Siheng Chen

CONTACT INFORMATION

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Google Scholar Profile: Siheng Chen

RESEARCH INTERESTS

- Theory: Graph signal processing, statistical machine learning
- Algorithm: Graph neural networks
- Application: Autonomous systems, smart infrastructure

WORKING EXPERIENCE

- Research Scientist at Mitsubishi Electric Research Laboratories — Feb. 2019 - Present
- Autonomy Engineer at Uber Advanced Technologies Group — Oct. 2017 - Feb. 2019
- Postdoctoral Researcher at Carnegie Mellon University — Jan. 2017 - Sept. 2017
- Research Intern at Mitsubishi Electric Research Laboratories — May 2016 - Aug. 2016

EDUCATION

- Ph.D in Electrical and Computer Engineering — 2011 - 2016
  GPA: 4.0, Carnegie Mellon University — Pittsburgh, PA, USA
  Ph.D Thesis: Data science with graphs: A signal processing perspective
  Advisor: Prof. Jelena Kovačević
- Master of Science in Machine Learning — 2014 - 2016
  GPA: 4.0, Carnegie Mellon University — Pittsburgh, PA, USA
  Master Thesis: Adaptive sampling for urban traffic monitoring
  Advisor: Prof. Christos Faloutsos
- Master of Science in Electrical and Computer Engineering — 2011 - 2012
  GPA: 4.0, Carnegie Mellon University — Pittsburgh, PA, USA
- Bachelor of Science in Electronic Engineering — 2007 - 2011
  GPA: 92 (1/108), Beijing Institute of Technology — Beijing, China

HONORS AND AWARDS

- IEEE Signal Processing Society Young Author Best Paper Award — 2018
- Best Student Paper Award of IEEE GlobalSIP — 2018
- IEEE ISIT Travel Grant — 2016
- IEEE ICASSP National Science Foundation Travel Grant — 2014, 2016
- Outstanding Graduates in the city of Beijing — 2011
- Outstanding Students, Beijing Institute of Technology — 2008, 2009, 2010
- China Aerospace Science and Technology Corporation Scholarship — 2011
- National Scholarship of China — 2009, 2010
- Meritorious Winner in Mathematical Contest in Modeling — 2010

PUBLICATIONS

Preprint

1. **S. Chen**, Y. C. Eldar, and L. Zhao, "Graph unrolling networks: Interpretable neural networks for graph signal denoising", *IEEE Transactions on Signal Processing.*, submitted.
2. V. Ioannidis, **S. Chen**, and G. Giannakis, "Efficient and stable graph scattering transforms via pruning", *IEEE Transactions on Pattern Analysis and Machine Intelligence.*, submitted.
3. M. Li, **S. Chen**, X. Chen, Y. Zhang, Y. Wang, and Q. Tian, "Symbiotic graph neural networks for 3D skeleton-based human action recognition and motion prediction", *IEEE Transactions on Pattern Analysis and Machine Intelligence.*, submitted.
4. X. Chen, **S. Chen**, H. Zheng, J. Yao, K. Cui, Y. Zhang, and I. W. Tsang, "Node attribute generation on graphs", *IEEE Transactions on Pattern Analysis and Machine Intelligence.*, submitted.

Journal

1. **S. Chen**, B. Liu, C. Feng, C. Vallespi-Gonzalez, and C. Wellington, "3D point cloud processing and learning for autonomous driving", *IEEE Signal Processing Magazine, Special Issue on Autonomous Driving*, 2020, Accepted.
2. **S. Chen**, C. Duan, Y. Yang, D. Li, C. Feng, and D. Tian, "Deep unsupervised learning of 3D point clouds via graph topology inference and filtering", *IEEE Trans. Image Proc.*, 2020, Accepted.
3. J. Liu, **S. Chen**, M. Berǵes, J. Bielak, J. H Garrett, J. Kovačević, and H. Y. Noh, "Damage diagnosis algorithms for indirect structural health monitoring of bridges", *Mechanical Systems and Signal Processing*, 2019.
4. J. Liu, **S. Chen**, George Lederman, David Kramer, H. Y. Noh, J. Bielak, J. H Garrett, J. Kovačević, and M. Berǵes, "Dynamic responses of two passenger trains with the corresponding GPS positions, environmental conditions and weekly maintenance schedules in Pittsburgh's light rail network", *Nature Scientific Data*, 2019.
5. Y. Yang, **S. Chen**, M. A. Maddah-Ali, P. Grover, S. Kar, and J. Kovačević, "Fast temporal path localization on graphs via multiscale Viterbi decoding", *IEEE Trans. Signal Proc.*, vol. 66 , no. 21 , Nov, 2018, pp. 5588 - 5603.
6. **S. Chen**, D. Tian, C. Feng, A. Vetro, and J. Kovačević, "Fast resampling of 3D point clouds via graphs", *IEEE Trans. Signal Proc.*, vol. 66, no. 3, Feb, 2018, pp. 666 - 681.
7. G. Lederman, **S. Chen**, J. H. Garrett, J. Kovačević, H. Y. Noh, and J. Bielak, "A data fusion approach for track monitoring from multiple in-service trains", *Mechanical Systems and Signal Processing*, vol. 95, Oct, 2017.
8. G. Lederman, **S. Chen**, J. H. Garrett, J. Kovačević, H. Y. Noh, and J. Bielak, "Track monitoring from the dynamic response of a passing train: a sparse approach", *Mechanical Systems and Signal Processing*, vol. 90, June, 2017.
9. G. Lederman, **S. Chen**, J. H. Garrett, J. Kovačević, H. Y. Noh, and J. Bielak, "Track-monitoring from the dynamic response of an operational train", *Mechanical Systems and Signal Processing*, vol. 87, Part A, March, 2017.
10. **S. Chen**, Y. Yang, S. Zong, A. Singh, and J. Kovačević, "Detecting localized binary attributes on graphs", *IEEE Trans. Signal Proc.*, vol. 65, no. 10, May, 2017.
11. **S. Chen**, R. Varma, A. Singh, and J. Kovačević, "Signal recovery on graphs: Fundamental limits of sampling strategies", *IEEE Trans. Signal and Information Proc. over Networks, Special Issue on Inference and Learning over Networks*, vol. 2, no. 4, Dec. 2016.
12. **S. Chen**, R. Varma, A. Sandryhaila, and J. Kovačević, "Discrete signal processing on graphs: Sampling theory", *IEEE Trans. Signal Proc.*, vol. 63, no. 24, Aug. 2015. IEEE Signal Processing Society Young Author Best Paper Award.
13. **S. Chen**, A. Sandryhaila, J. M. F. Moura, and J. Kovačević, "Signal recovery on graphs: Variation minimization", *IEEE Trans. Signal Proc.*, vol. 63, no. 17, Jun. 2015.

14. **S. Chen**, F. Cerda, P. Rizzo, J. Bielak, J. H. Garrett, and J. Kovačević, "Semi-supervised multiresolution classification using adaptive graph filtering with application to indirect bridge structural health monitoring", *IEEE Trans. Signal Proc.*, vol. 62, no. 11, Jun. 2014.
15. F. Cerda, **S. Chen**, J. Bielak, J. H. Garrett, P. Rizzo, and J. Kovačević, "Indirect structural health monitoring of a simplified laboratory-scale bridge mode", *International Journal Smart Structure and Systems, Special Issue: Challenge on bridge health monitoring utilizing vehicle-induced vibrations*, vol. 13, no. 5, May. 2014.

Conference

1. P. Wu, **S. Chen**, and D. Metaxas, "MotionNet: Joint perception and motion prediction for autonomous driving based on BEV maps", *In Proc. IEEE Conf. on Computer Vision and Pattern Recognition (CVPR). 2020.*
2. M. Li, **S. Chen**, Y. Zhang, and Y. Wang, "Dynamic multiscale graph neural networks for category-agnostic 3D skeleton-based motion prediction", *In Proc. IEEE Conf. on Computer Vision and Pattern Recognition (CVPR) 2020, Oral.*
3. Y. Hu, **S. Chen**, Y. Zhang, and Y. Wang, "Collaborative motion prediction via neural message passing", *In Proc. IEEE Conf. on Computer Vision and Pattern Recognition (CVPR) 2020, Oral.*
4. J. Liu, B. Chen, **S. Chen**, M. Bergés, J. Bielak, H. Noh, "Damage-sensitive and domain-invariant feature extraction for vehicle-vibration-based bridge health monitoring",*In Proc. IEEE Int. Conf. Acoust., Speech Signal Process. 2020.*
5. **S. Chen**, N. Zhang, and H. Sun, "Collaborative localization based on traffic landmarks for autonomous driving", *International Symposium on Circuits and Systems (ISCAS), 2020.*
6. V. Ioannidis, **S. Chen**, and G. Giannakis, "Pruned graph scattering transforms", *International Conference on Learning Representations (ICLR), 2020.*
7. **S. Chen**, S. Niu, T. Lan, and B. Liu, "PCT: Large-scale 3D point cloud representations via graph inception networks with applications to autonomous driving", *In Proc. IEEE Int. Conf. Image Process (ICIP).*, Taipei, Sep. 2019.
8. M. Li, **S. Chen**, X. Chen, Y. Zhang, Y. Wang, and Q. Tian, "Actional-structural graph convolutional networks for skeleton-based action recognition", *In Proc. IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, Long Beach, California, USA July 2019.
9. Y. Hu, **S. Chen**, X. Chen, Y. Zhang, and X. Gu, "Neural message passing for visual relationship detection", *ICML Workshop on Learning and Reasoning with Graph-Structured Representations.*, Long Beach, California, USA July 2019.
10. C. Duan, **S. Chen**, and J. Kovačević, "3D point cloud denoising via graph-based neural networks", *In Proc. IEEE Int. Conf. Acoust., Speech Signal Process.*, , Brighton, UK, May. 2018. Invited Paper.
11. C. Duan, **S. Chen**, and J. Kovačević, "MultiProject: 3D point cloud denoising", *Proc. IEEE Glob. Conf. Signal Information Process.*, Anaheim, California, USA, Dec. 2018. Awarded Best Student Paper.
12. **S. Chen***, S. Niu*, H. Guo, C. Targonski, M. Smith, and J. Kovačević, "Generalized value iteration networks: Life beyond lattices", *AAAI*, New Orleans, USA, Feb. 2018.
13. **S. Chen**, D. Tian, C. Feng, and J. Kovačević, "Contour-based resampling of 3D point clouds", *In Proc. IEEE Int. Conf. Acoust., Speech Signal Process.*, New Orleans, USA, March 2017.
14. Y. Yang, **S. Chen**, M. Maddah-Ali, P. Grover, S. Kar, and J. Kovačević, "Fast path localization on graphs via multiscale Viterbi decoding", *In Proc. IEEE Int. Conf. Acoust., Speech Signal Process.*, New Orleans, USA, March 2017.
15. **S. Chen**, Y. Yang, A. Singh, and J. Kovačević, "Signal detection on graphs: Bernoulli noise model", *Proc. IEEE Glob. Conf. Signal Information Process.*, Washington, DC, Dec. 2016.

16. **S. Chen**, Y. Yang, C. Faloutsos, and J. Kovačević, "Monitoring Manhattan's traffic at 5 intersections?" *KDD 2016, The 5th International Workshop on Urban Computing*, San Francisco, Aug, 2016.
17. **S. Chen**, R. Varma, A. Singh and J. Kovačević, "A statistical perspective of sampling scores for linear regression", *In Proc. IEEE Int. Symposium on Information Theory.*, Barcelona, Spain, July 2016. Awarded Travel Grant.
18. **S. Chen**, R. Varma, A. Singh, and J. Kovačević, "Representations of piecewise smooth signals on graphs", *In Proc. IEEE Int. Conf. Acoust., Speech Signal Process.*, Shanghai, China, March 2016. Invited Talk. Awarded Travel Grant.
19. R. Varma, **S. Chen**, and J. Kovačević, "Spectrum-blind signal recovery on graphs", *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing 2015*, Cancun, Mexico, Dec, 2015. Invited Talk.
20. T. Ji, **S. Chen**, R. Varma, and J. Kovačević, "Efficient route planning of autonomous vehicles based on graph signal recovery", *53rd Annual Allerton Conference on Communication, Control, and Computing 2015*, Allerton, IL, Oct, 2015. Invited Talk.
21. **S. Chen**, R. Varma, A. Singh, and J. Kovačević, "Signal recovery on graphs: Random versus experimentally designed sampling", *Sampling Theory and Applications 11th International Conference*, Washington, D.C., May, 2015. Invited Talk.
22. **S. Chen**, A. Sandryhaila, and J. Kovačević, "Sampling theory for graph signals," *In Proc. IEEE Int. Conf. Acoust., Speech Signal Process.*, Brisbane, Queensland, May 2015.
23. **S. Chen**, A. Sandryhaila, and J. Kovačević, "Distributed algorithm for graph signal inpainting", *In Proc. IEEE Int. Conf. Acoust., Speech Signal Process.*, Brisbane, Queensland, May 2015.
24. S. Bittner, **S. Chen**, and J. Kovačević, "Fast algorithm for neural network reconstruction", *In Proc. IEEE Int. Symposium on Biomedical Imaging.,* Brooklyn, April, 2015.
25. **S. Chen**, A. Sandryhaila, J. M. F. Moura, and J. Kovačević, "Signal denoising on graphs via graph filtering", *Proc. IEEE Glob. Conf. Signal Information Process.*, Atlanta, GA, Dec. 2014.
26. **S. Chen**, A. Sandryhaila, G. Lederman, Z. Wang, J. M. F. Moura, P. Rizzo, J. Bielak, J. H. Garrett, and J. Kovačević, "Signal inpainting on graphs via total variation minimization", *In Proc. IEEE Int. Conf. Acoust., Speech Signal Process.*, Florence, Italy, May 2014. Awarded Travel Grant.
27. G. Lederman, Z. Wang, J. Bielak, H. Noh, J. H. Garrett, **S. Chen**, J. Kovačević, F. Cerda, and P. Rizzo, "Damage quantification and localization algorithms for indirect SHM of bridges", *Proc. Int. Conf. Bridge Maint., Safety Manag.*, Shanghai, China, July 2014.
28. **S. Chen**, A. Sandryhaila, J.M.F. Moura, and J. Kovačević, "Adaptive graph filtering: Multiresolution classification on graphs", *Proc. IEEE Glob. Conf. Signal Information Process.*, Austin, TX, Dec. 2013.
29. Z. Wang, **S. Chen**, G.Lederman, F. Cerda, J. Bielak, J. H. Garrett, P. Rizzo, and J. Kovačević, "Comparison of sparse representation and Fourier discriminant methods: Damage location classification in indirect lab-scale bridge structural health monitoring", *Proc. Structures Congr.*, Pittsburgh, PA, May 2013.
30. **S. Chen**, F. Cerda, J. Guo, J. B. Harley, Q. Shi, P. Rizzo, J. Bielak, J. H. Garrett, and J. Kovačević, "Multiresolution classification with semi-supervised learning for indirect bridge structure health monitoring," *Proc. IEEE Int. Conf. Acoust., Speech, and Signal Proc.*, Vancouver, Canada, May 2013.
31. F. Cerda, J. H. Garrett, J. Bielak, P. Rizzo, J. A. Barrera, Z. Zhang, **S. Chen**, M. McCann, and J. Kovačević, "Indirect structural health monitoring in bridges: scale experiments", *Proc. Int. Conf. Bridge Maintenance, Safety and Management*, Lago di Como, Italy, Jul. 2012.

PATENTS

1. Object detection and determination of motion information using curve fitting in autonomous vehicle applications, filed June 27, 2018, as 16/020,193. Inventors: Carlos Vallespi-Gonzalez, **S. Chen**, Abhishek Sen, Ankit Laddha.
2. Methods and systems for fast resampling method and apparatus for point cloud data, filed Nov 22, 2016, as 62/417,007. Inventors: D. Tian, **S. Chen**, C. Feng, A. Vetro.
3. A system to enable rail infrastructure monitoring through the dynamic response of an operational train, filed May 29, 2015, as 15/168,735. Inventors: G. Lederman, **S. Chen**, H. Noh, J. Kovačević, J. H. Garrett, J. Bielak.

PROJECTS

High-definition map creation for autonomous driving 2019-Present

- developed a multi-modality-fusion-based mapping system that automatically creates high-definition maps with the categories and positions of traffic-rule-related objects (traffic signs, traffic lights, land markers) in the 3D environment
- worked on the computer vision team at Mitsubishi Electric Research Laboratories (MERL)

Joint perception and prediction system for autonomous driving 2017-Present

- developed *multisweep LidarCNN*, an end-to-end joint perception and prediction system based on real-time LIDAR sweeps, which automatically detects the objects and predicts their future trajectories and has been deployed on Uber's self-driving cars
- developed *LidarFlow*, an end-to-end point-wise motion prediction system, which automatically predicts the future trajectory of each LiDAR point and has been deployed on Uber's self-driving cars
- worked on the perception team at Uber Advanced Technologies Group (Continue collaborating)

Graph neural networks 2017-Present

- generalized deep learning techniques to the irregular structures with applications to 3D point clouds, skeleton-based action recognition and path planning
- proposed pruned graph scattering transforms, which are the nontrainable graph convolutional networks and provides theoretical insights for graph convolutional networks from a signal-processing perspective
- proposed actional-structural graph convolution networks, which stack a series of actional-structural graph convolution and temporal convolution to learn both spatial and temporal features for skeleton-based action recognition and future prediction
- proposed a novel end-to-end neural network planning module, generalized value iteration network, which allows an agent to learn and plan the optimal paths in unseen irregular spatial graphs, such as real-world city street networks

Graph signal processing 2012-Present

- developed a theoretical framework to analyze data that are indexed by general graphs with the applications to social networks, transportation networks and 3D point clouds
- generalized concepts and tools from classical signal processing to the graph domain, including sampling theory on graphs, graph wavelets and graph dictionary learning
- cooperated with Prof. José. M. F. Moura (ECE at CMU) and Prof Aarti Singh (MLD at CMU)

Graph representation learning 2015-2017

- proposed a generative model for social circle on graphs and a metric to evaluate the likelihood of being social circles
- proposed a fast nonlinear graph embedding algorithm, called WarpMap, to improve user profiling and link prediction

- cooperated with Prof. Christos Faloutsos (MLD at CMU) and Prof. Leman Akoglu (Heinz at CMU)

Urban data analysis with graphs 2016

- analyzed Manhattan's traffic patterns using graph dictionary learning techniques
- proposed a graph-based sampling method for monitoring Manhattan's traffic distribution from a few selected sensors
- cooperated with Prof. Christos Faloutsos (MLD at CMU) and Prof. José. M. F. Moura (ECE at CMU)

3D point cloud processing and learning Summer intern, 2016

- proposed a graph-based resampling strategy of large-scale 3D point clouds with potential applications to progressive compression and efficient registration
- proposed a graph-based multiresolution representation for 3D point clouds with potential applications to progressive compression
- cooperated with Dr. Dong Tian (InterDigital), Prof. Chen Feng (NYU) and Dr. Anthony Vetro (MERL)

Indirect structural health monitoring 2011-2017

- proposed signal processing and machine learning techniques to identify the health status of bridges
- explored an indirect measurement approach for bridge structural health monitoring that collects sensed information from the dynamic responses of multiple vehicles travelling on a bridge
- cooperated with Prof. Jacobo Bielak (CEE at CMU), Prof. Haeyoung Noh (CEE at CMU) and Prof. James H. Garrett (CEE at CMU)

PRESS COVERAGE

- CMU ECE Headlines: The student and the symposium
- CMU ECE Headlines: Doctoral student Siheng Chen gives talk at Tsinghua University

INVITED TALKS

- Seminar talk at University of Florida, Apr., 2020
- Seminar talk at University of California, Santa Barbara, Mar., 2020
- Seminar talk at Virginia Polytechnic Institute and State University, Feb., 2020
- Tutorial talk at IEEE International Workshop on Machine Learning for Signal Processing, Oct, 2019
- Seminar talk at Virginia Polytechnic Institute and State University, Mar., 2019
- Seminar talk at Michigan State University, Mar., 2019
- Seminar talk at Arizona State University, Mar., 2019
- Seminar talk at University of Utah, Jan., 2019
- Research talk at the Mitsubishi Electric Research Laboratories (MERL), Oct., 2018
- Seminar talk at the University of Michigan-Shanghai Jiao Tong University Joint Institute, Sep., 2018
- Seminar talk at Department of Electronic Engineering, Tshinghua University, Sep., 2018
- Research talk at School of Automation, Beijing Institute of Technology, Sep, 2018
- Invited talk at Machine Learning in Science and Engineering, June, 2018
- Research talk at Product Graph Team, Amazon, August, 2017
- Research talk at Facebook AI research, August, 2017
- Tutorial talk at Graph Signal Processing Workshop, May, 2017

- Research talk at Digital Signal Processing Group, Rice University, May, 2017
- Research talk at ECE Energy & Information Seminar, Carnegie Mellon University, April, 2017
- Research talk at School of Electronic and Computer Engineering, Peking University, January, 2017
- Research talk at Department of Electronic Engineering, University of Electronic Science and Technology of China, April, 2016
- Research talk at School of Electronic Engineering, Beijing Institute of Technology, March, 2016
- Research talk at Signal Transformation, Analysis and Compression Group, University of Southern California, January, 2016
- Research talk at Department of Electronic Engineering, Tshinghua University, May, 2014

TEACHING EXPERIENCE

- 18202 (Undergrad): Mathematical Foundations of Electrical Engineering (instructor: Prof. J. M. F. Moura)
- 18790: Wavelets and Multiresolution Techniques (instructor: Prof. Jelena. Kovačević)
- 18799J: Special topics in signal processing: compressive sensing and sparse optimization (instructor: Prof. A. C. Sankaranarayanan)

STUDENTS MENTORED

- Chao Pan (Ph.D in ECE at UIUC): Summer intern 2020
- Xiaolong Li (Ph.D in ECE at Virginia Tech), Spring intern 2020
- Ningxiao Zhang (Ph.D in Astronomy at Penn State University): Multimodality fusion, Fall intern 2019
- Vassilis Ioannidis (Ph.D in ECE at University of Minnesota): Graph scattering transforms, Summer intern 2019
- Pengxiang Wu (Ph.D in CS at Rutgers University): High-definition map creation for autonomous driving, Summer intern 2019
- Divyansh Garg (Undergrad at Cornell University): 3D object detection, Summer intern 2018
- Chaojing Duan (Ph.D in ECE at CMU, Female): 3D point cloud denoising, Fall 2016 - Present
- Keqin Zeng (Undergrad at China Agricultural University, Female): 3D point cloud generation, Summer intern 2017
- Yanxi Chen (Undergrad at Tshinghua China): Seed set expansion, Summer intern 2017
- Xiao Ma (Undergrad at Beijing Jiaotong, China): Urban computing, Summer intern 2016
- Yuru Wu (Undergrad at Tshinghua, China): Graph mining, Summer intern 2016
- Chao Pan (Undergrad at Tshinghua, China): Tensor decomposition, Summer intern 2016
- Shi Zong (Master in ECE at CMU) Community detection, Summer 2015 - May 2016
- Tianxi Ji (Master in ECE at CMU): Route planning for drone, March 2015 - May 2016
- Chao Li (Master in Software Engineeing at CMU): Ranking system, May 2015 - May 2016
- Chen Liang (Undergrad at Tshinghua, China): Graph mining, Summer intern 2015
- Akshay Varun (Undergrad at PESIT, India): Active learning for clustering, Summer intern 2015
- Sean Bittner (Undergrad in ECE at CMU): Neuron signal processing, Summer intern 2014
- Niv Zehngut (Undergrad in ECE at CMU): Wavelets on graphs, Spring 2014
- Yu Zhou (Master in BME at CMU, Female): Tissue classification in histology images, Fall 2012 - Spring 2014

SERVICE

Organizer

- Special Session on "A Signal-Processing-View of Graph Neural Networks" at IEEE Int. Conf. Acoust., Speech Signal Process. 2020

Conference Session Chair

- Graph Signal Processing Workshop 2017

Technical Program Committee

- IEEE European Signal Processing Conference 2018
- IEEE Global Conference on Signal and Information Processing 2017

Reviews

- IEEE Signal Processing Magazine
- IEEE Transactions on Signal Processing
- IEEE Transactions on Signal and Information Processing over Networks
- IEEE Transactions on Image Processing
- IEEE Transactions on Information Theory
- IEEE Internet of Things Journal
- IEEE Transactions on Industrial Electronics
- IEEE Transactions on Cybernetics
- IEEE Signal Processing Letter
- Applied and Computational Harmonic Analysis
- Signal Processing (ELSEVIER)
- IEEE International Conference on Acoustics, Speech and Signal Processing
- IEEE International Conference on Image Processing
- IEEE International Symposium on Biomedical Imaging
- IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing
- European Signal Processing Conference

SKILLS

- Programming Languages: Python, C/C++, Java, HTML, SQL, LaTeX
- Operating Systems: Windows, Linux