

# GONGPING HUANG

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

**Researchgate:** [https://www.researchgate.net/profile/Gongping\\_Huang](https://www.researchgate.net/profile/Gongping_Huang).

## EDUCATION

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- 🎓 **09/2012- 06/2019, Ph.D.** in Information and Communication Engineering  
*CIAIC, Northwestern Polytechnical University (NPU), China.*  
Advisor: Prof. Jingdong Chen and Prof. Jacob Benesty  
Microphone Array Speech Enhancement for Speech Communication and Human-machine Interfaces.
- 🎓 **10/2015 - 11/2017, Ph.D. (joint)** in Information and Communication Engineering  
*INRS-EMT, University of Quebec, Canada.*  
Advisor: Prof. Jacob Benesty.
- 🎓 **09/2008 - 06/2012, B.Sc.** in Electronic Engineering  
*Faculty of Electrical Engineering, Northwestern Polytechnical University (NPU), China.*

## PROFESSIONAL EXPERIENCE

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- 🎓 **06/2019 - Present, Postdoctoral Research Fellow**, *Faculty of Electrical Engineering, Technion, Israel.*  
Work on the Signal and Image processing Lab in the team of Prof. Israel Cohen.  
Lead a project on microphone array for speech enhancement.
- 🎓 **10/2015 - 11/2017, Visiting researcher**, *INRS-EMT, University of Quebec, Canada.*  
Work on microphone arrays frequency-invariant beamforming.
- 🎓 **02/2015 - 06/2019, Teaching/Research Assistant**, *CIAIC, China.*  
Work on audio and speech signal processing projects.  
Help supervising students on signal processing (4 bachelor students, 4 master students).
- 🎓 **11/2015 - 02/2019, Researcher**, *Research Institute of CVTE Co., Ltd., China.*  
In charge of a project on speech enhancement for video conferencing system.
- 🎓 **01/2015 - 10/2015, Internship/Researcher**, *CIAIC-IFLYTEK Joint Laboratory, China*  
As a core member, participated a front-end enhancement system for intelligent speaker and vehicle automotive speech recognition.
- 🎓 **07/2014 - 08/2014, Visiting Student**, *Technion-Israel Institute of Technology, Israel*  
Study image processing (Mentor: Prof. Israel Cohen).

## SELECTED PRIZES AND AWARDS

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- Best Ph.D. Thesis Award of Chinese Institute of Electronics, in [01/2021](#).
- Technion Andrew and Erna Finci Viterbi Post-Doctoral Fellowship's award, in [09/2019](#).
- IEEE SPS travel grants for ICASSP 2018, in [04/2018](#).
- China Ministry of Industry and Information Outstanding Scholarship, in [10/2017](#).
- China National Scholarship for Graduate, in [10/2015](#).
- China CSC Scholarship, in [05/2015](#).
- IEEE SPS travel grants for ICASSP 2015, in [04/2015](#).
- NPU Best Thesis Award, in [05/2012](#).
- NPU Outstanding Graduate Students Awards, in [06/2012](#).
- China National Scholarship for Undergraduate, **twice**, respectively in [10/2010](#) and [10/2011](#).
- NPU Excellent Student and the First Prize Scholarship, **3 times** in [09/2009](#), [09/2010](#), and [09/2011](#).

## PUBLICATIONS

### PEER-REVIEWED SCIENTIFIC JOURNALS

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- [1] X. Chen, J. Benesty, **G. Huang**, and J. Chen, "On the Robustness of the Superdirective Beamformer," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 29, 2021.
- [2] W. Yang, **G. Huang**, J. Chen, J. Benesty, I. Cohen, and W. Kellermann, "Robust dereverberation with Kronecker product based multichannel linear prediction," *IEEE Signal Processing Letter*, vol. 28, pp. 101-105, 2021.
- [3] X. Zhao, J. Benesty, **G. Huang**, and J. Chen, "Study of a particular family of differential beamformers: beampatterns with no nulls," *IEEE Signal Processing Letter*, vol. 28, pp. 191-195, 2021.
- [4] X. Wang, **G. Huang**, J. Chen, J. Benesty, and I. Cohen, "Time difference of arrival estimation based on a Kronecker product decomposition," *IEEE Signal Processing Letter*, vol. 28, pp. 51-55, 2021.
- [5] X. Zhao, J. Benesty, **G. Huang**, and J. Chen, "Differential Beamforming from the Beampattern Factorization Perspective," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 29, pp. 632-643, 2021.
- [6] W. Yang, J. Benesty, **G. Huang**, and J. Chen, "A new class of differential beamformers," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 29, pp. 594-606, 2021.
- [7] Y. Wang, J. Chen, J. Benesty, J. Jin, and **G. Huang**, "Binaural heterophasic superdirective beamforming," *Sensors*, vol. 21, no. 1, 74, Dec. 2020.
- [8] J. Jin, J. Chen, J. Benesty, Y. Wang, and **G. Huang**, "Heterophasic binaural differential beamforming for speech intelligibility improvement," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 11, pp. 13497-13509, Nov. 2020.
- [9] **G. Huang**, J. Chen, J. Benesty, I. Cohen, and X. Zhao, "Steerable differential beamformers with planar microphone arrays," *EURASIP Journal on Audio, Speech, and Music Processing*, Vol. 2020, no. 15, pp.1-18, Nov. 2020.

- [10] J. Jin, **G. Huang**, X. Wang, J. Chen, J. Benesty, and I. Cohen, "Steering study of linear differential microphone arrays," *IEEE/ACM Trans. Audio, Speech, Lang. Process.*, vol. 29, pp.158-170, Nov. 2020.
- [11] **G. Huang**, I. Cohen, J. Benesty, and J. Chen, "Continuously steerable differential beamformers with null constraints for circular microphone arrays," *J. Acoust. Soc. Am.*, vol. 148, no. 3, pp. 1248-1258, Sep. 2020.
- [12] **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, Mar. 2020.
- [13] **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, Feb. 2020.
- [14] **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, Oct. 2019.
- [15] 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.
- [16] **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.
- [17] **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, Jul. 2018.
- [18] **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.
- [19] **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.
- [20] **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.
- [21] **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.
- [22] **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.
- [23] **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.

## PEER-REVIEWED CONFERENCE PROCEEDINGS

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- [1] **G. Huang**, Y. Wang, I. Cohen, J. Benesty, and J. Chen, "Combined differential beamforming with uniform linear microphone arrays," *IEEE ICASSP*, 2021.
- [2] X. Wang, **G. Huang**, I. Cohen, J. Benesty, and J. Chen, "Robust steerable differential beamformers with null constraints for concentric circular microphone arrays," *IEEE ICASSP*, 2021.
- [3] X. Zhao, **G. Huang**, J. Benesty, J. Chen, and I. Cohen, "Design of square differential microphone arrays with multistage structure ," *IEEE ICASSP*, 2021.
- [4] **G. Huang**, I. Cohen, J. Benesty, and J. Chen, "Kronecker product beamforming with multiple differential microphone arrays," in *Proc. IEEE SAM*, 2020, pp. 1-5.
- [5] **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.
- [6] 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, pp. 291-295.
- [7] X. Zhao, **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, pp. 556-560.
- [8] X. Chen, **G. Huang**, J. Chen, and J. Benesty, "A Maximum-Achievable-Directivity Beamformer with White-Noise-Gain Constraint for Spherical Microphone Arrays" in *Proc. ICA*, 2019, pp. 2752-2759.
- [9] X. Wang, **G. Huang**, J. Benesty, J. Chen, and I. Cohen, "Design of Kronecker product beamformers with cuboid microphone arrays." in *Proc. ICA*, 2019, pp. 2660-2667.
- [10] X. Zhao, **G. Huang**, J. Benesty, and J. Chen, "Optimal design of symmetric and asymmetric beam-patterns with circular arrays," in *Proc. ICA*, 2019, pp. 2909-2916.
- [11] **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)
- [12] 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.
- [13] J. Jin, **G. Huang**, J. Chen, and J. Benesty, "Design of Optimal Linear Differential Microphone Arrays Based Array Geometry Optimization," in *Proc. IEEE ICASSP*, 2019, pp. 5741-5745.
- [14] 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.
- [15] **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.
- [16] **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.
- [17] **G. Huang**, J. Benesty, and J. Chen, "Subspace superdirective beamforming with uniform circular microphone arrays," in *Proc. IEEE IWAENC*, 2016, pp. 1-5.

- [18] **G. Huang**, J. Benesty, and J. Chen, "A parametric superdirective beamformer with uniform linear microphone arrays," in *Proc. ICA*, 2016.
- [19] C. Li, J. Benesty, **G. Huang**, and J. Chen, "Subspace superdirective beamformers based on joint diagonalization," in *Proc. IEEE ICASSP*, 2016, pp. 400-405.
- [20] **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.
- [21] **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](#))
- [22] 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.
- [23] 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*, US10506337B2, 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*. Pending.
- [4] J. Chen, J. Benesty, Y. Wang, and **G. Huang**, "Heterophasic Binaural Differential Beamforming for Speech Intelligibility Improvement," *US patent*. Pending.
- [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, C. 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. 201510378580.2, 2015. [Granted](#)

## PRESENTATIONS

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- Oral presentation (virtual), *IEEE SAM 2020*, Hangzhou, China, 06/2020.
- Oral presentation (virtual), *ICASSP 2020*, Barcelona, Spain, 05/2020.
- Poster presentation, *ICASSP 2019*, Brighton, United Kingdom, 05/2019.
- Invited oral presentations, *PhD Forum on APSIPA 2018*, Hawaii, USA, 11/2018.
- Poster presentation, *IWAENC 2018*, Tokyo, Japan, 09/2018.
- Poster presentation, *ICASSP 2018*, Calgary, Alberta, Canada, 04/2018
- Invited talk at Alibaba AI Labs, Hangzhou, China, 03/2018.
- Invited talk at Research institute at CVTE, Guangzhou, China, 06/2017.

- Poster presentation, *ICASSP 2017*, New Orleans, USA, 03/2017.
- Oral presentation, *ICA 2016*, Buenos Aires, Argentina, 09/2016.
- Poster presentation, *IWAENC 2016*, Xi'an, China, 09/2016.
- Invited oral presentation, *ChinaSIP 2015*, Chengdu, China, 07/2015.
- Poster presentation, *ICASSP 2015*, Brisbane, Australian, 04/2015.

## TEACHING, SUPERVISING, AND MENTORING ACTIVITIES

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### Teaching

- Microphone Arrays Signal Processing. [[CIAIC](#), [NPU](#), 01/2018 - 06/2019, 2 hours/week]
- Research in Signal Processing: How to Excel? [[CIAIC Orientation](#), [NPU](#), 09/2017, 09/2018]

### Co-supervised Ph.D. student

- Xuehan Wang, Beamforming with Cube Microphone Arrays. [[Technion](#), From 09/2019]
- Wenxing Yang, Microphone Array Beamforming and Dereverberation. [[NPU](#), From 09/2018]

### Co-supervised master student

- Jilu Jin, Optimal Differential Beamforming Based on Geometry Optimization. [[NPU](#), From 08/2018]
- Yuzhu Wang, Binaural Differential Beamforming. [[NPU](#), From 09/2017]
- Bingjie Zhang, DOA estimation with Co-prime Microphone Arrays. [[NPU](#), 09/2016 - 03/2018]

### Co-supervised bachelor's thesis

- Xueqing Luo, Dual Microphone Speech Enhancement. [[NPU](#), 09/2018 - 06/2019]
- Yunyi Bai, Superdirective Beamformers with Microphone Arrays. [[NPU](#), 09/2017 - 06/2018]
- Wenxing Yang, Design of Circular Differential Microphone Arrays. [[NPU](#), 09/2016 - 06/2017]
- Beibei Yang, Microphone Array Source Localization. [[NPU](#), 09/2015 - 06/2016]

## EXAMPLES OF PARTICIPATION IN INDUSTRIAL INNOVATION

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### Team/Project Leader at CIAIC [[02/2018 - 05/2019](#)]

- *Desktop Conference System for high directivity speech acquisition.*  
Led a team (with five graduate students) working on the project of Desktop Conference System. We developed a microphone arrays based desktop conference system for high directivity speech acquisition that over the existing situations and applied one US patents (granted).
- *Microphone arrays speech enhancement system for smart-speaker.*  
Led a team (with three graduate students) worked on the project of speech enhancement for smart-speaker. We developed the world-leading concentric circular microphone arrays based speech enhancement system for smart-speaker. We also solved the world wide difficult problem of deep nulls in the frequency invariant microphone array beamforming, and applied one US patents (granted).

### Project Leader at CVTE Co., Ltd. [[11/2017 - 02/2018](#)]

- *Speech enhancement system for the MAXHUB conference panel.*

Led a project on developing a speech enhancement system for the MAXHUB conference panel that can allow for multi-party video conferences. I independently developed the source localization, dereverberation, beamforming, and noise reduction algorithms for the conference panel, the product testing is in progress.

 **Researcher/Core-participant** at NPU-IFLYTEK Joint Laboratory [01/2014 - 05/2015]

– *Front-end speech enhancement system on vehicle for automotive speech recognition.*

As a core-participant, I developed the dual-channel source localization and speech enhancement algorithm for vehicle system. The developed algorithm is used in many IFLYTEK vehicle systems.

## OTHER ACTIVITIES

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

- **Reviewer** for scientific journals:

- *IEEE/ACM Transactions on Audio, Speech, and Language Processing;*
- *IEEE Transactions on Signal Processing;*
- *IEEE Signal Processing Letters;*
- *IEEE Transactions on Multimedia*
- *IEEE Transactions on Vehicular Technology;*
- *IEEE-ASME Transactions on Mechatronics;*
- *Journal of the Acoustical Society of America;*
- *Speech Communication;*
- *EURASIP Journal on Audio, Speech, and Music Processing;*
- *IEEE Communications Letters;*
- *EURASIP Journal on Advances in Signal Processing;*
- *IEEE Access;*
- *Circuits, Systems and Signal Processing;*
- *Sensors;*
- *Electronics.*

- **Programme Committee/Reviewer** for international conferences:

- *ICASSP 2021;*
- *Interspeech 2020;*
- *APSIPA 2020, 2019;*
- *EUSIPCO 2016;*
- *IWAENC 2016;*
- *ChinaSIP 2015;*
- *ICSPCC 2015.*

- **126 verified reviews** on Publons: <https://publons.com/researcher/3035051/gongping-huang/>

## REFERENCES

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Prof. Jingdong Chen (e-mail: [jingdongchen@ieee.org](mailto:jingdongchen@ieee.org))  
CIAIC, Northwestern Polytechnical University (NPU), China.

Prof. Jacob Benesty  
INRS-EMT, University of Quebec, Canada (e-mail: [benesty@emt.inrs.ca](mailto:benesty@emt.inrs.ca))

Prof. Israel Cohen (e-mail: [icohen@ee.technion.ac.il](mailto:icohen@ee.technion.ac.il))  
Faculty of Electrical Engineering, Technion, Israel.

Additional references available on request.