna Finci Viterbi Post-Doctoral Fellowship's award. 2019.
- IEEE SPS travel grants for ICASSP 2018 (May 2018) and ICASSP 2015 (Apr. 2015).
- Ministry of Industry and Information Outstanding Scholarship, Oct. 2017.
- National Scholarship for Graduate, Oct. 2015.
- Best Thesis Award, Jun. 2012.
- Outstanding Graduate Students Awards, Jun. 2012.
- National Scholarship for Undergraduate, Oct. 2011, Oct. 2010.
- Merit Student and the First Prize Scholarship, Sep. 2011, Sep. 2010, Sep. 2009.
- Excellent Student and the First Prize Scholarship, Sep. 2010.
- Merit Student and the First Prize Scholarship, Sep. 2009

Publications

Books

[1] **G. Huang**, J. Chen, J. Benesty, and I. Cohen, "Frequency Invariant Beamforming with Microphone Arrays." In preparation.

Peer-reviewed scientific journals

[1] **G. Huang**, I. Cohen, J. Benesty, and J. Chen "Continuously steerable differential beamformers with null constraints for circular microphone arrays," *J. Acoust. Soc. Am.*, to appear.

[2] **G. Huang**, J. Benesty, I. Cohen, and J. Chen "A simple theory and new method of differential beamforming with uniform linear microphone arrays," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 28, pp.1079–1093, 2020.

[3] **G. Huang**, J. Benesty, I. Cohen, and J. Chen, "Differential beamforming on graphs," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 28, pp.901–913, 2020.

[4] **G. Huang**, J. Chen, and J. Benesty, "Design of planar differential microphone arrays with fractional orders," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 28, pp. 116–130, 2020.

[5] **G. Huang**, J. Chen, and J. Benesty, "Insights into the frequency-invariant beamforming with concentric circular microphone arrays," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 26, no. 12, pp. 2305–2318, Dec. 2018.

[6] **G. Huang**, J. Chen, and J. Benesty, "On the design of differential beamformers with arbitrary microphone array geometry," *J. Acoust. Soc. Am.*, vol. 144, no. 1, pp. EL66–EL70, May 2018.

[7] **G. Huang**, J. Chen, and J. Benesty, "A flexible high directivity beamformer with spherical microphone arrays," *J. Acoust. Soc. Am.*, vol. 143, no. 5, pp. 3024-3035, May 2018.

[8] **G. Huang**, J. Benesty, and J. Chen, "On the design of frequency-invariant beampatterns with uniform circular microphone arrays," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 25, no. 5, pp. 1140-1153, May 2017.

[9] **G. Huang**, J. Benesty, and J. Chen, "Design of robust concentric circular differential microphone arrays," *J. Acoust. Soc. Am.*, vol. 141, no. 5, pp. 3236-3249, May 2017.

[10] **G. Huang**, J. Benesty, and J. Chen, "Superdirective beamforming based on the Krylov matrix," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 22, no. 12, pp. 2034-2047, Dec. 2016.

[11] **G. Huang**, J. Chen, and J. Benesty, "Direction-of-arrival estimation of passive acoustic sources in reverberant environments based on the Householder transformation," *J. Acoust. Soc. Am.*, vol. 138, no. 5, pp. 3053-3060, Nov. 2015.

[12] **G. Huang**, J. Benesty, T. Long, and J. Chen, "A family of maximum SNR filters for noise reduction," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 22, no. 12, pp. 2034-2047, Dec. 2014.

[13] T. Long, J. Chen, **G. Huang**, J. Benesty, and I. Cohen, "Acoustic source localization based on geometric projection in reverberant and noisy environments," *IEEE J. Selected Topics Signal Process.*, vol. 13, no. 1, pp. 143-155, Mar. 2019.

[14] C. Pan, **G. Huang**, and J. Chen, "Microphone array beamforming: an overview," *J. Signal Process.*, vol. 36, no. 6, pp. 804-815, Mar. 2020. (in Chinese).

[15] **G. Huang**, J. Chen, J. Benesty, I. Cohen, and X. Zhao, "Steerable differential beamformers with planar microphone arrays," submitted.

[16] Y. Wang, J. Benesty, J. Chen, J. Jin, and **G. Huang**, "Binaural heterophasic superdirective beamforming," submitted.

[17] J. Jin, J. Chen, J. Benesty, Y. Wang, and **G. Huang**, "Heterophasic binaural differential beamforming for speech intelligibility improvement," submitted.

[18] W. Yang, J. Benesty, **G. Huang**, and J. Chen, "A new class of differential beamformers," submitted.

[19] W. Yang, **G. Huang**, J. Chen, J. Benesty, I. Cohen, and K., Walter "Robust dereverberation with Kronecker product based multichannel linear prediction," submitted.

[20] Z. Xudong, J. Benesty, **G. Huang**, and J. Chen, "Study of a particular family of differential beamformers: beampatterns with no nulls," submitted.

PEER-REVIEWED CONFERENCE PROCEEDINGS

[1] **G. Huang**, I. Cohen, J. Benesty, and J. Chen, "Kronecker product beamforming with multiple differential microphone arrays," in *Proc. IEEE SAM*, 2020.

[2] **G. Huang**, J. Chen, J. Benesty, and I. Cohen, "Robust and steerable kronecker product differential beamforming with rectangular microphone arrays," in *Proc. IEEE ICASSP*, 2020, pp. 211–215.

[3] D. Li, **G. Huang**, Y. Lei, J. Chen, and J. Benesty, "Robust source separation with differential microphone arrays and independent low-rank matrix analysis," in *Proc. EUSIPCO*, 2020.

[4] Z. Xudong, **G. Huang**, J. Chen, and J. Benesty, "An improved solution to the frequency-invariant beamforming with concentric circular microphone arrays," in *Proc. IEEE ICASSP*, 2020.

[5] X. Chen, **G. Huang**, J. Chen, and J. Benesty, "On the design of maximum-achievable-directivity beamformer with white-noise-gain constraint." *in Proc. ICA*, 2019.

[6] X. Wang, **G. Huang**, J. Benesty, J. Chen, and I. Cohen, "On the design of Kronecker product beamformers with three-dimensional microphone arrays." *in Proc. ICA*, 2019.

[7] X. Zhao, **G. Huang**, J. Benesty, and J. Chen, "Optimal design of symmetric and asymmetric beam-

patterns with circular arrays," *in Proc. ICA*, 2019.

[8] **G. Huang**, X. Zhao, J. Chen, and J. Benesty, "Properties and limits of the minimum-norm differential beamformers with circular microphone arrays," *in Proc. IEEE ICASSP*, 2019, pp. 426–430 (IEEE SPS travel grant).

[9] W. Yang, **G. Huang**, J. Benesty, I. Cohen, and J. Chen, "On the design of flexible Kronecker product beamformers with linear microphone arrays," *in Proc. IEEE ICASSP*, 2019, pp. 441–445.

[10] J. Jin, **G. Huang**, J. Chen, and J. Benesty, "Optimal nonuniform linear differential microphone arrays based on optimizing array geometry and subarray combination," *in Proc. IEEE ICASSP*, 2019, pp. 5741–5745.

[11] W. Yang, **G. Huang**, W. Zhang, J. Chen, and J. Benesty, "Dereverberation with differential microphone arrays and the weighted-prediction-error method," *in Proc. IEEE IWAENC*, 2018, pp. 376-380.

[12] **G. Huang**, J. Chen, and J. Benesty, "On the design of robust steerable frequency-invariant beampatterns with concentric circular microphone arrays," *in Proc. IEEE ICASSP*, 2018, pp. 506 - 510.

[13] **G. Huang**, J. Benesty, and J. Chen, "Study of the frequency-domain multichannel noise reduction problem with the Householder transformation," *in Proc. IEEE ICASSP*, 2017, pp. 486-490.

[14] **G. Huang**, J. Benesty, and J. Chen, "Subspace superdirective beamforming with uniform circular microphone arrays," *in Proc. IEEE IWAENC*, 2016, pp. 1-5.

[15] **G. Huang**, J. Benesty, and J. Chen, "A parametric superdirective beamformer with uniform linear microphone arrays," *in Proc. International commission for acoustics (ICA)*, 2016.

[16] L. Li, J. Benesty, **G. Huang**, and J. Chen, "Subspace superdirective beamformers based on joint diagonalization," *in Proc. IEEE ICASSP*, 2016, pp. 400-405.

[17] **G. Huang**, J. Benesty, and J. Chen, "On a multichannel maximum SNR filter for noise reduction in the STFT domain," *in Proc. IEEE ChinaSIP*, 2015, pp. 697-700.

[18] **G. Huang**, J. Chen, and J. Benesty, "Investigation of a parametric gain approach to single-channel speech enhancement," *in Proc. IEEE ICASSP*, 2015, pp. 206-210 (IEEE SPS travel grant).

[19] J. Yu, J. Benesty, **G. Huang**, and J. Chen, "Optimal single-channel noise reduction filtering matrices from the Pearson correlation coefficient perspective," *in Proc. IEEE ICASSP*, 2015, pp. 201-205.

[20] J. Yu, J. Benesty, **G. Huang**, and J. Chen, "Examples of optimal noise reduction filters derived from the squared Pearson correlation coefficient," *in Proc. IEEE ICASSP*, 2014, pp. 1571-1575.

PATENTS

[1] J. Chen and **G. Huang**, "Frequency-invariant beamformer for compact multi-ringed circular differential microphone arrays" *US patent*, US10506337B1, 2019. Granted.

[2] J. Chen, **G. Huang**, and J. Benesty, "Concentric circular differential microphone arrays and associated beamforming" *US patent*, US9930448B1, 2018. Granted.

[3] J. Chen, **G. Huang**, and J. Benesty, "flexible geographically-distributed differential microphone array and associated beamformer" *US patent*. In process.

[4] J. Chen, J. Benesty, Y. Wang, and **G. Huang**, "Heterophasic Binaural Differential Beamforming for Speech Intelligibility Improvement" *US patent*. In process.

[5] J. Chen, **G. Huang**, and J. Benesty, "Parametric superdirective beamformer with uniform linear microphone arrays" *China patent*, no. 201610545565.7, 2016. Granted.

[6] J. Chen, L. Li, **G. Huang**, and J. Benesty, "Subspace superdirective beamformers based on joint diagonalization" *China patent*, no. 201610108588.1, 2016. Granted.

[7] J. Chen, **G. Huang**, and J. Benesty, "A source localization method and device" *China patent*, no. 2015103785802, 2015. Granted.

PRESENTATIONS

- Oral presentation (virtual), *IEEE SAM 2020*, Hangzhou, China, June, 2020.
- Oral presentation (virtual), *ICASSP 2020*, Barcelona, Spain, May, 2020.
- Poster presentation, *ICASSP 2019*, Brighton, United Kingdom, May, 2019.
- Invited oral presentations, *PhD Forum on APSIPA 2019*, Hawaii, USA, November 2018.
- Poster presentation, *IWAENC 2018*, Tokyo, Japan, September, 2018.
- Poster presentation, *ICASSP 2018*, Calgary, Alberta, Canada, April, 2018
- Invited talk at Alibaba AI Labs, Hangzhou, China, March, 2018.
- Invited talk at Research institute at CVTE, Guangzhou, China, June, 2017.
- Poster presentation, *ICASSP 2017*, New Orleans, USA, March, 2017.
- Oral presentation, *ICA 2016*, Buenos Aires, Argentina, September, 2016.
- Poster presentation, *IWAENC 2016*, Xi'an, China, September, 2016.
- Invited oral presentation, *ChinaSIP 2015*, Chengdu, China, July, 2015.
- Poster presentation, *ICASSP 2015*, Brisbane, Australian, April 2015.

TEACHING, SUPERVISING, AND MENTORING ACTIVITIES

Teaching
- Microphone Arrays Signal Processing, [in CIAIC, From Jan. 2018 to June 2019, 2 hours/week].
- Acoustic Signal Processing, [in Orientation, Sep. 2017/2018].

Co-supervised Ph.D. student
- Xuehan Wang, Beamforming with Cube Microphone Arrays, [From Sep. 2017].

Co-supervised master student
- Jilu Jin, Optimal differential beamforming based on geometry optimization, [From Aug. 2018].
- Yuzhu Wang, Binaural differential beamforming, [From Sep. 2017].
- Bingjie Zhang, DOA estimation with co-prime microphone arrays, [Sep. 2016 - March 2018].

Co-supervised bachelor's thesis
- Xueqing Luo, Dual Microphone speech enhancement, [Sep. 2018 - June 2019].
- Yunyi Bai, Superdirective beamformers with Microphone arrays, [Sep. 2017 - June 2018].
- Wenxing Yang, Design of circular differential microphone arrays, [Sep. 2016 - June 2017].
- Beibei Yang, Microphone array source localization method and device, [Sep. 2015 - June 2016].

EXAMPLES OF PARTICIPATION IN INDUSTRIAL INNOVATION

Project/Team Leader at CIAIC [Jan. 2016 - May 2019]

- Led a project on developing microphone arrays based multimedia desktop conference system.
- Independently developed speech acquisition algorithms for multi-ringed circular microphone arrays and applied a US patents (granted).

Project/Team Leader at CIAIC [Jan. 2016 - May 2019]

- Led a project on developing microphone arrays for high directivity speech acquisition.
- Independently developed circular and concentric circular differential beamforming algorithms and applied one US patents and two Chinese patents (all granted).

Project/Team Leader at CVTE Co., Ltd. [April 2017 - Sep. 2017]

- Led a team developed a microphone array speech enhancement system for video conferencing.
- Independently developed the source localization, dereverberation, beamforming, and noise reduction algorithms for a microphone arrays on screen (product testing in progress).

Researcher/Core-participant at CIAIC-IFLYTEK Joint Laboratory [Jan. 2015 - May 2015]

- Co-developed front-end enhancement system on vehicle for automotive speech recognition.
- Co-developed source localization and speech enhancement algorithms for intelligent speaker.

Other Activities

• Student member of IEEE, IEEE SPS, IEEE Young Professionals, ISCA, and APSIPA.

• Reviewer for scientific journals (80):

Publons: https://publons.com/researcher/3035051/gongping-huang/.

- *IEEE/ACM Transactions on Audio, Speech, and Language Processing*
- *Journal of the Acoustical Society of America*
- *IEEE Signal Processing Letters*
- *IEEE Transactions on Signal Processing*
- *IEEE-ASME Transactions on Mechatronics*
- *IEEE Transactions on Vehicular Technology*
- *Speech Communication*
- *EURASIP Journal on Audio, Speech, and Music Processing*
- *IEEE Communications Letters*
- *IEEE Access*

• Programme committee/Reviewer for international conferences:

- *Interspeech 2020, APSIPA 2019, EUSIPCO 2016, IWAENC 2016, ChinaSIP 2015, ICSPCC 2015*