Matthew K. Hong

Senior Research Scientist

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Summary

I am a human-computer interaction (HCI) research scientist with over 10 years of user research experience. I apply user research methods to bring a humancentric lens to the design and development of AI-based technologies. My current research explores the use of generative AI technologies to amplify human creativity in product design.

Education

2020 PhD, Human-Centered Computing, Georgia Institute of Technology.
Dissertation Thesis Designing Collaborative Mobile Health Experiences for Adolescent Patients
2014 MHCI, Human-Computer Interaction, Carnegie Mellon University.

- 2012 BSc, Cognitive Science, University of California, San Diego.
- Honors Thesis Multimodal Cues For Desktop Workspace Interaction

Certification

- 2023 Generative Al with Large Language Models, *DeepLearning.Al*, Coursera (Credential).
- 2021 **Natural Language Processing Specialization**, *DeepLearning.Al*, Coursera (Credential).
- 2021 **Designing, Running, and Analyzing Experiments**, University of California San Diego, Coursera (Credential).

Experience

- Apr 2024 Present **Senior Research Scientist**, *Toyota Research Institute*, Future Product Innovation, Los Altos, CA.
 - Generating scientific evidence for driving impact in the conceptual design process with Generative AI.

- Nov 2021 Apr **Research Scientist**, *Toyota Research Institute*, Future Product Innovation, Los
 - 2024 Altos, CA.
 - Managed a portfolio of projects to innovate the conceptual design process with Generative AI, some of which resulted in 4 research prototypes, 11 filed patents, 7 research articles, and a best paper award. Example projects include augmenting design space exploration with semantics and analogical transfer, supporting visual style mixing with zero-shot interpolation, and developing interventions aimed at supporting professional creatives.
 - Evaluated an ML-assisted user interface for unstructured text analysis, leading to actionable recommendations for ML/HCI practices, 1 filed patent, and 2 research articles.
- Sep 2020 Nov **NLM Postdoctoral Research Fellow**, *Department of Biomedical Informatics and* 2021 *Medical Education*, University of Washington, Seattle, WA.
 - Led a team of 9 researchers at UW and UCSD to develop an AI-based health tool that can mitigate hidden healthcare biases in the clinic (link).
 - Investigated opportunities to prevent home medication administration errors through large scale analysis of online health forum posts using a mix of topic modeling and content analysis.

Apr - Jul 2020 **Research Intern (PhD)**, *Human-Al eXperiences (HAX) Group*, Microsoft Research AI, Redmond, WA.

- Investigated challenges that UX practitioners face in prototyping and testing AI products.
- Developed an AI failures taxonomy based on a systematic characterization of 16 AI failure scenarios in common natural language based products.
- Designed and evaluated AI Playbook (rebranded as HAX Playbook), an interactive tool for generating interaction scenarios to test when designing user-facing AI systems.
- HAX Playbook (link) is released as an open source software and is fully extensible
- Research has been covered by WIRED (link) and Microsoft Al Blog for Business & Tech (link)
- 2014 2020 **Graduate Research Assistant**, *School of Interactive Computing*, Georgia Institute of Technology, Atlanta, GA.
 - Designed, deployed, and evaluated two fully functional mobile health systems (CO-OP and Rapport) to support chronically ill patients' collaborative health management.
 - Applied quantitative and qualitative user research methods in various clinical and non-clinical settings.
 - Managed IRB documentation work across two university hospitals and Georgia Tech.
 - Published nine peer-reviewed papers in leading computing conferences and medical journals.
- Jan Aug 2014 **Research Lead**, *Boeing Sponsored Project*, Carnegie Mellon University, Pittsburgh, PA.
 - Conducted research and designed new approaches to streamline communication on the 737 line at the Boeing Renton factory to improve efficiency and safety.
 - Devised and implemented qualitative research methods such as concept elicitation through speed dating, diary study, focus groups, and experience prototyping studies with factory employees.
 - Led negotiations with Boeing IT management to gain access to factory floor.
 - Submitted high-fidelity prototype, concept video, website, and two internal technical reports as final deliverables.

Apr 2013 - Aug UX Researcher (Contract), Tab32, Integrated Charts Inc., La Jolla, CA.

2013 • Created mid-high fidelity prototypes for a dental patient record management application

Oct 2012 - Mar UX Researcher (Contract), Cinder Cooking Grill, Palate Home Inc., La Jolla, CA.

- 2013 Conducted market research with middle class home makers to understand their challenges planning for and cooking daily meals.
 - Conducted usability testing of a prototype sous-vide cooking machine with home makers to capture reactions and generate insights for design.
 - Submitted low-mid fidelity prototypes for a smart cooking device with precision temperature control functionality, and research report summarizing design insights from market research and usability testing.

Jun - Oct 2012 **Research Assistant**, Department of Biomedical Informatics, UCSD School of Medicine, La Iolla, CA.

- Conducted usability studies, and designed and evaluated a prototype user interface for Schema Builder-a web-based user interface that allows clinicians to define custom NLP schemas in order to extract important information from unstructured patient records.
- Systematically investigated clinicians' workflow patterns via cognitive walkthroughs, which helped me structure concept elicitation tasks and contextual inquiries.
- Defined use case scenarios for adverse drug events and pathology reports of colonoscopy exams.

Publications

*Conference proceedings are considered top-tier venues in Human-Computer Interaction (HCI) and Computer Science disciplines, and generally exceed HCI journals in their selectivity, visibility, and impact. See h5-index for impact of HCI conference venues. See Google Scholar profile for full list of publications.

Refereed Journal [14] Xiang 'Anthony' Chen, leff Burke, Ruofei Du, Matthew K. Hong, Jennifer Ja-Publications cobs, Philippe Laban, Dingzeyu Li, Nanyun Peng, Karl D. D. Willis, Chien-Sheng Wu, Bolei Zhou. Next Steps for Human-Centered Generative AI: A Technical Perspective. arXiv preprint arXiv:2306.15774. (In Submission).

> [j3] Matthew Klenk, Matthew K. Hong, Shabnam Hakimi, and Charlene Wu. Anticipatory thinking in design. AI Magazine (AI Magazine 2023).

> [12] Jessica S Ancker, Marianne Sharko, Matthew K. Hong, Hannah Mitchell, and Lauren Wilcox. Should Parents See Their Teen's Medical Record? Asking About The Effect on Adolescent–Doctor Communication Changes Attitudes. Journal of American Informatics Association (JAMIA 2018).

> [1] Marianne Sharko, Lauren Wilcox, Matthew K. Hong, and Jessica S Ancker. Variability in Adolescent Portal Privacy Features: How the Unique Privacy Needs of the Adolescent Patient Create a Complex Decision-Making Process. Journal of American Informatics Association (JAMIA 2018). (editor's choice)

Refereed [c13] Youngseung Jeon, Matthew K. Hong, Yan-Ying Chen, Kalani Murakami, Jo-Conference nathan Q. Li, Xiang 'Anthony' Chen, and Matthew Klenk. Weaving ML with Human Proceedings Aesthetic Assessments to Augment Design Space Exploration: An Automotive Wheel Design Case Study. In Extended Abstracts of the 2024 CHI Conference on Human Factors in Computing Systems (CHI 2024), Honolulu, HI, USA, 2024.

> [c12] Hyeonsu B. Kang, David Chuan-en Lin, Martelaro Nikolas, Aniket Kittur, Yan-Ying Chen, and Matthew K. Hong. BioSpark: An End-to-End Generative System for Biological-Analogical Inspirations and Ideation. In Extended Abstracts of the 2024 CHI Conference on Human Factors in Computing Systems (CHI 2024), Honolulu, HI, USA, 2024.

[c11] Alice Cai, Steven R Rick, Jennifer L Heyman, Yanxia Zhang, Alexandre Filipowicz, **Matthew K. Hong**, Matthew Klenk, and Thomas Malone. DesignAID: Using Generative AI and Semantic Diversity for Design Inspiration. *Proceedings* of *The ACM Collective Intelligence Conference (Cl'23)*, Delft, Netherlands, 2023.

[c10] Francine Chen, **Matthew K. Hong**, Laurent Denoue, Kate S Glazko, Emily Sarah Sumner, Yan-Ying Chen and Matt Klenk. CodeML: A Machine Learning-Assisted User Interface for Code Identification and Labeling. *Proceedings of the 41st Annual ACM Conference on Human Factors in Computing Systems (CHI 2023)*, Hamburg, Germany, 2023.

[c9] Matthew K. Hong, Adam Fourney, Derek DeBellis, and Saleema Amershi. Planning for Natural Language Failures with the AI Playbook. *Proceedings of the 39th Annual ACM Conference on Human Factors in Computing Systems (CHI 2021)*, Yokohama, Japan, 2021 (26.3% acceptance rate).

[c8] Matthew K. Hong, Udaya Lakshmi, Kimberly Do, Prahalad Sampath, Thomas A. Olson, and Lauren Wilcox. Using Diaries to Probe the Illness Experiences of Adolescent Patients and Parental Caregivers. *Proceedings of the 38th Annual ACM Conference on Human Factors in Computing Systems (CHI 2020)*, Honolulu, HI, USA, 2020 (24.3% acceptance rate).

[c7] Lauren Wilcox, Marianne Sharko, **Matthew K. Hong**, Julie Hollberg, and Jessica S Ancker. The Need for Guidance and Consistency in Adolescent Privacy Policies: A Survey of CMIOs. *Proceedings of the 2018 AMIA Annual Symposium (AMIA 2018)*, San Fransisco, CA, USA, 2018.

[c6] Udaya Lakshmi, **Matthew K. Hong**, and Lauren Wilcox. Integrating Patient-Generated Observations of Daily Living into Pediatric Cancer Care: A Formative User Interface Design Study. *Proceedings of the Sixth IEEE International Conference on Healthcare Informatics (ICHI 2018)*, New York City, NY, USA, 2018.

[c5] Matthew K. Hong, Udaya Lakshmi, Thomas A. Olson, and Lauren Wilcox. Visual ODLs: Co-Designing Patient-Generated Observations of Daily Living to Support Data-Driven Conversations in Pediatric Care. *Proceedings of the 36th Annual ACM Conference on Human Factors in Computing Systems (CHI 2018)*, Montreal, Canada, 2018. (25.7% acceptance rate)

[c4] Matthew K. Hong, Clayton Feustel, Meeshu Agnihotri, Max Silverman, Stephen F. Simoneaux, and Lauren Wilcox. Supporting Families in Reviewing and Communicating about Radiology Imaging Studies. *Proceedings of the 35th Annual ACM Conference on Human Factors in Computing Systems (CHI 2017)*, Denver, CO, USA, 2017. (25% acceptance rate)

[c3] Matthew K. Hong, Lauren Wilcox, Clayton Feustel, Karen Wasilewski-Masker, Thomas A. Olson, and Stephen F. Simoneaux. Adolescent and Caregiver use of a Tethered Personal Health Record System. *Proceedings of the 2016 AMIA Annual Symposium (AMIA 2016)*, Chicago, IL, USA, 2016.

[c2] Matthew K. Hong, Lauren Wilcox, Daniel Machado, Thomas A. Olson, and Stephen F. Simoneaux. Care Partnerships: Toward Technology to Support Teens' Participation in Their Health Care. *Proceedings of the 34th Annual ACM Conference on Human Factors in Computing Systems (CHI 2016)*, San Jose, CA, USA, 2016. (23.4% acceptance rate)

[c1] Matthew K. Hong, Anne Marie Piper, Nadir Weibel, Simon Olberding, and James D. Hollan. Microanalysis of Active Reading Behavior to Inform Design of Interactive Desktop Workspaces. Proceedings of the 2012 ACM International Conference on Interactive Tabletops and Surfaces (ITS 2012), Boston, MA, USA, 2012. (29% acceptance rate)

Refereed **[w13]** David Chuan-En Lin, Hyeonsu B. Kang, Nikolas Martelaro, Aniket Kittur, Workshop Yan-Ying Chen, and Matthew K. Hong. Supporting Designers to Prototype Pro-Proceedings duct Designs through Sketching. In Generative AI and HCI Workshop at the ACM CHI 2024 Conference on Human Factors in Computing Systems (CHI 2024), Honolulu, HI, USA, 2024.

> [w12] Matthew K. Hong, Pablo Paredes, Shabnam Hakimi, Monica Van, and Matthew Klenk. Unstuck: Charting the Design Space of Generative Al-based Creativity Interventions. In Generative AI and HCI Workshop at the ACM CHI 2024 Conference on Human Factors in Computing Systems (CHI 2024), Honolulu, HI, USA, 2024.

> [w11] Youngseung Jeon, Matthew K. Hong, Yan-Ying Chen, Kalani Murakami, Jonathan Q. Li, Xiang 'Anthony' Chen, and Matthew Klenk. Weaving ML with Human Aesthetic Assessments to Augment Design Space Exploration. *Machine Learning* for Creativity and Design Workshop at NeurIPS 2023, New Orleans, LA, USA, 2023.

> [w10] Hyeonsu B. Kang, David Chuan-en Lin, Martelaro Nikolas, Aniket Kittur, Yan-Ying Chen, and Matthew K. Hong. BIOSPARK: An End-to-end Generative System for Biological-Analogical Inspirations and Ideation. Machine Learning for Creativity and Design Workshop at NeurIPS 2023, New Orleans, LA, USA, 2023.

> [w9] Matthew K. Hong, Shabnam Hakimi, Yan-Ying Chen, Heishiro Toyoda, Charlene Wu, Matthew Klenk. Generative AI for Product Design: Getting the Right Design and the Design Right. Generative AI and HCI workshop at CHI 2023 (CHI 2023), Virtual, 2023.

> [w8] Matthew K. Hong, Francine Chen, Yan-Ying Chen, and Matthew Klenk. Supporting Qualitative Coding with Machine-in-the-loop. Human-Centered Al Workshop at NeurIPS 2022 (NeurIPS 2022), Virtual, 2022.

> [w7] Marianne Sharko, Hannah Galvin, Susan J. Kressly, Joseph H Schneider, Fabienne Bourgeois Feliciano (Pele) Yu, Matthew K. Hong, Lauren Wilcox, Jessica S Ancker. National Working Group to Standardize the Identification of Sensitive Data Elements to Support Patient Privacy. Proceedings of the 2019 AMIA Annual Symposium (AMIA 2019), Washington, DC, USA, 2019.

> [w6] Jessica S Ancker, Marianne Sharko, Matthew K. Hong, Hannah Mitchell, and Lauren Wilcox. Should parents see teen medical records? Attitudes change when people are prompted to think about risky adolescent behaviors. Proceedings of the 2018 AMIA Annual Symposium (AMIA 2018), San Fransisco, CA, USA, 2018.

> [w5] Matthew K. Hong, Udaya Lakshmi, and Lauren Wilcox. Just-in-Time Design: In Situ Methods for Capturing and Articulating Adolescents' Illness Experiences. Workshop on Interactive Systems in Health Care (WISH 2017), Washington, DC, USA, 2017.

[w4] Marianne Sharko, Lauren Wilcox, **Matthew K. Hong**, and Jessica S Ancker. The Variation in Patient Portal Access for Adolescents in the United States: How Different Medical Centers Manage their Adolescent Access. *Proceedings of the* 2017 AMIA Annual Symposium (AMIA 2017), Washington, DC, USA, 2017.

[w3] Eunji Chong, Jaehoon Lee, **Matthew K. Hong**, and James Rehg. Scalable Image-based Search-and-Discovery. *Proceedings of the 35th Annual ACM Conference on Human Factors in Computing Systems (CHI 2017)*, Denver, CO, USA, 2017.

[w2] Matthew K. Hong and Lauren Wilcox. Care Partnerships: Toward Technology to Support Teens' Participation in Their Health Care (Research Highlight). *Workshop on Interactive Systems in Health Care (WISH 2016)*, San Jose, CA, USA, 2016.

[w1] Yang Liu, Melissa Tharp, **Matthew K. Hong**, Harry Hochheiser, and Wendy W. Chapman. Schema Builder: A Web-based User Interface for Authoring and Sharing Natural-Language Processing Schemas. *Proceedings of the 2013 AMIA Annual Symposium (AMIA 2013)*, Washington, DC, USA, 2013.

- Doctoral Consortia **[dc1] Matthew K. Hong**. Designing Visual Communication of Everyday Illness Experiences in Complex Pediatric Care. *Proceedings of the 37th Annual ACM Conference on Human Factors in Computing Systems (CHI 2019)*, Glasgow, UK, 2019. (16% acceptance rate)
 - Dissertation **[d1] Matthew K. Hong**. Designing Collaborative Mobile Health Experiences for Adolescent Patients. *Georgia Institute of Technology*, Atlanta, GA, USA, 2020.
- Industry/Technical **[t2] Matthew K. Hong**, Fonda Chen, Scott Chiu, Emily Danchik, and Chris Wang. Reports Contextualizing Communication at the Boeing Renton Factory. *Spring Research Report 2014 (Boeing-CMU Capstone Project)*, Pittsburgh, PA, USA, 2014.

[t1] Matthew K. Hong, Fonda Chen, Scott Chiu, Emily Danchik, and Chris Wang. Echo: Fostering Connection at the Boeing Renton Factory. *Summer Design Report 2014 (Boeing-CMU Capstone Project)*, Pittsburgh, PA, USA, 2014.

Teaching

- Winter 2021 **Co-Instructor**, *University of Washington*, School of Medicine. Participatory Design in the Age of Digital Health (Co-led with Andrew Berry).
- Spring 2018 **Graduate Teaching Assistant**, *Georgia Institute of Technology*, College of Computing. User Interface Design (Lauren Wilcox).
 - Fall 2017Guest Lecturer, Georgia Institute of Technology, College of Computing.Personal Health Informatics. "Designing Health Information Technologies to Engage Families in Data-Driven Medical Communication"(Lauren Wilcox).
- Spring 2017 **Graduate Teaching Assistant**, *Georgia Institute of Technology*, College of Computing. Issues in Human-Centered Computing (Betsy DiSalvo).
- Spring 2016 **Graduate Teaching Assistant**, *Georgia Institute of Technology*, College of Computing. User Interface Design (Lauren Wilcox).

- Summer S1 2014 **Graduate Teaching Assistant**, *Carnegie Mellon University*, School of Computer Science. Human-Computer Interaction for Technology Executives (Brad Myers).
 - Spring 2014 **Graduate Teaching Assistant**, *Carnegie Mellon University*, School of Computer Science. Entrepreneurship and Innovation in Technology (Edward Engler).
 - Winter 2012 **Undergraduate Teaching Assistant**, *UC San Diego*, Department of Cognitive Science. Cognitive Design Studio (James D. Hollan).

Invited Talks

- Spring 2020 **GVU Brown Bag Seminar**, *Georgia Tech*. "Personalizing Health Management Through Human-Centered Data Augmentation"
- Summer 2018 NSF REU Civic Data Science Seminar, Georgia Tech. "Using Data-Driven Approaches to Design Interactive Patient-Centered Technologies"

Press

- Feb 14, 2024 Ä generative AI tool to inspire creative workers", by Brian Eastwood, MIT Sloan (link)
- Jul 19, 2021 "New toolkit aims to help teams create responsible human-Al experiences", by Leah Culler, Microsoft Al Blog for Business & Tech (link)
- Jun 17, 2021 "The Efforts to Make Text-Based AI Less Racist and Terrible", by Khari Johnson, WIRED (link)

Mentoring

- Summer Intern Leah Chong, Postdoctoral Scholar (C), Massachusetts Institute of Technology. 2024
- Summer Intern **Youngseung Jeon**, PhD ECE (C), University of California, Los Angeles. 2023
 - 2020-2021 Hyeyoung Ryu, PhD iSchool (C), University of Washington.
 - Fall 2019 Gurudutt Perichetla, M.S. HCI (C), Georgia Tech.
 - Fall 2019 Aarti Thapar, B.S. CS (C), Georgia Tech.
 - 2019 Kimberly Do, B.S. CS (C), Georgia Tech.
 - Fall 2018 Xuejin Tan, M.S. HCI (C), Georgia Tech.
 - Spring 2018 Alan Lu, B.S. CS (C), Georgia Tech.
 - 2017-2018 Chaitanya Bapat, M.S. CS, Georgia Tech. Now SDE @ Amazon
 - Spring 2017 Udaya Lakshmi, M.S. HCI, Georgia Tech. Now User Researcher @ Microsoft
 - 2016-2017 Meeshu Agnihotri, M.S. HCI, Georgia Tech. Now Informatics PhD @ UCI
 - 2016-2017 Max Silverman, M.S. HCI, Georgia Tech. Now UX Researcher @ Yahoo

Fall 2016	Alex Ryan, M.S. HCI, Georgia Tech. Now UX Designer @ Roadie
2015-2016	Clayton Feustel, M.S. CS, Georgia Tech. Now CS PhD @ GT
2014-2015	Daniel Machado, M.S. HCI, Georgia Tech. Now UX Researcher @ Twitter
Fall 2014	Meghna Mehta, M.S. HCI, Georgia Tech. Now UX Designer @ Striim

Service

Associate Chair CHI: 2021-2023

- Peer-review CHI: 2014-CSCW: 2015-2021 Pervasive Health: 2015-2017 IMWUT: 2019
- Volunteering Conference Student Volunteer. Pervasive Health 2012, CHI 2015 Workshop Organizer: Workshop on Interactive Systems in Healthcare (WISH 2017)
- Working Group **Member**. American Academy of Pediatrics Council on Clinical Information Technology
 - Georgia Tech **President**. College of Computing, Korean Student Association (KSA)
 - UCSD Founding Member. User Experience San Diego (UXSD) Officer. Korean-American Scientists and Engineers Association (KSEA)

Awards

- 2023 Best Paper. ACM Collective Intelligence 2023.
- 2019 **GVU Foley Scholars**. Georgia Institute of Technology (\$5000). For student excellence in research contributions to computing (top 3 PhD students awarded in the program each year).
- 2019 **Doctoral Consortium Travel Award**. CHI 2019 (ACM SIGCHI). For presenting and developing research interests in an interdisciplinary workshop (16% acceptance rate)
- 2019 **George Family Foundation Fellowship**. Georgia Institute of Technology (\$3500).

For commitment to healthcare and demonstration of leadership

- 2018 Editor's Choice. Journal of American Informatics Association
- 2012 Department Honors with Distinction. University of California, San Diego
- 2010 2012 **Provost Honors List**. University of California, San Diego

Skills

- User Research Human-Al Interaction, Participatory Design, Contextual Inquiry, Design Probe, Ecological Momentary Assessment, Survey, Usability Testing, Thinkaloud Protocol
 - Data Analysis Experimental Design, A/B Testing, Statistical Programming, Statistical Analysis, Qualitative Analysis, Competitive Analysis, Usage Log Analysis
 - Tools Sketch, Adobe Creative Suite, Figma, HTML, CSS, JavaScript, Python, Node.js, R Studio, Qualitrics, REDCap

References

Managers **Matthew Klenk**, Director Toyota Research Institute Los Altos, CA., USA matt.klenk@tri.global

Adam Fourney, Principal Researcher Microsoft Research Al Redmond, WA., USA adamfo@microsoft.com

Saleema Amershi, Senior Principal Research Manager Microsoft Research Al Redmond, WA., USA samershi@microsoft.com

- Advisor Lauren G. Wilcox, Associate Professor School of Interactive Computing Georgia Institute of Technology Atlanta, GA., USA wilcox@cc.gatech.edu
- Co-advisor **Rosa Arriaga**, Associate Professor School of Interactive Computing Georgia Institute of Technology Atlanta, GA., USA arriaga@cc.gatech.edu

Dissertation **Beth Mynatt**, Professor Committee School of Interactive Computing Georgia Institute of Technology Atlanta, GA., USA mynatt@cc.gatech.edu

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Andrea Grimes Parker, Associate Professor

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