

## Hong (Herbert) Cai

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CONTACT INFORMATION	Phone: (805)-689-0081 Email: hongcai1991@gmail.com Homepage: <a href="https://www.ece.ucsb.edu/~hcai">https://www.ece.ucsb.edu/~hcai</a> LinkedIn: <a href="https://www.linkedin.com/in/hong-herbert-cai">https://www.linkedin.com/in/hong-herbert-cai</a>
SUMMARY	Extensive (6+ years) experience in artificial intelligence, robotics, optimization, machine learning and deep learning, and computer vision, with research papers (8 first-authored) in top venues (e.g., RSS, T-RO, CVPR, MobiCom) and real-world implementations. Practical experience in Matlab, Python, PyTorch, TensorFlow, Caffe, Google Cloud, Crowdsourcing via Amazon MTurk. Strong mathematical background.
EDUCATION	<b>University of California, Santa Barbara</b> July 2015 – present Ph.D., Electrical and Computer Engineering <ul style="list-style-type: none"><li>• Advisor: Dr. Yasamin Mostofi</li><li>• Expected Graduation: Sept. 2020</li></ul> <b>University of California, Santa Barbara</b> Sept. 2013 – July 2015 M.S., Electrical and Computer Engineering <b>Hong Kong University of Science and Technology</b> Sept. 2009 – July 2013 B.Eng., Electronic Engineering (Honors Research Track)
RESEARCH EXPERIENCE	<b>Graduate Student Researcher (UCSB)</b> Apr. 2014 – present <ul style="list-style-type: none"><li>• <b>Optimization of Robotic Decision-Making and Visual Sensing</b><ul style="list-style-type: none"><li>* Robot collaboration with human in visual tasks<ul style="list-style-type: none"><li>- <i>Proposed Deep CNN-based human visual performance prediction</i></li><li>- <i>Crowdsourced human performance data via Amazon MTurk</i></li></ul></li><li>* Optimization of robot decisions (e.g., path planning, human query)<ul style="list-style-type: none"><li>- <i>Proposed Knapsack-based fast near-optimal solution for large-scale decision-making</i></li><li>- <i>Extended path planning methods (e.g., RRT*, TSP) for human-robot collaboration</i></li></ul></li><li>* Exploiting correlation among visual inputs to improve accuracy<ul style="list-style-type: none"><li>- <i>Designed a Markov random field to capture visual object relationship</i></li></ul></li><li>* Validation on large-scale datasets and real-world robotic experiments</li></ul></li><li>• <b>Deep Learning Based Image Quality Assessment</b><ul style="list-style-type: none"><li>* Novel pairwise-structured deep CNN to learn image quality</li><li>* Large-scale training/test datasets collected via Amazon MTurk</li></ul></li><li>• <b>Optimization of Robot Actions in Wireless Environment</b><ul style="list-style-type: none"><li>* Co-optimization of robot path planning and data transmission<ul style="list-style-type: none"><li>- <i>Utilized optimal control, Monte-Carlo tree search, integer optimization, etc.</i></li></ul></li><li>* Distributed decision-making and coordination for multiple robots</li></ul></li><li>• <b>Cross-Modal Gait-Based Person Identification</b><ul style="list-style-type: none"><li>* Simulating WiFi for walking person in video via 3D shape reconstruction</li><li>* Vision-WiFi cross-modal person identification using machine learning</li><li>* Extensive real-world experimental validation</li></ul></li></ul>
PROGRAMMING AND SOFTWARE	Matlab, Python, C/C++, PyTorch, Caffe, TensorFlow
PUBLICATIONS	<ol style="list-style-type: none"><li>1. <b>H. Cai</b> and Y. Mostofi, “Exploiting Object Similarity for Robotic Visual Recognition,” IEEE Transactions on Robotics (T-RO), 2019, conditionally accepted.</li><li>2. B. Korany*, C. R. Karanam*, <b>H. Cai*</b>, and Y. Mostofi, “XModal-ID: Using WiFi for Through-Wall Person Identification from Candidate Video Footage,” ACM</li></ol>

International Conference on Mobile Computing and Networking (MobiCom), 2019. [acceptance rate: 19.0%]

3. **H. Cai** and Y. Mostofi, "Human-Robot Collaborative Site Inspection under Resource Constraints," IEEE Transactions on Robotics (T-RO), 2018.
4. E. Prashnani\*, **H. Cai**\*, Y. Mostofi, and P. Sen, "PieAPP: Perceptual Image-Error Assessment through Pairwise Preference," IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018. [acceptance rate: 29.6%]
5. U. Ali, **H. Cai**, Y. Mostofi, and Y. Wardi, "Motion-Communication Co-Optimization with Cooperative Load Transfer in Mobile Robotics: An Optimal Control Perspective," IEEE Transactions on Control of Network Systems (TCNS), 2018.
6. **H. Cai** and Y. Mostofi, "When Human Visual Performance is Imperfect – How to Optimize the Collaboration between One Human Operator and Multiple Field Robots," Trends in Control and Decision-Making for Human-Robot Collaboration Systems (Y. Wang and F. Zhang (Eds.)), Springer, 2017
7. **H. Cai** and Y. Mostofi, "Asking for Help with the Right Question by Predicting Human Visual Performance," Robotics: Science and Systems (RSS), 2016. [acceptance rate: 20.6%]
8. **H. Cai** and Y. Mostofi, "A Human-Robot Collaborative Traveling Salesman Problem: Robotic Site Inspection with Human Assistance," American Control Conference (ACC), 2016.
9. U. Ali, **H. Cai**, Y. Mostofi and Y. Wardi, "Motion and Communication Co-Optimization with Path Planning and Online Channel Prediction," American Control Conference (ACC), 2016.
10. **H. Cai** and Y. Mostofi, "To Ask or Not to Ask: A Foundation for the Optimization of Human-Robot Collaborations," American Control Conference (ACC), 2015.

\* indicates joint first authors.

COURSEWORKS

**Graduate Level:** Convex Optimization, Machine Learning, Stochastic Processes, Game Theory, Distributed Algorithms and Network Systems, Linear Systems Theory, Nonlinear Control Systems, Hybrid Control Systems, Kalman Filtering, Networked Control Systems, Computational Methods in Statistics, Wireless Communications and Networking

**Undergraduate Level:** Real Analysis, Advanced Linear Algebra, Differential Equations, Probability and Random Processes, Object-Oriented Programming, Data Structures, Robotics, Digital Image Processing, Signal Processing, Feedback Control Systems

ACADEMIC SERVICE

- Reviewer of T-RO, RA-L, L-CSS, TSP, TMC, J-SAC, IEEE Access, RSS, ICRA, IROS, CDC, ACC, CASE, SMC, ITSC, IV, Globecom, CoDIT
- Co-organized and chaired for invited session "Human-Robot Collaborations: Opportunities and Challenges" at ACC 2016

ACADEMIC AWARDS AND HONORS

- UCSB Graduate Division Dissertation Fellowship 2018
- UCSB ECE Ph.D. Dissertation Fellowship 2018
- HKUST Academic Achievement Medal (Top 1% of Students) 2013
- HKUST ECE Best Final Year Thesis 2013
- Cheung On Tak Charity Foundation Scholarship (4-Yr Full Tuition) 2009-2013