

3D Printing Cultures, Politics and Hackerspaces

Digital Activism and Society: Politics, Economy and Culture in Network Communication

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BY

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INVESTOR IN PEOPLE

*To all those people who tirelessly work to redefine the world toward the interests of
the vast majority.*

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List of Abbreviations

| | |
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| AM | Additive manufacturing |
| CAD | Computer-aided design |
| CBPP | Commons-based peer production |
| CEO | Chief executive officer |
| CLIP | Continuous liquid interface production |
| CNC | Computer numerical control |
| DARPA | Defense Advanced Research Projects Agency |
| DIY | <i>Do it yourself</i> |
| EU | European Union |
| FDM | Fused deposition model |
| IP | Intellectual patent |
| IT | Information technology |
| LOM | Laminated object manufacturing |
| MTC | Manufacturing Technology Centre |
| NASA | National Aeronautics and Space Administration |
| NSF | National Science Foundation |
| OSAT | Open-source appropriate technology |
| PLA | Polylactic acid |
| PVA | Polyvinyl alcohol |
| R&D | Research and Development |
| REMAP | Rehabilitation Engineering Movement Advisory Panels |
| SL | Stereolithography |
| STEM | Science, Technology, Engineering, Mathematics |
| STS | Science and technology studies |
| USB | Universal Serial Bus |
| UT | University of Texas |
| WEF | World Economic Forum |

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Abstract

This book examines the emergence of 3D printing culture outside the professional lab, predominantly in Hackerspaces, Makerspaces, and Fab Labs. Such spaces constitute important sites in the development of open-source, desktop 3D printing and provide conducive conditions for the spread of the technology to and often beyond technologically informed publics. Specifically, this research addresses the convergence of activism and the maker culture with prevalent cultural imaginaries such as the visionary creator within decentralized and distributive manufacturing, the vision of autopoietic social systems, or the imaginative leap to space colonization. In addition, it explores the emergence of grassroots innovation and how it is configured through 3D printing. In order to observe the aforementioned social phenomena, I conducted multi-sited ethnography in several experimental spaces in the United Kingdom, Germany, and Cyprus. The selection of the sites represents different types of Hackerspaces, Makerspaces, and Fab Labs: some of them bring hobbyist maker communities together, while others were explicitly conceived as political interventions and others operate as informal startup incubators. In my fieldwork I followed users of 3D printing technology as they navigate their activities through grassroots workshops, multiple associated communities, and broader hacker networks.

Drawing on the findings of my research, I argue that the emergence of digital DIY and maker cultures was not only powered by 3D printing technologies but also played a vital part in creating, expanding, and disseminating knowledge of 3D printing further afield. Within this process, 3D printing users become developers themselves who simultaneously reinvent forms of consumption, processes of learning, and reconceptualizing the relationship between science and craft. Despite the apparent social and collective nature of these practices, there is also a parallel individualistic twist at the heart of the maker culture. The book contributes to a growing debate within science and technology studies, which is concerned with the emergence of citizen science and civil society interventions in shaping technology. Moreover, it touches upon challenges and motivations in the field of grassroots innovation by examining how it is organized and conducted in semi-informal contexts such as the Hackerspaces, Makerspaces, and Fab Labs.