Jin Yu, PhD

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Executive Summary: Jin is a leading expert in harnessing data science, AI, & generative AI for product innovation and operational optimization. With creating advanced AI-driven solutions, Jin has spearheaded transformative innovations in areas such as healthcare, energy, legal applications, etc. and is dedicated to advancing innovative AI applications for semiconductor testing.

Profile:

- A tech visionary and a thought leader with 20 years of deep expertise in the design of AI/ML algorithms and solutions, skilled in technical leadership and the development of innovative use cases.
  - ❖ Solid training of data science, machine learning, statistics, signal processing, & generative AI.
  - ❖ 20+ years of coding experience in C/C++/C#, MATLAB, Python, etc. with various platforms.
  - ❖ Comprehensive background in commercial software development and lifecycle management.
  - ❖ Championed numerous tech innovations, excelling in agile and lean methods within cross-functional teams.
- A passionate advocate for innovation with strong communication and interpersonal abilities.
  - ❖ Innovation portfolio includes 50 filed patents and 30 scientific papers.
  - ❖ Directed IP creation sessions and managed academic-industry collaborations.
  - ❖ Direct interactions with customers and extensive collaboration with global R&D teams.
  - ❖ Presented technical content to academia, industry stakeholders, and business audiences.

Experience

Northeastern University, Boston, MA

- **Part-Time Faculty, Khoury College of Computer Sciences** 12/2023 –
  - Teach DS 5010 - Intro to Programming for Data Science during the spring semester and CS 6220 – Data Mining Techniques in the fall semester.

Teradyne, North Reading, MA

- **Head of Machine Learning** 12/2023 –
  - Lead AI transformation of semiconductor business unit and build a top-tier team of machine learning and data scientists.

Philips/Signify Research, Burlington, MA

- **Director of Machine Learning** 12/2021 – 11/2023
  - Lead and manage a top-tier team of machine learning and data scientists (90% held PhDs) in developing commercial AI applications. Key achievements include virtualizing lighting effect using generative imaging, IP compliance detection using LLMs, & enhancing AI IP portfolios.
  - Strategize and execute Public-Private Partnerships (PPP) initiatives which includes 1) orchestrating government grant applications (DOE, NSF, etc.), 2) identifying and engaging startup collaboration opportunities, 3) fostering academic partnerships. Notable collaborations include including a generative AI program with Northeastern University and an AI-driven elderly care program using remote sensing with C2SHIP and BestBuy Health.
  - Key projects include 1) *Image generation*: developed algorithms using GANs and stable diffusion to visualize lighting on/off effect; 2) *LLM applications*: created a self-learning model using text embeddings from OpenAI to detect patent penetration and crafted an LLM in-text

learning algorithm to identify top product return reasons from customer reviews; 3) *well-being*: developed personalized Circadian lighting and built a mind meditation prototype using Philips Hue with an EEG device; 4) *smart building*: developed data analytics algorithms for HVAC energy optimization and space management using lighting embedded sensors.
  - Lead AI IP catalyst events for Signify Research US resulting in the filing 20+ patents annually since 2018, topics include gen AI, explainable AI, Edge AI, distributed learning, etc.
- **IOT Data Science Manager** 01/2018 – 12/2021
  - Led the squad of data science team and provide mentorship to junior data scientists and analytics engineers to develop lighting IoT data analytics products for smart building and smart city.
  - Managed MIT-Signify/Philips Program: 1) PI for a three-year audio research program with MIT CSAIL (Jim Glass), including acoustic event detection, segmentation, and localization for home activity monitoring, public health and safety, speaker identification, and active audio sensing for ranging and imaging; 2) Co-PIs for Lighting Virtualization (Antonio Torralba), Data Fusion (John Fisher), Collective Intelligence (Peter Gloor), Distributed Networks.
  - Key projects include 1) *Space management*: created a probabilistic data fusion algorithm with message passing to achieve 88% accuracy in people counting for Signify Interact Office; 2) *System maintenance*: built a data-analytics tool for large lighting IoT system diagnosis; 3) *Context-aware lighting*: built lighting automation solution with human activity detection.
- **Senior Scientist** 09/2016 – 01/2018
  - Project lead for data enabled auto commissioning algorithm design for office lighting systems.
  - System architect for two DOE projects: 1) energy optimization for office lighting; 2) Circadian lighting for patient room.

Acuity Brands, System Architect, Boston, MA 11/2015-09/2016
- System architecture design and development for wired and wireless mainstream dynamic lighting systems, including nLight Tunable White, Rubic gray scale and color accent, etc.

Philips, Firmware Engineer Lead/Research Scientist, Burlington, MA 03/2012-10/2015
- Wireless system integration and technology development with Philips Research, and product development with Philips Color Kinetics and Philips Lighting professional systems.

Xperi Inc., Basking Ridge, NJ
- **Principal DSP Engineer** 11/2011-03/2012
- **Senior DSP Engineer** 09/2019-11/2011
- **DSP Engineer** 07/2008-09/2009

  Key achievement: developed a joint deinterleaver and Viterbi decoder algorithm to reduce the memory requirement by 33% for HD Radio Receiver Chips to win many contracts from auto makers.

Berkeley Varitronics Systems, Wireless Engineer, Metuchen, NJ 09/2005-07/2008
- Software and DSP algorithm development for wireless test instruments.

Education

- Ph.D. in Electrical & Computer Engineering, Stevens Institute of Technology, NJ 2002-2005
- B.S. in Electrical Engineering, Wuhan University, Wuhan, China 1994-1998

Academic Activities and Industry Affiliations

- Collaborator & Continued Education, MIT CSAIL, Cambridge, MA 09/2016 – 03/2022

  - Completed seven advanced courses in ML, RL, NLP, ASR, inference, algorithms, etc.
- Vice President, IEEE Wireless & Optical Communications Conference 01/2009 – 12/2012
  - Organized/coordinated annual international conferences with over 150 global attendees.
- Adjunct Professor, Stevens Institute of Technology, Hoboken, NJ 12/2007 – 12/2009
  - Taught two courses: "Wireless Communications" and "Communication Theory."

Awards and Honors

- Best Friday Afternoon Exploration (FAE) Award, Signify Research, 2022
- Heroes of Context-Aware Smart Lighting, Signify, 2021
- Who's Who in Science and Engineering, 2006-2009
- Peskin Award, Stevens Institute of Technology, 2005
- Best Paper Award, IEEE Wireless and Optical Communication Conference, 2005
- Outstanding Research Award, Stevens Institute of Technology, 2003

Patents

1. H. You, K. Monroe, **J. Yu**, P. Deixler, "Outdoor lighting system integrated pothole detection", Patent filed, US Patent and Trademark Office, Application No. 63/561,821, Mar 2024.
2. **J. Yu**, P. Deixler, Y. Zang, V. Robles, "Mitigation of lighting system effects on other systems", Patent filed, US Patent and Trademark Office, Application No. 63/552,214, Feb 2024.
3. Y. Liu, Y. Zang, S. Shishehchi, **J. Yu**, "Estimation and mitigation of indoor heat island effect", Patent filed, US Patent and Trademark Office, Application No. 63/621,652, Jan 2024.
4. **J. Yu**, P. Deixler, Y. Liu, "Method of and system for detecting vehicles", US Patent and Trademark Office, Application No. 63/534,885, European Patent Office, Application No. 23196639.1, filed Aug 2023.
5. P. Deixler, **J. Yu**, "Luminaire with precipitation estimation", European Patent Office, Application No. 23186581.7, US Patent and Trademark Office, Application No. 63/525174, European Patent Office, Application No. 23186581.7, filed Jul 2023.
6. **J. Yu**, P. Deixler, K. Monroe, Y. Liu, "Method and system for assessing structural integrity of street lighting luminaires", US Patent and Trademark Office, Application No. 63/457916, European Patent Office, Application No. 23168374.9, filed Apr 2023.
7. **J. Yu**, Peter Deixler, M. M. Siraj, S. Shishehchi, H. You, "Lighting system integrated hail detection", Patent filing, 2023.
8. **J. Yu,** P. Deixler, "Facing direction detection", patent filing, 2023.
9. S. Shishehchi, P. Deixler, and **J. Yu**, "Using transfer learning to mitigate lack of data in image-to-image translation in lighting virtualization", Patent filing, 2023.
10. V. Robles, **J. Yu**, P. Deixler, "Systems and methods to predict a hotel guest's checkout time from embedded sensors in Philips Dynalite IoT systems", patent filing, 2023.

11. **J. Yu**, K. Monroe, H. You, S. Shishehchi, P. Deixler, "System and methods to estimate gait speed and trajectory to monitor Parkinson Disease", Patent filing, 2023.
12. **J. Yu**, P. Deixler, "A system and method for determining a sleep posture of a user during a sleep session", US Patent and Trademark Office, Application No. 63/358504, European Patent Office, Application No. 22184843.5, WO Official File Reference: PCT/EP2023/068324, filed Jul 2023.
13. **J. Yu**, P. Deixler, M. M. Siraj, "Sensing system, method, and computer program and for event and/or human activity detection", US Patent and Trademark Office, Application No. 63/437162, European Patent Office, Application No. 23154617.7, filed Jan 2023.
14. **J. Yu,** P. Deixler, "Lighting system integrated voice type authentication", US Patent and Trademark Office, Application No. 63/436,982, European Patent Office, Application No. 23154714.2, filed Jul 2022.
15. Y. Zang, M. Zhao, **J. Yu**, "Systems and methods for predictive queue management using sensors embedded in connected lighting systems", US Patent and Trademark Office, Application No. 63/397979, European Patent Office, Application No. 22195012.4, WO Official File Reference: PCT/EP2023/071783, patent filed 2022.
16. **J. Yu**, M. M. Siraj, P. Deixler, "A system and method for determining an emotional state of a user based on one or more physical and/or physiological parameters", US Patent and Trademark Office, Application No. 63/347455, European Patent Office, Application No. 22178852.4, WO Official File Reference: PCT/EP2023/063611, filed May 2022.
17. **J. Yu**, P. Deixler, "System and method for location obfuscation", patent published, US Patent and Trademark Office, Application No. 63/308604, European Patent Office, Application No. 22176016.8, WO Official File Reference: WO 2023156158, filed May 2022.
18. P. Deixler, **J. Yu**, "VLC based shopper and sales monitoring", US Patent and Trademark Office, Application No. 63/388670, WO Official File Reference: PCT/EP2023/068981, filed Jul 2022.
19. P. Deixler, **J. Yu**, "System and method for tracking subjects in indoor spaces", US Patent and Trademark Office, Application No. 63/339546, European Patent Office, Application No. 22173413.0, WO Official File Reference: PCT/EP2023/061480, filed May 2022.
20. **J. Yu**, P. Deixler, "System for performing a sound-based sensing of a subject in a sensing area", US Patent and Trademark Office, Application No. 63/326957, European Patent Office, Application No. 22168412.9, WO Official File Reference: WO2023194167, filed Apr 2022.
21. **J. Yu**, P. Deixler, M. M. Siraj, "Systems and Methods for Determining Device Location Properties Using Channel State Information", US Patent and Trademark Office, Application No. 63/310749, European Patent Office, Application No. 22160369.9, WO Official File Reference: WO 2023156308, filed Feb 2022.
22. A. Murthy, **J. Yu**, Y. Zang, "Sensor system and method for monitoring a storage space", US Patent and Trademark Office, Application No. 63/296909, European Patent Office, Application No. 22151259.3, WO Official File Reference: WO 2023131555, filed Jan 2022.
23. **J. Yu**, Y. Zang, A. Murthy, P. Deixler, "Receiving and Analyzing Consumer Behavior Data Using Visible Light Communication", US Patent and Trademark Office, Application No. 63/241254, European Patent Office, Application No. 21199069.2, WO Official File Reference: WO2023036665, filed Sep 2021.
24. A. Murthy, **J. Yu**, "Systems and methods for determining a configuration of occupants in a space using sensors with single-pixel thermopiles", US Patent and Trademark Office, Application No. 63/196298, European Patent Office, Application No. 21179383.1, WO Official File Reference: WO 2022253600, filed Jun 2021.
25. **J. Yu**, P. Deixler, "A control device for determining a relative position of a mobile device relative to a user body and a method thereof", US Patent and Trademark Office, Application No. 63/238813,

European Patent Office, Application No. 21195896.2, WO Official File Reference: WO 2023031013, filed Aug 2021.

26. **J. Yu**, P. Deixler**,** "Apparatus for controlling radiofrequency sensing", US Patent and Trademark Office, Application No. 63/229571, European Patent Office, Application No. 21191295.1, WO Official File Reference: WO 2023012033, filed Aug 2021.
27. **J. Yu**, A. Murthy, E. Shen, F. Pijlman, P. Deixler, "System and method for determining human heart rate and/or respiration rate", US Patent and Trademark Office, Application No. 63/158098, European Patent Office, Application No. 21162728.6, filed Mar 2021.
28. **J. Yu,** E. Shen, P. Deixler, "Systems and methods to detect airflow patterns using lighting embedded sensors", US Patent and Trademark Office, Application No. 63/161588, European Patent Office, Application No. 21165099.9, WO Official File Reference: WO 2022194627, filed Mar 2021.
29. A. Murthy, Y. Yadav, **J. Yu**, P. Deixler, "Systems and methods for disinfection of areas using connected lighting", US Patent and Trademark Office, Application No. 63/161542, European Patent Office, Application No. 21165095.5, WO Official File Reference: WO 2022194745, filed Mar 2021.
30. **J. Yu**, M. Smith, B. Song, "Detecting human facing directions using thermal images from embedded overhead sensors", US Patent and Trademark Office, Application No. 63/3136939, European Patent Office, Application No: 21152771.8, WO Official File Reference: WO 2022152554, filed Jan 2021.
31. **J, Yu**, E. Shen, P. Deixler, M. Smith, "Systems and methods for infection risk assessment and workstation recommendation", US Patent and Trademark Office, Application No. 63/114654, European Patent Office, Application No. 20212958.1, WO Official File Reference: WO 2022106279, filed Nov 2020.
32. A. Murthy, Y. Yadav, **J. Yu**, P. Deixler, "Systems and methods for monitoring social distancing using motion sensors", US Patent and Trademark Office, Application No. 63/093538, European Patent Office, Application No. 4229610, WO Official File Reference: WO 2022084070, filed Oct 2020.
33. Y. Yadav, A. Murthy, **J. Yu**, P. Deixler, "Systems and methods for monitoring face mask wearing", US Patent and Trademark Office, Application No. 63/093811, European Patent Office, Application No.: 4232945, WO Official File Reference: WO 2022084171, filed Oct 2020.
34. **J. Yu**, Y. Yadav, A. Murthy, P. Deixler, "Systems and methods for enforcing contact tracing", US Patent and Trademark Office, Application No. 63/067004, US-2023-0317299-A1, WO Official File Reference: WO 2022037981, filed Aug 2020.
35. P. Deixler**, J. Yu**, "System for controlling a sound-based sensing for subjects in a space", US Patent and Trademark Office, Application No. 63/134752, European Patent Office, Application No. 21157454.6, WO Official File Reference: WO 2022148718, filed Feb 2020.
36. **J. Yu**, P. Deixler, "Selection criteria for passive sound sensing in a lighting iot network", ***Patent No***, WE 4111146, US Patent and Trademark Office, Application No. 63/980472, European Patent Office, Application No.: 20194802.3, WO Official File Reference: WO2021170458, filed Aug 2020.
37. D. Han, **J. Yu**, "Image recognition based individual identification and localization system", WO Official File Reference: US Patent and Trademark Office, Application No. 63/070659, EP Official File Reference: 20194513.6, WO Official File Reference: 2022043008, filed Aug 2020.
38. E. Shen, **J. Yu**, "Systems and methods for people counting using beam-forming passive infrared sensors having a dynamically configurable field of view", US Patent and Trademark Office, Application No. 63/050376, EP Official File Reference: 20186429.5, WO Official File Reference: WO 20220008340, patent filed Jul 2020.
39. **J. Yu**, J. Kaur, "Systems, methods and apparatus for improving energy consumption efficiency of appliances serving a facility", US Patent and Trademark Office, Application No. 63/085182, EP Official File Reference: 20200668.0, WO Official File Reference: WO 2022069396, filed Sep 2020.

40. A. Murthy, R. Kumar, **J. Yu**, "Systems and methods for fusing data from single pixel thermopiles and passive infrared sensors for counting occupants in open offices", US Patent and Trademark Office, Application No. 62/953787, EP Official File Reference: 20150400.8, WO Official File Reference: WO 2021130034, US-2023-0016414-A1, patent filed Dec 2019.
41. **J. Yu**, A. Murthy, J. Hu, D. Han, M. Smith, "Systems and methods for collision detection using a connected lighting system", US Patent and Trademark Office, Application No. 63/790037, EP Official File Reference: 19156576.1, WO 2020144009, filed Jan 2019.
42. D. Han, J. Hu, A. Murthy, **J. Yu**, "Systems, methods, and devices for drone detection using an outdoor lighting network", ***Patent No***. WE 3908850, US-2022-0057503-A1, WO Official File Reference: WO 2020144245, US Patent and Trademark Office, Application No. 62/790039, EP Official File Reference: 19156567.0, filed Jan 2019.
43. **J. Yu**, J. Hu, X. Wang, "System and method for automatically recommissioning a lighting node using wireless signal characteristics", ***Patent No.*** WE 3763169, US Patent and Trademark Office, Application No. 62/639373, EP Official File Reference: 18164890.8, EP3763169A, WO Official File Reference: WO 2019170506, filed Jan 2019.
44. D. Jiang, P. Gruijters, D. Han, **J. Yu**, Y. Zhang, "Power saving mode optimized dual-mode cellular and short range RF transceivers", ***Patent No.*** 3738356, US Patent and Trademark Office, Application No. 62/615116, EP Official File Reference: 18154016.2, WO Official File Reference: WO 2019/137850 A1, patent filed Jan 2019.
45. Y. Zhang, **J. Yu**, D. Jiang, D. Han, "System and method for end-to-end secure communication in device-to-device communication networks", ***Patent No.*** 3735387, US Patent and Trademark Office, Application No. 62/613439, EP Official File Reference: 18154579.9, WO Official File Reference: WO 2019134868, patent filed Jan 2019.
46. **J. Yu**, J. Warwick, T. Oliveira, "System and method for dynamic lighting using a narrowband wireless lighting network", US Patent and Trademark Office, Application No. 62/559162, EP Official File Reference: 17194543.9, WO Official File Reference: WO 2019052873, EP 3682599, filed Sep 2018.
47. A. Murthy, **J. Yu**, "System and method for performing building-wide wireless network intrusion detection via connected luminaires", US Patent and Trademark Office, Application No. 62/7587724, EP Official File Reference: 17205835.6, WO Official File Reference: WO 2019096785, US-2020-0351664-A1, filed Oct 2017.
48. **J. Yu,** M. Shaffer, "Methods and apparatus for custom color transition effects", US Patent and Trademark Office, Application No. 62/147618, US-2018-0139421-A1, WO Official File Reference: WO 2016166034, filed Apr 2016.

Papers

1. Y, Gong, **J. Yu**, and J. Glass, "VocalSound: A Dataset for Improving Human Vocal Sounds Recognition", IEEE ICASSP, 2022.
2. J. Hu, M. Smith, **J. Yu**, "Software architecture of integrated adaptive control for human-centric office lighting systems", IES Annual Conference, Aug 2017.
3. H. Li, Y. D. Yao, and **J. Yu**, "Outage probabilities of wireless systems with LCMV beamforming," IEEE Transactions on Wireless Communications, vol. 6, no. 10, pp. 3515-3523, 2007.
4. H. Li, Y. D. Yao, and **J. Yu**, "Outage Performance of Wireless Systems with LCMV Beamforming for Dominant Interferers Cancellation", IEEE ICC, 2007.
5. J. Yu, H. Li, Y.D. Yao, N.J. Vallestero, "LPI and BER Performance of a Chaotic CDMA System Using Different Detection Structures", ARMY CECOM, 2006.

6. D.J. Shyy, **J. Yu**, Y.D. Yao, "Modeling and performance evaluation of 3G CDMA networks with beamforming", Wireless Personal Communications, pp. 1-13, 2006.
7. **J. Yu**, H. Li, Y.D. Yao, N.J. Vallestero, "LPI and BER Performance of a Chaotic CDMA System", IEEE Vehicle Technology Conference, pp 1-5, 2006.
8. H. Li, Y.D. Yao, **J. Yu**, 'Outage probabilities of wireless systems with imperfect beamforming", IEEE Transactions on Vehicle Technology, 1503-1514, 2006.
9. **J. Yu**, Y. D. Yao, A. F. Molisch, and J. Zhang, "Performance evaluation of CDMA reverse links with imperfect beamforming in a multicell environment using a simplified beamforming model", IEEE Trans. on Vehicular Technology, vol. 55, no. 3, pp 1019-1031, May 2006.
10. H. Li, Y.D. Yao, **J. Yu**, "Modeling and outage probability analysis of wireless systems with imperfect beamforming", IEEE VTC fall, pp.1357-1361, 2005.
11. **J. Yu** and Y. D. Yao, "Reverse link capacity of CDMA systems with imperfect beamforming using different types of antenna arrays", IEEE VTC fall, pp. 182-186, 2005.
12. **J. Yu** and Y. D. Yao, "Outage probability of wireless systems with linear and circular antenna arrays in correlated Nakagami fading channels", IEEE ICC, 2005.
13. H. Li, Y.D. Yao, **J. Yu**, "Outage probabilities of wireless systems with beamforming", IEEE WOCC, pp.1357-1361, Apr 2005.
14. **J. Yu** and Y. D. Yao, "Secure chaotic spread-spectrum communication systems", IEEE WOCC, pp.71, Apr 2005.
15. **J. Yu** and Y. D. Yao, "Detection performance of chaotic spreading LPI waveforms," IEEE Trans. on Wireless Communications, pp.390-396, vol. 4, 2005.
16. **J. Yu** and Y. D. Yao, "Detection performance of time-hopping ultra-wideband LPI waveforms", IEEE Sarnoff Symposium on Advances in Wired and Wireless Communication, pp.137-140, Apr 2005.
17. **J. Yu**, Y. D. Yao, J. Zhang, "Reverse-link capacity of power-controlled CDMA systems with beamforming", IEEE Transactions on Vehicular Technology, pp. 1423-1433, Sep 2004.
18. **J. Yu** and Y. D. Yao, "Error probabilities of CDMA systems with beamforming under different power control schemes", IEEE 60th VTC, pp. 5285-5287, fall 2004.
19. Y.D. Yao, M. Syed, **J. Yu,** "Utilizing beamforming for random access-a cross-layer paradigm", IEEE 60th VTC, pp. 5160-5164, fall 2004.
20. D. J. Shyy, **J. Yu** and Y. D. Yao, "Performance analysis of deploying antenna array in 3G CDMA networks", IEEE 60th VTC, pp. 4260-4264, fall 2004.
21. D. J. Shyy, **J. Yu** and Y. D. Yao, "Performance evaluation of 3G CDMA networks with antenna arrays", IEEE 4th Workshop on Applications and Services in Wireless Networks, 2004.
22. **J. Yu**, Y. D. Yao, "Evaluation of reverse link performance of a CDMA system with imperfect beamforming", IEEE 59th VTC, pp.137-141, spring 2004.
23. **J. Yu**, Y. D. Yao, "Detection performance of LPI waveforms of chaotic spread-spectrum systems with antenna arrays", IEEE Sarnoff Symposium on Advances in Wired and Wireless communications", pp.99-102, Apr 2004.
24. Y Li, H Man, **J Yu,** YD Yao, "Multipath routing in ad hoc networks using directional antennas", IEEE Sarnoff Symposium on Advances in Wired and Wireless communications", pp.119-122, Apr 2004.
25. **J. Yu**, Y. D. Yao, A. F. Molisch, and J. Zhang, "Reverse link capacity of power-controlled CDMA systems with antenna arrays in a multipath fading environment", IEEE Global Telecommunications Conference, pp 1019-1031, May 2003.

26. **J. Yu**, Y. D. Yao, "Reverse link capacity of SIR-based power-controlled CDMA systems with antenna arrays", Wireless Communications and Mobile Computing, Vol. 3, pp. 759-772, 2003.
27. **J. Yu**, Y. D. Yao, "CDMA reverse link capacity with antenna arrays in a multipath fading environment", 6th International Symposium on Antennas, Propagation, and EM Theory, pp.311-314, 2003.
28. **J. Yu** and A. A. Kishk, "Wavelets transform of the method of moments matrix arising from electromagnetic scattering from 2D objects", 9th International Symposium on Antenna Technology and Applied Electromagnetics, pp.1-4, 2002.
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