

Recognizing, Supporting, and Futuring Diverse Pathways in Computing Work

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Abstract

Professional computing work is no longer limited to traditional roles requiring computer science degrees. HCI has long characterized computing tasks in roles like administrative assistant or operations specialist as end-user programming. With generative AI and enterprise low-code/no-code tools, however, many of these roles now center on building and maintaining computational systems. These are middle-skill jobs crucial to financial security for adults without college degrees, and a clear concept of them is needed to shape and support the future of these occupations and the people in them as AI transforms the workforce. In this workshop, we will bring together scholars and practitioners to ask: How do we articulate a broader conception of computing work? How do we support the diverse needs and populations engaging in this work? What is our vision for the future of broader forms of computing work?

CCS Concepts

• Social and professional topics → Computing occupations.

Keywords

computing professions, gatekeeping, training, future of work, workforce development

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1 Motivation

The computing workforce extends beyond formally educated software engineers at high-tech companies. Many adults engage in

computing work outside of specialized computing roles and without formal education. For example, a receptionist learns web development skills to contribute during a marketing campaign, a program coordinator at a nonprofit prepares and analyzes datasets for reporting, an aspiring entrepreneur develops and maintains segmented email marketing campaigns, and an HR operations specialist focuses on automating workflows and managing data in enterprise employee management systems. These examples demonstrate that computing work extends beyond computing-specific roles, in which workers typically considered “end-users” build and maintain computational artifacts as a primary aspect of their jobs, increasingly enabled by generative AI tools [5, 33].

HCI is positioned to broaden societal and academic conceptions of professional computing work beyond binaries that define it relative to traditional software engineering roles [3, 7, 31, 33, 37]. Terms like “end-user programming” and “non-programmers” describe people who use programming to extend otherwise non-computational work tasks, in contrast to “professional programming,” where formally trained programmers build and maintain computational systems using text-based, general-purpose programming languages [3, 17, 23, 31]. Other terms attempt to exist between this binary, e.g., “end-user developer,” “conversational programmer,” or “vernacular developer,” but they similarly derive meaning from their contrast to traditional ideas about professional programming [9, 37]. Today, the integration of generative AI technologies, libraries and frameworks, and low-code/no-code platforms into nearly all forms of work blur the distinction between workers labeled end-users vs. professional programmers [3, 7, 13].

Research is beginning to acknowledge the shift in how we conceptualize professional computing work. Education research shows that STEM skills are increasingly required in non-STEM jobs, challenging the binary of STEM and non-STEM work [16]. Similarly, software engineering and programming languages research critique their fields’ focus on formal symbolic systems, which often overlook real-world programming needs [17, 28, 37]. Recent work in HCI demonstrates the growing need for a broader conception of the computing workforce, as the need to develop and maintain complex computational artifacts extends far beyond traditional



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computing spaces [12, 30], often posing opportunities for stable employment for people without bachelor’s degrees or formal training [10, 11, 18–22, 24, 34, 35].

Recognizing diverse pathways in computing work is an opportunity for HCI to contribute to socioeconomic mobility initiatives, including policy, research, and program design. Jobs such as administrative assistant, operations specialist, IT support, and data entry roles, for example, are full-time computing jobs with benefits vital to securing economic stability for people without formal education. Labor economics research calls these roles “middle-skill,” i.e., they require more training than a high school diploma but less education than a four-year degree [1, 8, 14]. Middle-skill jobs are a pathway to the middle-class, but the number of these jobs is declining [6, 27, 32]. Their future is increasingly uncertain as organizations attempt to automate work tasks with generative AI, in many cases doing so without understanding the complexity in this work or the competencies required to do it [4, 11, 15, 25, 29]. With its long history of revealing the invisible competencies and complexities in computing work [38, 39], HCI is positioned to find new ways to recognize and support the computing contributions of people in middle-skill jobs. In doing so, HCI can inform policy and program design for employment pathways [2, 5, 19, 21, 27], while envisioning futures that expand access to socioeconomic mobility through stable employment in variety of computing jobs.

This workshop brings together HCI scholars and practitioners to articulate a research space for computing work that expands binary distinctions like programmer vs. non-programmer or professional vs. end-user. By recognizing and supporting more diverse conceptions of computing work, our field can extend computing workforce development efforts to middle-skill jobs, creating vital pathways to economic stability for much of the population. Our investigation into and articulation of this space will be organized around **recognizing** middle-skill computing work in both academia and industry, **supporting** this work and its workers, and **envisioning futures** for middle-skill computing work amid AI-driven workforce transformation.

2 Workshop Logistics

The workshop will consist of a participatory design exercise to generate a range of topics and concerns related to recognizing, supporting, and futuring diverse pathways in computing work. We will analyze the outputs to determine overarching themes and determine next steps for defining this research space in HCI.

2.1 Workshop Objectives

As a result of this workshop, we aim to **bring together a community of researchers and practitioners to collectively define the intellectual space for research into broader conceptions of computing work** through participatory design (PD) exercises. Workshop outputs will form initial, collectively defined boundaries, language, and research directions we can use moving forward. We will identify the next steps based on the themes from the PD exercise outputs, focusing on how to position research on broadening computing work for HCI research communities. Finally, we will publish a workshop website to serve as an information hub.

2.2 Plans to Publish Workshop Proceedings

We will document the themes and next steps from the workshop’s PD exercise and publish them on ArXiv.

2.3 Workshop Activities

The workshop will be a **half-day in-person event** with participants organized into working groups based on their submitted proposals. First, we will introduce the research space through a keynote presentation. Next, participants will form groups to engage in a PD exercise to explore a prompt related to the workshop objectives. Each group will display the outputs of the PD exercise on a poster, and all participants will review the posters and share feedback or questions. Then, groups will reassemble to synthesize their observations and generated ideas to present to the group. The workshop will conclude with the development of a set of next steps related to the workshop themes.

Time	Activity	Objective
13:00-13:30	Keynote	Establish themes, goals, and motivation.
13:30-14:30	PD Exercise	Generate ideas through PD exercises.
14:30-15:00	Review & Analysis	Review groups’ outputs and synthesize into themes.
15:00-16:00	Discussion	Groups present findings; collectively determine next steps.

2.3.1 Workshop Mode & Accessibility Accommodations. The workshop activity design involves walking around to view others’ PD exercises. Any artifacts can be captured as photographs to view from a seated position.

2.4 Call for Participation

In this in-person, half-day workshop, we will articulate the research space for broader conceptions of computing work and its workforce through a participatory design exercise and community building. We invite interested participants from any background to submit a 250 to 500-word response to one or more of the following prompts, and to share any related materials that express their interest in the topic:

- What are barriers to recognizing a broader spectrum of computing work in industry and academia?
- How can we support a broader range of computing workers, especially those in middle-wage roles?
- What are futures – both desirable and undesirable – for this work amid AI-driven workforce transformation?

Teams for the PD exercise will be determined in advance based on themes in the submissions. Workshop outcomes include an actionable list of next steps for this research space, a public website, proceedings published on ArXiv, and an email list to facilitate information sharing and future collaborations.

2.5 Submission Review & Selection

We expect 15-20 participants for the workshop; however, we can adjust the group size to accommodate any number. Organizers will

review submissions for relevance and alignment with the workshop themes. Based on the submitted statements, we will form working groups by theme. Participants will be notified of their groups at least one month before the workshop and encouraged to meet with the organizers before the conference.

3 Organizers

This workshop is organized by scholars and practitioners from Georgia Tech and the University of Michigan who work on, and in, middle-skill computing work-training programs: DataWorks and Community Tech Workers [11, 19–22, 26, 35, 36].

Lara Karki is a PhD candidate in Human-Centered Computing at Georgia Tech. After a career as an informally trained software developer, she researches middle-skill computing career pathways and job search in collaboration with DataWorks, a work-training program for adults at Georgia Tech.

Aarti Israni is a postdoctoral fellow at the University of Michigan, School of Information (UMSI). Her research examines how individuals navigate transitions in the future of work, focusing on how they seek informational, emotional, and financial support.

Tawanna Dillahunt is a Professor at UMSI. Her research in Human-Computer Interaction centers on employment and entrepreneurship, particularly focusing on job seekers and entrepreneurs experiencing marginalization.

Julie Hui is an Assistant Professor at UMSI. She studies and develops socio-technical systems that support workforce development in entrepreneurship, gig work, and manufacturing.

Dana Priest is the training lead at Georgia Tech's DataWorks program. She transitioned from a series of customer service jobs to a technology workforce development program through DataWorks and is now the lead trainer.

Asher Brown is a Data Fellow at Georgia Tech's DataWorks program, completing client data projects. She is studying cybersecurity and data analysis, and contributing to research on job seeking in middle-skill roles.

Betsy DiSalvo is a Professor in the School of Interactive Computing at Georgia Tech. Her work explores how culture shapes the production and use of computing, often applying these findings to the development of CS education.

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