Cultivating a Historicist Sensibility through Permacomputing

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1 Introduction

Despite its breadth of disciplines and approaches, Computer Science is too often portrayed and practiced as a techno-deterministic effort. This narrow vision of historical trajectories, innovation, and progress eventually leads to the creation of Undone Sciences. The path forward is usually depicted as unique, linear and vivid, a striking example being the recent trend with AI-hype taking over most of Computer Science research. Another example is the widely used term in Computer Science research "State of the Art", which often refers to a new technique or algorithm that is the culmination of a linear history. This single-minded approach to progress reinforces techno-determinism and the narrow revision of Computer Science history. However, academics have recognized that this tendency to concentrate efforts and funding toward a predetermined future forecloses alternative, marginalized practices and discourages efforts with the potential to undermine dominant narratives [4]. In this paper, we explore how the concept of and practices within *permacomputing* might aid in engaging with Undone Science. In doing so, we hope to provide one pathway to re-center the conversation away from dominant narratives and open the possibility for alternative and desirable futures.

Permacomputing is a nascent concept and a community of practices that harbors certain qualities and characteristics that make it a promising candidate in the exploration of sustainable approaches to computing. Permacomputing as a concept first emerged in a seminal 2020 blog post by Viznut (Ville-Matias Heikkilä) [5]. Since then, discussions and debates about permacomputing have been limited to niche computing circles, such as the permacomputing wiki[1], the permacomputing IRC channel[2], mailing lists[3], and more recently, its forum[4]. So far, only a few scholarly works have engaged with or mentioned permacomputing [3, 6, 8, 9, 12]. Rooted in principles inspired by permaculture, permacomputing seeks to radically challenge computing practices in the same way that permaculture challenged industrial agriculture. Its principles emphasize care, transparency, and critical refusal. Engaging with permacomputing

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practices and principles often requires its practitioners to look in the past and (re)examine alternative, undone paths in CS in order to move towards sustainable and just forms of computing.

Using permacomputing as a lens and a mode of praxis, we hope to explore how Undone Science can benefit gaining an understanding of historical decisions and outcomes that have undermined, overlooked, or ignored particular scientific and technological endeavors over others [4]. This examination of historical undercurrents, that others have termed as a *historicist sensibility* in computing research [10], is crucial in understanding trajectories of technological innovation, particularly those narratives which have been overshadowed by Siliconization [1] and the dominant paradigm of "progress stories". In other words, moving away or complicating the notion of a linear history of Computer Science is needed to challenge technological determinism, universalism, or "theoretical commitments"[4]. The general tendency in Computer Science to focus on technological innovation and its deep entanglement with the industry renders Computer Science particularly susceptible to *presentism*: "a tendency in the discourse around computing technology to take present arrangements and trajectories of technologies as given or universal, and in doing so obfuscate the complex situations and decisions through which they came to be as they are." [10]. Thus, in this ongoing study we aim to explore how cultivating a historicist sensibility is a crucial aspect when engaging with Undone Science.

Our interest in permacomputing and Undone Science in CS for this paper is twofold: First, permacomputing can be seen as Undone Science in itself. Second, by standing in radical opposition to the dominant narratives in computing (e.g., Californian Ideology [1]), permacomputing also promotes underexplored, forgotten, or ignored paths in Computer Science. In other words, we consider permacomputing as an Undone Science that supports the (re)visitation of other Undone Sciences.

2   Permacomputing as an Undone Science

We first argue that permacomputing practice is a contemporary Undone Science as it fundamentally moves in opposition to the flow of the dominant and hegemonic tech culture. Instead of the consumerism promoted by modern tech "solutions", permacomputing leans towards artistic creation, reuse, and disassembly. A notable example is UXN[5] — a small footprint computing stack based on a virtual machine that was designed with aesthetics of radical simplicity while allowing to create small graphical application often weighting only a few KB. The authors of UXN stress that the complexity of implementing the virtual machine runtime and toolchain "cannot exceed that which can be done within a weekend."[6] Permacomputing as a practice centers on small-scale approaches that appreciate constraints and designs that challenge maximalist and seamless approaches promoted by tech industries. As a self-proclaimed anti-capitalist political project, the values inherent to the praxis and theory of permacomputing are usually antithetical with the perspectives in popular neoliberal environments. For instance, the Gemini protocal project[7] has been a fascinating response to the hyper-consumption dominated HTTP/HTML protocol. Gemini, as a WWW protocol, focuses on low bandwidth pages that do not contain in-line media — a stark difference from the advertising-centric internet experience that exists today. Furthermore, the drive from anarchism, decoloniality, and degrowth will usually result in permacomputing productions that have no lucrative value for the markets, making them an unattractive venture for investments or funding. As such, the incentives to practice permacomputing may seem distant and counter to how most of us experience and approach computing technologies. Overall, due to its stark opposition to the dominant paradigm in technology, its

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[5]https://100r.co/site/uxn.html
[6]https://wiki.xxiivv.com/site/uxn.html
[7]https://geminiprotocol.net/

relative youth and practice at the margins, and its inability to bring direct "value" in a neoliberal ecosystem, we argue that permacomputing is an undone science that is susceptible of being overshadowed by dominant paradigms.

3 Permacomputing as a pathway to other Undone Sciences in Computing

The practice of permacomputing requires continuous and conscious design decisions for technologies that reinforce and sustain our ecosystems. Instead of the fast-paced technology production that prevails in dominant computing trends [11], permacomputation rather "is an invitation to slow down, to make sense of where we are, and to explore what's possible with what's already here to prepare for what could happen." [7]. In doing so, permacomputing praxis supports and is supported by the adoption of computing concepts, programming languages, and software and hardware stacks, that are rarely used or have been forgotten. Those concepts and technologies were often replaced by capitalist-oriented extractive technologies. We are not arguing for a "nostalgia of the past". Indeed, nostalgia is a concept based on the notion of *linearity* of time and *out-datedness* that has been critiqued by prior permacomputing scholarship as a concept that is grounded on the need continuous consumption, growth, and novelty, and thus is in contradiction with the values and principles of permacomputing [8].

Our ongoing practice of permacomputing, through the creation of a computer club, eventually led us to engage with underexplored approaches to project management, version control systems, communication, web hosting, and web development. For instance, when we started collaborating on the permacomputing project, we did not want to use proprietary cloud services for shared documentation, nor git/GitHub as a way to manage our project's output. Instead we turned towards Fossil[8] which offers a simple and lightweight self-hosted option to collaborate on and organize projects. From our point of view, using Fossil as a project management platform and version control system was more than a pragmatic choice. It allowed us to avoid using an industry-grade platform, such as GitHub or Gitlab, to host a collaborative project. Self-hosting Fossil gave us access to a comprehensive set of tools to collaborate, such as versioned files, a wiki, a forum, and a chat. Overall, the decision to engage with Fossil is part of a broader objective. The desire for more agency, sufficiency, and sustainability out of our technology.

Another example can be found in how framing our approach to communication within permacomputing encouraged us to become familiar with a technology that is simple, transparent, federated, and usually governed by democratic communities: Internet Relay Chat (IRC). It should be noted that IRC has an extremely low operating footprint in addition to generally providing a social experience that is free of Surveillance Capitalism [13] or other extractive practices [2]. IRC as a communication technology has mostly faded in the background, replaced by successive waves of Big Tech messengers, such as MSN, Whatsapp and Facebook Messenger. Simple federated communication protocols (e.g., IRC, XMPP) have many aspects left to explore, especially in terms of their design, governance, and social implications. The fact that such protocols are now largely overlooked within CS and sub-fields of HCI/CSCW is indicative of the idealization of complex and proprietary communications systems that are dominating the public and academic spheres.

Through our practice of permacomputing, we have observed our tendencies to take a deliberate approach when adopting a technology. This approach has involved careful examination of technological trends, historical patterns of computing, and patterns of technology ignorance and adoption. We argue that adopting a historicist sensibility, in our case via the praxis of permacomputing, can enable and support future designs. As such, these forms of Undone Science served as valuable sources of design knowledge and, more importantly, as a way to avoid repetition of the mistakes, concerns, and dangers that we find within dominant and hegemonic technologies [10].

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[8]https://fossil-scm.org/

4 Conclusion

In this abstract, we defend that Permacomputing is both an Undone Science and acts as a pathway to other Undone Sciences in computing. Engaging with permacomputing principles and praxis will raise ethical questions for Computer Science as a field while opening new epistemological pathways to challenge dominant paradigms. Some of those pathways include an increased historicist sensibility in the practice of computing and an awareness towards holistic, slower, more careful, and situated approaches in Computer Science. Our own practice is certainly evolving as we engage more with permacomputing through collaborative projects. We hope to raise more awareness of permacomputing as a practice through a short presentation that will hopefully lead to interesting discussions. As such, we conclude with a question to provoke the reader. What values and practices have been left behind in the not-so-linear history of Computer Science? Should we rely on the latest stride in AI to reclaim them, or does *Permacomputing* hold more promise?

5 Authors Biographies

Nils Bonfils' background in Computer Science and software engineering experience in the industry informed his perspective on the current unsustainable trends in ICT. Currently researching the environmental impact of the extractive practices of Big Tech corporations, he also aims to go beyond diagnosis and critique by investigating alternative and practical paths forward.

Aarjav Chauhan examines community-led governance strategies for commons-based systems. He is interested in designing participatory approaches for commoning digital resources, particularly within majority-world contexts.

Christoph Becker is a Full Professor at the Faculty of Information the University of Toronto and author of "Insolvent: How to Reorient Computing for Just Sustainability" (MIT Press, 2023). With a background in computer science and informatics, his research today focuses on enacting meaningful change in computing to meet the urgent need for sustainability and social justice (converging in just sustainability).

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