Chien-Ju Ho

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Contact Information

Dept. of Computer Science & Engineering
Washington University in St. Louis
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Research Interests

Machine learning, algorithmic economics, optimization, online social behavioral science, online algorithm, crowdsourcing, social computing, and artificial intelligence

I am interested in investigating the interactions between humans and AI, including developing AI algorithms to learn from humans (e.g., in the context of crowdsourcing) and designing AI algorithms to assist human decision-making (e.g., through updating decision-making environments or designing assistive information).

Employment

Washington University in St. Louis, St. Louis, MO
Assistant Professor, Computer Science & Engineering, August 2017 to Present

Cornell University, Ithaca, NY
Postdoctoral Associate, October 2015 to July 2017
- Host: Arpita Ghosh

Education

University of California, Los Angeles, Los Angeles, CA
Ph.D., Computer Science, September 2010 to October 2015
- Dissertation: Design and Analysis of Crowdsourcing Mechanisms
- Advisor: Jennifer Wortman Vaughan

Harvard University, Cambridge, MA
Visiting Ph.D. Student, Computer Science, October 2012 to September 2015
- Mentor: Yiling Chen

National Taiwan University, Taipei, Taiwan
M.S., Computer Science and Information Engineering, June 2007
B.S., Computer Science and Information Engineering, June 2005
B.S., Physics, June 2005

Awards

Best Paper Honorable Mention, AAAI Conference on Human Computation and Crowdsourcing (HCOMP), 2021

Best Paper Award Nominee, International World Wide Web Conference (WWW), 2015

Google Outstanding Graduate Research Award, Computer Science, UCLA, 2015

Dissertation Year Fellowship, UCLA, 2014-2015

Ph.D. Students

Wei Tang, Computer Science and Engineering 01/2018 to 08/2022
- Human-Centered Machine Learning: Algorithm Design and Human Behavior
- Next Position: Postdoctoral Associate at Columbia University
- (Starting in Sep 2024) Assistant Professor at CUHK Business School

Guanghui Yu, Computer Science and Engineering 01/2020 to present

Saumik Narayanan, Computer Science and Engineering 01/2021 to present

Lauren Treiman, Division of Computational and Data Sciences 09/2022 to present
- Co-advised with Wouter Kool

Alex DiChristofano, Division of Computational and Data Sciences 01/2023 to present
- Co-advised with Patrick Fowler

Robert Kasumba, Division of Computational and Data Sciences 01/2023 to present
- Co-advised with Dennis Barbour

Tory Farmer, Computer Science and Engineering 01/2024 to present

Publications

$*$ denotes students that I advise.

In most cases, my collaborators and I choose to have students listed first. We then determine the authorship of non-student authors alphabetically.

The Impact of Features Used by Algorithms on Perceptions of Fairness.
Andrew Estornell, Tina Zhang, Sanmay Das, Chien-Ju Ho, Brendan Juba, and Yevgeniy Vorobeychik
International Joint Conference on Artificial Intelligence (IJCAI), 2024

Rationality-Robust Information Design: Bayesian Persuasion under Quantal Response.
($\alpha - \beta$) Yiding Feng, Chien-Ju Ho, and *Wei Tang.
ACM-SIAM Symposium on Discrete Algorithms (SODA), 2024

Encoding Human Behavior in Information Design through Deep Learning.
*Guanghui Yu, *Wei Tang, *Saumik Narayanan, and Chien-Ju Ho.
Annual Conference on Neural Information Processing Systems (NeurIPS), 2023.

Humans Forgo Reward to Instill Fairness into AI.
*Lauren Treiman, Chien-Ju Ho, and Wouter Kool.
AAAI Conference on Human Computation and Crowdsourcing (HCOMP), 2023.

How Does Value Similarity Affect Human Reliance in AI-Assisted Ethical Decision Making?
*Saumik Narayanan, *Guanghui Yu, Chien-Ju Ho, and Ming Yin.
AAAI/ACM Conference on AI, Ethics, and Society (AIES), 2023.

Competitive Information Design for Pandora's Box.
($\alpha - \beta$) Bolin Ding, Yiding Feng, Chien-Ju Ho, *Wei Tang, and Haifeng Xu.
ACM-SIAM Symposium on Discrete Algorithms (SODA), 2023.

Environment Design for Biased Decision Makers.
*Guanghui Yu and Chien-Ju Ho.
International Joint Conference on Artificial Intelligence (IJCAI), 2022.

How Does Predictive Information Affect Human Ethical Preferences?
*Saumik Narayanan, *Guanghui Yu, *Wei Tang, Chien-Ju Ho, and Ming Yin.
AAAI/ACM Conference on AI, Ethics, and Society (AIES), 2022.

The Influences of Task Design on Crowdsourced Judgement: A Case Study of Recidivism Risk Evaluation.
Xiaoni Duan, Chien-Ju Ho, and Ming Yin.
The Web Conference (WWW), 2022.

Bandit Learning with Delayed Impact of Actions.
*Wei Tang, Chien-Ju Ho, and Yang Liu.
Annual Conference on Neural Information Processing Systems (NeurIPS), 2021.

On the Bayesian Rational Assumption in Information Design.
*Wei Tang and Chien-Ju Ho.
AAAI Conference on Human Computation and Crowdsourcing (HCOMP), 2021.
Best Paper Honorable Mention.

Linear Models are Robust Optimal Under Strategic Behavior.
*Wei Tang, Chien-Ju Ho, and Yang Liu.
International Conference on Artificial Intelligence and Statistics (AISTATS), 2021.

Efficient Nonmyopic Online Allocation of Scarce Reusable Resource.
*Zehao Dong, Sanmay Das, Patrick Fowler, and Chien-Ju Ho.
International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2021.

Optimal Query Complexity of Secure Stochastic Convex Optimization.
*Wei Tang, Chien-Ju Ho, and Yang Liu.
Annual Conference on Neural Information Processing Systems (NeurIPS), 2020.

Does Exposure to Diverse Perspectives Mitigate Biases in Crowdwork? An Explorative Study.
Xiaoni Duan, Chien-Ju Ho, and Ming Yin.
AAAI Conference on Human Computation and Crowdsourcing (HCOMP), 2020.

Differentially Private Contextual Dynamic Pricing.
*Wei Tang, Chien-Ju Ho, and Yang Liu.
International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2020.

Incorporating Compatible Pairs in Kidney Exchange: A Dynamic Weighted Matching Model.
Zhuoshu Li, *Kelsey Lieberman, *William Macke, Sofia Carrillo, Chien-Ju Ho, Jason Wellen, and Sanmay Das.
ACM conference on Economics and Computation (EC), 2019.

Leveraging Peer Communication to Enhance Crowdsourcing.
*Wei Tang, Chien-Ju Ho, and Ming Yin.
The Web Conference 2019 (WWW), 2019.

Bandit Learning with Biased Human Feedback.
*Wei Tang and Chien-Ju Ho.
International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2019.

Incentivizing High Quality User Contributions: New Arm Generation in Bandit Learning.
Yang Liu and Chien-Ju Ho.
AAAI Conference on Artificial Intelligence (AAAI), 2018.

Eliciting Categorical Data for Optimal Aggregation.
Chien-Ju Ho, Rafael Frongillo, and Yiling Chen.
Annual Conference on Neural Information Processing Systems (NIPS), 2016.

Adaptive Contract Design for Crowdsourcing Markets: Bandit Algorithms for Repeated Principal-Agent Problems.
Chien-Ju Ho, Aleksandrs Slivkins, and Jennifer Wortman Vaughan.
Journal of Artificial Intelligence Research, Volume 55, pages 317-359, 2016. (Supersedes the EC'14 paper)

Low-Cost Learning via Active Data Procurement.
($\alpha - \beta$) Jacob Abernethy, Yiling Chen, Chien-Ju Ho, and Bo Waggoner.
ACM Conference on Economics and Computation (EC), 2015.

Incentivizing High Quality Crowdwork.
Chien-Ju Ho, Aleksandrs Slivkins, Siddharth Suri, and Jennifer Wortman Vaughan.
International World Wide Web Conference (WWW), 2015.
Nominee for Best Paper Award.

Adaptive Contract Design for Crowdsourcing Markets: Bandit Algorithms for Repeated Principal-Agent Problems.
Chien-Ju Ho, Aleksandrs Slivkins, and Jennifer Wortman Vaughan.
ACM Conference on Economics and Computation (EC), 2014.

Adaptive Task Assignment for Crowdsourced Classification.
Chien-Ju Ho, Shahin Jabbari, and Jennifer Wortman Vaughan.
International Conference on Machine Learning (ICML), 2013.

Online Task Assignment in Crowdsourcing Markets.
Chien-Ju Ho and Jennifer Wortman Vaughan.
AAAI Conference on Artificial Intelligence (AAAI), 2012.

Towards Social Norm Design for Crowdsourcing Markets.
Chien-Ju Ho, Yu Zhang, Jennifer Wortman Vaughan, and Mihaela van der Schaar.
Human Computation Workshop (HCOMP), 2012.

DevilTyper: A Game for CAPTCHA Usability Evaluation.
Chien-Ju Ho, Chen-Chi Wu, Kuan-Ta Chen, and Chin-Laung Lei.
In ACM Computers in Entertainment, 2011.

On Formal Models for Social Verification.
Chien-Ju Ho and Kuan-Ta Chen.
Human Computation Workshop (HCOMP), 2009.

KissKissBan: A Competitive Human Computation Game for Image Annotation (Short Paper).
Chien-Ju Ho, Tao-Hsuan Chang, Jong-Chuan Lee, Jane Yung-jen Hsu, and Kuan-Ta Chen.
Human Computation Workshop (HCOMP), 2009.

Designing Human-Computer Multi-agent Collaboration in Productive Multi-player Games (Short Paper).
Wenn-Chieh Tsai, Yuan-Hsiang Lee, Tsung-Hsiang Chang, Chien-Ju Ho, and Jane Yung-jen Hsu.
International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2008.

PhotoSlap: A Multi-player Online Game for Semantic Annotation.
Chien-Ju Ho, Tsung-Hsiang Chang, and Jane Yung-jen Hsu.
AAAI Conference on Artificial Intelligence (AAAI), 2007.

The PhotoSlap Game: Play to Annotate (Intelligent System Demo).
Tsung-Hsiang Chang, Chien-Ju Ho, and Jane Yung-jen Hsu.
AAAI Conference on Artificial Intelligence (AAAI), 2007.

Funding

Leveraging Weak Human Supervisions to Improve Strong Machine Learning Models
- Funding agency: OpenAI Superalignment Fast Grants
- Role: PI
- Award amount: $133,000
- Duration: 2024-2025

Leveraging Machine Learning to Model Human Behavior and Improve Decision Making
- Funding agency: J.P. Morgan Faculty Research Award
- Role: PI
- Award amount: $70,000
- Duration: 09/2023-04/2025

Accounting for Human Biases to Improve AI-Assisted Decision Making
- Funding agency: WashU TRIADS Seed Grant
- Role: Co-PI (PI: Wouter Kool)

- Award amount: $39,906
- Duration: 04/2023-03/2025

Forming Representative Cohorts: Sequential Recruitment under Uncertainty
- Funding agency: J.P. Morgan Faculty Research Award
- Role: PI (Co-PI: Yevgeniy Vorobeychik)
- Award amount: $95,000
- Duration: 09/2022-04/2024

Understanding and Accounting for Human Behavior and Beliefs in Human-AI Collaboration
- Funding agency: McDonnell International Scholars Academy: Global Incubator Seed Grant
- Role: Co-PI (PI: William Yeoh)
- Award amount: $25,000
- Duration: 12/2022-12/2023

Promoting AI Research: HCOMP 2022 Doctoral Consortium
- Funding agency: Artificial Intelligence Journal (AIJ)
- Role: PI (with Alex Williams, Amazon)
- Award amount: Euro 3,000

Sequential Decision Making with Human Biases
- Funding agency: Office of Naval Research (ONR)
- Role: PI
- Award amount: $453,151
- Duration: 4/2020-6/2023

AI: FairGame: An Audit-Driven Game Theoretic Framework for Development and Certification of Fair AI
- Funding agency: National Science Foundation (NSF) / Amazon
- Role: Co-PI (PI: Yevgeniy Vorobeychik)
- Award amount: $785,000
- Duration: 1/2020-12/2023

Solving Homelessness Using Data-Driven Feedback Systems
- Funding agency: Washington University OVCR
- Role: Co-PI (PI: Patrick Fowler)
- Award amount: $50,000
- Duration: 6/2019-6/2020

Teaching Experience

Instructor, Washington University in St. Louis 2017 to Present
- SP 2024: Human-in-the-Loop Computation. Enrollment: 22;
- FL 2022: Introduction to Machine Learning. Enrollment: 90; Rating: 6.12 / 7.00
- FL 2022: Human-in-the-Loop Computation. Enrollment: 27; Rating: 5.78 / 7.00
- SP 2022: Introduction to Machine Learning. Enrollment: 103; Rating: 5.93 / 7.00
- FL 2021: Human-in-the-Loop Computation. Enrollment: 42; Rating: 6.67 / 7.00
- SP 2021: Introduction to Machine Learning. Enrollment: 84; Rating: 6.09 / 7.00
- FL 2020: Human-in-the-Loop Computation. Enrollment: 21; Rating: 6.63 / 7.00
- SP 2020: Introduction to Machine Learning. Enrollment: 123; Rating: 5.84 / 7.00
- FL 2019: Human-in-the-Loop Computation. Enrollment: 35; Rating: 6.13 / 7.00
- SP 2019: Crowdsourcing and Human Computation. Enrollment: 28; Rating: 6.35 / 7.00
- FL 2018: Introduction to Machine Learning. Enrollment: 83; Rating: 5.44 / 7.00
- FL 2017: Introduction to Machine Learning. Enrollment: 69; Rating: 5.76 / 7.00

Full-time Teaching Assistant, National Taiwan University 2009 to 2010
- Administrator of the Logic Laboratory.

- Instructor of the course "Digital Circuit Laboratory".
- Instructor of the course "Digital System Laboratory".
- Teaching assistant of "Artificial Intelligence" and "Digital System Design".

PH.D. COMMITTEE

Janet Huang (National Taiwan University, Dissertation Committee, Defense in Summer 2018)
Hao Yan (WashU, Dissertation Committee, Defense in Fall 2019)
Christabel Wayllace (WashU, Dissertation Committee, Defense in Spring 2021)
Arghya Datta (WashU, Dissertation Committee, Defense in Spring 2021)
Athena Tabakhi (WashU, Dissertation Committee, Defense in Summer 2021)
Henry Chai (WashU, Dissertation Committee, Defense in Summer 2021)
Maede Zolanvari (WashU, Dissertation Committee, Defense in Fall 2021)
Dingwen Li (WashU, Dissertation Committee, Defense in Fall 2021)
Sixie Yu (WashU, Dissertation Committee, Defense in Spring 2022)
Khoi Hoang (WashU, Dissertation Committee, Defense in Spring 2022)
Amanda Kube (WashU, Dissertation Committee, Defense in Spring 2022)
Hai Le (WashU, Dissertation Committee, Defense in Spring 2023)
Shayan Monadjemi (WashU, Dissertation Committee, Defense in Spring 2023)
Andrew Estornell (WashU, Dissertation Committee, Defense in Spring 2023)

Jizhou Huang (WashU, Dissertation Committee)
Jennifer Ha (WashU, Dissertation Committee)
Melanie Bancilhon (WashU, Dissertation Committee)
Yehu Chen (WashU, Dissertation Committee)
Ashwin Kumar (WashU, Dissertation Committee)
Zehao Dong (WashU, Dissertation Committee)
Hao Liu (WashU, Dissertation Committee)
Quan Nguyen (WashU, Dissertation Committee)

Athena Tabakhi (WashU, Oral Qualifying Committee)
Wint Hnin (WashU, Oral Qualifying Committee)
Zihao Deng (WashU, Oral Qualifying Committee)
Arghya Datta (WashU, Oral Qualifying Committee)
Zhuangzhuang Zhang (WashU, Oral Qualifying Committee)
Amanda Kube (WashU, Oral Qualifying Committee)
Xiaojian Xu (WashU, Oral Qualifying Committee)
Zhengliang Liu (WashU, Oral Qualifying Committee)
Kriti Bhattarai (WashU, Oral Qualifying Committee)
Jizhou Huang (WashU, Oral Qualifying Committee)
Xiaoxiao Zhou (WashU, Oral Qualifying Committee)
Shane Chu (WashU, Oral Qualifying Committee)
Nguyen Quan (WashU, Oral Qualifying Committee)
Ashwin Kumar (WashU, Oral Qualifying Committee)
Jingwen Zhang (WashU, Oral Qualifying Committee)
Hanyang Liu (WashU, Oral Qualifying Committee)
Sayantan Kumar (WashU, Oral Qualifying Committee)
Jennifer Ha (WashU, Oral Qualifying Committee)
Zehao Dong (WashU, Oral Qualifying Committee)
Hao Liu (WashU, Oral Qualifying Committee)
John Allen (WashU, Oral Qualifying Committee)
Melanie Bancilhon (WashU, Oral Qualifying Committee)
Weijie Gan (WashU, Oral Qualifying Committee)
Janeen Alfauri (WashU, Oral Qualifying Committee)
Alex DiChristogano (WashU, Oral Qualifying Committee)
Junlin Wu (WashU, Oral Qualifying Committee)
Anindya Sarkar (WashU, Oral Qualifying Committee)

Jiarui Feng (WashU, Oral Qualifying Committee)
Yuanhaur Chang (WashU, Oral Qualifying Committee)
Saugat Pandey (WashU, Oral Qualifying Committee)
Kris Nilsson (WashU, Oral Qualifying Committee)
Michael Lanier (WashU, Oral Qualifying Committee)
McKinley Oen (WashU, Oral Qualifying Committee)

Service

Conference Services:
Doctoral Consortium Co-Chair: HCOMP 2022
Works-in-Progress and Demonstration Co-Chair: HCOMP 2019

Area Chair or Senior Program Committee:
AAAI Conference on Artificial Intelligence (AAAI): 2020, 2021, 2022, 2023, 2024
Conference on Neural Information Processing Systems (NeurIPS): 2021, 2022, 2023
International Conference on Learning Representations (ICLR): 2024
International Conference on Machine Learning (ICML): 2023, 2024
International Joint Conference on Artificial Intelligence (IJCAI): 2021

Program Committee or Formal Reviewer:
AAAI/ACM Conference on AI, Ethics, and Society (AIES): 2023
AAAI Conference on Artificial Intelligence (AAAI): 2013, 2018, 2019
AAAI Conference on Human Computation and Crowdsourcing (HCOMP): 2016, 2018, 2024
ACM Conference on Economics and Computation (EC): 2015, 2016, 2017, 2018
ACM Conference on Fairness, Accountability, and Transparency (FAccT): 2023
ACM International Conference on Web Search and Data Mining (WSDM): 2021
Conference on Neural Information Processing Systems (NIPS, NeurIPS): 2013-2020
International Conference on Machine Learning (ICML): 2021, 2022
International Joint Conference on Artificial Intelligence (IJCAI): 2015, 2016, 2018, 2020, 2022
International World Wide Web Conference (WWW): 2017, 2018, 2019, 2021, 2022, 2023

Auxiliary Reviewer:
HCOMP 2012, HCOMP 2013 WiP, WINE 2013, AAAI 2014, WINE 2016, FAMAS 2019

Workshop Organizer:
HCOMP Workshop on Mathematical Foundations of Human Computation, 2016
NIPS Workshop on Crowdsourcing and Machine Learning, 2014

Journal Referee:
ACM Transactions on Intelligent Systems and Technology
ACM Transactions on Economics and Computation
Artificial Intelligence Journal
Annals of Mathematics and Artificial Intelligence
Autonomous Agents and Multi-Agent Systems
IEEE Transactions on Computational Intelligence and AI in Games
IEEE Transactions on Computational Social Systems
IEEE Transactions on Knowledge and Data Engineering
IEEE Transactions on Parallel and Distributed Systems
Journal of Artificial Intelligence Research
Journal of Machine Learning Research
Journal of the Association for Information Science and Technology
World Wide Web Journal

Organizer of UCLA Social Computing Reading Group, Sep. 2011 to Mar. 2012