Human-Centered Information Spaces[‡]

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"The computer desktop was an amazing design for its time, but does not reflect the complexity, flexibility, and sociality of human activity...Eventually we will have to reorganize the desktop to reflect the complex mix of activities users engage in and move beyond the rigidity of separate applications and files-and-folders." – Bonnie Nardi, Acting with Technology: Activity Theory and Interaction Design, 2009.

For far too long we have conceived of thinking as something that happens exclusively in the head. Thinking happens in the world as well as the head. We think with things, with our bodies, with marks on paper, and with other people. Increasingly, we think with computers. For good and for ill, computers now permeate the fabric of society. They are embedded in virtually every new device and system, ranging from the omnipresent cellphone to the complex web of socio-technical systems that envelop and shape modern life. They not only connect our activities to ever-expanding information resources with previously unimaginable computational power but also bring new risks, presenting a real danger of deepening existing inequalities, reinforcing injustices, and fostering disconnects within society.

Designing the future of work is one of the ten long-term science and engineering challenges identified by the U.S. National Science Foundation. In this presentation, I argue that a core aspect of this challenge arises from an unquestioned document-and-application-centered approach that views information systems as passive tools rather than active partners. The scale of information available and the sophisticated cognition demanded by contemporary information work has outpaced innovation in user interfaces. In modern computing systems, information is encapsulated in silos, leaving users to shuttle files between applications, cobbling together workflows, requiring troublesome context switching and increasing attentional demands. In short, we lack a human-centered information work space, a cognitively supportive visual space for intellectual work. I am currently working to establish a research network, a Collaboratory for Design of Information Work (CDIW), to design human-centered information spaces.

A *human-centered information space* is both an idea, and a computational environment. It is the idea of a spatial cognitive workspace—a desktop for intellectual activity—reified as a computational environment that actively supports the coordination of information activities. It should develop awareness of the history and structure of a user's action: how she accomplishes activities through discrete tasks across devices, programs, and working sessions. Through use, representations in the linked computational environment accumulate structure and context: not only who accessed them and when, but relationships to concurrent and other semantically related information and activities. This context and history of activity should drive the *behavior* of information representations. To the user, her information should seem *alive*, have awareness, know where it came from, how it got there, what it means—and *behave* accordingly. These dynamic representations will in turn guide the user's future action, providing a supportive personalized information context. It is important to emphasize that the human-centered information space will *not replace the user's current ecosystem of documents and applications, but be a separate space linked to them*, acting as a home, a control center, a multi-modal but fundamentally 'spatial workspace' where information across applications will converge augmented with history, visual features, and active behaviors to support the user in not only completing her tasks, but accomplishing long-term overarching activities.

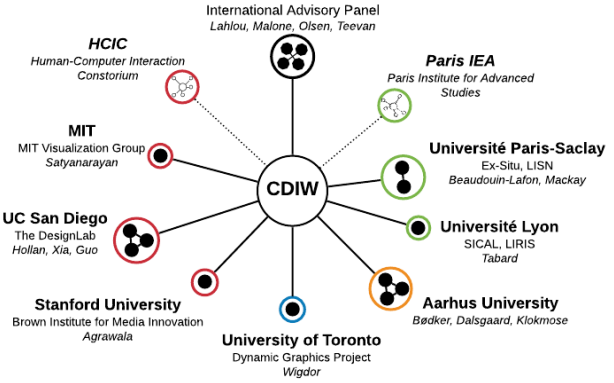

Figure 1: Collaboratory for the Design of Information Work (CDIW) Network of Networks. Filled circles refer to individuals, and colored circles to network sites.

[‡]Invited presentation at Aarhus University on March 25, 2022. This presentation benefited from a FIAS fellowship at the Paris Institute for Advanced Study (France). It has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 945408, and from the French State programme "Investissements d'avenir", managed by the Agence Nationale de la Recherche (ANR-11-LABX-0027-01 Labex RFIEA+).

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