3D Printing Cultures, Politics and Hackerspaces

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

The *Digital Activism and Society: Politics, Economy and Culture in Network Communication* series focuses on the political use of digital everyday-networked media by corporations, governments, international organizations (Digital Politics), as well as civil society actors, NGOs, activists, social movements and dissidents (Digital Activism) attempting to recruit, organise and fund their operations, through information communication technologies.

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- transformations of older topics such as inequality, gender, class, power, identity and group belonging;
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Dr Athina Karatzogianni

About the Series Editor

Dr Athina Karatzogianni is an Associate Professor at the University of Leicester, UK. Her research focuses on the intersections between digital media theory and political economy, in order to study the use of digital technologies by new sociopolitical formations.

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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

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	*Do it yourself*
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.