
The Future of Work

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ABSTRACT

We invite scholars, designers, developers, policymakers and provocateurs to explore non-standard, global and virtual work futures, to reflect on the impact of new sites and temporal patterns of work, and to consider emerging interpersonal and person-machine dynamics within work. We will frame these discussions with a consideration of the relationship between the future of work and existing modes of labor and political economy, with a view to identifying possibilities for both technological innovation and systemic change.

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ORGANIZERS

Siân Lindley is a Senior Researcher and social scientist at Microsoft Research. Her current and recent research focuses on organizational memory, content reuse and remix, cross-application workflows, and flexibility and productivity in freelance and gig work. She works in interdisciplinary teams to produce user insights, envisionments and prototypes. Lindley co-organized workshops on temporality at CHI'13 and DIS'17.

Noopur Raval is a PhD student in Informatics at the University of California Irvine. Her past research has focused on ridesharing platforms and labor issues as well as other forms of atypical work. Raval combines postcolonial and feminist theoretical perspectives to study the changing world of technology and work.

Hamed S. Alavi is a senior visiting researcher at the University College London Interaction Center and a lecturer at the Human-IST Institute, University of Fribourg. Taking a design-oriented approach, he has focused on exploring human interactive experiences with future built environments, namely, workspaces, classrooms, and public urban areas. He has co-organized workshops at CHI'16 (Future of Human-Building Interaction) and DIS'17 (From Artifacts to Architecture).

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)** → **HCI theory, concepts and models**

KEYWORDS

Workforce; workplace; atypical work; automation; heteromation; labor; crowd work; gig work; remote work; mobile work; microtask; work-life balance; temporality.

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1 INTRODUCTION

The ‘future of work’ is emerging as a focal point for a number of research organizations, foundations and funding bodies. There are good reasons for this: mobile and remote work are taking on new forms via the platform economy, while advances in AI and robotics are ushering in an ‘age of automation’ [15]. Yet, despite the wealth of emerging CSCW research on the experience and organization of crowd work, there is surprisingly little discussion within the CHI community on how work more generally is being shaped by technological innovation, how this is bound up with continuous forms of inequality and exploitation, and what implications this has for the future of work and labor.

In this workshop, we aim to bring together members of the CHI community who are interested in how technology intersects with the accomplishment and experience of work. We intend to explore this in a context that emphasizes implications for ‘atypical’ or ‘non-standard’ forms of work (fixed-term and zero hour contracts, part-time work, on-call work and freelancing), that notes how technologies that mediate work can have differential effects globally, and that considers how designing work ‘futures’ requires a willingness to engage with and disrupt past and current forms of inequality and exploitation.

During the workshop, we will identify a set of challenges for HCI with respect to innovating the future of work and addressing the need for systemic change. Outcomes will include insights, research questions and opportunities for design, to be made available to and used as a resource by the CHI community.

2 TOPICS OF INTEREST

While the future of work is a broad topic, in this workshop we will focus on the following areas of interest.

Silvia Lindtner is an assistant professor at the University of Michigan in the School of Information, with a courtesy appointment in the Penny W. Stamps School of Art and Design. Lindtner's research and teaching interests include innovation and technology entrepreneurship, making and hacking cultures, shifts in digital work, labor, industry, policy, and governance. This work unfolds through a deep engagement with issues of gender, inequality, and enactments of masculinity in engineering and computer science, politics and transnational imaginaries of design, contemporary political economy, and processes of economization.

Ding Wang is a Post-doc Researcher at Microsoft Research. Her current focus is how both the concept and practice of work has been impacted, shaped and re-defined by the use of technology, especially in developing contexts. Prior to this, she completed her doctoral thesis on unpacking the discourse of the smart city from a Foucauldian perspective, which offers a critical approach to the smart city discussion.

2.1 Emerging and Changing Modes of Work

Atypical and non-standard forms of work are becoming increasingly commonplace. Within HCI and CSCW, researchers have considered how the value proposition of non-standard knowledge workers is bound up with their expertise of particular applications [18], and have investigated the ramifications of the platform economy for both the experience of workers and for levels of productivity. For example, researchers have shown how crowd workers form collaborative networks outside of brick and mortar work environments [9], how rethinking the piece-work economic model on which crowd work is based could bolster yield [10], and how worker contributions might be optimized through the formation of experienced teams in complex tasks [21].

This work is set against a global backdrop in which the proliferation of micro- and gig work platforms has had diverse labor effects, which interact in complicated ways with older and continuous forms of inequality, exploitation, and regional and class divides. Changing access to work platforms and personal technologies (e.g. smartphones, bodycams, and self-monitoring devices) are enabling new workers to enter traditionally tight-knit local labor markets [8]. Nevertheless, precarious conditions of work have been proliferating across class, race, and gender [16, 6]. In this contemporary moment of precarity, citizens are called upon to self-entrepreneurialize as a techno-economic fix, while technologists and tech researchers render more systemic change as something too large to tackle [12, 11, 13]. Yet, where explicit efforts to contextualize and design work platforms to facilitate access have been made, for example by reducing barriers for workers with limited literacy levels and constrained resources, participation in labor markets has been enabled [17].

In this workshop, we see an opportunity to consider forms of atypical work in addition to micro- and crowd work, to address how these non-standard modes of work intersect with existing forms of inequality and political economy, and to bring worker progression and development under consideration.

2.2 Automation and Heteromation

A recent report by the McKinsey Global Institute [15] claims that we are living in 'a new automation age', in which machines are being developed to undertake not only routine physical work but also tasks requiring cognitive capabilities, including making tacit judgements and sensing emotion. Prominent and recent examples of machine capabilities include Google Duplex [7], an AI system for conducting tasks over the phone via 'natural' conversations, and self-driving Ubers, which are currently being piloted in Pittsburgh [23]. While forecasts of the effects of automation on work are inconsistent, McKinsey reports that at least 30% of the activities that make up ~60% of today's occupations could be automated, with highly structured physical activities and tasks involving the collection and processing of data being best suited to automation.

An important caveat here is that McKinsey assumes that people will work alongside machines to underpin productivity; their prediction is that in most cases work performed by humans will change rather than be replaced. Nevertheless, automation anxiety is highlighted in a recent survey by the UK's Royal Society of Arts (RSA) [4], with 34% of respondents believing that new technologies will result in large job losses. The RSA takes a more optimistic view, noting that automation could alternatively raise productivity and wages, as has been the case in the EU's most automated country, Germany. However, it is also acknowledged that the effects of automation will be differentially felt, with single-industry towns and specific trades, such as manufacturing, finance, and transport and logistics, being most heavily affected.

Within HCI, the requirement for human intervention in support of machines has been positioned as a shift to 'heteromation' [5]. Humans form an essential component of heteromated workflows, dealing with critical tasks that machines cannot address. However, little attention has been paid within CHI as to the nature of heteromated work, or to the possibility that intelligent machines may 'empower' humans within the workplace, despite the emphasis on this within the technology industry [22]. Relatedly, the possibility that new forms of brain-computer interaction may give rise to 'augmented' workers requires thoughtful discussion.

We see an opportunity to consider the role that new and intelligent technologies could play in work, how this intersects with the experience of workers, and the ethical and moral questions that are raised.

2.3 Changing Temporal Patterns and Sites of Work

A final topic of interest relates to the role of technology in where and when work is done. Salient here are new possibilities offered by smartphones and the use of personally owned devices for work. These have underpinned a shift in sites of productivity; people work in and from multiple places, including traditionally non-work spaces such as the home, as well as in third spaces and while in transit.

This raises implications for the organization of work, for collaborative communication, and for work-life balance [3]. There is an increasing need to appear 'always on', and in response to this, Mazmanian and Erickson [14] have pointed to temporal division of labor as a means of managing an appearance of availability across an organization, whilst individual workers disconnect backstage. Research has also pointed to the difficulties that shift and gig workers experience in managing the boundaries around work. For instance, research into ride-sharing has highlighted how vehicles need to be transformed from personal to service-oriented spaces [20], and Bakewell et al.'s [2] study of engineers revealed how they start planning their day via smartphone apps well before they dock their phones into their vans to signal they have 'started' work.

Finally, while the platform economy has made extremely visible the role of smartphones in transforming sites of work, other technologies are also playing a role in reconfiguring where work gets done. Architects and workspace designers are increasingly incorporating pervasive sensing, context-aware automation and interactivity, with a view to optimizing built spaces for sharing and hot-desking [1], as well as to enhance the comfort and wellbeing of workers. Alternative

WORKSHOP STRUCTURE*9-10:30 Pecha Kucha introductions*

We will outline the goals of the workshop and invite participants to introduce themselves using short presentations following the Pecha Kucha format. Participants will be asked to state (i) their area of interest (ii) how they envision the future of work and (iii) a challenge for HCI in meeting this ambition. Participants will be asked to send their slides in advance of the day, and organizers will collate the challenges ahead of time.

*10:30-11 Coffee**11-12:30 Group discussions*

Participants will identify four or five challenges, to be discussed in small groups using the World Café Method. The challenges will be discussed for 10 minutes before everyone (except a designated leader) moves on. As the session proceeds, participants will discuss all the themes, and at the end, the leaders will present an overview of the discussion around their challenge. Before lunch, participants (including leaders) will select a challenge that they wish to explore further.

12:30-2 Lunch

We will provide a series of questions for participants to reflect on over lunch, relating to food and labor.

applications of technology include embedded systems that track performance. As one example, Pritchard et al. [19] report how London bus drivers experienced technologies that monitored their driving, making efforts to alter their work but also to subvert the requirements of the system.

We see opportunities to explore how embedded and pervasive technologies intersect with how work is organized and experienced, and how workers manage temporal and spatial boundaries around work as these become more fluid.

3 THE WORKSHOP**3.1 Workshop Goals**

The workshop is intended to bring together scholars, designers, and provocateurs to collaboratively develop a visionary discourse on how the CHI community should research and design for the future of work. We aim to explore non-standard, global and virtual work futures, to reflect on the impact of new sites and temporal patterns of work, and to consider emerging interpersonal and person-machine dynamics within work. We will frame these discussions with a consideration of the relationship between the future of work and existing modes of labor and political economy, with a view to identifying the need for both technological innovation and systemic change. Outcomes will include insights, research questions, and opportunities for design, to be used as a resource by the CHI community.

3.2 Pre-Workshop Plans

We hope to attract participants from HCI, including researchers, designers and developers, but also those studying related fields (e.g. anthropology, philosophy, space design, economics, politics) as well as policymakers and thinktank members. We expect participants' interests to vary, but possible focal points include: emerging modes of work, including gig work, crowd work, and microwork; the devices used to perform work, including mobile and personal devices; the changing nature of the workforce, including the impact of gender and retirement age as well as types of worker (e.g. atypical workers and intelligent machines); the changing temporal patterns and sites of work, including work-life balance, the use of third spaces and homes as workspaces, and the creation of new and flexible workplaces; the role and importance of voluntary and unpaid work; and new and speculative methods for exploring the future of work. We especially encourage submissions from participants studying work in the Global South, to help expand the range of perspectives on work as well as technology-use.

The call for papers will be distributed via the 'CHI Announcements' and other HCI mailing lists, as well as being advertised as part of the CHI workshop process and via social media. We hope to attract a broad range of participants, and so those who wish to participate will be asked to submit a position paper or other portfolio of work relating to the topic. On acceptance to the workshop, submissions and links to online portfolios will be posted to the workshop website, to allow participants to gain familiarity with one another's work in advance of CHI 2019. We will not

2-3:30 Group activities

Participants will explore the challenges in groups using methods such as storyboarding or design fictions, highlight requirements and approaches for tackling them, and reflect on the role the CHI community should take in addressing them.

*3:30-4 Coffee**4-5:30 Present back, closing discussion*

Groups will give short presentations (~10 minutes each) and invite discussion from the wider group. As this is occurring, organizers will document potential insights, research questions, and opportunities for design and innovation that emerge.

allocate much time during the workshop itself for participants to present their work, so the website will be used as a means of supporting this, and participants will be encouraged to visit it ahead of time. We aim to recruit 15-20 participants.

3.3 Post-Workshop Plans

We will document the workshop outcomes on the website and build on these to produce an Interactions article. We will explore the idea of producing this as a manifesto for the future of work. We will also guest-edit a special journal issue on the topic, if there is sufficient interest from workshop participants.

3.4 Website

Ahead of the workshop, the website (www.futureofwork.site) will detail the rationale and goals for the day and provide the call for participation. Following the workshop, the website will include participants' position papers and direct the reader to additional outcomes.

4 CALL FOR PARTICIPATION

CFP: CHI 2019 Workshop on 'The Future of Work'

www.futureofwork.site

In this one-day workshop, we invite scholars, designers, developers, policymakers and provocateurs to explore the implications of innovations in technology for the future of work and its intersection with the CHI community.

Discussion and activity will be focused on the production of outputs (research questions, opportunities for innovation, insights) to be used as a resource in HCI research and design. These will be disseminated via the workshop website and an Interactions article.

WORKSHOP SUBMISSIONS

We invite submissions of up to 2,000 words, which articulate their importance to discussions on the future of work. Submissions can be primarily visual but should be accompanied by a description of their relevance, and may include any of the following:

- A thought-piece, description of research, design fiction, or analysis of ethics or policy;
- A design concept, prototype or experience, illustrated through photography, video or similar;
- A novel method or tool.

Submissions should be sent by email to futureofwork2019@gmail.com. At least one author of each accepted submission must attend the workshop. All participants must register for the workshop and for at least one day of the conference. Submissions will be made available on the workshop webpage.

IMPORTANT DATES

12 February 2019: Submissions due

1 March 2019: Notifications of acceptance

4/5 May 2019: Workshop held in Glasgow, UK

ORGANIZERS

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