Zichang He

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Education

University of California, Santa Barbara, *Santa Barbara, CA, USA* Sep. 2018 – 2023 (Expected)

Pursing Ph.D. in *Electrical and Computer Engineering*, *GPA*: 3.92/4.0;

Northwestern Polytechnical University, *Xi'an, China* Sep. 2014 – Jun. 2018

B.Eng. in *Detection, Guidance and Control Technology*

Research Experiences

Uncertainty & Data Analysis Lab, UCSB Sep. 2018 – Present

Graduate Research Assistant, Supervisor: Prof. Zheng Zhang

Research Interests: Uncertainty Quantification (UQ) & Tensor Analysis with applications on Design Automation, Machine Learning, and Quantum Computing.

- **AI safety verification based on quantum annealing.** Demonstrated a novel neural network verification approach based on SAT encoding and quantum annealer with a validation on D-Wave architecture.
- **Tensor Learning.** Proposed a tensor regression model for high-dimensional uncertainty quantification with automatic tensor rank determination and adaptive sampling.
- **Risk-aware engineering design.** Certified the robustness of engineering designs via tractable chance-constrained programming based on polynomial relaxation and polynomial optimization.
- **Fast simulation of electronic & photonics circuits.** Accelerated simulations via building precise but cheap surrogate models, dealing with high-dimensionality uncertainty, mixed-type uncertainty, and distributionally shifted data.
- **Experimental design for the high-dimensional data.** Proposed the active learning methods for tensor learning problems including both parameter estimation and data recovery.

Selected Publications [Google Scholar]

- **Z. He** and Z. Zhang, "High-dimensional uncertainty quantification via rank- and sample-adaptive tensor regression," submitted to *IEEE Trans. Components, Packaging and Manufacturing Technology (T-CMPT)*. arXiv:2103.17236 **(Invited paper)**
- **Z. He**, B. Zhao and Z. Zhang, "Active sampling for accelerated MRI with low-rank tensors," submitted to *International Conference on Image Processing (ICIP)*. arXiv:2012.12496
- **Z. He** and Z. Zhang, "High-dimensional uncertainty quantification via active and rank-adaptive tensor regression," *IEEE Electrical Performance of Electronic Packaging and Systems (EPEPS)*, San Jose, CA, Oct. 2020. **(Best Student Paper Award)**
- **Z. He**, W. Cui, C. Cui, T. Sherwood and Z. Zhang, "Efficient uncertainty modeling for system design via mixed integer programming," *International Conf. Computer Aided Design (ICCAD)*, Westminster, CO, Nov. 2019. (Acceptance rate = 23.8%)
- **Z. He**, F.T.S. Chan, and W. Jiang, "A quantum framework for modelling subjectivity in multi-attribute group decision making," *Computers & Industrial Engineering*, 124 (2018): 560-572.
- **Z. He** and W. Jiang, "An evidential Markov decision making model," *Information Sciences*, 467 (2018): 357-372.
- **Z. He** and W. Jiang, "An evidential dynamical model to explain the interference effects of categorization on decision making results," *Knowledge-Based Systems*, 150 (2018): 139-149.
- **Z. He** and W. Jiang, "A new belief Markov chain model and its application in inventory prediction," *International Journal of Production Research*, 56 (2018): 2800-2817.

Selected Honors & Awards

- Best student paper award at IEEE EPEPS Conference 2020
- Outstanding Teaching Assistant award in Department of ECE, UCSB 2020
- Graduate Fellowship in Department of ECE, UCSB 2018
- Meritorious Winner in Interdisciplinary Contest in Modeling (awarded by COMAP) 2016

Programming skills:

Languages: Python, Matlab, C, C++, R, Mathematica, Keil, LaTex