



GenAICHI 2023: Generative AI and HCI at CHI 2023

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ABSTRACT

This workshop applies human centered themes to a new and powerful technology, generative artificial intelligence (AI). Unlike AI systems that produce decisions or descriptions, generative AI systems can produce new and creative content that can include images, texts, music, video, code, and other forms of design. The results are often similar to results produced by humans. However, it is not yet clear how humans make sense of generative AI algorithms or their outcomes. It is also not yet clear how humans can control and more generally, interact with, these powerful capabilities in ethical ways. Finally, it is not clear what kinds of collaboration patterns will emerge when creative humans and creative technologies work together.

Following a successful workshop in 2022, we convene the interdisciplinary research domain of generative AI and HCI. Participation in this invitational workshop is open to seasoned scholars and early career researchers. We solicit descriptions of completed projects, works-in-progress, and provocations. Together we will develop theories and practices in this intriguing new domain.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**; • **Computing methodologies** → **Artificial intelligence**.

KEYWORDS

Generative AI; Design; Bias; Uncertainty.

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1 INTRODUCTION

In the past year, we have seen or made powerful tools that can create images from textual descriptions [1, 48] or conduct reasonably coherent conversations [32, 62], make writing suggestions for creative writers [33], and write code as a pair programmer [23]. We have also seen claims of what an historical person “really looked like” [4], and of a “completed” version of a musical compositions left unfinished by their composer’s untimely death [47]. What all of these examples have in common is that the AI does not simply categorize data and interpret text as determined by models, but instead creates something new—e.g., in images [35, 56], molecules [45, 65], or designs [46]. This work moves the potential of AI systems from problem solving to problem finding, and it tends to change the “role” of the AI from decision-maker to human-supporter [57, 71]. Following a successful CHI workshop in 2022 [40], we focus on various aspects of generative AI and its interactions with humans, including

- new sociotechnical opportunities for work and recreation that are afforded by powerful new interactive capabilities
- novel design challenges of systems that produce a *different* outcome after each invocation
- ethical issues related to their design and use; and
- useful patterns for collaboration between humans and generative AI in different domains.

Generative AI can be defined as an AI system that uses existing media to create new, plausible media [45, 46, 56, 65]. This scope is broad, and the generative potential of AI systems varies greatly.

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Over the last decade, we have seen a shift in methodology moving from expert systems based on patterns and heavy human curating [e.g., 21, 28, 49] towards stochastic and generative models such as Generative Adversarial Networks (GANs) that use big data to produce convincingly human-like results in various domains [18, 56], and Large Language Models (LLMs) that can generate text [62], source code [55], and images [1, 53] from simple instructions (“prompts”) [32].

1.1 HCI Challenges of Generative AI

In this workshop, we focus on the unique challenges that emerging generative AI methods pose to designers in various fields. These include, for example, the limited ability that designers and users have in gaining an understanding of the inner workings of these models: We cannot inspect the code or make sense of the latent vectors used in them and the generated results may vary. In addition the creative process is inherently fuzzy and involves elements of surprise and problem invention rather than achieving specific goals. Therefore we posit that generative AI proposes new challenges for human-centered design due to the serendipitous and uncertain nature of the design space and especially for use cases where users work with the AI.

Drawing from the long tradition of computer supported collaborative work and creativity support systems, the idea of humans and AI agents working together to achieve creative results is becoming more and more commonplace, and a research paradigm of human-computer co-creativity and mixed-initiative creative interfaces is emerging. In human-computer co-creativity, creative partners accept each others’ suggestions into the space of possible creative products [60] and both the human and the computer are influenced by each others’ contributions [12] culminating in sharing creative responsibility over the resulting product [28]. The new paradigm is characterized by the mixing of computer and human initiative [70] and human-computer co-creativity can be seen to flourish along a continuum between human creativity and autonomous computational creativity [15]. Emerging generative AI methods offer opportunities for designing creative AI agents that can generate useful artifacts with which they can contribute to the creative process of humans.

Despite powerful generative AI methods becoming more and more accessible for designers of creative systems, we still know relatively little about how to make generative AI methods interactive. There is a firm basis for designing UIs to AI-based systems that produce reliable and replicable outcomes [2]. By contrast, generative AI provokes us with questions of how to design good user experiences to deal with *generative variability* - i.e., systems whose purpose is *not* to produce the same outcome to invariant inputs - and which can sometimes provide incomplete or even incorrect outcomes [69]. Variable outcomes seem well-suited to the open-endedness of creative work (e.g., [17]), and yet even less is known about the long term effects of the new technology for the creative practice of artists, designers and laypersons; the role generative AI based interactive systems will eventually take in society; and what kind of regulations will eventually govern the space of design in this area. We propose this workshop to continue to unite

a disparate community around generative AI to investigate questions related to the design, evaluation, deployment and ethics of interactive generative AI.

1.2 Previous Workshops

The general topic of AI has led to multiple workshops in the SIGCHI traditions [e.g., 3, 16, 31, 36, 39, 41]; however, the theme of *generative* AI and user experience [22, 44, 61] has only been addressed via a workshop at last year’s CHI conference [40]. With this submission, we propose to build on the rich HCI possibilities of this emerging technology. Below, we describe some projects that have inspired our workshop.

2 BACKGROUND

2.1 Generative AI

Researchers have applied generative AI methods to diverse media, such as images [20, 51, 51], text [50, 62], music [18, 26], physical products [37, 38], source code [5, 8, 55], and movement [66]. Whereas previous eras of generative AI were rule-based or built on relatively small models, new models are trained on massive Internet-scale data and have untold abilities that we are only beginning to discover (see Figure 1). Moreover, these models (or versions of them) are open to the public without having to retrain them yourself [1, 9, 14, 64]. This gives many more people the ability to access powerful models. For example, there are thriving internet communities of artists collectively discovering how text-to-image synthesis can be used in the artistic process [1, 10, 27, 52, 53, 63]. However, there are many unanswered questions about how and what AI can generate and how can and should people be involved in the process (e.g., [11, 19, 24, 25]).

2.2 Designing for Creativity

Novelty and utility or value [54], sometimes accompanied by surprise [35], form three basic criteria for evaluating creativity. The products of emerging generative AI methods can be said to be creative since they can be novel, valuable and surprising in a context of use. This means emerging generative AI methods have great potential for facilitating creative work in some form or another. We propose that creative work in various domains, such as music, art, writing, and design, offers important application areas for generative AI methods.

There are domain independent considerations for facilitating interaction design for creativity. The open-ended nature of creative work challenges expectations that designers have about designing software for traditional, productivity centered domains; the requirements of creative work are vague, the measures of success unclear and the behaviors of users can be unorthodox [58]. This open-ended nature of creative work raises questions about the roles that Generative AI can play in the creative process [30] and how we evaluate and compare the human-AI systems that are emerging from the design for creativity [29]. Users of creative software are not necessarily even working towards a specific goal, but the process of creation itself can be the goal of autotelic creativity [13]. Combining powerful generative AI methods with users working and playing in creative domains opens up the design space to unforeseen dimensions.

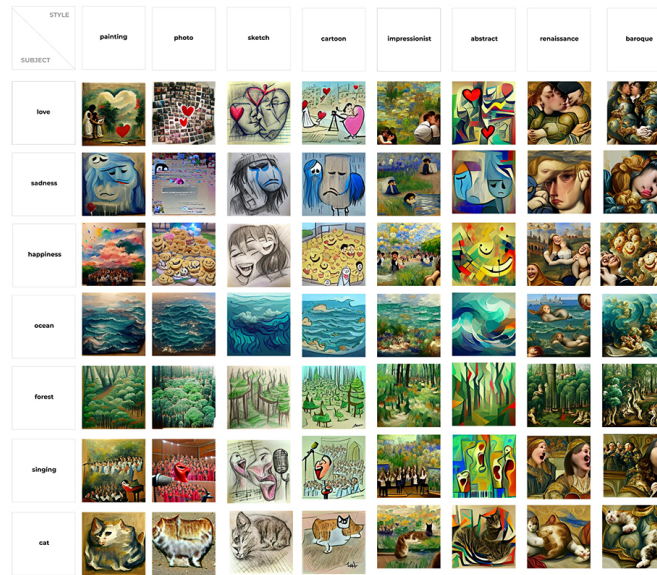


Figure 1: Images generated from text prompts in the VQGAN+CLIP model. Images for multiple subjects and various styles are shown to demonstrate the wide ability of image generation models trained with internet-scale data.

2.3 Imperfection in AI Outcomes for Human Use

These human-oriented and human-directed systems are just now becoming usable and useful. Initial findings suggest that, while perfect operation and outcomes would be preferable, for human creativity support even imperfect results can be better than no support at all, as studied in humans’ use of generated documentation from source code [43, 67] and in translated source code from one programming language to another [69]. Software engineers both adopt and adapt (and occasionally replace) the outcomes of generative AI systems. The principle of AI-imperfection has not yet been parameterized: How bad does a generated outcome have to be, for a human to abandon it and re-do the work from scratch? How would domain experts negotiate the trade-offs in quality vs. productive-cost of generated outputs?

Many generative systems have been *productive* of new instances and new combinations learned from a class of exemplars or other strategies that make use of known histories of work [35, 46, 56, 65]. However, systems that create novel instances that humans would consider to be *creative* (in terms of novelty, utility and surprise) are less understood. Spoto and Oleynik [59] created a *Library of Mixed Initiative Creative Interfaces* based on [15]. However, only a few of these experiments used specifically generative algorithms. Systems capable of producing novel instances are only recently documented [e.g., 7, 17], and tooling that allows domain experts to control those novel or creative outcomes is even rarer [e.g., 34]. There are few formal human-centric, empirical evaluations of the quality of generated outcomes.

2.4 Responsible GenAI

HCI research has played an imperative role in developing AI technologies responsibly by producing design solutions, guidelines, and

methods that align AI technology design with stakeholder values and mitigate potential harms. Understanding and tackling the ethical issues and harms of generative AI is an emerging area that draws much interest in the HCI and AI communities [6, 25, 42, 68]. Besides creating new challenges to the core ethical AI principles including fairness, transparency, accountability, privacy, and so on, generative AI can lead to other types of risk and potential harms due to the generative nature and unique characteristics of application domains, many of which are yet to be understood. For example, text generation models can produce unintended toxic content that harms certain groups and individuals or spreads misinformation [68]. Many genAI-powered productivity support tools, whether for programming, writing, or other creative work, can risk having over-reliance and threatening to user agency and ownership [33]. Large Language Model’s societal harms including environmental and socioeconomic risks are also being actively researched [68].

3 TOPICS AND THEMES

Our workshop is open to diverse interpretations of interactive generative AI, characterized by the AI systems’ abilities to make new things, learn new things and foster serendipity and emergence. We are interested in several dimensions of generative AI, including mixed initiative, human–computer collaboration, or human–computer competition, with the main focus on interaction between humans and generative AI agents. We welcome researchers from various disciplines, inviting researchers from different creative domains including, but not limited to art, images, music, text, style transfer, text-to-image, programming, architecture, design, fashion and movement.

Because of the far-reaching implications of Generative AI, we propose the following list of non-exhaustive, thematic questions to guide our discussions at the workshop:

- What is generative AI and how can we leverage diverse definitions of it? Does generative AI go beyond intelligent interaction? What distinguishes generative AI?
- How do you design in this characteristically uncertain space? What design patterns do we need to think about? How does uncertainty play into this and how to we help people set expectations to designing *with* AI?
- Do generative AI algorithms contribute needed serendipity to the design process—or simply randomness—or worse, chaos?
- Is presenting AI as a desirable and “objective” method appropriate for generative AI?

We encourage people to write and answer their own questions as well. We hope that the workshop leads to new ways-of-thinking.

These themes can be addressed within the following topics:

- The emerging capabilities of generative AI.
- Generative AI existence in different domains including (but not limited to) images, music, text, design, and motion.
- The role of generative AI in assisting, replacing, and regimentering human work.
- Human-AI collaboration and co-creative systems.
- Ethical issues including misuses and abuses, provenance, copyright, bias, and diversity.
- The uncanny valley in Human-AI interactions.
- Speculative futures of generative AI and its implications for human-AI utopias and dystopias.

As above, we encourage people to add new topics and domains.

4 WEBSITE

Our workshop website is: <https://generativeaiandhci.github.io> (currently online).

5 PRE-WORKSHOP PLANS

We will publicize the workshop via ACM, HCI, and AI distribution lists, plus social media [i.e., similarly to 3, 16, 31, 36, 39, 41]. We will also reach out to selected scholars to encourage them to submit their work.

We will request participants to submit completed work, works-in-progress, and provocations. Submissions should use the single-column ACM small format (see <https://chi2022.acm.org/for-authors/presenting/papers/chi-publication-formats/>). While the CHI 2022 instructions for *papers* say that there is no page-limit, we request that each submission be limited to four pages of content; references may appear on subsequent pages, and are not counted toward the four-page limit. The four-page submissions may take the form of reports, essays, or pictorials (for more information about pictorials, please see the section “What are Papers and Pictorials?” at <https://dis.acm.org/2021/papers-and-pictorials/>).

The co-organizers will select submissions for inclusion in the workshop. We anticipate a workshop size of 20-30 participants. Selection will be based on uniqueness and/or provocativeness of content, engagement with the themes and topics in the workshop call, and potential for contribution to this new community. All submissions will be subjected to anonymous peer-review by at least two experts. If we receive a large number of submissions, we will recruit a program committee from known researchers and

scholars who have worked at the intersection of HCI and generative AI.

6 WORKSHOP STRUCTURE

The goals of the workshop are to build community, exchange knowledge and to co-create new understandings in this emerging field. As we note below in Section 8, the workshop will run remote and it may be configured in multiple sessions to provide more inclusive access for participants in different timezones. We postpone setting up the exact schedules until we have a tentative list of participants, so that we can adjust the timing to fit their timezones.

The following list of topics describes the general content of our workshop sessions designed to reflect our goals to build a community, to exchange knowledge, and to co-create new understandings in this emerging field:

- (1) We will reserve significant time for the participants’ and organizers’ self-introductions and descriptions of research interests.
- (2) We will invite a subset of the participants to present the most influential or promising work submitted to the workshop - either as individual talks or in a panel format (see Section 8).
- (3) We will preserve time for small-group discussions around themes of mutual interest, or generative HCI design challenges. These themes and challenges may be identified ahead of time, or they may be emergent from the presentations.

All participants’ submissions will be made available on our website before the workshop, and communications platforms will be arranged to enable asynchronous engagement before, during, and after our sessions. Online tools (e.g., Padlet, Miro) will be used to engage our community in collaborative ideation and critical discussion.

7 POST-WORKSHOP PLANS

We hope to build a persistent hybrid research area among HCI and generative AI. Toward that goal, we plan to submit an *Interactions* article or post for the general HCI audience. In addition, we want to create resources for teaching and researching in this emergent domain. Therefore, we hope to publish selected papers from the workshop, as an invitational journal issue or a book of readings.

8 REMOTE/ONSITE PLANS

We assume that this workshop will be entirely virtual, so as to include people from around the world, and so as to avoid visa issues at international borders. To make a successful workshop under these circumstances, we propose to schedule several partial sessions, held so as to accommodate timezones of multiple continents. For example, if we receive submissions from Asia, Europe and Africa, and the Americas, then we would schedule three partial sessions (perhaps four hours per session) so as to include people from each of those regions. We will need to work adaptively and inclusively, depending on the submissions.

We realize that participants may not be able to attend all sessions, and we will therefore request that presenters prepare a video version of their presentation, and/or a slide-deck and a “script” that one of the organizers can read during the slide-deck. Each presentation will be followed by discussion. If authors can attend the discussion,

that will make the discussion richer. However, we know from many reading groups that it is possible to conduct a rich and productive discussion even if the author is not present.

9 ORGANIZERS

Lydia B. Chilton is an Assistant Professor in the Computer Science Department at Columbia University. She is an early pioneer in decomposing complex tasks so that crowds and computers can solve them together. Her current research is in computational design - how computation and AI can help people with design, innovation and creative problem solving. Applications include: conveying a message within an image for journalism and advertising, developing technology for public libraries, improving risk communication during hurricanes, and helping scientists explain their work on Twitter.

Anna Kantosalo is a Postdoctoral Researcher at the University of Helsinki and a Service Designer at Siili Solutions. Anna focuses on the design and evaluation of AI solutions with a creativity twist. Anna has co-chaired the PC committee for the 13th International Conference on Computational Creativity and organized several workshops related to interactions with creative systems.

Q. Vera Liao is a Principal Researcher at Microsoft Research Montréal, where she is part of the FATE (Fairness, Accountability, Transparency, and Ethics of AI) group. Her current research interests are in human-AI interaction and responsible AI. She serves as the Co-Editor-in-Chief for Springer HCI Book Series, in the Editors team for CSCW, and on the Editorial Board of ACM Transactions on Interactive Intelligent Systems (TiiS).

Mary Lou Maher is a Professor in the Software and Information Systems Department at the University of North Carolina at Charlotte. Her early research in AI-based generative design has led to a human centered approach to computational creativity and co-creative systems. She has Chaired the Creativity and Cognition Conference (2019) and the International Conference on Computational Creativity (2019) as well as organized several workshops on AI-based design and creativity.

Charles Martin is a Senior Lecturer in Computer Science at the Australian National University. Charles works at the intersection of music, AI/ML and HCI. He studies how humans can interact creatively with intelligent computing systems and how such systems might fit in the real world. Charles has organized multiple generative-AI-focused workshops at the New Interfaces for Musical Expression conference.

Michael Muller works as a Research Scientist at IBM Research in Cambridge MA USA, and is co-author of *Human Centered Data Science: An Introduction*. He has analyzed how domain experts make use of generative AI outcomes, and how humans intervene between "the data" and "the model" in responsible and accountable data science work. He has co-organized workshops on human centered data science at CHI, CSCW, GROUP, and NeurIPS.

Greg Walsh is an associate professor at the University of Baltimore where he teaches courses in Design. He is an interaction design researcher who focuses on user-centered, inclusive design for children and adults. His work seeks to include more voices in the design process and has been a recipient of a prestigious Google

Faculty Research Award. His work has included participatory design sessions in Baltimore City libraries and is now exploring the use of generative AI as a co-design partner.

10 CALL FOR PARTICIPATION (250 WORDS)

This workshop applies human centered themes to a new and powerful technology, generative artificial intelligence (AI). Unlike AI systems that produce decisions or descriptions, generative AI produces new instances of types of data that can include images, texts, music, design, and motion.

However, it is not yet clear how humans can make sense of generative algorithms and outcomes. We have yet to understand what user interface technologies will enable humans to control, and more generally to interact with these powerful, variable capabilities. These human-like capabilities put into question our current paradigms for mixed initiative user interfaces. Further, the unpredictability of "creative" algorithms raises new questions about how, when, and how much control humans may wish to share with these algorithms, and what types of societal governance may be needed for such powerful capabilities. Finally, it is not clear what kinds of collaboration patterns will emerge when creative humans and creative technologies work together.

In this one-day workshop, we will convene the interdisciplinary research domain of generative AI and HCI. Participation in this invitational workshop is open to seasoned scholars and early career researchers from diverse disciplines. We solicit descriptions of completed projects, works-in-progress, and provocations. Together we will develop theories and practices in this intriguing new domain. Please visit <https://generativeaiandhci.github.io/> to learn more about the workshop, and about how you can participate. Please send any questions to Michael Muller, michael_muller@us.ibm.com.

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