

Naming Things is Hard: Real Title Following Colon

Leave Authors Anonymous
for Submission
City, Country
e-mail address

Leave Authors Anonymous
for Submission
City, Country
e-mail address

Leave Authors Anonymous
for Submission
City, Country
e-mail address

ABSTRACT

With growing attention on gig work — ranging from the “sharing economy” to microtasks — scholars have made connections to frameworks like Taylorism, and mechanisms such as worker advocacy and empowerment, to make sense of our observations of on-demand work and the workers that power this movement. We argue that our the underlying trend towards “piecework” — driven in part by the discretization, routinization, and external management of said work — not only suggests, but in fact generates what we have observed: members of this transient workforce increasingly feeling disempowered, marginalized, and frustrated by the systems and platforms on which they work.

After evaluating this framing through a series of case studies in various industries falling broadly under the “gig work” category, we turn our theoretical lens to look to the future, to identify worthwhile questions and points of inquiry that researchers in social computing should consider as we attempt to anticipate and perhaps shape the future of work.

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous; See <http://acm.org/about/class/1998/> for the full list of ACM classifiers. This section is required.

Author Keywords

Please don’t make me pick keywords. This is like asking a teacher to give the bullet points of what a student missed in lecture.

INTRODUCTION

The past decade has seen microtasks, the “sharing economy”, and other instantiations of on-demand contract work grow to occupy the fascination of both academic circles and our culture as a whole [15, 10, 17]. The research community has identified myriad connections between this emergent form of work and the historically situated “piecework”, [MSB: Did the research community really do this? Or is **your** contribution? I want to understand whether the literature threw around the word as a metaphor, or if they really meant it in the full historical context

of the term.] as well as a number of observations relating to the frustration workers feel stemming from the management of this work [9, 16, 13]. This body of work represents the cornerstones of how we understand crowd workers and on-demand labor more generally.

While much of this work appears to gesture toward the parallels between contemporary on-demand work and piecework, it’s proven difficult to bring the totality of these observations into focus using one theoretical lens. This paper will attempt to do so by arguing that the topics social computing researchers have investigated are not just parallel to historical piecework and the process of factorization that took place in the early 20th century; indeed, these phenomena are directly related [MSB: how? what’s the difference between parallel and directly related?], and that they [MSB: ‘they’ means ‘the topics social computing researchers have investigated’? I’m not sure I understand which topics these are, or how they precipitate outcomes] precipitate the social outcomes we have observed, especially with regard to worker frustration, coordination, and resistance. [MSB: At this point I’m not sure what the argument is. I see several possible arguments being made: 1) People already talked about piecework, and I’m going to talk about it more and argue its ‘direct’ relation as opposed to ‘parallel’ relation. 2) People have talked about the *effects* of gig work, and I’m going to tie them all together under one *cause*—piecework—and show how that cause led to them historically and will now too. 3) There are topics that social computing researchers investigated (not sure which) and they are directly related to these outcomes. I sort of assumed it was going to be number two, but that’s not what I understood here.]

In the reflection on the literature published in the last 5 years since Kittur et al.’s “The Future of Crowd Work”, we notice a broader trend describing the change in work that’s being done [11]. Crowd-powered work is not just distributed across homes, but dispersed among drivers, cleaners and other on-demand workers [MSB: I don’t understand the distinction. Was Kittur et al’s vision about homes somehow? Or are you saying that it was about information work but in fact is occurring elsewhere?]. By looking at the movements toward distributing work, routinizing and breaking down tasks, and externally managing workers as linked to one another, we give ourselves a framing of contemporary piecework that explains, and arguably predicts, what we have seen thus far — and perhaps what we should expect to see going forward. [MSB: this paragraph sounded like half review of previous literature, and then the second half switched into “my contribution” mode. Either a clearer transition or a more singular purpose would help.]

Paste the appropriate copyright statement here. ACM now supports three different copyright statements:

- ACM copyright: ACM holds the copyright on the work. This is the historical approach.
- License: The author(s) retain copyright, but ACM receives an exclusive publication license.
- Open Access: The author(s) wish to pay for the work to be open access. The additional fee must be paid to ACM.

This text field is large enough to hold the appropriate release statement assuming it is single spaced.

Every submission will be assigned their own unique DOI string to be included here.

Crowd work, they argued in 2013, represents a threat to the future of work inasmuch as it marginalized and perhaps even harmed workers; their driving question, then, was whether the future of (crowd, but arguably all discretized) work might be one in which they wish their children to participate someday; it seems strikingly like one that might have been asked as patches of denim were first being delivered to the homes of early pieceworkers. [MSB: this seems speculative—I'm not sure whether they knew what was coming, and wasn't income distribution different then? Who was the 'they' in this case? Industrialists?]

This paper will argue that the familiarity is more than passing; it [MSB: what is 'it'?] was an inevitable milestone in the maturation of the type of work that is reemerging today. [MSB: I'd like the argue to summarize the argument as to **why** it was inevitable. Why was it inevitable then, and why is it inevitable now? What is it about piecework that generates this outcome? In two sentences or less...] “But”, as Scholz points out, “it would be wrong to conclude that in the realm of digital labor there is nothing new under the sun” [17]. Indeed, we will attempt to reason about more than the larger-scale progression from the discretization of work toward scientific management and future steps; we will attempt to make sense of how the modern processes in digital labor, in particular the use of the Internet as a medium to manage as well as *do* work, affect these unfolding events. [MSB: That felt like a bit of a calorie-free sentence — I'm not sure what it was trying to say. I think it needs to connect the dots more visibly for the reader. Is it that we're using histories and theories of piecework to reason about that progression as it applies to today?] [MSB: I'd like to see a 1–2 sentence summary of what the takeaways from this part of the exploration are. What is new under the sun?]

Piecework as a lens to understand gig work

Kittur et al. investigate the future of crowd work by situating and interrogating it through “piecework”, [MSB: I would not say that piecework was exactly the centerpiece of that paper. It was used as a point of contrast.] a term almost lost to history [MSB: a bit exaggerated], but which for a time described work done in the home, in manageable tasks, often involving clear instructions and payment only for work completed, not work done (the differentiation, here, being that one would be paid for the *output* of the work, not the *duration*) [11] [MSB: is that true? by that definition, design is piecework too, right, because I get paid for the job, not for hours worked. But design doesn't seem like piecework.]. This work was largely in textiles and was predominantly done by women, which by itself is a topic worthy of unpacking [MSB: instead of gesticulating, can we indicate what the punchline of unpacking it was?] [18]. Given the scope, we'll leave this topic with the superficial takeaway that piecework and microtasks share some structural similarities: [MSB: may be just me, but that felt like it was belittling the reader, like their puny brains wouldn't be able to understand more than a superficial takeaway] 1) the work is done in the home [MSB: true? isn't it still piecework if it's in a factory?]; 2) the worker is paid for each discrete piece of work done, regardless of time or effort; and 3) the worker's status (not only socially, but also economically) is ambiguous, or at least the subject of some controversy [MSB: my first reaction

was “this isn't definitional”. But now I look back and see that you're just saying there are similarities. It would be helpful if the sentence made it clearer that the similarities were in not just what the work was but also in the environment around it.] It may be said that on-demand work shares, if not inspiration [MSB: I doubt it was inspiration — ‘hey, let's create something like factory floors but for information work!'], then many of the same outcomes as piecework. [MSB: what are outcomes?]

Context

Importantly, since the reemergence of piecework we've seen substantial frustration and resistance among the workers in this area [13, 9, 16]. This paper attempts to make sense of the broader research on this piecework, or “gig work”, by framing this as one of several steps in the marginalization of workers, [MSB: this feels out of order to me. I don't think resistance is a step in the marginalization of workers, isn't it a reaction to the marginalization of researchers?] starting with the discretization of tasks, followed by routinization and the rise of workflows, and finally the external management of workers. All of this is to say that these milestones follow sequentially, not coincidentally but necessarily, and that by tracing this path using the corpus of scholarship on labor and workers we can both make sense of past events and perhaps reasonably predict next steps. [MSB: I don't think we've offered much proof that this is the case yet. Why must they follow necessarily? Can you offer a cause and effect relationship?]

We explore each topic — discretization, routinization, & management — by looking at case studies in social computing. Having validated this lens as a way of reasoning about contemporary piecework, or “gig work”, we turn to look ahead, envisioning future areas that researchers in social computing — and particularly digitally mediated work — should explore.

CASE STUDIES

The existing body of research has shed light on on-demand from various perspectives, and revealed a number of topics that, through our framing, are clearly situated together. Those topics, at a very high level, are

1. the **distribution** of work,
2. the **routinization** and **discretization** of work, and finally
3. the **relationships** between the workers and the product of their work, as well as workers and managers.

We will follow these topics, using them as prompts for case studies in the emergence and development of contemporary piecework.

Distributing Work

In both the historical and contemporary cases, distributed, speculative work has promised to diffuse the costs of capital-intensive resources (whether they were sewing machines or laboratory equipment).

*There's a reference to something that's **not** 99designs, that describes a call for scientific solutions/designs to solve some problem that the requesters have. Honestly it's killing me that*

I can't remember the name, and I need to find this before I do anything productive ever again. [MSB: netflix prize?]

The HCI community is perhaps most familiar with examples such as 99designs, Uber, Lyft, and Amazon Mechanical Turk (AMT), which all allow requesters in various forms to tap into resources such as cars, computers, and above all “cognitive surplus” with relative ease [5, 8, 19]. This insight, that workers can be geographically distributed, has proven remarkably compelling [2].

The insight here seems to have been that a substantial amount of work does not necessarily need to be done in collocated space, but can be done from one's own home or other space arranged by the worker. Moreover, by shifting the workplace into the worker's domain, the cost of capital involved in that work can more easily be placed on workers' backs [MSB: I don't think that was the original motivation for AMT or Uber — it was about reaching people who could not otherwise join the labor force for Amazon's data cleaning or for taxi-ing.]. While yellow-cab organizations often manage drivers in similar ways to platforms such as Uber and Lyft (inasmuch as drivers are often considered contractors, or otherwise exempt from the formal status of “employee”), these new systems go further, by framing ownership and responsibility for costs (e.g. automotive maintenance) on drivers. In our fieldwork, we discovered many longtime “on-demand” drivers (affiliated with platforms such as Uber and Lyft) who readily voiced frustration with the costs of frequent oil changes and the unexpected replacement of expensive parts. Distributing labor had similar effects on pieceworkers at the turn of the 20th century; textile workers were given the source material with which to work, but were generally expected to use their own sewing materials and work in their own homes [6].

Discretization and Routinization

Distributing work in method described above may be thought of as vertically slicing work such that each person is responsible for the whole task — making a whole garment or being responsible for driving in a single neighborhood. Broken down in this way, work could grow to unprecedented scales, but the quality of the work would remain relatively variable. Textile work being a salient example, some seamstresses might be better than others at the same task, making this framing of the work initially problematic.

A compelling solution emerged in the early 20th century to break tasks down into discrete, manageable routines that could be taught relatively easily, and whose work output could be evaluated in abstraction from the rest of the work. In Ford's assembly line, this meant that workers were not responsible for building a whole car, but a single very narrowly defined action that needed to be done on every car.

This approach paralleled what would be known as “Taylorism”, and its influences can be seen today in crowd work and micro-tasks. *talk about breaking tasks down both in general (Cheng) and even for the self (Teevan); horizontal cuts instead of vertical* [3, 20]. By decomposing and recomposing tasks, and in particular by assigning similarly natured work to the same workers, workers could become “experts” in a small aspect of

the work that they did, speeding their work dramatically [12]. Perhaps more important, however, was that the breaking down of work into tasks has made it more practical to evaluate work at each stage [citation needed].

Opening the door to more discrete modules of work known as tasks Contributions such as “find-fix-verify” and “Cascade” make it easier to assign smaller components of work to myriad workers and recompose the constituent parts into something more complex [1, 4]. Some work has taken special interest in the process of breaking tasks down into more manageable parts inasmuch as decomposing what we might call “macro” tasks into microtasks, both for the purposes of crowd-sourcing in the sense of out-sourcing work as well as “selfsourcing” [3, 21].

The parallels between this kind of work and historical piecework of the turn of the 20th century is by no means new [citation needed — who said this first? most notably? Turner?] [MSB: not familiar with it, but google scholar suggests this was an early one to talk about it <http://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=1433&context=bjell>]. *Elaborate on gig work, piece-work, etc...*

The **discretization** and decomposition of work certainly facilitates breaking tasks down, parallelizing work, and getting more done across a broader array of people; but the key advantage in turning macro tasks into many micro tasks is that we can make that work *routine*.

By making larger bodies of work less contextually situated, we can define processes that make that work and the instructions thereof useful for virtually anyone with shared cultural or intellectual background.

routinization can be seen in the contemporary in workflows [14, 1] [*There are various papers that talk about creating a workflow; maybe this is where FFV belongs? Foundry?*].

External Management

Discretization, enabling **routinization**, thus allows us to manage work more meaningfully. Routinization in particular made it possible (and indeed preferable) to assume that people “...are of equal ability and ...can do any of the n jobs” [7]. Irani and Silberman find similarly that this work is only made to seem new by framing the units of work as the output of “task-completion APIs” [8].

Crucially, Hu's case study assumed that workers were similarly trained and capable, which in 1961 meant that workers would at least have to be trained in person, if not instructed as well. Throughout the industrial revolution, workers flocked to centralized locales of production, and physically situated factories made it both difficult to ignore the general pattern of mistreatment and relatively easy to organize.

Irani and Silberman describe is that the “APIs” in the latter case

I want to cite Justin's work on crowdsourcing effort to highlight that we can evaluate workers for the work they do with increasingly finite amounts of time; also, Ranjay's work that

embraces failure because we can essentially algorithmically make sense of failure (let's call it noise) and re-capture signal.

Resistance

So it's not surprising, then, that workers are frustrated: Turkopticon, Dynamo, and many other pieces of work point this out [9, 16, 13] [*also want to cite Brian's work from CHI this year*]. In popular culture, reporters have inquired about what "the future of labor unions" will look like [*Imagine I had cited an online article and it wasn't totally inappropriate for a conference*].

The parallels here would be difficult to ignore; Lily and others have pointed this out, but it's worth thinking about the broader trend of resisting management, driven by routinization, enabled by discretization. Do that here.

Looking forward

If we agree that discretization, routinization, management, and even resistance necessarily follow one another according to this theoretical lens, then we have to use it to attempt to envision what comes next.

I've been going back and forth regarding how to frame this paper; the approach that tries to look at things that are similar vs things that are different doesn't seem to work, but I've left the thoughts here because it's not all completely bad.

THINGS STAY THE SAME

How is gig work the same as it's been historically?

I think this section would be compelling to draw parallels between the narratives drivers gave about the flexibility, autonomy, etc. . . and that which we might have seen among pieceworkers (predominantly women, who benefited from being able to work from home).

Flexibility

Are there cultural differences between the people that did piecework and the people that do gig work now? I'm not sure there are significant differences that have affected the outcomes so far.

Many of the workers to whom piecework appealed were mothers, wives, etc. . . who mostly stayed at home for various reasons (certainly largely it was cultural — women weren't afforded equal access to labor opportunities, making in-home job opportunities not only compelling, but also one of few available options).

Gig workers are in some senses similarly constrained: workers on Amazon Mechanical Turk — those that use it as a primary source of income, at least — report being homebound for various reasons (e.g. medical, parenting, etc. . .). Society and circumstance have made it difficult or impossible to join the contemporary, conventional workforce; gig work re-opens that door.

But there are differences; during our research over the summer, we spoke to drivers on Uber and Lyft, cleaners, and other gig workers. Many of them told us about their home lives — about children, spouses, and other commitments — to which they wanted to dedicate more time. One driver (let's call him

Raúl) told me about how he drove for Lyft after working as an inventory manager at a hospital for more than nine years.

I asked him why he quit that job and forewent the benefits, predictability, and career growth opportunity that his old job offered. He told me that when his daughter was born, he was overcome with a desire to spend more time with her. No longer satisfied with work where he often left before his daughter would wake up and return after she fell asleep, Raúl decided to start driving for Lyft, because he could drive in the evenings when his daughter was asleep.

Other drivers reported similar benefits; gig work affords its workers flexibility that conventional careers don't allow.

routinization of work

This leads into the next section, but I want to bring up the process of making work about mass-manufacturing, at least inasmuch as the instructions are the same for everyone.

The Internet arguably has made it much easier to broadcast those instructions, but it's had this deeper effect of enabling some amount of back-and-forth between the worker and the (algorithmic) manager.

Taylorism

The routinization of work makes it possible to measure that process, optimize it for certain characteristics, and ultimately lead to Taylorism and scientific management. This is not new; researchers have studied and written about the slow creep of algorithmic management and discretization & routinization of work tasks.

We hope to take a step back from the context in which this work is often applied, and look for its place in the larger trends and theories to make sense of the trends of gig work at large.

Industrialization and the automobile assembly line makes this famous, but piecework functioned on the principle that everyone was making similar or identical garments and other products.

Now, we see Turkers being evaluated on the outcome of their work conforming to norms, sometimes bootstrapped, as in Ranjay's talk on "Embracing Error to Enable Rapid Crowdsourcing", but more conventionally in work flows like "Find-Fix-Verify".

This might be an opportunity to reflect on how pieceworkers internalized the work they were doing, responded to the stress of the uncertainty of potentially rejected work, etc. . . but I'm not familiar with research in that space.

The emergence of decentralized workplaces

The practice of in-home piecework was consumed by the centralization of factories (the effect of which we'll talk about later, since we can talk about how this made unions more practical), but for a time many pieceworkers at the turn of the 20th century worked out of their homes. Strikingly, many of the gig workers Kittur et al. discussed in 2013, and indeed many more continue to do what we might call "information work" — that is, work that predominantly demands human

computation — but increasingly we’re seeing the movement toward transient work that largely requires embodied presence [13] (and others).

What was this about?

I was going to check in quickly and take a photo of your whiteboard (hoping that you’d kept our conversation notes around) but your room was *literally* full of people lol.

THINGS ARE CHANGING

The medium on which this work is being done — and to an extent the medium used to manage workers — has dramatically changed things as well, however; workers are distributed around the world, working out of their cars in the cases of livery services (notably, never returning to a base of operations) across and between cities as well as nations, or in their homes (paralleling the trend of piecework even more closely).

Trying to understand how gig work has differed from piecework should at least start with looking at the different characteristics of the work involved. After that, we should think about how the demography and culture of the people engaging in this kind of work have changed versus that of the pieceworkers.

Differences in the work itself

Gig work has all of the above similarities with piecework, but there are key differences.

Piecework emerged at the turn of the 20th century, right at the time that telecommunications began to boom in the United States. *Did telecom enable remote management?*

Gig work in its contemporary formation is largely mediated by ubiquitously accessible digital media (the Internet, telephony, etc. . .) and importantly has relied on this technology to facilitate the remote management of workers [13].

Has the work fundamentally changed, or are we just being managed remotely in different ways? I’m not entirely sure.

How does this work differ from the experience of being “on-call” that is so familiar to retail employees? How does this work differ from the work in which truckers, taxi drivers, and other independent contractors have been participating for decades? We argue that the substantive difference in these markets is the speed of the market itself, motivated by the technology which mediates it. Because workers can be sourced and dispatched virtually instantly, businesses that engage in this kind of work (e.g. Uber, Amazon Mechanical Turk, etc. . .) have taken to removing other bottlenecks, like vetting workers upfront

MORE DELIBERATE WORK

References

- [1] Michael S Bernstein et al. “Soylent: a word processor with a crowd inside”. In: *Communications of the ACM* 58.8 (2015), pp. 85–94.

- [2] L. Elisa Celis et al. “Assignment Techniques for Crowdsourcing Sensitive Tasks”. In: *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing*. CSCW ’16. San Francisco, California, USA: ACM, 2016, pp. 836–847. ISBN: 978-1-4503-3592-8. DOI: [10.1145/2818048.2835202](https://doi.org/10.1145/2818048.2835202). URL: <http://doi.acm.org/10.1145/2818048.2835202>.
- [3] Justin Cheng et al. “Break it down: A comparison of macro-and microtasks”. In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. ACM. 2015, pp. 4061–4064.
- [4] Lydia B Chilton et al. “Cascade: Crowdsourcing taxonomy creation”. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. ACM. 2013, pp. 1999–2008.
- [5] Tawanna R. Dillahunt and Amelia R. Malone. “The Promise of the Sharing Economy Among Disadvantaged Communities”. In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. CHI ’15. Seoul, Republic of Korea: ACM, 2015, pp. 2285–2294. ISBN: 978-1-4503-3145-6. DOI: [10.1145/2702123.2702189](https://doi.org/10.1145/2702123.2702189). URL: <http://doi.acm.org/10.1145/2702123.2702189>.
- [6] Laura Hapke. *Sweatshop: the history of an American idea*. Rutgers University Press, 2004.
- [7] Te C Hu. “Parallel sequencing and assembly line problems”. In: *Operations research* 9.6 (1961), pp. 841–848.
- [8] Lilly C. Irani and M. Six Silberman. “Stories We Tell About Labor: Turkopticon and the Trouble with “Design””. In: *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. CHI ’16. Santa Clara, California, USA: ACM, 2016, pp. 4573–4586. ISBN: 978-1-4503-3362-7. DOI: [10.1145/2858036.2858592](https://doi.org/10.1145/2858036.2858592). URL: <http://doi.acm.org/10.1145/2858036.2858592>.
- [9] Lilly C. Irani and M. Six Silberman. “Turkopticon: Interrupting Worker Invisibility in Amazon Mechanical Turk”. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI ’13. Paris, France: ACM, 2013, pp. 611–620. ISBN: 978-1-4503-1899-0. DOI: [10.1145/2470654.2470742](https://doi.org/10.1145/2470654.2470742). URL: <http://doi.acm.org/10.1145/2470654.2470742>.
- [10] Aniket Kittur, Ed H. Chi, and Bongwon Suh. “Crowdsourcing User Studies with Mechanical Turk”. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI ’08. Florence, Italy: ACM, 2008, pp. 453–456. ISBN: 978-1-60558-011-1. DOI: [10.1145/1357054.1357127](https://doi.org/10.1145/1357054.1357127). URL: <http://doi.acm.org/10.1145/1357054.1357127>.
- [11] Aniket Kittur et al. “The Future of Crowd Work”. In: *Proceedings of the 2013 Conference on Computer Supported Cooperative Work*. CSCW ’13. San Antonio, Texas, USA: ACM, 2013, pp. 1301–1318. ISBN: 978-1-4503-1331-5. DOI: [10.1145/2441776.2441923](https://doi.org/10.1145/2441776.2441923). URL: <http://doi.acm.org/10.1145/2441776.2441923>.

- [12] Walter S. Lasecki et al. “The Effects of Sequence and Delay on Crowd Work”. In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. CHI ’15. Seoul, Republic of Korea: ACM, 2015, pp. 1375–1378. ISBN: 978-1-4503-3145-6. DOI: [10.1145/2702123.2702594](https://doi.org/10.1145/2702123.2702594). URL: <http://doi.acm.org/10.1145/2702123.2702594>.
- [13] Min Kyung Lee et al. “Working with Machines: The Impact of Algorithmic and Data-Driven Management on Human Workers”. In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. CHI ’15. Seoul, Republic of Korea: ACM, 2015, pp. 1603–1612. ISBN: 978-1-4503-3145-6. DOI: [10.1145/2702123.2702548](https://doi.org/10.1145/2702123.2702548). URL: <http://doi.acm.org/10.1145/2702123.2702548>.
- [14] Daniela Retelny et al. “Expert Crowdsourcing with Flash Teams”. In: *Proceedings of the 27th Annual ACM Symposium on User Interface Software and Technology*. UIST ’14. Honolulu, Hawaii, USA: ACM, 2014, pp. 75–85. ISBN: 978-1-4503-3069-5. DOI: [10.1145/2642918.2647409](https://doi.org/10.1145/2642918.2647409). URL: <http://doi.acm.org/10.1145/2642918.2647409>.
- [15] Joel Ross et al. “Who Are the Crowdworkers?: Shifting Demographics in Mechanical Turk”. In: *CHI ’10 Extended Abstracts on Human Factors in Computing Systems*. CHI EA ’10. Atlanta, Georgia, USA: ACM, 2010, pp. 2863–2872. ISBN: 978-1-60558-930-5. DOI: [10.1145/1753846.1753873](https://doi.org/10.1145/1753846.1753873). URL: <http://doi.acm.org/10.1145/1753846.1753873>.
- [16] Niloufar Salehi et al. “We Are Dynamo: Overcoming Stalling and Friction in Collective Action for Crowd Workers”. In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. CHI ’15. Seoul, Republic of Korea: ACM, 2015, pp. 1621–1630. ISBN: 978-1-4503-3145-6. DOI: [10.1145/2702123.2702508](https://doi.org/10.1145/2702123.2702508). URL: <http://doi.acm.org/10.1145/2702123.2702508>.
- [17] Trebor Scholz. *Digital labor: The Internet as playground and factory*. Routledge, 2012.
- [18] Joan W Scott and Louise A Tilly. “Women’s work and the family in nineteenth-century Europe”. In: *Comparative Studies in Society and History* 17.01 (1975), pp. 36–64.
- [19] Clay Shirky. *Cognitive surplus: Creativity and generosity in a connected age*. Penguin UK, 2010.
- [20] Jaime Teevan, Shamsi T. Iqbal, and Curtis von Veh. “Supporting Collaborative Writing with Microtasks”. In: *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. CHI ’16. Santa Clara, California, USA: ACM, 2016, pp. 2657–2668. ISBN: 978-1-4503-3362-7. DOI: [10.1145/2858036.2858108](https://doi.org/10.1145/2858036.2858108). URL: <http://doi.acm.org/10.1145/2858036.2858108>.
- [21] Jaime Teevan, Daniel J Liebling, and Walter S Lasecki. “Selfsourcing personal tasks”. In: *CHI’14 Extended Abstracts on Human Factors in Computing Systems*. ACM. 2014, pp. 2527–2532.