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# Where Art Meets Technology: Integrating Tangible and Intelligent Tools in Creative Processes

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**Abstract**

Art and design are an essential aspect of our culture and how we interact with the world. Artists and designers use a wide selection of tools, which, with the progression of digital technologies is rapidly growing. This change has opened up new opportunities for the Mobile HCI community to build creative supportive tools for this group. The digital switch has come with many benefits such as lowering barriers, mobile work environments and mass production for distribution of work. Along with these benefits we also see challenges of how art and design processes work and its future perception in society. As technology takes a more significant role in supporting art and design what will this mean for the individual artist or designer? The focus of this workshop is to bring together researchers and practitioners to explore what the future of digital art and design will hold. The exploration will centre around synthesizing key challenges and questions, along with ideas for future interaction technologies that consider mobile aspects of digital art.

**Author Keywords**

Tangible Interaction, Creativity support Tools, AI, Art, Design, Dialogue-labs

**ACM Classification Keywords**

H.5.m [Information interfaces and presentation (e.g., HCI)]:  
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**Figure 1:** Authors running workshops with designers at BBC

## Background

Technology is playing a more predominate role in art and design [13]. As there is an increasing diversity in the tools for creative processes, this workshop aims to bring together people working in these spaces to facilitate discussions and exploration to technology for artists and designers.

An increasing amount of intelligent tools aim to support creative practices in a co-creative manner. Especially in more abstract, tacit areas like design and art, human knowledge can enhance computational processes and vice versa [12]. Machine learning based ideation tools, for example, aim to support the generation of ideas by providing verbal [1, 2, 7], or visual material [8] to explore creative spaces together with the user by interactively contributing and interpreting inspirational material. This interactivity allows systems to work within the iterative processes which are fundamental to design. However, it can also be used to create more abstract artifacts in art and design, as when machines draw [3, 11], improvise dance [5] or improvise music [15] with users. The ability of machines to create own artifacts allows designers and artists to not only be more inspired, but also, to get inspired to work and adapt ideas to their own needs needs and interpretations. We also consider the mobile aspects deploying intelligent tools. The versatility of mobile devices holds potential for allowing intelligent tools to become an integrated part of the process.

Similarly to this, physical and tangible material have the ability to carry meaning and can be appropriated in creative support tools. To further enhance this tangible layer we see increased exploration into the possibilities of tangible art and design interfaces. This work aims to combine the benefits of physical tangibility with the freedom of digital tools, as with advantages of digital interactions comes a loss of physical engagement. In some cases these elements borrow



**Figure 2:** Prototype Mobile Canvas using Hydrogels to simulate paints [14]

from existing traditional methods [6], for example, simulating brushes to make advanced stylus [17, 16, 9] or explore the possibilities of tactile sensations and realistic textures that missing in the mobile digital experience [4, 14] appropriating separate mobile device to be used as tangible tools (See Figure 2).

The active work in this space demonstrates the strong interest in designing, building, and testing improved tools, and the active commercial participation. Researchers could also take the next step to explore the impact of these developments in practice over long-term use. In this workshop, we will challenge researchers and practitioners to think deeper into how a combination of existing physical and computational tools could yield more usable, interactive and creative for the artists and designers. We aim to invite ideation of new physical form factors or digital concepts of art and design tools to understand how we can enhance these experiences and take advantage of mobile aspects.

## Goals of the Workshop

The workshop provides a platform from HCI researchers and practitioners of different backgrounds to discuss the potential benefits and associated risks of tangible and intelligent technologies in relation to the field of art and design. It aims to create a deeper understanding of designing and evaluating new and existing interaction technologies and their societal implications to creative practices practices. More concretely, our aims are to:

- Identify the key opportunities that new interactions and mobile tools can bring to the art and design community;
- Explore contexts and work-flows and discover how such interactions can be deployed;

## Call for Participants

We invite submission from practitioners and researchers in disciplines such as human factors, computer science, art, and HCI who are interested in exploring digital technology in art and design practices.

Papers should be between 2-4 pages in the ACM Extended Abstract Format. The submission should address any topic related to novel tangible and digital technologies for art and design practices. This includes designing/exploring tangible prototypes for digital experiences, advanced creativity support tools for practitioners, i.e. AI/ML based tools. We further encourage submissions related to exploring contexts and methodologies of studying artist and designers as well as ethics and societal impact of technology on creative fields.

Submit the extended abstract not later than the xx.xx.xx by email. The participants will be selected by the clarity of their submissions and the relatedness to the topic. At least one author of the each paper has to attend the workshop.

- Investigate the implications of the use of digital tools on the perception of art and design from the perspectives of the creator and consumer.
- Examine possible directions for prototyping and evaluating new digital and tangible artistic systems with consideration to mobile form factors.

## Pre-Workshop Plan

### *Website and Social Media*

We will create a website including the call for participants (see Fig.3), submission details and contact information. Post-workshop the website will be an archive of the accepted papers and plan of activities to be conducted during the workshop. We will also integrating a timeline for social media posts facilitated this with hashtags (#ArtmeetsHCI) used among social media platforms to encourage a better collection of content. We welcome content from attendees on these channels and wider engagement. We will dedicate one organizer to collating and sharing further information from the workshop as the event progresses. After the workshop it will a platform of discussion for further collaboration and the creation of a public article.

### *Recruitment*

We intend to recruit a diverse set of scholars and practitioners from the HCI community and beyond who work with artists and designers, with AI and Machine learning to assist their processes, or with mobile tangibles and shape-changing interfaces. We further encourage submissions that address societal and views on using such technologies in creative practices. We will recruit via diverse channels e.g. CHI Meta Facebook Group, Twitter, as well as mailing lists of the HCI, Computational Creativity and Design Research Communities. We will reach out to practitioners via

Social Media (e.g. IxDA), Industry conferences and meet-ups. We are looking for 15 to 20 participants, who will be asked to submit a 2-4 page positioning paper and will be selected by the quality of the submission and their professional background as well as their contribution to the workshop. The organizers represent a vast amount knowledge and thus will review the submissions.

### *Required facilities and specifications*

Morning session will require a VGA projector as well as some simple note taking materials (pens and papers). For the rest of the ideation phase and hands-on session the instructors will provide paper prototyping materials and objects for constructing prototypes. More details of which are described in the workshop plan. Student volunteers are not required but are welcome to attend.

## Workshop Structure

This workshop aims to foster and develop future research ideas in the field along with bringing together like minded individuals to build a community and encourage collaboration around shared ideas and perspectives.

**Morning Session** It will begin with an ice breaker activity to introduce everyone. Then time will be dedicated for participants to present their submitted papers to the other attendees in the form of, *lighting talks, demo's or presentations*. In the end of the first session we will introduce prepared scenarios to the attendees.

After the coffee break, participants will group around these scenarios based on their personal interest and start discussing potential ideas/concepts and open questions. This sets the stage to introduce an ideation method called *dialogue-labs* [10]. Here, participants will cycle around different stations with inspiring tools and materials (like paper, pens, lego) to aid the generation of new concepts and research

Figure 3: Call for Participants



**Figure 4:** Example of Dialogue-Lab activities author's research [10]

questions.

**Afternoon Session** Based on the morning session groups will choose their most interesting ideas and prototype them. We will bring a range of materials and a selection of tools for sketching and building practical resources (e.g. cards, pen, paper, lego). This activity will give the participants the best opportunity to present their ideas in a fun and hands-on way.

Before the end of the workshop all ideas will be shared via presentation/demo to collect feedback, which will be recorded and later on provided on the website. The activity will aim to stimulate discussion on how to prototype and evaluate such concepts.

### Planned Outcomes

Other outputs such as specific papers and articles arising from discussions and exercises to be prepared as appropriate. The results of the workshop will be summarized and published on the workshop's website. We further aim to summarize the collected challenges/ideas around prototyping such tools in an public blog post the workshop website and larger blogging platforms with UX communities to reach out to a larger community of practice related to these topics (e.g. Medium). In line with this, we will use real-time documentation (e.g. video streaming, tweets, posts on social media platforms) for a larger audience, e.g. for those unable to join. This content will integrated into the website for archival purposes.

### Organizers

The workshop organizers are all researchers in the area of technology for art and design, focusing on both novel interactions, methodologies and societal impact. The contact person will be Janin Koch (janin.koch@aalto.fi).

**Janin Koch** is a PhD student at Aalto University focusing on the design, development and impact of collaborative intelligent systems for visual design ideation.

**Cameron Steer** is a PhD student at Swansea University focused on the design and development of mobile tangible and deformable interfaces for art and design.

**Andrés Lucero** is Associate Professor of Interaction Design at Aalto University. His work focuses on the design and evaluation of novel interaction techniques for mobile devices and other interactive surfaces.

**Makayla Lewis** is a Postdoctoral Research Fellow at University of the Arts London, she uses mixed methods to explore human factors in private and organization data management. She's also a visual thinker and sketcher, organizing a workshop at DIS2017, courses and special interest groups at CHI, and a multitude of industry conferences.

**Wendy Mackay** is a Research Director at Inria and head of the ExSitu research group focused on the design of human-computer partnerships, with an emphasis on interactive tools that support early-stage creative design.

**Jennifer Pearson** is a senior lecturer at Swansea University whose research interests span a number of topics including information interaction, co-creation, mobile device interaction, digital reading and HCI for development.

**Simon Robinson**'s research focuses on the human side of mobile interaction, looking beyond the current heads-down and self-focused digital world to include everyone, worldwide, in far-off future design.

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