HCII 2025 Design Café
Human-AI Teaming Fostering Innovations
rooted in the Human/Humanity-Centered Design Approach

Authors: Christine Riedmann-Streitz, Norbert Streitz, Helmut Degen, George Margetis, Stavroula Ntoa, Pei-Luen Patrick Rau

Looking back (2025) and ahead (2026)

The *HCII Design Café* is a successful interactive in-person satellite event during the HCII conferences. It provides a forum for (re)thinking and discussing HCI issues in the context of broader topics relevant to economy and society as a whole. It is based on a proven, valuable participatory scheme for engaging on a specific topic in a moderated small group setting, with interested stakeholders that come from different professions in related fields. It aims to stimulate open dialogue, constructive deliberations, and informal but meaningful collaboration, to empower creativity and inspiration in a casual atmosphere, and to promote innovative approaches for transforming ideas into practice. Participants are academic and research experts, students from universities and design schools, professionals working in design or R&D departments in industry, government institutions, service providers, and decision-makers.

Human-AI-Teaming [HAT]
fostering innovations rooted in the
Human- / Humanity-Centered Design Approach

With the enormously rapid advancements of technology in general and the increasing adoption and utilization of AI, in particular, in a wide range of application areas, the nature of human work must be subject to review and evaluation. In the HCII 2025 Design Café, we employed the following approach: Humans and AI each have different, unique strengths, the impact of which varies in the context of different application domains. In this respect, the development of a "team-concept" is required, based on collaboration models and ways of coupling and synchronizing the strengths of humans with the strengths of AI. The goal was to use the best of both "worlds" to optimize results and the ways to achieve them efficiently and effectively, keeping in mind that different mindsets and approaches can significantly impact the outcomes. Synchronization of teamwork can focus on various overarching goals, such as cost effectiveness, high-quality results, and/or sustainability, humanity and prosperity.

The HCII 2025 Design Café explored how the architecture and framework of a HAT-configuration can be developed in a human-centered way (Human-/Humanity-Centered-Design approach) and in accordance with the policies of the EU AI ACT.

Three global frameworks guided the HAT discussion:

1. Seven HCI Grand Challenges:
   The **HCI Grand Challenge # 6: Learning and Creativity**

2. UN Sustainable Development Goals:
   SDG # 9: Foster Innovation

3. EU Artificial Intelligence Act:
   It provides the frame and key principles, as described in **article 1** "Subject Matters" and in **article 51**, "Classification of General-Purpose AI Models as General-Purpose AI Models with Systemic Risk".

Keynote

"Designing Human-AI Teaming from the Perspective of the EU AI Act, selected HCI Grand Challenges and UN SDGs"
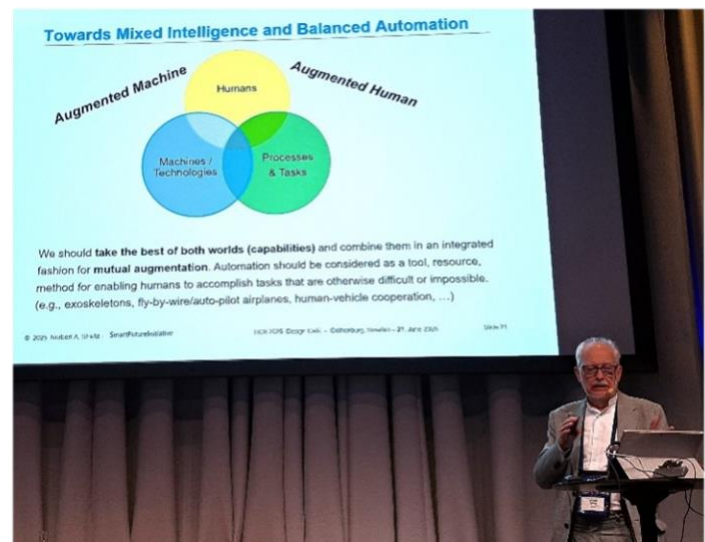
Norbert Streitz

Founder & Scientific Director
Smart Future Initiative, Germany

Co-Author
"Seven HCI Grand Challenges"

Chair of DAPI
(affiliated conference of HCII)

Keynote Speaker Norbert Streitz reflected constructively and critically on the approaches to HAT, in particular the approaches "to use AI to replace humans" and "to use the best of both worlds." Here, decision-makers value the respective strengths of humans and AI (often depending on a particular area of application). Norbert Streitz stated:

"This will often require developing a team-concept based on collaboration models and ways of coupling and synchronizing the strengths of humans with the strengths of AI."

"Automation should be considered as a tool, a resource method for enabling humans to accomplish tasks that are otherwise difficult or impossible, such as exoskeletons, fly-by-wire/ autopilot airplanes, human-vehicle cooperation, etc."

Norbert Streitz

The HCII Design Café Approach: "Power to the Participants"

Participants, proven experts in their fields, from different continents, with diverse backgrounds, areas of expertise and professions, discussed and worked on crucial questions for the future development of Human-AI Teaming (HAT).

Christine Riedmann-Streitz moderated the HCII Design Café

Framing the HCII Design Café discussions

Given the complexity of major challenges humankind is confronted with, humans need the support of digital technologies including AI. On the other hand, Human Intelligence (HI) is needed for defining the goals and constraints when tackling these challenges, especially when following an ethics- and value-based approach and furthermore for providing inspiration and guidance when solving problems which require creativity and visionary thinking.

But: What does "teaming" mean in this context? Collaboration with equal or distributed roles, rights, and responsibilities? And who decides about who is in the "driver seat"? There is a wide range and many nuances from simple exchange of data and information to assistance, cooperation and collaboration to full automation or even an autonomous AI informing the humans only about the results (which would be no "teaming" anymore).

After extensive research and in-depth discussions, four core questions were identified for the experts' work during the HCII 2025 Design Café in four rotating creative sessions.

HAT-Question 1

Host **Stavroula Ntoa, FORTH-ICS, Greece** (center rear), empowering participants to create and find answers and solutions for the HAT-question

"How can HAT be designed to ensure a common ground of understanding?"

Stavroula Ntoa about the issue

Humans must be in the position to know about and understand the capabilities of the particular AI agents they want to collaborate with, their assumptions/knowledge about the tasks and the domains, as well as their context and their routines for addressing the tasks. Humans need to know about the collaboration capabilities of the respective AI agents and their limitations. To achieve this, the concept of "*Self-disclosure of an AI agent*" is needed.

On the other hand, AI agents should know about the corresponding capabilities of their human collaborators. AI should be designed to interpret human cues and communicate effectively, as well as proactively help in decision-making and be flexible and adaptive to human behaviors and needs to accomplish a common task. Otherwise, there is a big risk that AI is being rigid, misaligned and untrustworthy. Once common grounds are established, humans can have precious AI team-mates that are context-aware, reliable, and capable of seamless cooperation across diverse tasks.

Core findings of the discussion

Common ground between humans and AI systems cannot be treated as a given or static property. Instead, it must be actively constructed and continuously maintained throughout interaction. Participants emphasized that **alignment** emerges through ongoing exchanges, feedback, and adaptation over time, rather than through one-time configuration or onboarding. Qualities of this **dynamic relationship** were explored, including mutual transparency, bidirectional legibility, role clarity, shared agency, and memory as a mechanism for grounding collaboration.

In this **interplay between Human and AI**, the key mediating factor is the user interface, acting as an active conversational space where understanding is built and calibrated. At the same time, common ground is inseparable from privacy, trust, ethics, and governance.

Overall, the discussion converged on the view that designing for common ground in Human–AI Teaming requires moving beyond isolated features (e.g., explainability or personalization) toward **holistic interaction ecosystems**. These ecosystems must support mutual understanding, adaptive collaboration, and negotiated control over time, grounded in transparent, ethical, and user-centered design principles.

HAT-Question 2

Host **Helmut Degen, Siemens Corporation, USA** (second from left), empowering participants to create and find answers and solutions for the HAT-question

"How can we establish a trustful relationship between a human and an AI agent, whether in a leadership or in a follower role?"

Helmut Degen about the issue

In HAT, either a human or an AI agent may be the more effective leader depending on the activities' goals, situational objectives, risks, and the skill profiles of each agent. This scenario assumes a larger mission with an overarching goal, composed of smaller situations, each with their own objectives. Leadership may shift between the human and AI agent based on the required leadership skills for different situations.

Core findings of the discussion

To establish a trustful relationship between a human and an AI agent in human AI teaming (HAT), the AI's agenda and relevant boundaries should be transparent to the human. Here, agenda refers to the AI's **overarching intent in the collaboration**, including what it is optimizing for and what it prioritizes when tradeoffs arise, while boundaries refer to the constraints it will follow and the limits of its authority and competence. Making these explicit supports trust because it reduces uncertainty about the AI's motives and limits, increases predictability of its behavior, and enables the human to calibrate reliance, oversight, and delegation.

An essential step toward establishing a trustful relationship is a negotiation phase in which HAT related aligned goals and boundaries are stated, potential goal conflicts are identified and made transparent, and, ideally, resolved. If conflicts cannot be resolved directly, a mediator can support resolution. The negotiation should also clarify leadership, meaning whether the AI leads or the human leads in specific decisions or subtasks, and when. This **leadership decision** is likely influenced by multiple factors, including context, risk, and the skill levels of both parties. Leadership may change during collaboration as conditions change or as new information becomes available. It is also possible that goal misalignments and conflicts emerge during execution. This implies that negotiation should not be treated as a one-time event, but as an activity that may need to be revisited through periodic or event triggered renegotiation.

Over time, global trust increases or decreases as local trust accumulates across successive AI outcomes.

Open questions that arise include the following: Can an AI operationally represent trust relevant signals in a way that supports calibrated reliance? Can it assess and communicate its competence relative to humans for a given task and context? Can it represent, communicate, and enforce its boundaries, including uncertainty, capability limits, and constraints on permissible actions?

HAT-Question 3

Host **George Margetis, FORTH-ICS, Greece**, empowering participants to create and find answers and solutions for the HAT-question

"How can we measure the performance and effectiveness of AI in Human-AI Teaming and how can we define failures and successes?"

George Margetis about the issue

As AI increasingly becomes a teammate rather than a mere tool, measuring its performance in Human–AI Teaming (HAT) becomes inherently more complex. Evaluation should not rely solely on quantitative metrics, such as task completion time and accuracy, etc. We should also consider qualitative aspects, such as trust and adaptability. An AI system may achieve technically correct outcomes yet still fail as a member of a human-AI team if it frustrates users, erodes trust, or requires continuous human micromanagement. Effectiveness in HAT, therefore, should be judged based on how well AI supports human objectives, enhances team synergy, and adapts to dynamic environments. Within this perspective, failures extend beyond technical issues (e.g., incorrect assumptions and/or outputs), collaborative breakdowns (misalignment with human intent), or trust-related problems (like over-reliance or under-utilization of AI). Identifying and understanding these failures is essential for enhancing AI's role in teamwork.

Core findings of the discussion

Assessing HAT must extend **beyond objective performance metrics** to include subjective, human-centered factors like trust, communication quality, and perceived agency. While metrics such as efficiency and task success are important, they alone cannot fully capture the effectiveness of a Human-AI team as a socio-technical system. Participants emphasized the importance of **how humans interpret AI behavior** and calibrate trust, viewing these subjective evaluations as critical indicators of both success and potential failure. The participants highlighted that **accountability for failures** must ultimately lie with humans, regardless of AI's autonomy or learning capabilities, concluding that for whatever goes wrong, "AI never has a bad day; only humans do." Collectively, these reflections highlighted the need for an explicit, **iterative HAT evaluation framework** that combines objective and subjective measures, treats failure as an informative design element, and preserves clear human oversight and responsibility throughout the system lifecycle.

HAT-Question 4

Host Patrick Rau, Tsinghua University, P.R. China (second from right), empowering participants to create and find answers and solutions for the HAT-question

"How does attribution in HAT influence human user's trust and behavior?"

Patrick Rau about the issue

Attribution refers to the perception or inference of the cause of behaviors, events, and outcomes. In collaborative work between humans and AI, people must assess the success or failure of task results, and the attribution of responsibility between humans and AI (e.g., when execution of the task succeeds, who takes the credit? When the execution of the task fails, who should be blamed?) becomes a crucial issue. Understanding the role of attribution in Human-AI interactions is crucial because it can help to understand the minds of people involved and facilitate the human-centered design of Human–AI Teaming, which can positively impact human well-being, performance, and satisfaction.

Core findings of the discussion

A central insight of the discussion was the **complexity of responsibility and credit in AI-human collaboration**, focusing on factors such as task attributes (time pressure, risk, clarity, and scalability), human traits (personality, expertise, cultural background, and attribution style), and AI limitations (bias, ethical risks, and explainability).

Culture also plays a pivotal role in shifting blame between individuals and systems. Humans are often blamed for failures in their role as gatekeepers. **Over-reliance** on AI leads to accountability gaps and diminishing human credit even in successful outcomes. Humans are also criticized for setting unreasonable standards, misusing tools, or failing to upskill, even when excessive trust in AI results in disappointment.

We also discussed methods for **measuring and rewarding** collaborative work, considering how human intent shapes credit distribution.

Looking ahead (2026)

In the final panel discussion – after the hosts had presented the results of the discussion on each of the four HAT-questions – the interdisciplinary experts from all over the world came to a strong conclusion and recommended the next steps.

They strongly recommend an explicit Ethical Responsibility of each company that provides AI. They all agreed that the UN Declaration of Human Rights should be mandatory when providing and using AI. The intensive and in-depth discussions revealed that, despite the focus on current and future key issues, further highly relevant aspects should be discussed, too.

Conclusion

The format of this Design Café certainly contributed to these core issues being raised in the context of HAT in the first place:

- o Does AI know what trust is?
- o Does AI know its boundaries?
- o What change of behavior (Humans/AI) could we expect over time during interaction?
- o How will the relationship (Humans/AI) develop in the future?
- o Is a human digital twin a Human or an AI artifact?

Next Steps

The HCII 2026 Design Café, to be held during the HCI International 2026 Conference (26 - 31 July) at the Montreal Convention Centre in Montreal, Canada, should further explore these HAT issues of great economic, social, and existential significance.