Ti-Chung Cheng

Email: tcheng10@illinois.edu | Website: https://tichung.com | GitHub: https://github.com/a2975667 | LinkedIn: https://linkedin.com/in/tcheng10

RESEARCH SUMMARY

Keywords: Computer-Supported Cooperative Work (CSCW); Participatory Systems; Algorithmic Decision-Making; Preference Elicitation Methods

I build and evaluate **participatory computational systems that keep human values visible and usable in algorithmic decision-making**. My work spans **preference elicitation** with explicit tradeoffs [R1], **empirical studies** of control dynamics and user roles in smart environments [R2], and **generative AI** in high-stakes decisions and its influence on information quality [R3].

[R1] Quadratic Surveys for preference elicitation and collective choice.
Introduced Quadratic Surveys, a preference elicitation instrument that captures intensity through budgeted tradeoffs, and validated it against behavioral outcomes using controlled experiments and Bayesian models. [C4, C5, C6, W3]

[R2] Contextual preferences in smart homes.
Studied how smart home control practices shape whose preferences become defaults, focusing on user roles in setup and troubleshooting and shifts between control as contexts and breakdowns change. [C3, C7]

[R3] Generative AI in high-stakes decision-making.
Studied how generative AI supports coordination by translating goals into context-aware metrics, and its public-facing influence through generative propaganda and mis/disinformation that shift beliefs in contested spaces. [TR1, W2]

EDUCATION

Doctor of Philosophy in Computer Science, University of Illinois Urbana-Champaign — Expected May 2026
Research Topics: Quadratic Survey, Human-Computer Interaction, Decision-Making Toolkit, Human-AI Interaction — GPA: 4.00/4.00
Co-advised by Prof. Karrie Karahalios & Prof. Hari Sundaram Committee: Dr. Glen Weyl & Prof. Ranjitha Kumar
Thesis Proposal: "Quadratic Surveys: Empirical Research on Using Quadratic Voting Mechanism as a Preference Elicitation Tool"

Master of Science in Computer Science, University of Illinois at Urbana-Champaign — Aug 2020
Advised by Prof. Karrie Karahalios, Prof. Hari Sundaram, and Prof. Aditya Parameswaran — GPA: 4.00/4.00
Thesis: "Comparing Quadratic Voting and Likert Surveys"

Bachelor of Science in Computer Science (Minor in Business Economics), The Chinese University of Hong Kong — December 2017
Final Year Project advised by: Prof. James Cheng and Dr. JinFeng Li, Academic Advisor: Prof. John C.S. Lui — GPA: 3.29/4.00
Final Year Project: "Efficient Nearest-Neighbor Search in Distributed Manner"

SELECTED RESEARCH AND WORK EXPERIENCE

University of Illinois at Urbana-Champaign — Champaign, IL
Graduate Researcher — Aug 2018 - Present

- Led human-computer interaction research projects in human-data interaction, and individual preference elicitation.
- Designed, prototyped, and built an interactive attitude elicitation system using Quadratic Voting mechanisms with Nest.js, MongoDB, and React.
- Evaluated multiple interactive systems using interviews, surveys, questionnaires, click-stream data, and in-lab behavioral experiments.
- Analyzed experiment data using qualitative and quantitative methods, including open coding, thematic analysis, and Bayesian analysis.
- Supported human-computer interaction research in smart home experiences, version control, and spreadsheet analysis workflows.

University of Illinois at Urbana-Champaign — Champaign, IL
Graduate Teaching Assistant — Aug 2018 - Present

- Led, managed, and assisted CS 411 Introduction to Database Systems, a 450-student and 10+ staff class, across 8 semesters.
- Assisted and prepared course material for CS470 Social and Information Networks.
- Led and designed assignments for CS242 Programming studio, a course teaching best coding practices with 200+ students for 3 semesters.
- Collaborated with three faculty for CS598 HCI Research Methods, offering feedback, facilitating class activities, and assessing student assignments.
- Led and revamped CS598 Data Mining Capstone, offering support and redesigned capstone projects for MOOC classes through Coursera.

Microsoft Research, Special Projects — Redmond, WA
Research Intern — Feb 2024 - May 2024
Mentors: Madeleine Daepp, Robert Ness.

- Investigated the influence of Large language models on high-stakes decision-making via misinformation and generative propaganda.
- Analyzed 150K+ crowd-sourced articles using time series, linguistic, and qualitative methods.
- Contributed cultural and regional expertise, guiding internal discussions and ensuring accurate framing in external publications.

Microsoft Research, Software Analysis & Intelligence (SAINTES) Group — Redmond, WA
Applied Sciences Intern — May 2023 - Aug 2023
Mentors: Denae Ford Robinson, Nicole Forsgren, Carmen Badea, Christian Bird, Tom Zimmermann, Rob DeLine.

- Designed a multi-agent LLM system to generate theory-driven metrics for software organizations team pairing, using GitHub and DevOps signals.
- Built the system (GEMS) with GPT-4, AutoGen, Guidance, and MySQL; introduced iterative prompt priming for expert-informed metric generation.
- Evaluated GEMS via qualitative comparisons on DevOps performance proxies, showing gains in specificity, diversity, and theoretical grounding.

Salesforce, Lightning Component Services Team — Remote
Software Engineer Intern — May 2020 - Aug 2020

- Developed VSCode Plugin for Salesforce developers to reduce XML development time by 2x using TypeScript.
- Contributed to Red Hat XML Open Source Plugin with 794K installs on VSCode Store.

Salesforce, Lightning Component Services Team — San Francisco
Software Engineer Intern — May 2019 - Aug 2019

- Built pipelines and designed 3 dashboards for front-end cache monitoring using Java, Grafana, and Splunk to visualize daily logs on a billion scale.
- Reduced dashboard query code by 10x for better readability and maintainability.

Machine Learning Research Intern, KKBOX, Machine Learning Team — May 2018 - Aug 2018

- Researched and implemented a natural language processing pipeline for Mandarin named-entity recognition with 90%+ accuracy.
- Designed and built a pattern-based relation extraction pipeline for cross-language music content using 3B+ music data.

Undergraduate Research Assistant, The Chinese University of Hong Kong — Dec 2015 - Dec 2017

- Conducted research on distributed hash-based nearest-neighbor search algorithms with a publication at SIGMOD.
- Built a 15% more time-efficient and scalable image retrieval system compared to OpenCV FLANN Library.

PUBLICATIONS

In Submission/Preparation

[W4] Small Group Deliberation with Quadratic Survey

Ti-Chung Cheng, Pranay Midha, Hari Sundaram, Karrie Karahalios

[W3] Eliciting Delegation and Proactivity Preferences in AI-Assisted Cooking Systems

Han Pan, **Ti-Chung Cheng**, Yu-Chun Yen, Yi-Ting Chen

[W2] Generative Propaganda

Madeleine I. G. Daepp, Alejandro Cuevas, Robert Osazuwa Ness, Vickie Yu-Ping Wang, Bharat Kumar Nayak, Dibyendu Mishra, **Ti-Chung Cheng**, Shaily Desai, Joyojeet Pal

[W1] Documenting and Communicating Design Processes

Andrew Chen, David Zhou, **Ti-Chung Cheng**, Sarah Sterman

Conference Papers (**Denotes equal contribution*)

[C7] Control in Context: How Smart Home Users Navigate Centralized and Per-device Schemes

Ali Zaidi, Anna Karanika, **Ti-Chung Cheng**, Yi-Shyuan Chiang, Camille Cobb, Indranil Gupta, Karrie Karahalios, *Proceedings of the 2026 CHI Conference on Human Factors in Computing Systems, CHI 2026*

[C6] Budget, Cost, or Both? An Empirical Exploration of Mechanisms in Quadratic Surveys

Ti-Chung Cheng*, Tiffany Wenting Li*, Karrie Karahalios, Hari Sundaram, *Proceedings of the ACM Collective Intelligence Conference, CI '25*

[C5] Organize, Then Vote: Exploring Cognitive Load in Quadratic Survey Interfaces

Ti-Chung Cheng, Yutong Zhang*, Yi-Hung Chou*, Vinay Koshy, Tiffany Wenting Li, Karrie Karahalios, Hari Sundaram, *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems, CHI 2025*

[C4] "I can show what I really like.": Eliciting Preferences via Quadratic Voting

Ti-Chung Cheng*, Tiffany Wenting Li*, Yi-Hung Chou, Karrie Karahalios, Hari Sundaram, *Proceedings of the 2021 ACM Conference on Computer Supported Cooperative Work and Social Computing, CSCW 2021*

[C3] "We Just Use What They Give Us": Understanding Passenger User Perspectives in Smart Homes

Vinay Koshy, Joon Sung Park, **Ti-Chung Cheng**, Karrie Karahalios, *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems, CHI 2021.* Best Paper Honorable Mention (Top 5%).

[C2] Understanding Data Analysis Workflows on Spreadsheets: Roadblocks and Opportunities.

Pingjing Yang, **Ti-Chung Cheng***, Sajjadur Rahman*, Mangesh Bendre, Karrie Karahalios, Aditya Parameswaran. *Workshop on Human-In-the-Loop Data Analytics (HILDA) at SIGMOD, June 2020, HILDA 2020*

[C1] A General and Efficient Querying Method for Learning to Hash.

Jinfeng Li, Xiao Yan, Jian Zhang, An Xu, James Cheng, Jie Liu, Kelvin K. W. Ng, **Ti-Chung Cheng**. *SIGMOD '18: ACM SIGMOD Int'l Conf. on Mgnt. of Data, Houston, USA, 2018.*

Technical Report

[TR1] GEMS: Generative Expert Metric System through Iterative Prompt Priming

Ti-Chung Cheng, Carmen Badea, Christian Bird, Thomas Zimmermann, Robert DeLine, Nicole Forsgren, Denae Ford, *Microsoft Research*

Research Poster

[P2] Understanding Quadratic Survey Results: Interactive Visualization for Collective Insights

Pranay Midha*, **Ti-Chung Cheng***, Hari Sundaram, Karrie Karahalios, *Proceedings of the ACM Collective Intelligence Conference, CI '25*

[P1] Quadratic Voting better elicits user preferences compared to Likert Surveys [In Mandarin]

Ti-Chung Cheng, Tiffany Wenting Li, Yi-Hung Chou, Karrie Karahalios, Hari Sundaram, *Proceedings of the 2021 Taiwan CHI Conference, TAICHI 2021*

SELECTED SOFTWARE DELIVERABLES

[Web] Here@Illinois (Link)

Co-Founder and Tech Lead

- Founded and led a dynamic team of developers, delivering a fast, secure attendance solution used by 1,000+ students and 120+ staff.
- Managed full-cycle product development using an agile process and continuous integration to align features with stakeholder needs.
- Designed distributed system architecture with MongoDB, Node.js, React; deployed on AWS and Google Cloud.
- Handled recruiting, onboarding, and mentorship, while leading business development to drive university-wide adoption.

[Data Visualization] Visualizing the Impact of SARS-CoV-2 Intervention Strategies (Link)

Contributor

- Supported visualization design for comparative analysis of public health interventions.
- Collected, parsed, and cleaned coding intervention data from different states, regions, and countries

RECENT SERVICES

Peer Review & Academic Services

Invited Reviewer, ACM Transactions on Interactive Intelligent Systems, TiiS	2025
Reviewer, Human Factors in Computing Systems (CHI)	2023, 2024, 2025, 2026
Reviewer, Intelligent User Interfaces (IUI)	2026
Reviewer, Collective Intelligence (CI)	2025
Invited Reviewer, Methodology, European Journal of Research Methods for the Behavioral and Social Sciences	2025
Reviewer, Mensch und Computer (MuC)	2025
Student Volunteer, Computer-Supported Cooperative Work And Social Computing (CSCW)	2021, 2022
Student Volunteer, Human Factors in Computing Systems (CHI)	2021

Science Communication & Public Engagement

Book Reviewer, Python x Excel Data Processing Tips (Mandarin, ISBN: 9786263490291)	Oct 2022
Tech Columnist, Mandarin Daily News, Taiwan	Jan 2020 - Dec 2021

Mentorship

Taiwanese Young Researcher Association (TYRA) - Fulbright Taiwan Mentor-Mentee Program	2023, 2024, 2025
PURE (Promoting Undergraduate Research in Engineering) Mentor, UIUC	Sept 2023 - May 2024
MUSE (Mentoring Undergraduates in Science & Engineering) Mentor, UIUC	Aug 2019 - May 2023

Community Services

Tech and Information Director, The Chinese University of Hong Kong Taiwan Alumni Association	Jan 2023 - Present
Initiator and coordinator, The Circle Group CUHK, Taiwanese Student Association	Oct 2016 - Dec 2017
Information Officer, CUHK, Taiwanese Student Association	Oct 2015 - Oct 2016

SELECTED AWARDS

UIUC Computer Science Department Outstanding Teaching Assistant	2020, 2024
List of Teachers Ranked as Excellent SP23 (for HCI Research Methods course)	2024
UIUC CS PhD Fellowship	2023, 2024, 2025
ACM CHI Special Recognitions for Outstanding Reviews	2023 (1), 2024 (2), 2026 (3)
ACM CHI 2021 Student Volunteer Award	2021
ACM CHI 2021 Best Paper Honorable Mention Award (top 5%)	2021

TEACHING EXPERIENCE

CS 411 Database System, Lead Teaching Assistant, UIUC	SP 2021, FA 2021, SP 2022, SP 2023, FA 2025, SP 2026
CS 411 Database System, Teaching Assistant, UIUC	FA 2020, FA 2024, SP 2025
CS 598 Data Mining Capstone, Teaching Assistant, UIUC	SU 2025
CS 598 HCI Research Methods, Teaching Assistant, UIUC	FA 2023

CS 470 Social and Information Networks, Teaching Assistant, UIUC — FA 2022
CS 242 Programming Studio, Head Teaching Assistant, UIUC — FA 2019, SP 2020
CS 242 Programming Studio, Teaching Assistant, UIUC — FA 2018
CSCI 2040 Introduction to Python, Course Assistant, CUHK — FA 2017

SELECTED INVITED TALKS & PANELS

[T3] Rethinking Surveys: Using Quadratic Surveys to Capture What People Really Care About — April 24th, 2025
Ti-Chung Cheng. National Yang Ming Chiao Tung University (NYCU)

[T2] 2023 Fall Student Panel – AI: The Student Perspective — Nov 10th, 2023
Ti-Chung Cheng, Jiheng Jing, Aryan Gosaliya. Academy for Excellence in Engineering Education, University of Illinois at Urbana-Champaign

[T1] Guest Lecture: Nudges in Computer Science — March 30th, 2022
Ti-Chung Cheng. ECON 490 Behavioral Economics, University of Illinois at Urbana-Champaign

STUDENTS MENTORED

Pranay Midha *(UIUC BS MATH + CS '26)* — 2023-Present
Janine Leong *(UIUC BS CS + ECON '27)* — 2023
Anupam Das *(UIUC BS CS '27)* — 2023
Yutong Zhang *(UIUC BS CS '23; Now Graduate Student at Stanford)* — 2021-2023
Tue Do *(UIUC BS CS + Math '24; Now Graduate Student at UIUC)* — 2022-2023
Ashay Parikh *(UIUC BS CS '24; Now SWE at IMC Trading)* — 2022
Yi-Hung Chou *(CUHK BS CS '21; Now PhD Student at UCI)* — 2019-2021

TECHNICAL SKILLS

[Research] Contextual Inquiry, Interview, Cognitive Walkthrough, Questionnaire and Survey, Behavioral Experiment Design, Prototyping, Bayesian Analysis, Coding, Persona Construction, Wizard of Oz
[Code & Frameworks] Python, TypeScript, JavaScript (Express.js, Angular.js, React.js, Nest.js, D3.js), Java, SQL, MongoDB, Neo4j, HTML, CSS
[ML Tools] Prompt Engineering, Natural Language Processing, Large Language Models, LangChain, Guidance, Locality-Sensitive Hashing
[Libraries and Others] ChromaDB, CosmosDB, Photoshop, Figma, Linux, LaTeX, Agile (Jira), Salesforce