



UvA-DARE (Digital Academic Repository)

Feminist avenues for listening in: amplifying silenced histories of media and communication

Birdsall, C.; Carmi, E.

DOI

[10.1080/09612025.2021.1944345](https://doi.org/10.1080/09612025.2021.1944345)

Publication date

2022

Document Version

Final published version

Published in

Women's History Review

License

CC BY-NC-ND

[Link to publication](#)

Citation for published version (APA):

Birdsall, C., & Carmi, E. (2022). Feminist avenues for *listening in*: amplifying silenced histories of media and communication. *Women's History Review*, 31(4), 542-560. <https://doi.org/10.1080/09612025.2021.1944345>

General rights

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

UvA-DARE is a service provided by the library of the University of Amsterdam (<https://dare.uva.nl>)

Feminist avenues for *listening in*: amplifying silenced histories of media and communication

Carolyn Birdsall ^a and Elinor Carmi ^b

^aDepartment of Media Studies, University of Amsterdam, Amsterdam, Netherlands; ^bDepartment of Communication and Media, University of Liverpool, Liverpool, UK

ABSTRACT

This paper proposes a feminist critique of the media and communication field by offering a different soundtrack to guide future historical research. By shifting the focus from well-known protagonists, and acknowledging process and community rather than individuals, we aim to amplify ‘hidden’ domains of gendered labour and layers of media technologies and services. We propose the ‘listening in’ model as a different way to engage with histories of media and communication, providing four pathways for how the histories of film, radio and internet in particular have been theorised and researched. These pathways focus on multiplicities of expertise, layers of infrastructure, users, and the media canon. For the first pathway, we show how media production has always been a collective work of multiple expertise. The second pathway breaks with the distinction between media and communication and emphasises reciprocal processes of media production. For the third, we demonstrate how media theory and research have tended to assume specific ideal bodies while ignoring others. For the final pathway, we propose a rethinking of how media histories and theories are narrated via the usual protagonists and call for a new canon to achieve a richer and more nuanced understanding within the field.

KEYWORDS

Listening in; feminist media history; sound studies; gendered labour; race; disability; science and technology studies (STS); radio history; film history; internet history

Introduction: how not to tell media history

Austrian actress Hedy Lamarr, born Hedwig Eva Maria Kiesler, is commonly described as the ‘most beautiful woman in the world’ in relation to her acting career in Hollywood during the 1930s and 1940s.¹ What she is less known for is a key contribution to the development of Wi-Fi, GPS, cell phone and Bluetooth technologies. Lamarr co-developed a ‘Secret Communications System’ to help the Allied Forces combat the Nazis during World War II. By manipulating radio frequencies at irregular intervals between transmission and reception, the invention formed a code to prevent classified messages from being intercepted by enemy armies, in what would be called ‘frequency hopping’. It

CONTACT Carolyn Birdsall  c.j.birdsall@uva.nl  Department of Media Studies, University of Amsterdam, Turf-draagsterpad 9, Amsterdam 1012XT, Netherlands

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

was only in 1997 that Lamarr became the first woman recipient of the BULBIE Gness Spirit of Achievement Award, a prestigious lifetime prize for inventors.

It is important to remember, acknowledge and teach Lamarr's contribution to the development of these multiple technologies. But we want to tell a different story. Too often when scholars seek to draw attention to historical wrongdoings, we find the same kinds of storytelling techniques being deployed: a single protagonist who is framed as the hero; with the main difference being that the hero is a woman, person of colour and/or queer. We appreciate these efforts and do not wish to silence them. However, we want to make different theoretical interventions: we seek to critique and rethink the ways the fields of media and communication studies have conducted research and framed its narratives. We propose a 'listening in' framework, which makes use of feminist and sound-related approaches, and focus on four main ways to think, research, and write media and communication differently.

By shifting the focus from well-known protagonists, and following feminist traditions that acknowledge process and community rather than single individuals, we aim to foreground the hidden layers of media technologies and services. From the field of sound studies, we draw from Elinor Carmi's concept of *processed listening*, which amplifies the way media 'involve multiplicities of actors (users, workers, and nonhumans), infrastructures, channels, and temporalities that vision cannot capture'.² Processed listening underscores both acts of listening and their status as processed: *Listening* is about an active decision making about what to focus on and makes a distinction between different categories, and provides the ability to cross borders and tune into multiple spaces with attention and direction. *Processed* relies on feminist technoscience process-based philosophies that emphasise the way events, phenomena and subjectivities are never fixed or static but always in the process of being (co)produced. As Carmi argues, processed listening 'is conducted in multi-layered media territories that are co-created by these different actors (human and non-human) and tools'.³ The concept of processed listening is particularly useful for examining power relations by attending to (non)humans who are involved in media technologies and the multiplicities of channels and infrastructures.

Processed listening offers a way to acknowledge the role of hidden workers in the development of media, and especially their ability to cross physical and sensory boundaries, which are also characteristics unique to sound. In doing so, this concept helps to challenge notions of media processes as automated or 'naturally' happening, and reveals the politics in which these processes are made silent. Attending to these boundaries may take the form of infrastructural tuning into multiple material and immaterial layers, as underscored by recent scholarly accounts of infrastructure as defined by relationality and the dynamic 'movement or patterning of social form'.⁴ But breaking such boundaries can also encourage us to question and challenge the very definition of what media are, and thus reconsider what should be included when we examine media technologies and services. Drawing both on sound's border-crossing potential and feminist approaches to process and multiplicities, our aim in this article is to show the power of telling stories differently, to create a different soundtrack.

Our 'listening in' framework focuses on **four pathways** around multiplicities of: (1) expertise, (2) layers of infrastructure, (3) users, and (4) the media canon. First, we amplify how media production has always been a result of the collective work of multiple

workers and expertise rather than a single male auteur. Second, we break the hard distinction between media and communication, to include the entanglement of material and immaterial considerations, and emphasise the reciprocal processes of media production. Third, we tune into how media theory and historical research have tended to assume specific ideal bodies while ignoring others, those that are differently abled, gendered and/or racialised. And finally, we aim to rethink the way media and communication narratives are framed around the usual 'stars' and instead offer recommendations for an enriched historical canon that offers a richer and more nuanced understanding of the broader field and its subfields.

The four pathways of 'listening in' offer scholars and practitioners tools to create different media discourses. Our framework can be used in multiple ways, by applying one, several, or all four avenues, and by using various research methods. The purpose is not to be restrictive on how to use it, but to encourage other ways of analysing, understanding and amplifying the hidden layers and workers of media and communication. As such, this model serves as a methodological impulse for researchers, and thus expands on previous work in which the notion of 'listening in' was mainly developed in specific reference to sound and aurality.⁵

Using the 'listening in' model as a way to amplify the significance of hidden layers and collective media work, our analysis engages with several case studies, drawn respectively from the histories of film, broadcasting, and the internet/new media, across the long twentieth century. In particular, gendered labour and feminist approaches serve to guide our argument and we highlight how they contribute to our proposed approach and analysis. In each case, we conduct a historiographical review of how researchers have used an object of research or a method that helped tell a different story. Taken together, our account of 'listening in' provides a toolbox to think differently about the way we conduct research both in terms of what we choose to focus on and the methods we use. Finally, we evaluate the potential for the 'listening in' framework for historicising obscured sites for the production and development of various media, and unsettling mainstream media histories that continue to focus on inventors, producers and well-known institutional actors. This then, should be taken as a starting point for doing media and communication differently.

Rethinking media and communication storytelling

In her famous 'Cyborg Manifesto', Donna Haraway challenges various boundaries and shows how the categories of human, animal and machine, and of material and non-material, are not distinct from one another.⁶ In doing so, Haraway encourages us to re-narrate stories about the body, technology and social interactions in a different manner from the entrenched patriarchal order. We draw inspiration from Haraway's intervention and aim to do similar political work in this paper, seeking to reprogramme our ways of thinking and doing research in a way that re-orient norms of scholarly praxis in narrating and theorising media and communication histories. For these purposes, we study various fields of media work across time and space. The cultural and media industries have long been identified as sectors characterised by gendered work segregation, discrimination and lack of diversity.⁷ Despite this scholarly recognition, we suggest that further critical work is needed in examining hidden, 'below the line'

media work, both as a theoretical agenda and intervention in conventional narratives of media and communication history.

This calls for media researchers to tune into other places and relations to gain such insights. In their research on international networking between women involved in radio broadcasting during the 1950s, Alec Badenoch and Kristin Skoog highlight the need to take up viewpoints of labour and workplace relations beyond media-specific institutional frameworks, since 'personal correspondence and women's and feminist archives might be sites where individuals, and patterns and examples of transnational broadcasting, can be successfully traced and explored'.⁸ The authors amplify the way media histories have layers that need to be gleaned from multiple sources, some of which are not traditionally media-focused. A good example of such an approach can be found in Stephen Norwood's treatment of the complex workers' unions negotiations and conflicts between telephone companies and operators during the 1880s to 1920s.⁹ Here, the unionisation of telephone operators and their struggle to gain work rights and better conditions helped to shape the way that telephone technology developed, and pushed these companies to move to the automatic dial system. In terms of methodology, Norwood's study shows the importance of examining not only the material and business-oriented aspects of a given technology but especially workers' conditions, the laws around their work and their negotiations with media companies. Such conflicts shape the way media and communication companies develop, change and frame their technologies and services.

Instead of being 'trapped' or siloed in gender/race/ability-related media 'topics', we want to take these approaches as a key entry point for doing research and telling stories on media and communication. We examine media labour and work environments with feminist perspectives, while also acknowledging the importance of integrating our 'media-centric' findings with larger sociopolitical frameworks and conditions. By doing so, we posit that such a 'listening in' can carve out theoretical and methodological directions that shape media and communication towards a field of research that provides intersectional considerations as its central mode of engagement. Such an approach provides a critical perspective on technologies of the past and the future.

A good illustration can be found in the work of Lisa Nakamura, who examines additional layers of media development such as labour, tax and (land) resources.¹⁰ In her research on Fairchild Semiconductor, Nakamura amplifies the voices of the Navajo women and their community contributions to this tech company. In 1965, Fairchild opened its operations on the Navajo reservation in Shiprock, New Mexico, during which time hundreds of Navajo women worked in the company's factories. These women received low income due to reservations' special position as being excepted from US minimum wage laws. As Nakamura argues:

[...] Haraway draws our attention to the irony that some must labor invisibly for others of us to feel, if not actually be, free and empowered through technology use: technoscience is, indeed, an integrated circuit, one that both separates and connects laborers and users, and while both genders benefit from cheap computers, it is the flexible labor of women of color, either outsourced or insourced, that made and continue to make this possible.¹¹

This type of exploitation of both women workers and land would later become a model for many US companies who have outsourced their hardware factories to China, India

and other Asian countries. These practices - underpaying workers, avoiding high taxes and exploiting land/resources - have been crucial in enabling companies like Amazon, Google, Apple and Facebook to secure their dominant position within the global tech market. Such practices, along with the offshoring of digital waste, are an integral part of the development of media technologies, infrastructures and their logistics.¹² In the following sections we will show how the four avenues of 'listening in' outlined here can be applied in three key media and communication domains, namely in the histories of film, broadcasting and internet studies.

What to watch for in film history?

How can we think about the multiplicities of labour and infrastructure we discussed above in the film industry? One of the major aims in feminist scholarship of early cinema has been to resituate women's activities in the film industry as a means of unsettling the persistent dominance of a concept of the film director as a single male auteur working in isolation from a production team. One of the explanations for the persistence of the male genius figure, and the erasure of women from histories of film, is offered by J. E. Smyth:

male historians tended to edit out women's roles, leaving them on the cutting room floor of conventional film histories. These classic "professional" studies of Hollywood would later be taught in universities as film history emerged as an academic discipline, perpetuating the belief that women had no creative role in Hollywood save acting.¹³

This example reiterates that what we research contributes to what we teach and, in turn, affects how histories of media are thought of and understood within academia and beyond; they represent a power relation that demands critical interventions into and reorientations of historical narratives.

When focusing on the collective work of media, Annette Förster argues for a sensitivity to how women *co-created* early cinema, as authors, producers and directors, and examines 'how they adopted, adapted and reworked crafts, genres, styles, and subject matter'.¹⁴ Förster calls for close attention to how work in acting and directing was contingent on collaboration, and thus was enacted in a collective manner. In her analysis, Förster focuses on women actresses who also produced and directed, and worked across cinema and popular theatre. This critical intervention redresses our understanding of distinct roles within the film industry, which may have not been as distinct in the past. Förster's analysis also shows that while moving between multiple roles, these women drew on the unique skills and affordances of each role to inform the others. The study of this fluidity in the operations of early film industries is highly revealing about how these professional roles developed historically and in turn affected different stages of film production and distribution.

In terms of infrastructure development, there is a tendency to focus on technical 'innovations' and to present them as a natural progress of the field, detached from their gendered context. We can 'listen' in to such tendencies in the case of the transition to film sound during the late 1920s, which was bound up with anxieties about (gendered) voice and vocal performance.¹⁵ Emily Thompson shows that the efforts to send US acoustical engineers to wire cinemas around the world also served as an overt display

of masculinist technical expertise and framed in cultural-imperialist terms.¹⁶ Peeling back these layers of how these technologies and industries were historically developed is therefore key to uncovering muted histories of collective and collaborative work and delineating the gender politics bound up with the 'birth' of cinema and the film industry.

In their project of de-mystifying the impact of the 'great directors' in the Soviet cinema of the 1920s and 1930s, Karen Pearlman and Adelheid Heftberger amplify the influence of women editors, whose work, often uncredited, was devalued as technical rather than creative.¹⁷ They show the challenges of reconstructing this work with a scant archive and male-dominated historiography. In particular, they demonstrate how different work practices such as the multiple names given to the editor role and the predominant notion of sophisticated editing rendered these women professionals 'invisible'. Exploring cross-disciplinary methods as a means of reconstructing women's creative contribution to the filmmaking process, Pearlman, MacKay, and Sutton examine Elizaveta Svilova and her collaborative process and innovations to 'recuperate Svilova's position as creative contributor to what are known as Dziga Vertov's works of genius by showing that their editing processes are the expert work of a distributed cognitive system'.¹⁸ With the 'listening in' framework our aim is to tune in to the creative contributions within professional occupations when performed by women and people of colour such as editors, special effects, visual effects, make-up artists, prop and costume designers, sound design, stunt doubles and others who are an integral part of the film production.¹⁹

Another layer of infrastructure that is usually kept silent in terms of early industry practices can be found in colouring work, starting from lantern slides and through to early film prints. This field is one of the earliest areas of production work accessible to women, premised on notions of female sensitivity to colour and suitability to the delicate nature of film colouring.²⁰ Such examples of work carried out by unnamed, uncredited and scantily documented below-the-line workers is indicative of the broader obscuring of women's 'creative work'. As Erin Hill has argued, this calls for more scholarly attention to workplace participation and agency, while also acknowledging 'explicit, managerial motives for hiring women' in the media industry and how this was governed by 'implicit, gender-based expectations'.²¹ These silent workers have shaped the way we understand and engage with film and media more broadly, how we interpret it and give it meaning; their collective work has played an important role in co-creating the way we have experienced media.

In the field of early cinema research, it is striking how little attention is paid to the contribution of migrants and/or minority communities to these labour markets. In the US, there are investigations of early histories of African American women filmmakers, along with actors, performers, and production workers, and the broader context of African American audiences, cinema-going and black urban modernity.²² This practice of reconnecting film texts to specific contexts of exhibition and reception has been explored in recent work on African American women. For example, entrepreneurs and cinema owners, such as Madame C.J. Walker and her daughter A'Lelia Walker, participated in the industry through financially investing in early Afro-American filmmaking from the 1920s onwards, and re-editing films to better cater for their audiences.²³ Such acts of selecting and re-working films in cinemas challenges the way we think about films as a finished product and shows how it is always in the process of being produced, interpreted and negotiated by different workers in the industry and audiences.

Moreover, the funding of film production is a powerful media practice that helps shape who gets to be seen and heard in the domain of media and communication.

So how does focusing on work conditions, industry trade issues and archival practices help us understand the film industry better? A major preoccupation of early cinema scholarship, particularly in the US context, concerns the process described by Mahar as a 'remasculinisation of filmmaking' in the period between 1916 and 1928, which was accompanied by the rise of the studio system in Hollywood.²⁴ In the case of Universal Studios, as Cooper has examined, we find that the company employed eleven women as directors between 1916 and 1919, who were almost all replaced by men by 1920, and whose stories and works are underrepresented in company archives.²⁵ In response, Smyth suggests that the existing work on women in early cinema has mistakenly led to a firm belief that women 'disappeared' from Hollywood between the 1920s and 1960s, and thus 'were not important within the Hollywood studio system and had little creative control'.²⁶ In contrast to the conventional archives and industry trade publications used in much early cinema research, Smyth attends to studio archival collections, union and guild reports, trade papers, local and national reportage to examine the diverse career paths available to women in Hollywood, and citing statistics that between 1930 and 1950, forty per cent of film industry employees were women. As this case shows, a critical *listening in* to other spaces of work can offer new directions and insights to women's key roles in the development of a media such as film.

In methodologically-sensitive engagements with the scholarly practice of feminist film history, recent interventions have called upon researchers to adopt a critical and self-reflexive understanding of their own present-day acts of reconstruction of histories of women's work in cinema history.²⁷ In other words, the act of 'discovery' is insufficient in and of itself, but should be understood as an opportunity to reflect on the choices made in how scholars themselves engage with, represent, and narrate historical discoveries. Scholars should reflect and re-evaluate on searching for appropriate language to approach the labour of unnamed thousands as opposed to the reified figure of woman as 'pioneer'.²⁸ Similarly, Christine Gledhill and Julia Knight have also called for a sensitivity to reading available sources against the grain, or seeking out unconventional sources and approaches. Using a more careful reading reveals participation in the film industry in ways we have not thought about before or encourages a rethinking of the film medium.²⁹ One of the important challenges when engaging with women involved in the various domains of film history concerns the problem of identification from a feminist vantage point in the present day. As Gledhill and Knight suggest:

Thus women's film history has to perform a delicate balancing act between establishing the roles women *did* play in film history and recognition of practices that, arising from women's gender positioning, are outwith both feminist politics and traditional concepts of historical significance.³⁰

This nuanced account echoes Jane Gaines' recent methodological reflection on the fate of women in the silent film industries, which encourages feminist film historiography to acknowledge the limits of historical research, and the methodological considerations necessary when faced with a dearth of archival materials.³¹ Rather than seeking definitive explanations or complete histories, Gaines calls on feminist film historians to reflect on their own process of searching and narrating historical artefacts, and seek out the

potential of a historiographic practice based on the lost, unknown and the unnamed, rather than trying to gain a definitive answer to 'what happened?'

Vibrating waves of broadcasting

Most of the literature about the history of broadcasting has mainly centred on aesthetic and creative innovation in terms of radio conventions, style and genre, usually from the standpoint of (predominantly male) star announcers/presenters, scriptwriters or programme producers. Thus, while the 'auteur' legacy in radio is less predominant than that discussed in the previous section on cinema, there is a similar sense to which authorial agency and expertise has been attributed to well-known writers and 'star' announcers in early radio. Acknowledgment of the collaborative nature of creative processes within broadcasting, or the contribution of a larger collective of employees, particularly within radio institutions as organisational frameworks guiding programme production, is lacking.

Radio studies remains a comparatively smaller field within media and communication research, which is reflected in the scope of scholarship on radio history, as well as related questions of labour and the gendering of work. Nonetheless, scholarship in recent decades has been characterised by cultural histories that are mindful of how the early establishment of broadcasting as a media system and cultural form was predicated on domestic reception, and bound up with negotiations of gender, feminism and domesticity. Exemplary in this regard are studies sensitive to gendered voice in on-air performance, offering integrated accounts of production, audience and programming.³² Such scholarship has been instrumental in critically evaluating the 'low culture' associations that have historically persisted in the association of broadcast content with the popular, the everyday, domestic and feminine, such as the genre of 'daytime' soap opera on radio.

What other work-related conditions can inform us about the development of the radio? More recent scholarship has delved into the concrete working conditions for women in radio production, and how this relates to specific career paths and employment. Here we find accounts of the widespread presence of women in a range of positions, which included typing and secretarial work that was crucial to broadcast organisations, but also other positions for women that were often less amenable to career advancement.³³ One of the important interventions in this regard is to acknowledge the formal barriers to *remaining* in employment, such as the 'marriage bar' introduced to the interwar British Broadcasting Corporation (B.B.C.).³⁴ Carol Stabile's recent monograph also documents the dozens of prominent women who were forced to leave the US radio and television industries during the 1930s and 1940s due to being blacklisted under suspicion of 'Communist influence'.³⁵ Tracing the resulting exclusion of non-white and non-male voices from media production, Stabile investigates how 'media production in the 1930s and 1940s was full of far richer, more varied, and complex perspectives than what ensued as a result of anti-communist efforts'.³⁶ Stabile argues that the work and struggles of women serve as an important site to consider how people of colour and anti-racist whites already endeavoured to offer critiques of racist stereotypes and underrepresentation, and to recognise that intersectionality was already a 'vital part of the field of cultural production in the years before the blacklist'.³⁷

Media companies' internal regulations and policy, then, are also highly useful sources in order to listen in to who gets hired, who retains their jobs, and who is promoted.

In historical accounts of radio, there has generally been less scholarly attention to questions of infrastructure, such as the specificities of studio space, its technical set-up or the role of technical staff as creative collaborators.³⁸ However, there is a growing attention to the crucial sites of work that allow for radio broadcast production to be created, edited, broadcasted and archived. In organisations like the B.B.C., for instance, the departments related to archives and documentation were largely initiated or headed by women.³⁹ In various European settings, a significant number of young women entered into roles connected to library, archiving and sound technical work before, during and after World War II.⁴⁰ New assessments of the institutional archive have suggested a site of collaborative teamwork and 'distributed creativity' even if not officially credited as such.⁴¹ This silenced avenue of enquiry highlights the important creative roles performed by diverse practitioner groups across various stages of the production line in radio, from the creation of studios through to archives and the various staff engaged in recording and editing of broadcast sound. Therefore, amplifying such practitioners can help us think and examine radio as part of a much wider process, rather than restricting attention to the content of radio programming.

The domestic environment has figured strongly in critical histories of broadcast culture, as a key infrastructure, if not battleground, in which gender, space and power relations have been negotiated.⁴² Under-emphasised in media histories, recent research has sought to identify how listener preferences and feedback contributed in various ways to the development of technology, programming and advertising in US network radio.⁴³ In doing so, such research also helps contradict the myth that 'social media' only started in 2004, and that media content is never a finished product but always an ongoing process of edits and negotiations with multiple actors. Several new studies have devoted attention to black radio listening audiences previously elided in mainstream media histories, as well as the norms of audio, visual and textual relations articulated from the perspective of deaf studies, crip and critical disability studies.⁴⁴

In terms of mainstream historical narratives and canons, it is crucial to critically consider the importance of archivist selection practices, and keep in mind the multiple forms of historical exclusion inherent to broadcasting's institutional practices.⁴⁵ From the outset of broadcasting, there was a highly selective understanding of who was included in radio's imagined audiences and national public sphere. These conditions had serious repercussions for broadcast content, who produced it, and how it sounded, and also, which programmes were pre-recorded or recorded off-air for historic preservation.⁴⁶ It is thus essential to critically assess the narrow understanding of the 'golden age' of US radio, to understand the broadcast canon and its limited archive as a 'feminist issue'.⁴⁷

Another aspect we want to amplify is that the majority of scholarship has focused on studies of radio from the perspective of mainstream institutional settings, especially at large networks in North America, in Western Europe and the United Kingdom. By contrast, it is important for media and communication scholars to listen in to other sites and types of radio, such as pirate radio, low power FM, and other independent/activist media praxis, which often establish collective and collaborative media production and artistic practices.⁴⁸ Community radio figures as a crucial space in media history for enactments of publicness, protest and public advocacy, whether for migrants, refugees or non-

dominant languages,⁴⁹ or in feminist and LGBTQI communities and subcultures.⁵⁰ Such attention serves as a critical rejoinder to mainstream broadcasting histories and archives, yet continue to be neglected in scholarly accounts of 'radio history'.

Internet from other screens

In this section we examine the not-so-distant history of the internet. A historical review of this relatively new medium involves different time periods, but mainly focuses on the period where digital networks started to materialise. In the first decade of internet or 'new media' studies, from the middle of the 1990s, there was mainly an enthusiasm and utopian framing of the possibilities that the internet could offer. Such enthusiasm continued when web 2.0 and social media started to appear from 2004 onwards.⁵¹ The focus then was mainly on showing how the user 'suddenly' became empowered to create content, hence turning into 'produser'. From 2010 and onwards more critical voices of these networks and platforms started to emerge, giving a different history which showed that this 'empowerment' comes at a price of turning people into the product.⁵² But while both of these waves in internet studies have pointed to interesting developments, they also took much for granted, such as what 'empowerment' exactly means in the internet context; who gets empowered and who does not; which other layers in these networks influence what users can do in them; and the labour of those working behind the screen.

The 'emancipated' user narrative has been used almost since the beginning of internet studies. However, in most of these works there was an imagined ideal user with fully functioning mental and physical abilities. A field that has paid more attention to the variations in abilities and skills has been that of the digital divide/inclusion/literacy, which has pointed to the unequal way that many people access, use, and engage with networked systems.⁵³ In most of this work, there is a particular focus on the social, economic and cultural contexts which shape people's access and use of media technologies. Eszter Hargittai, for example, has focused on skills as well as people's social support networks, the autonomy of use, and levels of skills.⁵⁴ But while there is an emphasis of inequality that stems from various societal causes, there is an assumption that there are sets of skills to be learned and then after acquiring them people will be able to become full members of the online community. However, such sets of skills do not apply to all people, and requires a further sensitivity to the diverse abilities that arise from different bodies.

The body is an important entry and departure point for media and communication because development, use, work and maintenance all revolve around diverse types of bodies. But while much work in internet studies assumes an ideal body, there is a field that media and communications studies have been neglecting for years that challenges such notions - disability studies. Disability studies scholars have called for a greater awareness of digital inequalities for decades; however, their integration into the core of media and communication has been somewhat slow, and only recently received positive attention.⁵⁵ Gerard Goggin, for example, has analysed disability in the contemporary developments and discourses of connected cars. He argues that:

an important and rich starting point is historiographical thinking, notably the acknowledgment of the alternative histories and politics of technology systems of mobility associated with disability, spurred on by disability histories, activism, and emergent work in Crip technoscience.⁵⁶

Disability studies encourage us to interrogate why technologies and internet services assume particular user's bodies, and the exclusion of those who deviate from the ideal. Importantly, it shows us that there are many ways of developing technologies, and thus invites multiplicity in the understanding of use rather than the narrow view of user experience (UX) that many online services and apps offer today.

Several feminist scholars have also showed how different designs of information systems have a bias towards not only the healthy male body, but also to those which are cis-gendered. One example would be Facebook's mandatory use of one's legal given name which may force trans and other queer people to use their 'deadname'.⁵⁷ Scholars have been working on data justice and intersectional feminist frameworks to include more inclusive designs and fairer processing of media of people of colour, from marginalised and LGBTQI communities.⁵⁸ In the context of internet studies, the consideration of disability *and* intersectional *and* feminist approaches is still in its infancy.⁵⁹ The complex entanglements of race, class, gender and economic state still need further investigation. A possible fruitful direction can be found with the field of Crip feminist technoscience studies.⁶⁰ Such outlooks emphasise how the internet technologies and services we use have in-built assumptions and that we should question and re-narrate how they have been designed and developed. In particular, we should question and critique the notion that technologies can only be developed in one way; this involves a renewed imagination for the multiple ways technologies can be made, and shifting the focus from heteronormative accounts of the past into intersectional futures.

If early research on the internet focused on content and the possibilities that different features of the web enabled, in more recent years there has been a shift, tuning into the multiple layers of this complex infrastructure. There has been a growing incorporation of feminist approaches to the processual and to multiplicities, especially from scholars of science and technology studies (STS). The main inspiration here comes from the work of Susan Leigh Star on the politics of infrastructures, standards and other 'boring things'.⁶¹ In particular, Star argues that studying information systems is inherently about infrastructures and that there is a need to 'surface invisible work'.⁶² Taking up this call, scholars such as Janet Abbate, Laura DeNardis and Francesca Musiani show the importance of different kinds of infrastructure elements which help sustain, manage, control and shape mundane digital things including internet protocols and standards as well as peer-to-peer technologies.⁶³ Other scholars in what is commonly termed 'software studies', including Wendy Chun and Taina Bucher, amplify the importance of analysing the politics of interfaces, algorithms and machine learning.⁶⁴

More recently, scholars such as Safiya Noble show the assumptions baked into algorithms and how these have direct consequences especially for black women.⁶⁵ With these more nuanced approaches we can start investigating new avenues of infrastructure, including interface design, metrics and algorithmic ordering, and the way they shape how we experience and understand the internet. In addition, we can listen in to how such 'boring' digital things effect and are affected by race, gender, and economic assumptions, which can help to amplify obscured histories that inform our everyday uses and understanding of these technologies.

When it comes to the hidden workers who make different media infrastructures function in different ways there has been much more attention in the past few years. The field

of content moderators in social media - the workers who ensure that anything that can be offensive or harmful as well as damaging to the media company will be filtered out - has received attention from various scholars.⁶⁶ Key aspects examined include work conditions, ethical considerations of filtering content, and negotiations between people about what has been removed. Such research demystifies the 'magical' and seemingly objective work of algorithms, and reveals the decision-making process behind such practices, and that the people who make these decisions are an integral part of the media apparatus.

In particular, these avenues of research also emphasise the racial(ised) and gendered aspects of such work and why it was important for companies to hire such cheap labour in various parts of Asia, through third-party companies that do not give workers proper job security, rights or benefits. Importantly, while these media companies' more prestigious workers, the programmers, are often credited for the 'innovation' and development of these companies, it is, in fact, the hidden workers who sustain, maintain and manage the success of these companies on a daily basis. Such a shift, focusing on maintenance rather than innovation,⁶⁷ is necessary not only for internet studies but especially for researchers in the field of media and communication who seem to have fallen for the 'engineer specialist' tale. This shift also means paying more attention to contracts, tax and labour laws, material resources and infrastructures, affective labour, training and maintenance, as core, not marginal, aspects of media and communication.

In histories of the internet, the common protagonists come from cybernetics, particularly the names of Claude Shannon, Norbert Wiener and Vannevar Bush. However, Elizabeth Losh tells a different story of Bush, usually credited as the famous inventor of computing, by shifting the focus to feminised care work.⁶⁸ Losh avoids focusing 'exclusively on programmers, engineers, or designers as potential "mothers of invention"', because there were other people involved in the development, diffusion, promotion, coordination of such technologies. As such, Losh aims to amplify the infrastructure history of technology by focusing on Mina Rees who was considered to be a 'low status assistant', but whose role was central in decision making, which Losh dubs technological 'care-work'. Drawing on STS and feminist approaches to infrastructure, Losh calls for attention to the roles that involve connection, mediation and caregiving as central to the development of technologies—valuing processes of reproduction and care rather than innovation.

But while Losh leans on a historiography that focuses on the work of one protagonist, Joy Rankin shows how the history of the personal computer and digital culture was part of a *collective* development by a diverse group of teachers and students working together on academic computing systems.⁶⁹ Rankin demonstrates how our understanding of the singular protagonist in media 'innovation' is misleading and that we should broaden our understanding of media history. Others such as Anna Lauren Hoffmann and Raina Bloom point to a larger group that was part of digital access, namely, librarians.⁷⁰ Demystifying the dominant narrative of Google Books, Hoffmann and Bloom argue that the company's 'ideology of access' is part of a broader ideology of information technology; we see how librarians' values of access which centres on complexity, locality, care and attentiveness to people's personal needs have been erased as a media practice, and replaced with Google's ideology of 'universal access'. As such, the move to Google Books has obscured the gendered contribution of women to information systems and

neglects their professional contribution to the way people access and engage with information.

Recent works about Chilean, Soviet, and French internet histories have provided further insights on this technology.⁷¹ They have shown how different political regimes as well as in local, social, economic and cultural contexts, have influenced the way internet technologies were developed and failed in these two cases. These examples are important for us to have a better understanding of the different paths that this technology has had, and importantly, the different paths it can have in the future.

Conclusion: researching media by other means

In this paper we propose ‘listening in’ as a theoretical and methodological framework to take stock of how we can do media and communication research differently. By examining the gendered work domains of ‘hidden’ or silent workers in media and communication—from film colourists and editors, to broadcast archivists and sound technicians through to promoters and content moderators—this article has shown the importance of tuning in to the ongoing processes within the multiple layers of communication systems. In particular, we offer the ‘listening in’ framework to examine media and communication through four pathways: expertise, layers of infrastructure, users, and the media canon. Influenced by feminist approaches to collective and ongoing processes of production, we argue that this framework allows us to shift attention into other directions in our research and how we tell it. It is about thinking and doing media and communication differently.

Throughout this paper we have foregrounded examples of research, ostensibly positioned as marginal, and argued that such insights should take centre stage in the history of media and communication. In particular, we advocate for rethinking previously rigid and fixed categories of media and communication roles, audiences, processes, (im)material infrastructures and their local adaptations and contestations. When it comes to the first avenue of *expertise*, we suggest focusing on practitioners who have been historically part of the media industry and production but have not received credit or acknowledgement. This could be done by tuning in to topics such as work, labour and union transitions or protests, as mentioned above in relation to telephone operators. The demonstrations and rebellion of the telephone operators against automating their work were a crucial point in showing the struggles of media companies trying to devalue hidden gendered labour. These cases can point to important tensions and decisions to adopt a particular technology or design. These workers can also challenge how we perceive the ‘finished’ media product by examining its various stages, including how it may be reciprocal (entanglements between infrastructure, producers, workers and audiences), and result in complex afterlives and waste.

When it comes to *layers of infrastructure*, we suggest examining the multi-layered design of systems, equipment and standards, but at the same time looking for other aspects of the production line, such as the material used, and place of production and manufacture. Future research in this vein could expand such concerns to include the study of formal agreements, laws or policies related to tax, environment and city planning, or art/cultural policy.

When it comes to *users*, we argued that researchers should take as a starting point differently-abled bodies and examine how technologies and their prescribed uses have

been developed (or not) around their needs. We also amplified the ways in which audiences may have an active voice in shaping media products; this may take the form of audience feedback, such as film test screenings that often shape the way films are edited before they are released to a wider audience. Finally, when it comes to the *media canon*, we emphasised that it is important to listen beyond the 'usual heroes': the directors, anchormen and internet innovators who tend to receive much of the focus, to the detriment of the many other stories around collective work, and in its diversely gendered, racialised and non-Western forms. We also emphasised how these decisions to focus on a limited pool of auteurs is reflected in archives, popular culture and newspapers through to research topics and teaching materials. In order to start telling new stories we need to be critical of our own practice and to challenge hegemonic knowledge production by offering a different body of knowledge.

'Listening in' is a call for action, to reprioritise, refocus, retell and reproduce different stories and research on media and communication. As scholars we have responsibility to keep critiquing and evaluating—not only our research objects and subjects but also our own practices and their consequences. Over the past few years, several initiatives such as 'decolonizing the syllabus' and #WomenAlsoKnowStuff have sought to correct the overtly male and Western-centric academic syllabuses and referencing practices. These initiatives are important and we adopt them ourselves in our practices. But they are not enough.

Our goal in this paper has been to take these political sounds and echo them into several other directions which we believe can serve not only academics but also others who work on media and communication, including artists, lawyers, activists, journalists and policy makers. The four avenues of multiplicities that we have outlined in this paper - expertise, layers of infrastructure, users, and the media canon - are useful tools to anyone who wants to tell, teach, write, play, create, sing, debate, programme and dance to a rhythm of inclusive, intersectional, feminist and ethical media and communication field. These proposals have a powerful political potential for much-needed change in the way we think and for the narratives we craft about historical pasts and futures, in and across film, broadcasting and the internet/new media.

Notes

1. Richard Rhodes, *Hedy's Folly: The Life and Breakthrough Inventions of Hedy Lamarr, the Most Beautiful Woman in the World* (New York etc.: Doubleday, 2012).
2. Elinor Carmi, 'The Hidden Listeners: Regulating the Line from Telephone Operators to Content Moderators', *International Journal of Communication* 13 (2019): 441.
3. Elinor Carmi, *Media Distortions: Understanding the Power Behind Spam, Noise and Other Deviant Media* (New York: Peter Lang, 2020), 32.
4. Lauren Berlant, 'The Commons: Infrastructures for Troubling Times', *Environment and Planning D: Society and Space* 34, no. 3 (2016): 393–419, here 393. On the relational nature of infrastructure, see also Susan Leigh Star, 'The Ethnography of Infrastructure', *American Behavioral Scientist* 43, no. 3 (1999): 377–91; Brian Larkin, 'The Politics and Poetics of Infrastructure', *Annual Review of Anthropology* 42 (2013): 327–43.
5. See, for instance, an understanding of 'listening in' as an approach that can connect 'specific texts, the sensory experience of listening and a political philosophy of listening' in Kate Lacey, *Listening Publics: The Politics and Experience of Listening in the Media Age* (Cambridge: Polity, 2013), 8.

6. Donna Haraway, 'A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century', in *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 149–82.
7. Maria DiCenzo, Lucy Delap, and Leila Ryan, 'Introduction: The Challenges and Contributions of Feminist Media History', in *Feminist Media History* (Palgrave Macmillan, London, 2011), 1–18; Rosalind Gill, *Gender and the Media* (Cambridge: Polity Press, 2015); David Hesmondhalgh and Sarah Baker, 'Sex, Gender and Work Segregation in the Cultural Industries', *The Sociological Review* 63 (2015): 23–36.
8. Alexander Badenoch and Kristin Skoog, 'Lessons from Lilian: Is Transnational (Media) History a Gendered Issue?', *Feminist Media Histories* 5, no. 3 (2019): 27.
9. Stephen Norwood, *Labor's Flaming Youth: Telephone Operators and Worker Militancy, 1878–1923* (Urbana: University of Illinois Press, 1990).
10. Lisa Nakamura, 'Indigenous Circuits: Navajo Women and the Racialization of Early Electronic Manufacture', *American Quarterly* 66, no. 4 (2014): 919–41.
11. *Ibid.*, 919.
12. Jennifer Gabrys, *Digital Rubbish: A Natural History of Electronics* (Ann Arbor: University of Michigan Press, 2011).
13. J.E. Smyth, *Nobody's Girl Friday: The Women who Ran Hollywood* (Oxford: Oxford University Press, 2018), 13.
14. Annette Förster, *Women in the Silent Cinema: Histories of Fame and Fate* (Amsterdam: Amsterdam University Press, 2018), 14.
15. For two classic accounts, see Amy Lawrence, *Echo and Narcissus: Women's Voices in Classical Hollywood Cinema* (Berkeley, CA: University of California Press, 1991); Kaja Silverman, *The Acoustic Mirror: The Female Voice in Psychoanalysis and Cinema* (Bloomington and Indianapolis: Indiana University Press, 1988).
16. Emily Thompson, 'Wiring the World: Acoustical Engineers and the Empire of Sound in the Motion Picture Industry, 1927–1930', in *Hearing Cultures: Essays on Sound, Listening and Modernity*, ed. Veit Erlmann (Oxford: Berg, 2004), 191–209.
17. Karen Pearlman and Adelheid Heftberger, 'Recognising Women's Work as Creative Work', *Apparatus: Film, Media and Digital Cultures of Central and Eastern Europe* 6 (2018), <https://doi.org/10.17892/app.2018.0006.124>.
18. Karen Pearlman, John MacKay, and John Sutton, 'Creative Editing: Svilova and Vertov's Distributed Cognition', *Apparatus: Film, Media and Digital Cultures of Central and Eastern Europe* 6 (2018), <https://doi.org/10.17892/app.2018.0006.122>.
19. For a recent example, see, for example, Walter Forsberg, 'Red Star/Black Star: The Early Career of Film Editor Hortense "Tee" Beveridge, 1948–1968', in *Screening Race in American Nontheatrical Film*, eds. Allyson Nadia Field and Marsha Gordon (Durham, NC: Duke University Press, 2019), 112–34.
20. Joshua Yumibe, 'French Film Colorists', in *Women Film Pioneers Project*, eds. Jane Gaines, Radha Vatsal and Monica Dall'Asta (New York, NY: Columbia University Libraries, 2013), <https://doi.org/10.7916/d8-7zt2-9e47>.
21. Erin Hill, *Never Done: A History of Women's Work in Media Production* (New Brunswick, NJ: Rutgers University Press, 2016), 6.
22. Aimee Dixon Anthony, 'Early African American Female Filmmakers', in *Silent Women: Pioneers of Early Cinema*, eds. Melody Bridges and Cheryl Robson (Twickenham: Supernova Books, 2016), 35–68; Kyna Morgan and Aimee Dixon, 'African-American Women in the Silent Film Industry', in *Women Film Pioneers Project*, eds. Jane Gaines, Radha Vatsal and Monica Dall'Asta (New York, NY: Columbia University Libraries, 2013), <https://doi.org/10.7916/d8-vt0f-1758>.
23. A'Leia Bundles, *On Her Own Ground: The Life and Times of Madam CJ Walker* (New York: Washington Square Press, 2002).
24. Karen Mahar Ward, *Women Filmmakers in Early Hollywood* (Baltimore: JHU Press, 2006), 3.
25. Mark Garrett Cooper, *Universal Women: Filmmaking and Institutional Change in Early Hollywood* (Urbana: University of Illinois Press, 2010).

26. Smyth, *Nobody's Girl Friday*, xv.
27. See Jennifer M. Bean, 'Introduction: Toward a Feminist Historiography of Early Cinema', in *A Feminist Reader in Early Cinema*, eds. Jennifer M. Bean and Diane Negra (Durham, NC: Duke University Press, 2002), 1–26.
28. Hill, *Never Done*, 6.
29. Christine Gledhill and Julia Knight, 'Introduction', in *Doing Women's Film History: Reframing Cinemas, Past and Future*, ed. Christine Gledhill and Julia Knight (Urbana: University of Illinois Press, 2015), 1–12.
30. *Ibid.*, 9. 'Outwith' is Scottish English for 'outside of'.
31. Jane M. Gaines, *Pink-slipped: What Happened to Women in the Silent Film Industries?* (Urbana: University of Illinois Press, 2018).
32. Charlotte Brunson, *The Feminist, the Housewife, and the Soap Opera* (Oxford: Clarendon Press, 2003); Charlotte Brunson and Lynn Spigel, eds., *Feminist Television Criticism: A Reader* (Maidenhead and New York: Open University Press, 2008); Kate Lacey and Michele Hilmes, 'Editors' Introduction: Women and Soundwork', *Feminist Media Studies* 1, no. 4 (2015): 1–4.
33. Kate Murphy, *Behind the Wireless: A History of Early Women at the BBC* (New York: Palgrave Macmillan, 2016); see also Jeannine Baker and Justine Lloyd, 'Gendered Labour and Media: Histories and Continuities', *Media International Australia* 161, no. 1 (2016): 6–17.
34. Kate Murphy, 'A Marriage Bar of Convenience? The BBC and Married Women's Work 1923–39', *Twentieth Century British History* 25, no. 4 (2014): 533–61.
35. Carol A. Stabile, *The Broadcast 41: Women and the Anti-Communist Blacklist* (Cambridge, MA: MIT Press, 2018).
36. *Ibid.*, 33.
37. *Ibid.*, 35.
38. Carolyn Birdsall, 'Divisions of Labour: Radio Archiving as Gendered Work in Wartime Britain and Germany', *Jaarboek voor Vrouwengeschiedenis/Yearbook for Women's History* 37 (2017): 107–33; Carolyn Birdsall, "Worlding the Archive: Radio Collections, Heritage Frameworks, and Selection Principles". in *Transnationalizing Radio Research: New Approaches to an Old Medium*, eds. Golo Föllmer and Alec Badenoch (Bielefeld: transcript, 2018), 197–208; Shawn VanCour, *Making Radio: Early Radio Production and the Rise of Modern Sound Culture* (New York: Oxford University Press, 2018).
39. Murphy, *Behind the Wireless*.
40. Birdsall, 'Divisions of Labour'; Kathryn Terkanian, 'Women, Work, and the BBC: How Wartime Restrictions and Recruitment Woes Reshaped the Corporation, 1939–45' (PhD diss., Bournemouth University, 2019).
41. Birdsall, 'Divisions of Labour'; Birdsall, 'Worlding the Archive'; Pearlman, Mackay and Sutton, 'Creative Editing'.
42. Keir Keightley, "'Turn it Down!' She Shrieked: Gender, Domestic Space, and High Fidelity, 1948–5", *Popular Music* 15, no. 2 (1996): 149–77; Maggie Andrews, *Domesticating the Airwaves: Broadcasting, Domesticity and Femininity* (London: A&C Black, 2012).
43. Elena Razlogova, *The Listener's Voice: Early Radio and the American Public* (Philadelphia, PA: University of Pennsylvania Press, 2011).
44. Jennifer Stoeber, 'Black Radio Listeners in America's "Golden Age"', *Journal of Radio & Audio Media* 26, no. 1 (2019): 119–33; Michele Friedner and Stefan Helmreich, 'Sound Studies Meets Deaf Studies', *The Senses and Society* 7, no. 1 (2012): 72–86; Bill Kirkpatrick, 'Voices Made for Print: Crip Voices on the Radio', in *Radio's New Wave: Global Sound in the Digital Era*, eds. Jason Loviglio and Michele Hilmes (New York: Routledge, 2013), 116–35.
45. Jennifer Lynn Stoeber, *The Sonic Color Line: Race and the Cultural Politics of Listening* (New York: NYU Press, 2016).
46. Derek Kompare, *Rerun Nation: How Repeats Invented American Television* (New York: Routledge, 2006).

47. Rachel Moseley and Helen Wheatley, 'Is Archiving a Feminist Issue? Historical Research and the Past, Present, and Future of Television Studies', *Cinema Journal* 47, no. 3 (2008): 152–8.
48. Christina Dunbar-Hester, *Low Power to the People: Pirates, Protest, and Politics in FM Radio Activism* (Cambridge, MA: MIT Press, 2014); Dwight E. Brooks and George L. Daniels, 'The Tom Joyner Morning Show: Activist Radio in an Age of Consolidation', *Journal of Radio Studies* 9, no. 1 (2002): 8–32; Lynn Spigel, 'Warhol's Everyday TV', *Multitudes* 5 (2010): 162–79.
49. Dolores Inés Casillas, *Sounds of Belonging: US Spanish-language Radio and Public Advocacy* (New York: NYU Press, 2014); Christoph Hilgert, Alina L. Just and Gloria Khamkar, 'Airtime for Newcomers: Radio for Migrants in the United Kingdom and West Germany, 1960s–1980s', *Media History* 26 (February 2020): 62–74.
50. Caroline Mitchell, *Women and Radio: Airing Differences* (London: Routledge, 2014); Brad Stiffler, 'Punk Subculture and the Queer Critique of Community on 1980s Cable TV: The Case of New Wave Theatre', *Television & New Media* 19, no. 1 (2018): 42–58.
51. Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (New Haven: Yale University Press, 2006); Clay Shirky, *Here Comes Everybody: The Power of Organizing without Organizations* (New York: Penguin, 2008).
52. José van Dijck, *The Culture of Connectivity: A Critical History of Social Media* (New York: Oxford University Press, 2013); Eli Pariser, *The Filter Bubble: What the Internet is Hiding from you* (New York: Penguin, 2011).
53. Jan van Dijk and Kenneth Hacker, 'The Digital Divide as a Complex and Dynamic Phenomenon', *The Information Society* 19, no. 4 (2003): 315–26; Neil Selwyn, Stephen Gorard and Sara Williams, 'Digital Divide or Digital Opportunity? The Role of Technology in Overcoming Social Exclusion in US Education', *Educational Policy* 15, no. 2 (2001): 258–77.
54. Eszter Hargittai, 'Second-Level Digital Divide: Mapping Differences in People's Online Skills', *First Monday* 7, no. 4 (2002), <https://doi.org/10.5210/fm.v7i4.942>. Eszter Hargittai, 'Digital Na(t)ives? Variation in Internet Skills and Uses Among Members of the "Net Generation"', *Sociological Inquiry* 80, no. 1 (2010): 92–113.
55. Stuart Blume, 'What can the Study of Science and Technology Tell us about Disability?', in *Routledge Handbook of Disability Studies*, eds. Nick Watson and Simo Vehmas (Abingdon, Oxon: Routledge, 2013), 358–69; Meryl Alper, *Giving Voice: Mobile Communication, Disability, and Inequality* (Cambridge, MA: MIT Press, 2017); Mara Mills and Jonathan Sterne, 'Afterword II: Dismediation: Three Proposals, Six Tactics', in *Disability Media Studies*, eds. Elizabeth Ellcessor and Bill Kirkpatrick (New York: NYU Press, 2017), 365–78.
56. Gerard Goggin, 'Disability, Connected Cars, and Communication', *International Journal of Communication* 13 (2019): 2763.
57. Rena Bivens, 'The Gender Binary will not be Deprogrammed: Ten Years of Coding Gender on Facebook', *New Media & Society* 19, no. 6 (2017): 880–98.
58. Anna Lauren Hoffmann, 'Data, Technology, and Gender: Thinking about (and from) Trans Lives', in *Spaces for the Future: A Companion to Philosophy of Technology*, eds. Joseph C. Pitt and Ashley Shew (New York: Routledge, 2017), 3–13; Sasha Costanza-Chock, 'Design Justice, AI, and Escape from the Matrix of Domination', *Journal of Design and Science* (July 2018), <https://doi.org/10.21428/96c8d426>.
59. Aimi Hamraie, 'Crippling Feminist Technoscience', *Hypatia* 30, no. 1 (2015): 307–13; Aimi Hamraie, *Building Access: Universal Design and the Politics of Disability* (Minneapolis, MI: University of Minnesota Press, 2017).
60. Alison Kafer, 'Compulsory Bodies: Reflections on Heterosexuality and Able-Bodiedness', *Journal of Women's History* 15, no. 3 (2003): 77–89; Alison Kafer, *Feminist, Queer, Crip* (Urbana, IL: Indiana University Press, 2013); Robert McRuer, *Crip Theory: Cultural Signs of Queerness and Disability* (New York: NYU Press, 2006).
61. Star, 'The Ethnography of Infrastructure'.
62. *Ibid.*, 385.

63. Janet Abbate, *Inventing the Internet* (Cambridge, MA: MIT Press, 2000); Laura DeNardis, *Protocol Politics: The Globalization of Internet Governance* (Cambridge, MA: MIT Press, 2009); Francesca Musiani, 'Caring about the Plumbing: On the Importance of Architectures in Social Studies of (Peer-to-Peer) Technology', *Journal of Peer Production* 1 (2012), <http://peerproduction.net/issues/issue-1/peer-reviewed-papers/caring-about-the-plumbing/>.
64. Wendy Hui Kyong Chun, *Control and Freedom: Power and Paranoia in the Age of Fiber Optics* (Cambridge, MA: MIT Press, 2008); Taina Bucher, *If... then: Algorithmic Power and Politics* (New York: Oxford University Press, 2018).
65. Safiya Umoya Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: NYU Press, 2018).
66. Sarah T. Roberts, 'Digital Refuse: Canadian Garbage, Commercial Content Moderation and the Global Circulation of Social Media's Waste', *Wi: Journal of Mobile Media* 10, no. 1 (2016): 1–18; Tarleton Gillespie, *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions that Shape Social Media* (New Haven: Yale University Press), 2018; Elinor Carmi, 'The Hidden Listeners: Regulating the Line from Telephone Operators to Content Moderators', *International Journal of Communication* 13 (2019): 440–58.
67. Andrew L. Russell and Lee Vinsel. 'After Innovation, Turn to Maintenance', *Technology and Culture* 59, no. 1 (2018): 1–25.
68. Elizabeth Losh, 'Home Inspection: Mina Rees and National Computing Infrastructure', *First Monday* 23, no. 3 (2018), <https://doi.org/10.5210/fm.v23i3.8282>.
69. Joy Lisi Rankin, *A People's History of Computing in the United States* (Cambridge, MA: Harvard University Press, 2018).
70. Anna Lauren Hoffmann and Raina Bloom, 'Digitizing Books, Obscuring Women's Work: Google Books, Librarians, and Ideologies of Access', *Ada: A Journal of Gender, New Media, and Technology* 9 (2016), doi:10.7264/N3BC3WTH.
71. Eden Medina, *Cybernetic Revolutionaries: Technology and Politics in Allende's Chile* (Cambridge, MA: MIT Press, 2011); Benjamin Peters, *How Not to Network a Nation: The Uneasy History of the Soviet Internet* (Cambridge, MA: MIT Press, 2016); Julien Mailland and Kevin Driscoll, *Minitel: Welcome to the Internet* (Cambridge, MA: MIT Press, 2017).

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Carolyn Birdsall is Associate Professor of Media Studies at the University of Amsterdam. Her publications include the monograph *Nazi Soundscapes* (2012), *Doing Memory Research* (Palgrave 2019, with Danielle Drozdowski) and 'Listening to the Archives: Sound Data in the Humanities and Sciences' (2019, with Viktoria Tkaczyk). Birdsall is currently leading the NWO-funded project TRACE (Tracking Radio Archival Collections in Europe, 1930-1960), which explores transnational dynamics in how radio was historically recorded, archived, circulated and re-used in Europe. For more information on this project, see www.trace.humanities.uva.nl.

Elinor Carmi is a Research Associate in Digital Media & Culture at the Department of Communication and Media at Liverpool University, UK. She recently published her second book *Media Distortions: Understanding the Power Behind Spam, Noise, and Other Deviant Media* (open access on Peter Lang). She is working on several projects: (1) 'Me and My Big Data—Developing Citizens' Data Literacies' Nuffield Foundation funded project; (2) 'Being Alone Together: Developing Fake News Immunity' UKRI funded project; (3) POST Parliamentary Academic Fellowship working with the UK's Digital, Culture, Media & Sport Committee on the project: 'Digital literacies for a healthy democracy'. Before academia, Elinor worked in the electronic dance music industry

for various labels, and was a radio broadcaster and a music television editor for almost a decade. She also tweets @Elinor_Carmi.

ORCID

Carolyn Birdsall  <http://orcid.org/0000-0001-9870-3035>

Elinor Carmi  <http://orcid.org/0000-0003-1108-2075>