

NOTES TOWARD A
DIGITAL WORKERS'
INQUIRY

The Capacitor Collective



Brooklyn, NY
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Notes Toward a Digital Workers' Inquiry

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c/o Making Worlds Bookstore
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www.commonnotions.org

info@commonnotions.org

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NOTES TOWARD A DIGITAL WORKERS' INQUIRY

Enda Brophy, Julie Chen, Alessandro Delfanti, Brian Dolber, Lilly Irani, and Tamara Kneese

An upswing of labor resistance, unionization, and autonomous self-organization is happening at multiple points along digital capitalism's value chains—from the workers building the software to those whose precarious labor on the very margins of the labor market is governed by algorithms. Since the mid-2010s, this resurgence has been remarkable in its scope and variety, from the uncoordinated, invisible, below-the-surface movements of “quiet quitting” and its China-based equivalent “*tang ping*” [“lying flat”], to struggles over remote work and contracting out, to the actual organizing campaigns, strikes, and walkouts by workers at tech contractors, e-commerce warehouses, and food delivery apps.¹ Yet, by and large, researchers tend to represent these workers as powerless, invisible, and subject to exploitation and oppression by forces they cannot control.

While bringing attention to the deeply uneven power dynamics between labor and capital is important, knowledge production must consider workers' own perspectives, desires, and concerns. Although the kinds of labor that digital capitalism requires are often highly exploited and invisible,

workers are always already capable of self-organization, even in the most challenging of circumstances. The truth is that only knowledge from below—knowledge generated by and for workers—can fully grasp labor’s creativity, potential, and power.

As with any social movement, workers often use grassroots research as part of their organizing and mobilization.² “Research is the lifeblood of our strategy,” said one platform worker in discussing how knowledge can be used to assume an offensive posture instead of simply reacting to capital’s actions. For instance, e-commerce warehouse workers study their companies to identify the chokepoints that could be vulnerable to labor action and the best tactics to impact them. Workers who tag or clean data for machine-learning training that makes “artificial intelligence” through crowd-work platforms use research to understand the composition of the workforce and its diversity in terms of demographics, geographic location, and economic treatment. App-based food couriers do research to unveil how opaque algorithmic decisions determine task assignments and worker deactivation. Rideshare drivers screenshot and share app requests in social media forums or group chats so that they can study why and how they may receive different fees for the same order, or as they all decline fares during a strike (see our interview with Shenzhen V Fleet organizer Qi Ge, pp. TK). Microtask workers at Amazon Mechanical Turk (AMT) turn their collective gaze toward “requesters,” those who hire them for “human intelligence tasks” (HITs), by using purpose-built software that can identify those who engage in wage theft or treat workers poorly (see our interview with Turkopticon’s Krystal K and Phil, pp. TK). Some researcher-organizers have called for what they refer to as algorithmic or *data workers’ inquiry*, a form of data collection and tool development that gives platform workers recourse against algorithmic wage discrimination, directly using data-based research to inform

their strategies.³ The need to understand the global division of labor at a multinational corporation requires research, too; for instance, to organize across the divide between engineers and contracted-out data entry workers, cooks, or cleaners at tech companies, and thus build wall-to-wall solidarity regardless of education, specialization, and other markers of fragmentation (see interviews with Tech Workers Coalition organizers RK Upadhyia and Erik H, pp. TK).

We see all these different ways to produce knowledge from below as forms of *digital workers' inquiry*, a term which has increasingly been circulating in recent years.⁴ We take it up to refer to a wide range of collaborative research and knowledge-sharing practices which can feed into labor organizing efforts within and against digital capitalism writ large. Digital workers' inquiry is a form of knowledge production that gathers, assists, and shapes forms of struggle from below. This approach to research can be formal or informal, systemic or ephemeral. It can be pursued with automated digital data collection methods, or through more traditional social science strategies such as interviews or ethnographies with the workers of digital capitalism. In any case, digital workers' inquiry draws on the situated experiences of workers and the relevant skills of researchers to expose, subvert, and overturn digital capitalism's technologically mediated power.

We are inspired by the militant tradition of workers' inquiry, especially the research conducted in the 1960s and '70s in Italy by sociologists and independent researchers within the tradition of *operaismo* [workerism], which studied the emergent Fordist industrial economy—ranging from factory work to domestic labor—in collaboration with workers and toward revolutionary goals.⁵ Workers' inquiry adopts an irreducibly partisan position, as it is research that is not only always on the side of labor but always and explicitly anticapitalist. As a corollary of labor's primary role in capitalist development, workers' inquiry centers labor resistance,

even those invisible forms of organization that are hidden or difficult to see on the surface.⁶ As the methodological offshoot of radical, worker-led social movements, workers' inquiry openly challenges the division between the researcher and their "subject," instead encouraging collaboration whenever possible. If all is going as it should, the research supports the organizing and the organizing feeds into the research.

This remains true in digital capitalism, albeit the forms these inquiries take, the ways they are produced, and how they can be shared are substantially different from those typical of twentieth-century industrial capitalism. Digital platforms and technologies have contributed to restructuring the labor process, most notably through forms of algorithmic management that mediate the relationship between workers and employers. It is also crucial to understand the algorithmic reorganization of labor is based on capital's newly acquired ability to automate the generation of information on the labor process: the extraction and algorithmic crunching of digital data from workers' activities amounts to a new kind of knowledge production for capital. Increasingly, the data used to analyze and control labor reside on distant servers inaccessible to workers, are computed by billion-dollar proprietary technologies, and feed into all-too-human forms of workplace power that benefit from decades of labor restructuring and the defeat of labor organizations in many industries (see our interview with Cailean Gallagher, Workers' Observatory, pp. TK).

Workers may seem powerless in the face of capital's new epistemic power, but as we argue here, a digital workers' inquiry can challenge and subvert this knowledge monopoly. A digital workers' inquiry is not simply the application of a set of research methods to a problem. As theorized by *operaismo*, struggles and conflicts not only impose new directions on capitalist development, but they also generate new kinds of knowledge from below—including new experiences, new

connections, and new organizational forms. Adapting Mario Tronti's explosive insights,⁷ we argue that in this transitory situation, workers within digital capitalism appear to be testing out (and sometimes moving beyond) older forms of collective organization—without yet having settled on new forms which can overturn the mode of production entirely once again. Within this uncertainty, the starting point for our research are the new forms of digital workers' struggle. These have the potential not only to impose a different kind of capitalist development, but to generate new kinds of subversive knowledge and organization. The urgent need for knowledge about capital's goals, management's tools, and counterstrategies to be used in organizing feeds this knowledge from below.

The analysis of class composition—the complex and ever-changing makeup of the working class—is always at the core of workers' inquiry. Traditionally, this has meant the analysis of two complementary characteristics: technical and political composition. Technical composition is the form in which technological and managerial principles organize labor on the shopfloor and thus the social relations of work. Political composition is the self-organization of workers to confront capital: their political cultures, tactics of resistance, and power-building. An in-depth understanding of both and the relationship between them, workerists argued, is the necessary condition for organizing.

In recent years, that tradition has been rediscovered and updated to better grasp the circuits of the digital economy. For instance, the UK-based journal *Notes from Below* has added the analysis of social composition—that is, the social relations that shape the workforce beyond the workplace, including race, gender, dis/ability, as well as consumption and reproduction processes.⁸ A digital workers' inquiry aims to support the leap from technical and social to political composition, or what *operaismo* called *recomposition*.⁹ This is a political strategy,

sustained by attention to the social and political determinants of worker struggles and workers' knowledge of the conditions under which labor takes place. The aim is to unite an artificially divided working class and find ways to make its struggles more effective.

In the following sections, we present various concrete examples in three areas where a digital workers' inquiry can contribute to recomposition: (1) the generation of knowledge about the working class within digital capitalism; (2) the bottom-up analysis of the nature and application of digital technology on the shop floor; and (3), the tactical use of research to identify bottlenecks in production processes or other chokepoints where workers' power can be leveraged. First, we address the epistemic question behind a workers' inquiry approach to producing knowledge from below through labor research: *whose knowledge?*

STAKING OUR POSITION

As scholars based in the neoliberal university who study labor and digital technologies, over the last two decades we have witnessed a proliferation of scholarship on labor that is mediated, organized, and controlled by digital technology. While we are happy to see the efforts of many colleagues drawn to this critically important dimension of social life, we have serious questions about the ways some of this research has unfolded. Much of it appears to be ambivalent or even apolitical in its orientation, and extractive in its nature.

A paradigmatic example of this is when university-based scholars parachute into a labor community—these days, usually platform-based gig workers—in order to extract knowledge from workers. They then present their findings solely for academic audiences, in specialized journals behind paywalls or at conferences with exorbitant registration fees. Rarely

do these researchers ever give back—or even go back—to the labor community from which that knowledge derives. While we consider the troubling dynamics of university-based research further below, more recently we've seen developments specific to the era of digital capitalism.

Above all, in this era, “Big Tech” plays a dominant role in knowledge production. Companies pour millions into think tanks that heavily influence the conversation around the role of digital technology in our societies. They hire researchers, seed research institutes and internal AI ethics teams, and fund conferences and research chairs at public universities.¹⁰ For example, Amazon is a corporate leader in terms of its spending large amounts of money on research and development on tech tools for instrumentalizing and exploiting its labor power (see our interview with Milla Vodello, *Amazon Worker Solidarity*, pp. TK). While the research firepower afforded to Big-Tech companies in these efforts is breathtaking, industry forces also work to capture, construct, and contain any opposition to their strategies. Uber, for example, does this by paying well-known professors six-figure sums to produce favorable academic research at respected universities and even by hiring away scholars who had been critical of the platform's labor exploitation model. Finally, tech capitalists pour money into foundations that build networks of experts empowered to speak for the global internet, setting agendas, and turning the volume up or down on different conversations if not overtly directing findings. Despite Silicon Valley's long-professed cyberlibertarian ethos, Google has quashed internal dissent by firing researchers critical of the famously racist trajectory taken by the company's AI tools.¹¹ Whether it is pursued through financing, coercion, or network cultivation, tech capital has a research strategy—and it is dominant.

The tech industry's outsized control over academic research priorities is connected to an older, Cold War-era history of the military's influence on scientific knowledge

production, particularly in the United States.¹² This proximity to power makes it difficult (and sometimes dangerous) for academic researchers to remain openly critical of the industries that are directly funding their labs and institutions. At the same time, labor movements in both academia and in tech have the power to subvert and shape research trajectories and organizing strategies. In their interviews with Capacitor Collective members for this book, Alex Hanna (Distributed AI Research Institute) and Kate Sim (No Tech for Apartheid) discuss the ways their training as graduate student union organizers shaped their organizing strategies at Google and beyond.

This suggests that while the research university emphasizes scholarly publications, patents, and major grants, researchers can help circulate knowledge beyond its confines. This may involve illuminating organizing histories and possibilities to nonacademics in tech and the general public through teaching, or even after leaving an academic position. Academic knowledge production can also cater to labor's needs beyond the university, contributing to tech workers' critical understanding of where they sit in relation to other workers historically, geographically, and hierarchically across the digital economy value chain.

The pressure of austerity budgeting within the neoliberal university makes digital labor an appealing site of investigation to academics. The research focus on new labor dynamics offers a way to justify the relevance of social science programs as they contend for waning budgets. Precarious researchers at para-academic nonprofits follow digital labor research trends to appeal to funders. In this context, researchers increasingly compete for a dwindling number of jobs with secure contracts. They pump up publication numbers and conduct studies of online workers with quick turnarounds and little time to establish trust, understand the offline contexts of work, or shape research questions that serve the communi-

ties under study. Academics are, after all, workers too, and subject to many of the workplace invisibilities, inequities, and indignities that are familiar across digital labor.

Updating the workers' inquiry tradition for digital capitalism requires that we reject the scholarly detachment that academic institutions encourage. Our effort to forge a different relationship between research and organizing is rooted in theoretical and political traditions that vigorously refuse the notion of objectivity in research, aligning instead with feminist, community-based, and participatory action research approaches. These traditions blend organizing with the research process and trouble hierarchical distinctions between researcher and research subject. Research conducted in these traditions aims to generate knowledge that is unambiguously political and confrontational; its researchers build bonds of solidarity against pretenses of objectivity. Feminist philosophers and sociologists have highlighted the situated nature of all knowledge, demonstrating the need to recognize and embrace one's position rather than claiming false generalizability. Among others, Patricia Hill Collins has theorized how Black women's experiences as workers—in households and in academia—grants them deeper insight into social structures and processes, as they must navigate that which their employers or more privileged others ignore or disavow.¹³ Similarly, researchers are compelled to ask more broadly relevant questions when they are held to account through community-based participatory research methods.¹⁴ Through inquiry, labor movements can also challenge ideological beliefs that reflect the values of the ruling elite—what the Italian Marxist Antonio Gramsci termed “common sense”—with counterhegemonic knowledge built on workers' embodied understandings and “good sense.”¹⁵

These epistemologies demonstrate how a sense of where one stands—understanding the limitations and advantages of those positions—can yield more robust and reflexive knowl-

edge claims.¹⁶ Such models of scholarly research emerged from—and were influenced by—social movements, so they are irreducibly partisan and committed to methodologies of solidarity. As we research across the myriad divides capital's composition forces upon us, these radical scholarly traditions have emphasized reciprocity against extractivism.

Building from these approaches, a digital workers' inquiry must be rooted in collaborations with digital workers and their organizations, challenging and breaking through the divisions which artificially separate researchers and workers.¹⁷ These perennial problems of anticapitalist organizing and research are now playing out on a different terrain of working-class composition. When Gramsci theorized the division between intellectuals and workers, overcoming it was exemplified by militant intellectuals meeting workers in front of the factory gates. Today, we deal with new fractures: the divisions between academia and tech, between permanent and precarious, and between labor aristocracies (e.g., programmers) and low-wage workers in food service, cleaning, and care industries.

Organizing across those lines of division can be powerful. For instance, the Tech Workers Coalition (TWC) in Silicon Valley originated when a cafeteria worker-turned-organizer recruited an engineer to attend informal meetings among other engineers organizing in solidarity with service workers to unionize on their tech campuses.¹⁸ The movement challenged tech libertarianism with a merciless analysis of Silicon Valley's division of labor and the notion that even the more glamorous and high-paid forms of knowledge work can become precarized.

In the last decade, many workers and researchers have built upon the tradition of workers' inquiry to produce powerful worker-led research fitting the material, political, and social conditions under which digital capitalism operates. In the UK, scholars have brought workers' inquiries into

call centers and across the metropolitan workspace of food delivery companies like Deliveroo, combining research with organizing.¹⁹ A team at the Distributed AI Research Institute (DAIR) has initiated a community-based research project with data workers from across the world taking the lead in inquiries about their experience, struggles, and organizing efforts.²⁰ In Scotland, activist academics and labor organizers have argued for the development of “worker data science,” drawing attention to bottom-up practices of data gathering, sharing and analysis.²¹ These data-based forms of workers’ inquiry have highlighted the diverse compositions and situated struggles of the global labor force feeding AI and moderating social media content. More importantly, through creative forms of expression and knowledge production in a wide variety of media—video and film documentaries, vlogs, online speaker’s series, and zines—digital workers’ inquiries attest to the persistent need to foreground workers’ knowledge for labor empowerment and organizing.

Feminist knowledge production reminds us to be aware of our own positionality as researchers who are mostly based in the academy. While we can’t overlook the many differences, there is a striking symmetry in labor conditions from the college campus to the tech campus. Beneath privileged campus veneers, contingent, subcontracted food service, custodial, and clerical staff facilitate the cognitive labor of so-called innovation reinscribing racialized and gendered labor hierarchies in both of these contexts.²² Further to this, cognitive labor is itself precarious; in the last several decades, the shift from secure, tenure-track positions to part-time teaching roles in higher education has made academic labor increasingly comparable with other forms of “gig” work where temps, vendors, and contractors are not given the same benefits, resources, or security as their full-time employee counterparts. By taking a self-reflexive position and situating ourselves within these structural dynamics, researchers can

begin to make sense of digital capitalism's broader terrain and develop projects that strengthen the power of workers.

MAPPING THE SOCIAL FIELD

Digital capitalism remains, at the end of the day, capitalism—but to address workers' needs under digital capitalism, we must understand how modes of production have changed in the last decades. Platforms have become a new, highly centralized and data-intensive way of designing the labor process and generating data as intangible property and for the purposes of surveillance. Nick Srnicek notes that they constitute an extractive apparatus for data.²³ Fueled by vast sums of venture capital and boosted by powerful network effects, platforms have enabled firms to commodify data and gain monopoly power within industries ranging from advertising to e-commerce, food delivery, music, and data storage. As controlled, branded environments marked by hyper-surveillance, platforms are also social spaces that shape the nature of work in the twenty-first century. For example, AMT uses machine-learning algorithms to monitor workers' "suspicious" behavior, suspend them, and lock up their earnings without due process. Uber and Lyft drivers similarly complain of algorithmic account suspensions, which amount to automated firing. Therefore, understanding platforms is critical not only for the insights into how digital capitalism operates, but how it might be—and how it *is*—resisted.

Often, the digital economy's workforce needs first and foremost to know itself. Platforms tend to function by organizing a geographically dispersed workforce, keeping it divided from itself in the labor process, and capturing and privatizing the results of complex cooperation processes mediated and structured by digital technology. Take AMT or any other type of online data labor—for instance, data labeling and tagging

for machine learning software. Workers may reside in any part of the world and will likely never meet each other. This digital mediation obscures workers' embodied presence and the geographies they inhabit.

But this atomization is not simply a byproduct of technological change; it is entirely by design. Even when workers are physically close to each other they can be kept separate. At Google, food service workers use a separate entrance to the building (see our interview with TWC organizer Erik H, pp. TK) and the secret "ScanOps" workforce—a group of mostly women and racialized contract workers who undertook the highly physical labor of scanning texts for Google Books—worked in a separate building and were discouraged from speaking to other workers at the Mountain View campus.²⁴ All along digital capitalism's value chain, workers are hidden from each other by brick walls and digital veils, even as their work becomes increasingly connected and interdependent.

In any industry, capital strives to deploy this process through subcontracting and outsourcing, reliance on individualized contracts and labor relations, and the imposition of individualistic and competitive workplace cultures that fracture the workforce. *Operaismo* called this process *decomposition* and strove to identify forms of recomposition that allow for workers to come together and face capital as a unified class. A digital workers' inquiry must figure out ways to overcome such artificial separations and study the social composition of the workforce beyond the political and technical obstacles set up by digital capital. This means illuminating the diversity and intersectionalities of the digital workforce, identifying common threads, and devising ways of learning, socializing, and organizing that can forge unities.

Efforts to build knowledge from below within digital capitalism start from the need to make work visible, and thus from the question of who and where the workers are, including their position along lines of difference with regard

to gender, race, geography, and dis/ability, among others. AMT is again a perfect case in point: workers congregate in online forums maintained by workers themselves, where they share information, show newer workers the ropes, create supportive friendships and research to understand their composition. One worker, known on the platform as “Clickhappier,” published a meta-analysis of studies of AMT worker demographics conducted by academic researchers across many fields, for purposes of understanding their workforces and study pools, but those academics had not made their investigations and results open for worker participation, feedback, or use. Their published works resided behind paywalls. Clickhappier compiled these studies to understand workers’ education levels and national locations, finding that the majority were college educated. This finding flew in the face of stereotypes of AMT workers as “unskilled.”

Workers and allies develop community data approaches to help them gain power in the platform. Built in 2008, Turkopticon is a system created by white-collar tech students and AMT workers to complement workers’ research and forum maintenance capacities. The software allows workers to quickly exchange information, such as writing reviews of employers or “requesters” on the AMT system and accessing other workers’ reviews when choosing jobs. Eventually, this generated enough pressure to force Amazon to add an indicator about what percentage of jobs an employer has historically paid for.²⁵ Other kinds of data-driven research from below strive to reappropriate the data extracted and monopolized by digital platforms, in some cases repurposing the methods used by capital to automate algorithmic data analysis. The “worker data science” initiative developed by the Workers’ Observatory in Edinburgh aims at subverting the collection and analysis of digital information so that workers’ existing practices of data gathering, sharing, and analysis can be collectively repurposed and supplemented with researcher

expertise to gain insight into working conditions, pay rates, and managerial practices.²⁶

Workers' inquiry can take the form of data collection or research document production, but it can also simply be a set of conversations that build solidarity across groups of workers that corporations do their best to keep separate.²⁷ In the early years of the TWC, workers' inquiry took the form of an alternative ice breaker (see our interview with RK Upadhyya, pp. TK). At monthly meetings, new and old members would form small groups to discuss what they were doing at work, how what they were doing contributed to value production, and what were their grievances and frustrations with this work. Through these conversations, workers built relationships, analyzed class composition, and laid the groundwork for campaigns.

Media-making can play an important role in broadening the impact of these conversations. In harmony with the group's inclusive, solidarity-based approach to who counts as a tech worker, TWC developed a publication, the *TWC Newsletter*, which has highlighted the experiences of cleaning service workers at Twitter, craft sellers on Etsy, contractors and temps at Microsoft, and food delivery workers at Instacart. In a section called "The Worker's Perspective," the newsletter features essays that result from a deeply collaborative interview and editing process with workers. These first-person narratives from workers across the tech industry create space for connection and solidarity, linking individual experiences to broader organizing movements. Similarly, researchers at Collective Action in Tech, DAIR, Collective Action School, and Data & Society collaborated on a zine documenting creative workers' on-the-ground experiences with generative AI as a counterbalance to the hype and speculation around AI's future labor impacts. Organizers then used that zine to facilitate conversations with tech workers and researchers.²⁸

In the face of digital technologies and contracting out, digital workers' inquiry can also assist organizers in mapping the workplace, an essential part of any union campaign. In Toronto, organizers with the successful Foodsters United campaign to organize Foodora delivery riders were forced to grapple with the reality that the city itself was their workplace, and that nobody knew how many people actually worked for the platform. Organizers met coworkers, had stoplight conversations, and got them to sign union cards at busy intersections.²⁹ Research carried out through the Capacitor Collective project assisted the Alphabet Workers Union with an unprecedented survey of Alphabet's contractor workforce, using data visualization tools on the company's own internal messaging systems.³⁰ The survey highlighted the volume of contractors used by Google, enormous differences in remuneration between Google's in-house and contract workforces, and how inequities among temps, vendors, and contractors are exacerbated by race, gender, sexual orientation, and ability.³¹

In China, taxi drivers in Shenzhen used social media groups to organize themselves into cooperative fleets, through which they shared information about job allocation and surge pricing and how algorithms mapped onto the city, as well as tacit knowledge to exploit the algorithmic loopholes of ride-hailing platforms (see our interview with Qi Ge, pp. TK). Wei Ding argues that these drivers have recreated their knowledge about the workplace to challenge platforms' technical enclosure.³²

Digital workers' inquiry involves understanding that the composition of the labor force isn't only about knowing who the workers are or mapping their experiences in creating value across the digital economy. Workers and researchers also need to get under the hood of the technologies designed to control them on the job and defraud them of the value they create. To do this, they need research.

ANALYZING THE TECHNOLOGICAL LAYER

The algorithms used to manage workers are famously opaque. Although workers encounter algorithmic calculations throughout their daily activities, these procedures are run at the deeper levels of the technological layer and according to logics that are inaccessible to them. They are “black-boxed” technologies. The software systems that run the show are proprietary, patented, secretive, or simply too complex to be analyzed and clearly understood. For instance, how is the price of a ride calculated? Why is a certain commodity assigned to a certain picker in a warehouse? What leads an AI tool to generate a specific picture in response to a designer’s prompt? Which data have influence in a ratings system? A ruthless form of “epistemic injustice” enables the unequal distribution of power between workers and employers.³³ An inability to understand the “calculative logics” that underpin algorithmic systems is a defining feature of the conditions faced by the digital workforce and of its technical composition.

As noted by researchers facing such challenges, engaging these software systems requires taking opacity as one of their defining features. Social research has come up with strategies to study black-boxed technologies, for instance, through analysis of the documents corporations make available to the public, such as instructions, patents, or PR materials.³⁴ Yet digital workers’ inquiry is uniquely positioned to “peel back the black box”³⁵ of algorithmic systems. Collaboration between researchers and workers can produce powerful tools to understand black-boxed algorithmic technology. Worker knowledge—the lived experience of workers—remains key to analyzing the labor process and the technologies used to organize it. At the same time, researchers trained in the analysis of digital technologies can provide priceless insights to workers who encounter such devices in the course of their work.

Attempts at generating knowledge from below surface organically when workers are confronted by opaque technologies. For instance, in many industries, workers have set up informal spaces for knowledge sharing. Having resources in common to navigate the apps or software that mediate one's labor can be vital when these tools provide so much power to management. Both Uber drivers and Amazon warehouse workers rely on massive Reddit forums to post anonymous information about their lived experience of the apps or inventory systems they work with. Facebook forums have become important resources for delivery workers at companies such as DoorDash who need to make sense of algorithmic logics such as price surging, ride assignment, or deactivation, so that they can collectively decline exploitatively priced jobs and give themselves a raise. WhatsApp chats were crucial in the cycle of labor struggles that swept the platform-based food delivery sector in Europe and beyond.³⁶ In these informal spaces that have been set up for similar app-based companies, not only in food delivery but in the service economy more broadly, workers can find app data, screenshots, and reverse engineer algorithmic logics based on the lived experiences of their colleagues.³⁷

If these forms of organic information solidarity are key, how can they be enhanced by more structured interventions based on the systematic collection and analysis of worker data and knowledge? Rideshare Drivers United (RDU), an app-based driver organization in California, conducted a study in 2021 aimed at understanding pay scales and mechanisms in the local ride-hailing industry. They were assisted by the Driver's Seat Cooperative, an organization that had developed an app that draws on the data collected by Uber from its workers. The data, analyzed by research think-tank PolicyLink, showed that median driver take-home pay amounted to just \$6.20 per hour in California, and was sometimes as low as \$4.10 per hour. Thus, the study demonstrated not

only that Proposition 22—a law introduced in 2020 that denies California drivers full labor rights—was substantially harming driver pay and access to benefits, but also that the process of algorithmic control was absolutely central in that process (see our interview with Tyler Sandness, pp. TK). A similar initiative to better calculate the hourly pay of ride-hailing drivers was taken by the RideFair Coalition and the Rideshare Drivers Association of Ontario in 2023–2024. Analyzing ninety-six weekly statements submitted by drivers, RideFair concluded that the median hourly wage for drivers in Toronto was estimated to be C\$6.37, much lower than the provincial minimum wage.³⁸ The drivers who participated in these initiatives were not mere subjects providing data to an academic study—they were engaged in a larger organizing drive that they contributed to envisioning in order to better understand their own working conditions and resist them.

Beginning our research from resistance does not mean ignoring how domination unfolds. Regardless of the methods used to approach them, technological artifacts—e.g., a piece of software or a robot—cannot be studied in separation from the managerial techniques that capital deploys to organize and control the workforce that operate them. For *operaismo's* thinkers, exploitation is the result of capital's "rationality," which confronts workers in the form of machines, but also as all-too-human methods and organizational forms.³⁹ Early struggles in app-based delivery work aimed at exposing the human managers hidden behind the app. Studies of Chinese food-delivery platforms and AI data production suggest that human management's power complements algorithmic systems for labor control in order to contain labor grievances. This phenomenon captures the idea of "augmented despotism," which has been used to highlight how the technological organization of labor at Amazon warehouses—with its pervasive digital surveillance of labor—boosts managerial power rather than replacing or automating it (see our

interview with Mostafa Henaway, Immigrant Workers Centre, pp. TK).⁴⁰

A digital workers' inquiry must ultimately seek a radical deconstruction and reverse engineering of the manifold ways in which technology and management work together to ensure capital's domination. At times, it is workers who control technology. In addition to repurposing or subverting the workplace technologies that capital relies on (like Slack or internal workplace mailing lists or messaging systems), one of the more intriguing developments within digital workers' modes of resistance has been the emergence of labor organizing platforms—the purpose-built, worker-to-worker communication channels developed by labor activists *for* labor movements. Turkopticon was an early example of these counter-technologies. A number of collaborations with designers and software developers have since generated digital organizing tools designed to be used directly in struggles, including the union-driven social networking site UnionBase, the “platform for worker voice” Coworker.org, and the AI chatbot-driven, question-and-answer app for and by Walmart workers, WorkIt.⁴¹

While this first wave of organizing technologies met with mixed success, they prepared the ground for a new generation of technologies which can supplement the face-to-face methods essential to organizing. In British Columbia, programmers have collaborated with unions to develop YouIn? This app was designed to help workers safely reach out to each other in organizing efforts.⁴² Another example of these in-house organizing technologies is the Solidarity Tech app, designed in 2018 for use by RDU in Los Angeles. In a conversation around the development of counter-platforms, the app's designer Ivan Pardo suggested that “software is more about how we build a process for turning intake forms into a conversation with somebody, [and] for turning intake forms into having a leader after a series of training sessions.”⁴³ The

tool allows driver-organizers to make encrypted phone calls, take notes, and rate drivers as potential leaders, activists, or supporters. While most RDU members see themselves—not the technology—at the center of the organization's strength, the app has been key to overcoming gig worker atomization, enabling conversation and ongoing maintenance of the large amount of information necessary for large-scale organizing efforts.

These efforts to more fully understand the technological layer of capital's domination and even build parallel systems for the expansion of solidarity are ultimately directed toward an identification of the weakest links in digital capital's value chain. Here too, things are moving, and the labor conflicts to come are becoming visible.

FINDING THE CHOKEPOINTS

If the aim of digital workers' inquiry is to produce knowledge that can be immediately used in struggles, it must go beyond understanding the working class and its exploitation to identify tactics to deploy against capital. Within digital capitalism, this often means finding ways to subvert, block, or slow down the algorithmic organization of production. Such a task can seem overwhelmingly difficult in today's thoroughly mediated and networked workplaces. How do you organize a union when your workplace is virtual and/or transnational, and you've never even met any of your coworkers in person? How do you strike against a company which can easily reroute production through a different set of warehouses? How can you build worker power at a company where Slack channels are monitored and many of your colleagues are either depoliticized or afraid of getting fired?

At first, workers' intimate knowledge of the labor process in highly automated workplaces may be repurposed toward

acts of individual sabotage and resistance. This can help workers subvert the global algorithmic organization of labor: in Italy, an e-commerce worker misplaces a commodity on the shelves, thereby gaming the inventory software that alone is supposed to incorporate knowledge of the randomized position of items in the warehouse; in China, a ride-hailing driver uses bot apps to circumvent algorithmic rules and reject ride requests paying low fares without facing consequences such as deactivation from the platform; in Spain, a courier learns to cheat delivery apps' face recognition software and to simultaneously log onto different companies and increase their chances to make enough money in one shift; in the US, a Google security engineer crafts a pop-up message informing workers who visit the website of a union-busting law firm about their legal right to organize.⁴⁴ These examples demonstrate how individual resistance practices can quickly turn into tactical weapons.

The very same knowledge can be harnessed to feed recomposition efforts and struggles when workers build mutual-aid systems or organize as a collective. In Canada, groups of Amazon workers and allies have been mapping warehouses in a metropolitan area to identify the chokepoints within the algorithmically organized network of facilities the company uses to reroute orders. The e-commerce company famously relies on a redundant network so that any disruption in a single facility cannot threaten to shut down the entire operations. The Canadian effort has not yet led to mobilizations, but in a similar attempt in Italy in 2021, a strike across the entire production chain—from call centers to warehouses and all the way to local sortation facilities and last-mile delivery—exposed the bottleneck represented by delivery. While the political goal of the strike was to make visible the national division of labor that e-commerce relies on, another result was the accumulation of knowledge about the strongest tactical link in this recomposition: drivers, who

by withdrawing their labor were able to prevent the delivery of tens of thousands of orders in Milan alone.

Similar forms of grassroots knowledge production that feed struggles directly are at play in strikes or other mobilizations organized by app-based workers. One common strategy has been to use a collective, grassroots analysis to subvert the temporalities of digital capital. Workers, especially in the food delivery and ride-hailing industries, log off en masse from the app after having accumulated enough knowledge on *when* it would be best to strike, for instance, at the most profitable time for the company. Similarly, food delivery workers in many cities have organized to accept and then cancel orders from popular restaurants to maximize the effect of a labor action carried out by a minority of the employees. This knowledge is not built through a concerted research effort (although in some cases militant researchers were embedded in these groups), but rather, on series of informal and collective conversations—including sharing app screenshots of price surging and other app dynamics.⁴⁵

Others have focused their efforts on subverting the artificial divisions through which digital capital separates and decomposes the workforce. For example, Uber's algorithms are designed to keep workers from meeting each other. To counter this, app-based drivers in Los Angeles and Washington, DC have taken advantage of their location at the airport to organize locally, repurposing the algorithm's logic of producing "just-in-place" workers.⁴⁶

At times, the bottleneck is a symbolic one. The major walkouts organized by Google workers across the globe in 2018 to protest the company's labor practices and, most importantly, its response to workplace sexual harassment, highlighted this. The action represented a major blow to Google's public image as one of the most desirable workplaces for the tech workforce, with its aura of informality, horizontality, and creativity. Google had already removed its original

“Don’t Be Evil” motto, but to many, learning of widespread labor issues came as a surprise. While the walkouts were not the result of formalized bottom-up knowledge production initiatives, they did catalyze and inspire workers to use their lived experiences at Google as the source of narrative forms of inquiry. These sometimes took the form of intimate and self-reflective memoirs, such as Wendy Liu’s book *Abolish Silicon Valley*. While women’s personal essays are often diminished and derided, here they successfully exposed the structural inequalities embedded in the tech industry.⁴⁷

Chinese tech workers had similar goals when they called out the tech industry’s rampant overwork culture and mobilized a GitHub-based online movement called 996.ICU. The name refers to “work by 996, sick in ICU,” an expression that captures the sector’s typical work schedule: from 9:00 a.m. to 9:00 p.m., six days a week. This anti-996 movement attracted attention from the Chinese state and tremendous support from the domestic and international tech workers, pressuring some tech companies (e.g., ByteDance) to announce changes to its workers’ schedules. Notably, Chinese tech workers repurposed the issues page on GitHub—typically used for technical troubleshooting—to share their workplace grievances. Although the anti-996 movement subsided not long after tech workers outside China showed solidarity, and the threat of layoffs loomed large in the slowdown tech sectors within China, it shined a light on the poor work conditions highly skilled professionals face in the underbelly of the global tech industry.

WHAT ABOUT UNIONS?

Digital workers’ inquiries bring researchers into regular and close contact with unions, raising political, ethical, and methodological questions about our relationships with these

organizations. On the one hand, as institutions which unquestionably bring about tangible benefits to workers and lift them up through the power and resources they dispose of, unions deserve a default position of strong support and collaboration. While a significant amount of organizing within digital capitalism has been enacted by self-organized groups of workers like the Amazon Workers Union, Turkopticon, the African Content Moderators Union, and RDU, established unions have been present all along the value chain as these flare ups have emerged.

On the large US tech campuses, outsourced cleaning, food service, and security workers launched a labor revolt through successful organizing drives with UNITE HERE, Teamsters, and Service Employees International Union (SEIU). Workers at cultural production platforms like Kickstarter and Bandcamp have organized through the Office and Professional Employees International Union (OPEIU), and those at Google chose the Communications Workers of America (CWA) to support the emergence of the Alphabet Workers Union. Temps and contractors at the Google contractor HCL Technologies organized through the United Steelworkers (USW) in Pittsburgh.⁴⁸ Similarly, in app-based platform work, established unions have organized food delivery workers in Toronto, while e-commerce workers at Amazon have been organized by CGIL in Italy and GMB in the UK, among many others. Unions have been catching up with some of the issues faced by the new workforces that make digital capitalism possible. In the process, they have also generated their own knowledge about the digital economy, often through union-led research departments or various "Future of Work" research initiatives focusing on the impacts of new automation on the workforce.

Despite these important contributions, to paraphrase the Zerowork Collective, a digital workers' inquiry should never mistake digital labor with its official organizations.⁴⁹

The traditional labor unions that emerged in the twentieth century are not the natural nor the only form of representation for workers. As institutions situated within capitalism, unions have serious limitations both historically and today. They are contested terrain, where rank-and-file members and bureaucracies are often in tension with each other and within themselves.⁵⁰ With their tendency to focus on bread-and-butter issues, established unions can neglect the broader objectives of worker control and anticapitalist organizing. US labor activist Jane McAlevey described how much union activity since the 1990s has happened within a professionalized “mobilization model,”⁵¹ in which workers serve mainly as props in highly coordinated and mediated campaigns managed by professional union staff. This top-down approach has reached peak form with the rise of platform work, as some unions have agreed to maintain systems of misclassification in the rideshare and app-based delivery industries, in exchange for the opportunity to expand their ranks and generate revenue while avoiding the challenges of democratic organizing processes.⁵²

Bringing the spirit of Zerowork to digital capitalism, one goal of a digital workers’ inquiry is therefore to better understand the emergent relationship between digital workers and the trade union movement—when it is functional for workers, when it is dysfunctional, and when routing around it entirely is the only way to develop effective worker-led organizations. The picture is even more complicated by the structural constraints faced by workers in sectors (e.g., care work) and countries (especially in the Global South) where trade unions are simply absent or do not represent the main organizational form for labor. In these cases, grassroots knowledge generated by workers can be even more essential for organizing in the absence of unions.

Ultimately, although many instances of worker-led research that we identify as digital workers’ inquiries have

emerged in collaboration with unions and their research efforts, a digital workers' inquiry always maintains a position of autonomy with respect to unions. This position not only leaves open space for collaboration with democratic and member-driven initiatives by established trade unions; first and foremost, it maintains a commitment and duty of care to the workers without whom no successful inquiry would be possible. The goal of digital workers' inquiry is not worker representation. It is building *counterpower* so that labor can prevail at the negotiating table—or in open conflict—with owners. This approach to inquiry highlights the ways direct action and radically democratic forms of organizing can move us toward worker power. An inquiry-based practice that emerges from and supports struggles can build autonomous relationships with workers through the process of research itself.

OF ALLIANCES AND FUTURES

A digital workers' inquiry is in continuity with a long tradition of militant labor research, in both Europe and North America, but also arises from more recent transformations that have swept through academia and capitalism. Foremost, these include processes of restructuring, precarization, and the platformization of work under digital capitalism; but also more general processes of globalization, neoliberalism, and austerity; renewed offensives against organized labor; new forms of surveillance and political repression; the global emergence of new forms of fascism; advanced forms of climate change; anti-immigration policies; transphobia; and the spread of war and genocide. Because digital workers' inquiry is not a research method but rather a political approach to the production of knowledge from below that operates within and against digital capital, it cannot be imagined outside of

the current historical moment with all its constraints and opportunities. Indeed, the new political formations that make digital workers' inquiry possible increasingly intersect and ally with movements against the use of computing in apartheid and genocide, immigrant surveillance, and climate destruction. In the United States, India, Hungary, Italy, Brazil, and too many other places, they also fight against the resurgence of fascism and its impact on labor politics.

Importantly, digital workers' inquiry is not a technological determinist approach. While it focuses on the role of digital technology in mediating, organizing, controlling and—at times—liberating labor, it does so with an awareness that technology is one element of contemporary capitalism and forms of resistance against it. This point is important to workers, as they often find social science's fascination with technology problematic. Most would rather discuss the structural and material issues that have an immediate impact on their lives, from contracts to managerial despotism. Further, the technologies workers encounter daily on the shop floor often appear to them mundane and unimpressive. Digital workers' inquiry—whether focused on the algorithmic organization of labor, or the forms of sabotage workers adopt on the shop floor, or a subversive use of digital data, or the recomposition of workers' identities and struggles—is always aimed at producing knowledge toward collective liberation, not just knowledge for its own sake or for the rewards of academia. This orientation must be reflected throughout the research process and the ways its results are written up, shared, and discussed.

Researchers are predisposed to alliances with the digital workforce given the similarities we face across the division of labor in advanced capitalist economies. Academic workers might hire platform workers to drive their Ubers, annotate their research data, or deliver their late-night food. More precarious academics, such as graduate students and adjunct

professors, may turn to platform or data work to supplement declining wages and job security in academia. These overlaps create possibilities for solidarity. Organizing and political education can help us, as differently positioned workers make sense of shifting material conditions that we sometimes share.

We share many common antagonists, too. Labor history is filled with examples of small groups of committed organizers struggling against the ways that owners, bosses, and the culture they produce pit workers against each other. Under digital capitalism, white-collar tech workers stand with cafeteria workers and Turkers engaged in collective struggle. Faculty organize alongside service workers on the university campus. How can our contributions to workers' inquiry illuminate the value chains that both divide and potentially unite workers in tech? How can research illuminate possibilities and barriers toward solidarity? How can it help us develop tactical and strategic knowledge for organizing?

Communication models within digital workers' inquiry must address concerns from all sides: who can speak for a group of workers? Whose names are on publications or reports—that is, whose knowledge counts and is recognized in public? What is the value of opaque and inaccessible communication systems such as scholarly journals and conferences if they confer legitimacy to academic knowledge, but workers cannot benefit from them? We don't necessarily have the answers to these questions, and we certainly do not purport to offer the definitive word on research best practices, but we hope that other researchers and organizers in this field will continue our method of centering workers' experiences and priorities.⁵³

Even deeper epistemic concerns are on the table: think of the tension between providing authoritative knowledge that is valued by workers, and on the other hand, producing that knowledge through one's own positioning and worldview *as a worker*. An uneven division of labor based on class, gender,

and race will tend to surface within the practice of digital workers' inquiry. Researchers must be ready to mobilize their privilege whenever useful, while at the same time working actively to undermine it. For instance, using someone's life experience as an example of a larger theoretical problem can be seen as an extractive practice and thus compromise the mutual trust that is so central to workers' inquiry. At the same time, it can help generalize workers' consciousness of their conditions of work beyond the individual experience (see our interview with Mikail Hussein and Peter Zschiesche, United Taxi Workers of San Diego, pp. TK). Relationships rooted in solidarity between digital workers and researchers can help navigate the choices around representation in digital workers' inquiries.

Above all else, workers do not like being portrayed as passive, deskilled, or downtrodden. Research that uses employment situations as examples of dystopia tends to overlook the fact that people's working lives are also active, hopeful, and dynamic. This is one of the main insights of *operaismo*: workers and their struggles are major engines of economic change, whether capital likes it or not. A digital workers' inquiry is focused on workers as transformative agents. Thus, it can produce new ways of imagining different, revolutionary futures based on workers' empowerment rather than immiseration.

Worker-centered attempts at imagining such different futures can lead to radically new narratives. A lively example of this is *The World After Amazon*, a collection of speculative science fiction stories written by rank-and-file workers at the corporation. Here, workers "dream their own dreams, and reclaim the collective power to shape the future" in opposition to the dystopian plans Amazon has in store for its workforce, as put by the researchers who catalyzed this initiative. Stories include an alliance between humans and robots that sets off an uprising, or a woman's journey from terrified house cleaner

in a post-apocalyptic gated community to fearless revolutionary.⁵⁴ Engaging in a digital workers' inquiry is different from writing a work of speculative fiction, but it can also contribute to imagining radical futures centered around workers' desires and struggles, futures that we hope will soon materialize to subvert and ultimately replace digital capitalism. In a period where digital capitalism feels ubiquitous and insurmountable, documenting workers' perspectives across the value chain may help foment new shared organizing strategies.