Kuan Huang

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Assistant Professor, Department of Computer Science and Technology
The Dorothy and George Hennings College of Science, Mathematics and Technology, Kean University

Education

Utah State University (USU) — Logan, UT
Ph.D. in Computer Science. GPA: 3.98/4.00, Best Dissertation Award — *Aug. 2016 – May 2021*
Supervisor: Dr. Heng-Da Cheng
Dissertation: Breast Ultrasound Image Segmentation Based on Uncertainty Reduction and Context Information

Harbin Institute of Technology (HIT) — Harbin, China
B.Eng. in Measurement Control Technique & Instruments. GPA: 3.78/4.0 — *Sep. 2012 – Jun. 2016*
Thesis topic: Estimating Lithium-ion Batteries State of Health (SOH) Using Particle Filter

Professional Work Experience

Assistant Professor
Kean University — *Union, USA, Sep. 2022-Present*

Post-doctoral Researcher
Baylor College of Medicine — *Houston, USA, May 2021-Sep. 2022*

Teaching Assistant
Utah State University — *Logan, USA, Aug. 2016-May 2021*

National and Regional Leadership

CAHSI GenAI Regional Advocate
Computing Alliance of Hispanic-Serving Institutions (CAHSI) — *Appointed 2026–present*

Teaching

Assistant Professor — Kean University
CPS2231: Computer Programming (Java Programming) — *Fall 2022 - Spring 2024*
CPS4801: Artificial Intelligence — *Spring 2023, 2024, 2025*
CPS5801: Advanced Artificial Intelligence — *Spring 2023 - 2026*
CPS4802: Machine Learning Algorithms — *Fall 2022, 2023, 2024*
CPS3830: Machine Learning Foundations — *Fall 2025*
CPS3840: Deep Learning and Applications — *Spring 2026*
CPS5802: Machine Learning Innovations — *Fall 2022 - 2025*

Teaching Assistant — Utah State University
CS2810: Computer Systems Organization and Architecture — *Fall 2016, Spring 2020, Fall 2020, Spring 2021*
CS5050: Advanced Algorithms — *Fall 2017 – Fall 2019*
CS1410: Introduction to C++ — *Spring 2017*

Lab Instructor — Utah State University
CS1400: Introduction to Python — *Summer 2019*

Research Experience

Research Interests:

- Artificial Intelligence
- Computer Vision
- Machine Learning
- Deep Learning
- Pattern Recognition
- Medical Image Analysis

Grants:

- **2026 received:** Students Partnering with Faculty (SpF) 2026 Awards, Kean University, Co-PI, $9,000 budget, "From Waves to Shorelines: AI-Driven Nonlinear Modeling of Beach Evolution."
- **2025 received:** President's Global-Local (Glocal) Anchor Institution Research Grant 2025-2026, Kean University, PI, $12,500 budget, "Enhancing Cancer Detection through Advanced Mathematical and Statistical Modeling."
- **2025 received:** Students Partnering with Faculty (SpF) 2025 Awards, Kean University, PI, $11,500 budget, "Breast Cancer Detection in Ultrasound Images Using Weakly Supervised Techniques and Multimodal Model."
- **2025 received:** IST Research Fellowship, Kean University, PI, $10,000 budget, "Breast Cancer Early Detection in Ultrasound Based on Weakly Supervised Techniques and Multi-Modal Models."
- **2025 received:** OpenAI Researcher Access Program, $10,000 OpenAI API credits.
- **2025 received:** Oak Ridge Leadership Computing Facility (OLCF) computational resource, Co-PI, Frontier: 20,000 node hours and Andes: 2,500 node hours, "Large Language Models for Breast Cancer Detection."
- **2024 received:** NSF CISE MSI Award # 2430746, PI, $203,981 budget, "Collaborative Research: CISE MSI: RCBP: SCH: Advancing Breast Cancer Detection in Ultrasound Imaging through Active and Weakly Supervised Learning Techniques."
- **2024 received:** Students Partnering with Faculty (SpF) 2024 Awards, Kean University, Co-PI, $17,000 budget, "Trustworthy Weakly Supervised Breast Cancer Detection in Ultrasound Imaging."
- **2023 received:** IST Research Fellowship, Kean University, PI, $10,000 budget, "A Novel Trustworthy Weakly-Supervised Image Segmentation Framework."
- **2023 received:** CAHSI-Google Institutional Research Program, PI, $80,000 budget, with $20,000 Google Cloud Platform (GCP) credits,"Weakly Supervised Image Segmentation with Image Level Labels."
- **2023 received:** Students Partnering with Faculty (SpF) 2023 Awards, Kean University, PI, $16,000 budget, "Deep Learning-Based Breast Ultrasound Image Analysis."

Peer Reviewed Journal Articles

1. M. Xu, B. Hu, Y. Wang, P. Koo, **K. Huang (corresponding author)**, DRSeg: A Weakly Supervised Framework for Breast Ultrasound Image Segmentation, accepted by Scientific Reports (Impact Factor = 3.9), 2026.
2. **K. Huang**, M. Xu, Y. Wang, Using Adversarial Training to Improve Uncertainty Quantification, in IEEE Transactions on Artificial Intelligence, 2025.
3. B. Hu, J. You, **K. Huang**, M. Xu, D. Liu, S. Ma, EffTEE: Efficient Image Classification and Object Detection on Mobile Devices using Trusted Execution Environments, in IEEE Access (Impact Factor = 3.4), 2025.
4. T. Wang, **K. Huang**, M. Xu, J. Huang, Weakly Supervised Chest X-ray Abnormality Localization with Non-Linear Modulation and Foreground Control, in Scientific Reports (Impact Factor = 3.9), 2024.
5. Y. Kumar, **K. Huang**, A. Perez, G. Yang, J. J. Li, P. Morreale, D. Kruger and R. Jiang, Bias and Cyberbullying Detection and Data Generation Using Transformer Artificial Intelligence Models and Top Large Language Models, in Electronics (Impact Factor = 2.6), 2024.
6. Y. Kumar, **K. Huang**, C. C. Lin, A. Watson, J. J. Li, P. Morreale, J. Delgado, Applying Swin Architecture to diverse Sign Language Datasets, in Electronics (Impact Factor = 2.6), 2024.
7. M. Xu, J. Huang, **K. Huang (corresponding author)**, F. Liu, Incorporating Tumor Edge Information for Fine-Grained BI-RADS Classification of Breast Ultrasound Images, in IEEE Access (Impact Factor = 3.4), 2024.
8. M. Xu, **K. Huang (corresponding author)**, X. Qi, Regional-Attentive Multi-Task Learning Framework for Breast Ultrasound Image Classification and Segmentation, in IEEE Access (Impact Factor = 3.4), 2023.

9. **K. Huang**, Y. Zhang, H. D. Cheng, P. Xing, Trustworthy Breast Ultrasound Image Semantic Segmentation Based on Fuzzy Uncertainty Reduction, in Healthcare (Impact Factor = 2.8), 2022.
10. Y. Zhang, M. Xian, H. D. Cheng, B. Shareef, J. Ding, F. Xu, **K. Huang**, B. Zhang, C. Ning, Y. Wang, BUSIS: A Benchmark for Breast Ultrasound Image Segmentation, in Healthcare (Impact Factor = 2.8), 2022.
11. **K. Huang**, Y. Zhang, H. D. Cheng, P. Xing, B. Zhang, Semantic Segmentation of Breast Ultrasound Image with Fuzzy Deep Learning Network and Breast Anatomy Constraints, in Neurocomputing (Impact Factor = 5.719), 2021.
12. Q. Yu, **K. Huang**, Y. Zhu, X. Chen, W. Meng, Preliminary results of computer-aided diagnosis for magnetic resonance imaging of solid breast lesions, in Breast Cancer Research and Treatment (Impact Factor = 4.872), 2019.

Peer Reviewed Conference Papers

1. S. Ali, D. Kwak, and **K. Huang**, Point-Then-Preach: Coordinate-Guided Spatial Reasoning for Medical Vision-Language Models, accepted by the 48th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2026).
2. M. Xu, B. Hu, B, Li, and **K. Huang (corresponding author)**, Pixel-Level Data Augmentation for Robust Medical Image Classification, accepted by the 48th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2026).
3. **K. Huang**, M. Xu, I. Lyngaas, and Y. Wang, Efficient Fine-Tuning for Chest X-Ray Report Generation on Multiple HPC Platforms, accepted by the 48th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2026).
4. N. Zhang, M. Xu, G. Tong, **K. Huang (corresponding author)**, Segmenting What Matters: A Dual Stage Active Learning Framework for Weakly Supervised Breast Ultrasound Segmentation, in the IEEE International Conference on Bioinformatics and Biomedicine 2025 (BIBM 2025), acceptance rate 19.6%.
5. **K. Huang**, Y. Wan, J. Huang, M. Xu, A Deep Active Learning Framework with Information Guided Label Generation for Medical Image Segmentation, in the IEEE International Conference on Bioinformatics and Biomedicine 2025 (BIBM 2025), acceptance rate 19.6%.
6. **K. Huang (corresponding author)**, N. Sahel, D. Karki, M. Xu and Y. Wang, One Pixel Can Change the Diagnosis: Adversarial and Non-Adversarial Robustness and Uncertainty in Breast Ultrasound Classification Model, in the AAAI 2025 Fall Symposium Series (FSS-25).
7. J. Li, Y. Mi, M. Chen, **K. Huang**, G. Gupta, G. Tong, FD-GAN: A Dual-Domain Approach with Fourier Domain Discriminators for Denoising Low-Dose CT Images, accepted by the International Joint Conference on Neural Networks (IJCNN 2025).
8. M. Xu, Y. Wang, **K. Huang (corresponding author)**, AnatoSegNet: Anatomy Based CNN-Transformer Network for Enhanced Breast Ultrasound Image Segmentation, in the 22nd IEEE International Symposium on Biomedical Imaging (ISBI 2025).
9. **K. Huang (corresponding author)**, Y. Wang, M. Xu, Investigating the Fairness of Deep Learning Models in Breast Cancer Diagnosis Based on Race and Ethnicity, in the AAAI 2024 Fall Symposium on Machine Intelligence for Equitable Global Health (MI4EGH 2024).
10. T. H. Lin, D. Kwak, and **K. Huang (corresponding author)**, Weakly Supervised Breast Ultrasound Image Segmentation Based on Image Selection, in the 46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2024).
11. Y. Kumar, **K. Huang**, Z. Gordon, L. Castro, E. Okumu, P. Morreale and J. J. Li, Transformers and LLMs as the New Benchmark in Early Cancer Detection, in the 2023 5th International Conference on Advanced Information Science and System (AISS 2023).
12. J. Huang, **K. Huang (corresponding author)**, M. Xu and F. Liu, CFAB: An Online Data Augmentation to Alleviate the Spuriousness of Classification on Medical Ultrasound Images, in the 14th International Conference on Computer Vision Systems (ICVS 2023).

13. **K. Huang**, J. Huang, W. Wang, M. Xu, F. Liu, A Deep Active Learning Framework with Information Guided Label Generation for Medical Image Segmentation, in IEEE International Conference on Bioinformatics and Biomedicine 2022 (BIBM 2022).
14. **K. Huang**, Y. Cheng, Q. Gao, B. Zhang, Weakly Unpaired Image Translation from Hematoxylin and Eosin Staining Image to Immunohistochemistry Staining Image, in IEEE International Conference on Bioinformatics and Biomedicine 2022 (BIBM 2022).
15. M. Xu, **K. Huang**, X. Qi, Multi-Task Learning with Contextual Oriented Self-Attention for Breast Ultrasound Image Classification and Segmentation, in IEEE International Symposium on Biomedical Imaging 2022 (ISBI 2022).
16. **K. Huang**, M. Xu, X. Qi, NGMMs: Neutrosophic Gaussian Mixture Models for Breast Ultrasound Image Classification, in the 43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2021).
17. Y. Xiao, **K. Huang**, S. Niu, J. Huang, Interpretable Fine-grained BI-RADS Classification of Breast Tumors, in the 43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2021).
18. **K. Huang**, Y. Zhang, H. D. Cheng, P. Xing, MSF-GAN: Multi-Scale Fuzzy Generative Adversarial Network for Breast Ultrasound Image Segmentation, in the 43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2021).
19. **K. Huang**, Y. Zhang, H. D. Cheng, P. Xing, Shape-Adaptive Convolutional Operator for Breast Ultrasound Image Segmentation, in IEEE International Conference on Multimedia and Expo 2021 (ICME 2021).
20. M. Xu, **K. Huang**, Q. Chen, X. Qi, MSSA-Net: Multi-scale Self-attention Network for Breast Ultrasound Image Segmentation, in IEEE International Symposium on Biomedical Imaging 2021 (ISBI 2021).
21. **K. Huang**, Y. Zhang, H. D. Cheng, P. Xing, B. Zhang, Semantic Segmentation of Breast Ultrasound Image with Pyramid Fuzzy Uncertainty Reduction and Direction Connectedness Feature, in 2020 25th International Conference on Pattern Recognition (ICPR 2020).
22. **K. Huang**, H. D. Cheng, Y. Zhang, B. Zhang, P. Xing, C. Ning, Medical Knowledge Constrained Semantic Breast Ultrasound Image Segmentation, in 2018 24th International Conference on Pattern Recognition (ICPR 2018).
23. F. Xu, M. Xian, Y. Zhang, **K. Huang**, H. D. Cheng, B. Zhang, J. Ding, C. Ning, Y. Wang, A Hybrid Framework for Tumor Saliency Estimation, in 2018 24th International Conference on Pattern Recognition (ICPR 2018).

Mentoring Students in Conference Papers

1. S. Ali, D. Kwak, and **K. Huang**: Hair Coverage Regression with Self-Training and Model Interpretation, accepted by the 2026 International Conference on the AI Revolution: Research, Ethics, and Society (AIR-RES 2026).
2. H. Zhang and **K. Huang**: Chest X-ray Diagnosis with Joint Report Generation and Lesion Localization Using Multimodal Vision–Language Models, in the International Conference on Pattern Recognition and Artificial Intelligence (PRAI 2025).
3. C. Marte, M. Xu, **K. Huang**, Text-Guided Weakly Supervised Segmentation for COVID-19 Detection in X-Ray Images, in 2024 International Conference on Computational Science and Computational Intelligence (CSCI 2024).
4. M. Ahmed, J. Loja, **K. Huang**, M. Xu, Benchmarking the Robustness of Segmentation Methods Against Adversarial Attacks in Breast Ultrasound Segmentation, in 2024 International Conference on Computational Science and Computational Intelligence (CSCI 2024).
5. A. Mendez, M. Xu, **K. Huang**, Multimodal Breast Ultrasound Segmentation: Combining Visual and Clinical Data, in 2024 International Conference on Computational Science and Computational Intelligence (CSCI 2024).

6. J. Rodriguez, **K. Huang**, and M. Xu: Multi-Task Breast Ultrasound Image Classification and Segmentation Using Swin Transformer and VMamba Models, in the International Conference on Pattern Recognition and Artificial Intelligence (PRAI 2024).
7. T. Dacayan, E. Ponte, **K. Huang**, D. Kwak, Utilizing a Spatial Grid for Automated Parking Space Vacancy Detection, in 2023 International Conference on Computational Science and Computational Intelligence (CSCI 2023).
8. J. Loja, A. Mendez, **K. Huang**, Multi-Task Breast Ultrasound Image Segmentation and Classification Using Convolutional Neural Network and Transformer, in the 2023 IEEE MIT Undergraduate Research Technology Conference (URTC 2023).
9. A. Balcacer, B. Hannon, Y. Kumar, **K. Huang**, J. Sarnoski, S. Liu, J. J. Li, P. Morreale, Mechanics of a Drone-Based System for Algal Bloom Detection Utilizing Deep Learning and LLMs, in the 2023 IEEE MIT Undergraduate Research Technology Conference (URTC 2023).
10. E. Ponte, X. Amparo, **K. Huang**, and D. Kwak, Automatic Pill Identification System based on Deep Learning and Image Preprocessing, in the 2023 World Congress in Computer Science, Computer Engineering, & Applied Computing (CSCE 2023).

Book Chapters

1. **K. Huang**, Y. Zhang, H. D. Cheng, and P. Xing, Reliable Multi-layer Segmentation of Breast Ultrasound (BUS) Images, in *Pattern Recognition and Computer Vision in the New AI Era*, World Scientific, pp. 215–245, 2025.

Services

- **Professional Service**
  - NSF Panelist, 2025–present.
  - Reviewer for IEEE Transactions on Image Processing (Q1, 2 papers/year).
  - Reviewer for IEEE Journal of Biomedical and Health Informatics (Q1, 3 papers/year).
  - Reviewer for Computational and Structural Biotechnology Journal (Q1, 1–2 papers/year).
  - Reviewer for Pattern Recognition (Q1, 2 papers/year).
  - Reviewer for Scientific Reports (Q1, 1–2 papers/year).
  - Reviewer for Computers in Biology and Medicine (Q1, 1 paper/year).
  - Reviewer for IEEE Winter Conference on Applications of Computer Vision (WACV) (peer-reviewed conference, 2–3 papers/year).
  - Reviewer for IEEE International Conference on Pattern Recognition (ICPR) (peer-reviewed conference, 2 papers/year).
  - Reviewer for IEEE International Symposium on Biomedical Imaging (ISBI) (peer-reviewed conference, 4 papers/year).
  - Reviewer for IEEE International Conference on Multimedia and Expo (ICME) (peer-reviewed conference, 3 papers/year).
  - Reviewer for International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) (peer-reviewed conference, 3 papers/year).
  - Reviewer for The British Machine Vision Conference (BMVC) (peer-reviewed conference, 2 papers/year).
- **Professional Societies**
  - IEEE Member, 2020–present.
  - IEEE Engineering in Medicine and Biology Society (EMBS) Member, 2020–present.
- **College and Department Service**

- Member, College Teaching and Service Committee, 2025–present.
- Department representative, meetings with external consultants on proposals for the Ph.D. in Computer Science and B.S. in Artificial Intelligence programs, Spring 2025.
- Member, Department Research Committee, 2024–present.
- Contributor to the Development of the Ph.D. in Computer Science Program, Spring 2024.
- Contributor to the Development of the B.S. in Artificial Intelligence Program, Spring 2024.
- Committee Member, End-of-Year Faculty Research Conference, 2023–present.
- Advisor, Departmental ACM Student Club, 2023–present.
- Chair, Department DEI Committee, 2023–2025.
- Member, Department Curriculum Committee, 2023–2024.
- Contributor, Departmental BPC Plan, 2023.
- Faculty Search Committee, Wenzhou-Kean University, Fall 2023.
- Departmental GPU Server Manager, 2022–present.

- **Academic Advising and Mentoring**
  - Undergraduate Academic Advisor (∼50 students/year), 2022–present.
  - Faculty Mentor for Independent Study/Senior Research, 2023–present.
  - Faculty Mentor for Local REU Program, 2023–present.
  - Referee for Student Job and Academic Applications, 2023–present.

- **Community and Outreach**
  - Participant, Undergraduate Open House, 2022–present.
  - Participant, Graduate Open House, 2022–present.
  - Participant, Major/Minor Fair, 2024–present.
  - Participant, Merit Scholars Brunch, 2023.
  - Department Visit Host, Lockheed Martin, 2023.
  - Participant, HackKean Event, 2023.
  - Commencement Faculty Marshal, Graduate and Undergraduate Ceremonies, 2023 and 2024.

- **Other Service**
  - Ph.D. Student Interviewer for Tenure-track Candidates, Utah State University, 2020.

Honors and Awards

Best Dissertation Award	USU, 2022
Travel grant of the 24th International Conference on Pattern Recognition	Beijing, 2018
Outstanding Individual Student Scholarship, School of Electrical Engineering	HIT, 2014
Excellent Students of Harbin Institute of Technology	HIT, 2014
Excellent Students of Harbin Institute of Technology	HIT, 2013
Third prize of Chinese Mathematics Competitions	Heilongjiang Province, 2013
Excellent Volunteer in Freescale Cup National College Students Intelligent	HIT, 2013
Second prize in Project Design for the freshman, School of Electrical Engineering	HIT 2013
Outstanding Individual Student Scholarship, School of Electrical Engineering	HIT 2013
Third prize in Adolescents Science and Technology Innovation Contest	China 2013

Professional Training

- Attended GenAI in CS Education Workshop, 2026.
- Attended Kean University's AI Ethics Faculty Development Workshop, 2025.
- Participated in the GenAI in CS Education Consortium, 2025.
- Completed Kean University's SESMag Faculty Development Workshop, 2024.
- Completed CAHSI Affinity Research Group (ARG) Professional Development, 2023.
- Attended the Broadening Participation in Computing (BPC) Workshop, 2023.
- Completed GenderMag Evaluator Training, 2023.
- Attended CURF Workshop: Student-Faculty Research Opportunities, Kean University, 2022.
- Attended the New Faculty Orientation, Kean University, 2022.
- Attended Workshop: Pathways to Independence (K99/R00, Understanding NIH), 2022.
- Completed Empowering Teaching Excellence Program, with professional training on Canvas and course design, Utah State University, 2022.
- Attended Equity in Graduate Education Panel, Utah State University, 2021.
- Attended Graduate Student Proposal Writing Seminars, Utah State University, 2021.