

GONGPING HUANG

Department of Electrical Engineering
Technion - Israel Institute of Technology

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

Researchgate: https://www.researchgate.net/profile/Gongping_Huang.

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 Fellowship in Technion's Faculty of Electrical Engineering [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.
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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**, 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.
- [2] **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.
- [3] **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.
- [4] **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.
- [5] **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.
- [6] **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.
- [7] **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.
- [8] **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.
- [9] **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.

- [10] **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.
- [11] **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.
- [12] 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.
- [13] C. Pan, **G. Huang**, and J. Chen, "Microphone Array Beamforming: an Overview," *J. Signal Process.*, vol. 36, no. 6, pp. 804-815, Mar. 2020.
- [14] **G. Huang**, J. Chen, J. Benesty, I. Cohen, and X. Zhao, "Steerable Differential Beamformers with Planar Microphone Arrays," [submitted](#).
- [15] **G. Huang**, I. Cohen, J. Chen, and J. Benesty, "Continuously Steerable Differential Beamformers with Null Constraints for Circular Microphone Arrays," [submitted](#).
- [16] Y. Wang, J. Benesty, J. Chen, J. Jin, and **G. Huang**, "Binaural Heterophasic Superdirective Beamforming," [submitted](#).
- [17] W. Yang, J. Benesty, **G. Huang**, and J. Chen, "A New Class of Differential Beamformers," [submitted](#).

PEER-REVIEWED CONFERENCE PROCEEDINGS

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- [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**, 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 beam-patterns 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

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- [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*