

# Challenges and Opportunities of LLM-Based Synthetic Personae and Data in HCI

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Synthetic personae and data powered by artificial intelligence (AI) are emerging in many HCI areas, including education and training, gaming, and piloting research studies. Recently, Large Language Models (LLMs) have shown promise for synthetic AI personae, experimenting with human and social simulacra and producing synthetic data. This presents challenges and opportunities for extending HCI research via LLMs and AI. In this proposed workshop, we engage HCI researchers interested in working with LLMs, synthetic personae, and synthetic data through speculative design and producing visions, desiderata, and requirements for future HCI research engaging with synthetic personae/data. The outcomes of this workshop may be disseminated to the HCI community through scientific publications or special issues to facilitate continued discussion and advance knowledge on a timely HCI topic.

CCS Concepts: • **Human-centered computing** → **Natural language interfaces**; • **Computing methodologies** → **Natural language processing**; **Artificial intelligence**.

Additional Key Words and Phrases: Large Language Models, AI, synthetic personae, synthetic data, speculative design, sketching

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## 1 INTRODUCTION

The recent rise of Large Language Models (LLMs) has imposed a reconceptualization of how we interact with AI and critical reflections on AI's future roles in HCI research. In that respect, the community has worked to exploit the potential benefits and impact of deploying LLMs in HCI research (e.g., [12]). These include using LLMs for software engineering [11], writing stories and screenplays [18, 39], public health interventions [14], summarizing medical records [30], and LLM-powered creativity support tools [4]. HCI research has also experimented with using LLMs for enacting human-like behaviors, including deploying LLMs as agents in social simulacra experiments [19] or LLM-based life-long learning agents for gaming (e.g., *Minecraft* [37]). Recently, LLMs used as synthetic participants [12, 16] and to generate synthetic data [12, 29] have become relevant to HCI. Hence, leveraging LLMs in HCI research as synthetic personae (or human simulacra [20]) and for generating synthetic data [12] present opportunities and challenges to HCI research and fertile ground for critical reflection/discussion.

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## 1.1 Opportunities

The present workshop seeks to tackle these opportunities and challenges with the objective of producing desiderata for future HCI endeavors that leverage LLMs. While LLMs are widely debated and often questioned for their potential “negative” impact (e.g., hindering academic integrity [21]), they provide a unique opportunity to advance HCI research and applications. For instance, prior work has shown that users interacting with LLMs may develop empathy towards them, including emotional reactions similar to those arising in human-human relationships, such as embarrassment or frustration [3]. It was also anecdotally shown that LLMs, like humans, can display a “moody” attitude or perform “questionable behaviors”, which often entails unsolicited advice to users, such as suggesting considering a divorce [24], or fabricating misinformation [41]. These synthetic “human traits” make them good candidates to propel the design of credible human simulacra [19, 20] or to augment the performance of non-playable characters (NPCs) in video games [2]. LLMs are also increasingly adopted as co-writing “buddies” and contribute to advancing human-AI collaboration [8]. Prior work showed how people’s views and behaviors may be impacted by interacting with LLMs [13], which is a testament to their ability to persuade humans based on their plausible personalities and behaviors; they can even faithfully enact the style of historically popular writers [6]. LLMs have also been shown to speculate about the future and produce visions that are human-alike [15]; this, in turn, presents opportunities for generating synthetic data [12].

**Workshop Objective # 1:** The first objective of the proposed workshop is to explore the opportunities for using LLM-based synthetic personae and data to advance HCI research. We do so through speculative design exercises [5] and sketching [10].

## 1.2 Challenges

At present, LLMs are mostly a “black box” [26] to HCI researchers who are not experts in Natural Language Processing (NLP) and may not know the mechanisms that underpin LLMs’ logic and behavior. A lack of established prompt design workflows poses complex challenges for a predictable input-output and relies on trial and error efforts even among NLP experts [40]. Yet, LLMs are used to advance HCI research [12], and their use in our community is bound to increase. This poses challenges to HCI research that wishes to leverage LLMs. For instance, if we plan to use LLM-powered synthetic personae (i.e., human simulacra) as research participants, how do we ensure that our synthetic participants display behaviors and personality traits relevant to our research questions/hypothesis? What are their personalities, preferences, and taboos? Are these personalities shared across different LLMs or unique to each model? What are their biases, views, and values? To that end, prior work evaluated GPT-3’s personality, values, and demographics [17] to find out that the demographics it represents are similar to those of young females, scoring high on the honest-humility scale and lower than the female population on emotions, demonstrating somewhat inconsistencies with real-world demographics model. However, they also found that manipulating the temperature of LLMs can change their personality; yet, these LLM “personalities” are heavily tied to training data [27] and mostly obscure to the average HCI researcher. Further, these synthetic personalities lean towards specific personality traits, where prior work with ChatGPT [25] showed that it mostly has progressive political views and displays the ENFJ personality on the Myers-Briggs personality test. Yet, employing synthetic persona HCI research requires further scrutiny and discussion.

**Workshop Objective # 2:** The second objective of the workshop is to identify the pressing challenges of using “black box” LLMs for generating synthetic personae and using those AI personae as research participants or to generate synthetic data. We are interested in identifying how those challenges impact HCI research to what extent and how they can be mitigated.

## 2 SCOPE

Overall, our objective is to envision research-compatible LLM and define a set of requirements for the use of LLMs in HCI research. We engage HCI practitioners with reflecting and envisioning using LLM for HCI research. We aim to produce desiderata for applications, methods, and standard practices for leveraging LLMs in HCI research in ways that are systematic, effective, and ethically sound. We let our workshop participants tackle opportunities and limitations of LLMs via speculative and designerly exercises and roundtable discussion based on the following themes/RQs:

### **LLMs as Synthetic Personae and Human Simulacra:**

#### *Core RQs*

- (1) What are the benefits/drawbacks of using synthetic personae in HCI research?
- (2) What HCI application areas can benefit from synthetic personae (e.g., VR)?
- (3) What are the challenges of engaging with synthetic personae for research purposes, including data analysis, trustworthiness, and generalizability?

#### *Additional RQs*

- (a) What personality traits and characteristics of synthetic personae are desirable for HCI research?
- (b) How do we customize synthetic personae beyond the limitations of current LLMs?
- (c) What limitations should we impose on synthetic personae in HCI research?

### **LLMs for Producing Synthetic Data:**

- (1) How should we engage with synthetic data in HCI research?
- (2) What are desirable uses and scope for synthetic data?
- (3) Does synthetic data need to be validated with real data, and if yes how and for what purposes?
- (4) What are the ethical implications of using synthetic data, including IRB?
- (5) What are the potential fitting contexts for synthetic data (e.g., pilot, replication, interview)?
- (6) What should be considered and disclosed in ethics applications for HCI studies using synthetic data?

The workshop will employ speculative design, sketching, and focused groups and be structured as a mix of breakout sessions and round-table discussions, with the goal of creating a set of visions, requirements, and recommendations for using LLMs in HCI research. Notably, the above-proposed RQs are suggestions, and the finalized themes will be completed based on their relevance to the workshop participants and their submissions.

## 3 METHODOLOGY

The scope of the proposed workshop is to explore how HCI researchers view, invoke, and speculate about future uses of LLMs in HCI research for (1) deploying synthetic AI personae [16] and (2) producing synthetic data [12] to advance scientific knowledge in HCI and related areas of interest. As such, our method is aligned with the scope of research that is concerned with anticipating or conjecturing the future (e.g., [36]). We employ a speculative design [5] approach and focus group discussion [9] to engage workshop participants with both sketching, writing, and round table discussion to tackle the future of LLMs in HCI research. Particularly, we leverage *story completion method* (SCM, [35, 38]) to generate speculative visions, which we have our participants integrate with sketching [10] for producing comprehensive visions and requirements for the use of LLMs in HCI research. Through our proposed methodology, we aim to (1) reveal insights and perspectives on how HCI researchers speculate about futures where LLM-based synthetic persona/data can propel HCI research, including practical application areas (e.g., VR), and (2) advance discussion on issues that are relevant to the ethical use of LLMs in HCI research.

#### 4 ORGANIZERS

The workshop organizers have been or are currently working on HCI research that involves LLMs in various contexts. The workshop themes proposed have emerged from organizers' direct engagement with LLMs and the most recent HCI literature that amplifies the importance and timeliness of the proposed themes.

**Mirjana Prpa** is an Assistant Teaching Professor at Northeastern University, researching the application of LLMs in social Virtual Reality Platforms as a continuation of her research on immersive VR experiences for health and well-being [23]. In addition, Mirjana's research interests include understanding the complexity of user experiences by leveraging micro-phenomenology in HCI and design research [22] and extending it to unfold the complexity of experiences arising from human-AI persona interactions.

**Giovanni Troiano** is an Assistant Research Professor at Northeastern University, affiliated with the College of Arts, Media, and Design. He is a creative technologist, a designer, and a human-computer interaction (HCI) researcher. His work is focused on the use of games for learning in STEM [31, 33] and the development of new HCI paradigms [1] via participatory [32] and speculative design [34–36]. He has previous experience with organizing CHI workshops [28].

**Matt Wood** is a Digital Learning Developer at Durham University. He is a social computing researcher [35, 38], often utilizing playful (qualitative) methods to inquire about the relationship between people and technology. He is well recognized for his expertise around the implications of LLMs for higher education and regularly engages in external speaking engagements around the topic. He also publishes about the topic on his YouTube channel: @MattyWood.

**Yvonne Coady** is a Professor at the University of Victoria and a Visiting Professor at Northeastern University, Vancouver, researching topics in the intersection of systems and high-fidelity extended reality. Exploring recent trends in this space includes a recent workshop at MobileHCI [7] and work on efficiently using cloud computing resources for NeRFs (Neural Radiance Fields).

#### 5 PUBLISHING PLANS

Accepted position papers will be collected and submitted to <https://ceur-ws.org> or ArXive as workshop proceedings.

#### 6 IN-PERSON WORKSHOP

The proposed workshop will be organized in person. The workshop will involve in-situ participants in hands-on activities and round-table discussions. The in-person workshop provides more organic opportunities for the participants to get to know each other and share ideas outside scheduled activities during the coffee breaks and over lunchtime.

#### 7 ASYNCHRONOUS ENGAGEMENT

As our workshop is in-person only, we will not provide asynchronous engagement.

#### 8 PRE-WORKSHOP PLANS

This workshop aims to gather participants who leverage LLMs in HCI research and publish on this topic. Calls for participation will be distributed through formal and informal channels, including contacting authors cited in this proposal. In addition, we will encourage participation from the industry and will promote the workshop through personal connections. The proposed themes for this workshop reflect a timely topic and interests of the current HCI community. However, we will finalize the themes based on the position papers we receive. Finalized themes will be grouped into scenarios that participants will work on in speculative design activities and round table discussions.

## 9 WORKSHOP STRUCTURE

Time	Activity
8:30 a.m. – 9:00 a.m.	Arrival, networking, and introductions
9:00 a.m.- 9:15 a.m.	Welcome and introduction to workshop goals, agenda, and schedule
9:15 a.m. - 10:00 a.m.	Current use of LLMs in HCI research (Discussion)
10:00 a.m. - 10:45 a.m.	Activity # 1 (a.k.a., SCM)
10:45 a.m. - 11:00 a.m.	<i>Coffee break</i>
11:00 a.m. - 11:45 a.m.	Activity # 2 (a.k.a., Sketching)
11:45 a.m. - 12:30 p.m.	Activity # 3 (a.k.a., Refining Ideas)
12:30 p.m. - 1:45 p.m.	<i>Lunch</i>
1:45 p.m. – 3:15 p.m.	Presentation of the themes from activities
3:15 p.m. – 3:30 p.m.	<i>Coffee break</i>
3:30 p.m. – 4:45 p.m.	Roundtable group discussions (a.k.a., Focused Groups)
4:45 p.m. – 5:00 p.m.	Future plans and wrap up

This one-day workshop is focused on hands-on activities that will engage the community in envisioning, speculating, and identifying the future through design fiction scenarios. In the first half of the workshop, participants will be answering one of the themes in groups. In the afternoon portion of the workshop, workshop organizers will present emerging themes and facilitate discussion to include the next steps and future plans for the community interested in this line of research.

## 10 POST-WORKSHOP PLANS

This proposed workshop is the first one we plan on organizing, and it will serve to gather community and be followed up with subsequent workshops, given the topic’s timeliness. Continuous communication with workshop participants and others interested in the topic will be via the workshop website, where we will share the workshop report and the next steps. In addition, we aim to submit the learnings from the workshop as a paper to CHI 25.

## 11 CALL FOR PARTICIPATION

The rise of Large Language Models and their availability to the general public has opened a rich space to explore how LLMs can contribute to HCI research. The HCI community has been engaging with LLMs in multiple ways, from exploring novel applications to leveraging LLMs as research participants, simulating social interactions, and generating synthetic data. Yet, these models act as black boxes challenging HCI researchers on how to best leverage LLMs in the HCI research due to their limitations and ambiguities. This in-person workshop will focus on the following themes (some adjustments may be made after the submissions):

### **LLMs as Synthetic Personae and Human Simulacra:**

#### *Core RQs*

- (1) What are the benefits/drawbacks of using synthetic personae in HCI research?
- (2) What HCI application areas can benefit from synthetic personae (e.g., VR)?
- (3) What are the challenges of engaging with synthetic personae for research purposes, including data analysis, trustworthiness, and generalizability?

#### *Additional RQs*

- (a) What personality traits and characteristics of synthetic personae are desirable for HCI research?

- (b) How do we customize synthetic personae beyond the limitations of current LLMs?
- (c) What limitations should we impose on synthetic personae in HCI research?

**LLMs for Producing Synthetic Data:**

- (1) How should we engage with synthetic data in HCI research?
- (2) What are desirable uses and scope for synthetic data?
- (3) Does synthetic data need to be validated with real data, and if yes how and for what purposes?
- (4) What are the ethical implications of using synthetic data, including Institutional Review Boards (IRB)?
- (5) What are the potential fitting contexts for synthetic data (e.g., pilot, replication, interview)?
- (6) What should be considered and disclosed in ethics applications for HCI studies using synthetic data?

Participants should email a position paper of 1000 - 2500 words to: [chi24llm@gmail.com](mailto:chi24llm@gmail.com) and CC Mirjana Prpa ([m.prpa@northeastern.edu](mailto:m.prpa@northeastern.edu)) by February 22, 2024. Authors should identify themes of interest and describe their contribution to the workshop topic in their submissions. Submissions will be accepted based on the relevance to the workshop topic and the overall quality of the submission. CHI requires that at least one author of each accepted submission must attend the workshop and that all participants must register for both the workshop and at least one day of the conference. More information about the workshop can be accessed at: <https://llmchi24.weebly.com/>

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