Note: This document contains hyperlinks to external websites that are indicated by blue, underlined text. The statement has been written to read fluidly without needing to visit any of the links, but they are included to provide further context for the interested reader.

The central aim of my research and publications is to understand, evaluate, and reconceptualize the role that computing plays—and *should* play—in society. Drawing on philosophy, history, and literary theory, I study how computing both works and doesn't work in society by critically examining modern conceptions of freedom, as they are operative in software production and also more generally. As an interdisciplinary scholar trained both in the humanities (Ph.D. Modern Culture and Media, Brown) and in information science (Sc.M. Computer Science, Brown; A.B. Computer Science, Princeton), I seek to contribute fully to both sets of disciplines through multiple categories of academic output:

1. **The publication of conceptual work** on computing freedom—in the fields of philosophy, history, and literary/critical theory [4, 6–8].
2. **The production of practical systems** realizing computing freedom—published as software that is actively used by researchers and presented in HCI and computing ethics venues [2, 3, 5, 9].

My work has been exhibited in art galleries such as the San Francisco de Young Museum, New York City's Whitney Museum of American Art, London's Tate Modern, Germany's ZKM, and Aotearoa New Zealand's Artspace. I have published in both humanities and computer science academic venues, and my work has been recognized through fellowships at the IWM in Vienna, ZRC SAZU in Ljubljana, the University of Auckland, and through the Open Graduate Fellowship at Brown University. I have presented research in diverse and interdisciplinary venues such as the Birkbeck Critical Theory Summer School, the American Academy in Berlin, the Lucerne University of Applied Sciences, and the Toronto Geometry Colloquium, among others. I have taught original courses as the Instructor of Record in the departments of both Computer Science and Modern Culture and Media at Brown University; I have given seminars and workshops in art museums, architecture schools such as the Architectural Association in London, and online; and open source software that I have written has been used by researchers investigating human rights abuses in Ukraine, Palestine, the United States, Northern Africa, and the Mediterranean.

1) Conceptual work

Through coursework and research for my dissertation in the Department of Modern Culture and Media at Brown University (2021–26), two critical traditions have become essential to my thinking about the nature of freedom in computing and social life: the **critique of political economy** and **psychoanalysis**, methods shorthanded by the monikers Marx and Freud respectively. Over the course of the long 20th century, Marx and Freud have consistently featured in an astonishing set of practical and philosophical uprisings, from the social history of the Soviet Union and China to the literary theory of Fredric Jameson and Alain Badiou. The materialist and psychoanalytic accounts of the subject and society in Marx and Freud can (still) serve as critical starting points for both 1) a **political theory of computation** to show us the role that the computer *should* play in a society where freedom is flourishing rather than deprecated or defunct, and 2) **a critically grounded practice of software production, development and maintenance** that does not so easily succumb to the capitalist fantasy of value.

My dissertation and first book project, *From One to Zero: Capital, Calculus, and the Cradle of Computer Science*, argues that Marx's philosophy in *Capital*, the *Grundrisse*, and—crucially—the mathematical manuscripts that he worked on concurrently alongside his critique of political economy (1858–83) provide a thoroughgoing critique of automation's function in modern society that still has relevance in an age of AI. I argue that the computer is a concept that casts a long historical shadow by showing that it bears essential similarities, when we see it as a structure of automation rather than a historically specific substance, as Alan Turing did in his seminal work on the matter, to what Marx calls a machine. The machine for Marx is a structure of automation through which all movement is measured as work, and thus all desire in society is distorted such that it can be counted out as cash. Though it finds new footing in the fantasies and fears associated with language models and neural nets in our time, there is thus a greater precedent for critique of a society besotted with computation than might at first be thought. Projects that fantasize about

computation's potential impact on the production of capitalist value, my dissertation shows, date back at least to Charles Babbage, whose factory travelogues Marx explicitly criticizes in chapter 15 of *Capital* Volume I. The fact that Marx's 19th-century critique of political economy comprises a firm notion of the computer shows that the problems it presents in society are in fact not quite as novel or unprecedented as they are made out to be.

In my second book project, I want to show how both Marx's theory of capitalism and psychoanalysis can serve as *practical* frameworks through which we, as software developers and computer scientists, can take action 'on the street' today. Psychoanalysis is, I believe, the intellectual tradition that has most seriously and successfully taken up Marx's mantle in developing a theoretical practice of an anti-capitalist ethics. Sigmund Freud's discovery of the unconscious through his clinical practice in the 20th century revealed the same distinctive feature of modern subjectivity that Marx sketched out in his critique of political economy: the human subject cannot, logically speaking, simply be a self-contained rational totality, or as political theorist Wendy Brown puts it, *homo oeconomicus* [1]. The modern subject is not capable of uncovering every inch of itself, but is rather split and scarred in a fundamental sense. We cannot know everything about ourselves, nor even can we be sure of what it is that we *do* seem to know. This psychoanalytic insight into the nature of our own incompleteness is the substance of Freud's discovery and the premise of his clinical practice. As I argue in my dissertation, Marx's philosophy also implicitly recognizes this contradiction at the heart of modern subjectivity. Psychoanalysis thus puts Marx's philosophy on its feet and asks the question: what should we do with ourselves now that we know we can never know everything about ourselves?

On account of the curious nature of modern subjectivity and the semantic subtleties at stake in the idea of freedom, we cannot rely simply on 'technical' characterizations of computing systems to produce rather than prohibit freedom. Though I support FLOSS (Free/Libre Open Source Software), decentralized, local-first, federated, and/or privacy-preserving systems, no single class of technical architecture is self-sufficient as a proxy to ensure that a piece of software will do unqualified good when it is put to work in the world. Rather, we must study history and philosophy, both of computing and more broadly, to more concretely conceive of the social and political consequences that software systems effect. To give a specific and particularly topical example: the problem of how we should (or shouldn't) use LLMs in the university could be studied with reference to Marx's critical theory of value (use-value, exchange-value, etc.) to better understand the risks of ceding pedagogical infrastructure to private interests, and of delegating jobs once done by humans to a machine. Critical theory can be the basis of a more robust guide for our practice as developers, policymakers, and computing specialists.

I have presented work arguing this point in recent years at venues such as Historical Materialism, LACK, and the TU Wien Digital Humanism circle, seeking to speak to computer scientists and humanities folk alike. In January 2026, I will present a series of seminars as a visiting fellow at the ZRC SAZU Institute of Philosophy in Ljubljana arguing that a contemporary theory of the subject cannot wall it off from its work in the world. This dialectic of self/society appears in Marx's mature work through the notion of labor, and in Freud and psychoanalysis more generally through the thematization of the unconscious. I have work under review at both Critical Inquiry (*The cybernetic conjecture*) and October (*The machine that therefore I am*, included in this dossier), which are representative of the journals in which I aim to publish theoretical research.

2) Practical systems

The third arm of my research develops practical software systems that aim to advance freedom in the real world. I am actively working on three software projects that will be open sourced and published at an HCI or otherwise appropriate conference venue.

1. **Rostra.** Through my work developing and maintaining timemap (2018-2022), several problems became apparent even as the software proved useful for FA and other organizations. Like timemap, rostra is a frontend framework to contextualize and correlate time-series events in time and space by plotting them cartographically. Unlike timemap, rostra is a *modular* framework

which is *additively* configured, meaning that a deployment can selectively include panels for a timeline and other forms of data visualization from a library ecosystem. I first saw the need for rostra through work on the Violent Legalities exhibition in Aotearoa New Zealand in 2020, secured its concept through subsequent exhibitions in Auckland 2021 and Tauranga 2022, and began development in earnest in partnership with Karamia Muller's group at the University of Auckland in mid-2025.

2. **Acta.** In 2024, I began working with Lorenzo Pezzani at the University of Bologna, the director of LIMINAL Lab, to visualize the correlation between drone surveillance and migrant pushbacks in the Mediterranean. Working from a redacted dataset that was retrieved through freedom of information requests to Frontex, the EU border control agency, I co-designed and built a platform to present XLSX data more intelligibly by temporally correlating it with other data sources such as aerial asset flight hours and social media reports of certain pushbacks (forthcoming 2026). Acta is a framework for describing the political import of any time-series spreadsheet by visually aligning it with other data sources and by narrativizing its possible redactions. Acta is conceived as part of the same suite of investigative human rights tooling as rostra, which is used by agencies such as FA and Bellingcat.

3. **Rheo.** More recently in 2025, I have begun collaborative work with Will Crichton (Assistant Professor at Brown University) investigating the potential of Typst as the basis for a more pragmatic document authoring and publishing pipeline. By making several contributions to the upstream Typst codebase, I enhanced Typst's capabilities to export document structure such as bibliographic entries and citations to an HTML document, a compilation target that is secondary to Typst's full-featured support for PDF. Rheo is a static site and experimental typesetting engine based on Typst that will eventually support PDF, HTML, EPUB, and Portable EPUB with richer semantics in the latter format than standalone Typst. It is envisioned as a tool that will enable more freedom in the domain of document dissemination in line with the original vision of the Internet as a mechanism for lively and reasonably unfettered academic exchange, rather than the densely commercial space of 'platform capitalism' that it has become. (An early prototype of rheo is what powers the ability to read all the materials in the dossier as HTML documents.)

Future work

In my conceptual work thus far, I have primarily focused on the relevance of Marx's and Freud's philosophy for the project of computing freedom. In future work, I seek to deepen my appraisal of psychoanalysis as a critical method by engaging with the Ljubljana School's philosophical inflection of the method via the midcentury French philosopher, Jacques Lacan. Alain Badiou, a militant Maoist philosopher who came of age during the years in which Lacan presented his infamous seminars (1953–80), also offers important resources for a political theory of computing freedom on account of his deep engagement with set theory and history of 20th-century mathematics.

My work developing practical systems such as rostra and acta is driven by the needs of investigations at LIMINAL Lab and Forensic Architecture, as I work closely with both organizations. I am also committed to building a suite of tools complementing rheo to enable academic writing, research, and publication that is more fluid and more free. One idea that I have for such a tool is a Unix-based document storage system that can be accessed through the browser, inspired by DEVONthink, a Mac-only indie app for organizing PDFs, notes, and other files.

My research program is thus trained on the simultaneous conceptualization and execution of a more critically attuned computing practice in academia and in industry in modern society. I would be thrilled to continue with my program to more rigorously practice a politics of computing freedom in the 21st century in the English Department at Carnegie Mellon University.

As Marx famously pronounced in his *Theses on Feuerbach*: "Philosophers have hitherto only *interpreted* the world in various ways; the point is to *change* it." [10] My research program aspires to change the world for the better by acknowledging the necessity of critical interpretation in any consequential understanding of what it means to be free today.

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