Introduction

Science and Media in Cold War Europe

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Representations of scientific knowledge and scientists on screen and paper provoked both awe and anxiety among audiences during the Cold War—and continue to do so today.[1] After the end of World War II, scientists, governments, and the public alike sought to reevaluate the impact of war and genocide as well as of the most destructive force in the history of mankind—the atomic bomb. With this reevaluation arose the questions of how to preserve the peace and how new advances in science and technology would contribute to this goal.[2] For the West, the very notion of a Cold War—famously coined by British author George Orwell in a much-cited 1945 essay "You and the Atomic Bomb"—carried the fear that it would be displaced from its control over geopolitical economies and, ultimately, world peace.[3] From the very inception of the term, Orwell—following James Burnham's political philosophy—linked knowledge production and circulation via public media to science and power. Indeed, then as now, print and audiovisual media, as well as feature and documentary films, responded to societal aspirations and anxieties and made scientific knowledge more accessible to the wider public. After World War II, theoretical and popular science journals, radio broadcasts, public relations (PR) films, and educational and other media reflected not only on the threat of nuclear war but also on the need to harness science for the advancement of humanity.

The "dual use" of technology and science, which could both harm and aid humanity, was a dilemma that soon became central to two new disciplines: science studies and the history of science.[4] Nevertheless, the military sponsorship of scientific research—and the resulting entanglement of science with media and governmental bodies as well as armament efforts—remained insufficiently explored. Concurrently, scientific organizations not only continued to interact with expert audiences, including researchers in industry and the academy, but

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also began making some of their research available to the public via mass media. Theoretical nuclear physicists who had been involved in wartime atomic programs in Nazi Germany, for example, were now able to reestablish their careers and advertise their expert knowledge in relation to new "democratization" projects, be they in the service of either a communist or democratic society.

A prominent example for the new awareness of the duality of science and technology is the signing, in April 1957, of the so-called Göttinger Erklärung (Göttingen Manifesto) by eighteen leading West German scientists (the Göttingen Eighteen). Among them were nuclear experts who both rejected the production of nuclear armaments and advocated for the peaceful use of science to reduce global conflicts.[5] Also in 1957, the international Pugwash Conferences on Science and World Affairs, still taking place today, were founded to "bring scientific insight and reason to bear on the catastrophic threat to humanity posed by nuclear and other weapons of mass destruction" and to appeal for the reduction of armed conflicts by scientific and diplomatic means to secure international peace.[6] Thus, scientists on both sides of the Iron Curtain contributed, on one hand, to advancing nuclear research and, on the other hand, to achieving a "nuclear balance".[7]

By the 1960s, with the arms and space races in full swing, public interest in scientific knowledge and scientists at the service of the state escalated. The decade saw the release of Mikhail Romm's drama *Nine Days in One Year* (1962, USSR), about a physicist in the socialist bloc, and of Stanley Kubrick's classic *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb* (1964, US/UK). Though quite different in formal and narrative terms, both films visualized the widespread fear of experiments with fusion power and the detrimental effects of radiation on the human body. Focusing on the moral dilemmas faced by scientists, these pictures invited viewers to question the boundless potential of science as well as its limitless capacity for destruction. These topics continued to shape the popular imagination of science and scientists throughout the Cold War and beyond. That scientists' dilemmas remained in focus until the very end of Eastern European communisms is indicated by the 1990 premiere of the East German documentary *Väter der Tausend Sonnen* (*Fathers of a Thousand Suns*, dir. Joachim Hellwig, 1989, GDR). Indeed, the film's US premiere, at the World Fellowship Center in New Hampshire in 2023, inserted it into current discussions of pacificism and political action as well as renewed fears of nuclear warfare fueled by ongoing global crises like the Russian invasion of Ukraine.

Fathers of a Thousand Suns tells the story of Klaus Fuchs, a participant in the Manhattan Project and infamous Cold War spy. Before joining the highly secretive Los Alamos Laboratory in 1944, Fuchs had escaped from Nazi Germany and pursued a research career as a nuclear physicist in Bristol, in the UK. A committed communist since his youth, he became a spy for the So-

viet Union and, for several years, transmitted classified information that aided the Soviets in designing their own atomic bomb. Tried and convicted of being a spy in 1950, Fuchs was nevertheless released after spending only nine of fourteen years in prison. In 1959, he started a new life in East Germany (GDR), where he led the Central Institute for Nuclear Physics near Dresden until 1979. Here, he achieved considerable prominence and recovered his reputation.

Upon closer inspection, the film is one example, among many others, of how Cold War media construed the image of the scientist. Hellwig's documentary represents more than twenty physicists from the United States, the UK, and the USSR, as well as from East and West Germany, who not only worked with Fuchs but also were intimately involved in creating the atomic bomb before and after the end of World War II. The film not only sheds light on the moral dilemmas of this international community of physicists but also documents, on camera, paths of transmitting scientific knowledge from the capitalist to the communist camp during the Cold War. A microhistory of the Cold War, *Fathers of a Thousand Suns* went beyond laboratory epiphanies to thematize the impact of nuclear research on individual lives; in addition to recording interviews with witnesses, the director used unpublished footage and photographs from international archives and private collections on both sides of the Iron Curtain. *Fathers of a Thousand Suns* thus confirms that both confrontation and cooperation shaped the exchange and exploitation of scientific knowledge between the Cold War's ideological blocs.[8]

As the present volume shows, various media during the Cold War fulfilled a similar function. Their role in inserting, representing, reshaping, and construing scientific knowledge in relation to people's everyday lives is emphasized in the subtitle: "media cultures of knowledge production." More importantly, the present volume takes its cue from perennial discussions about competing discourses and definitions media representation of science and the role of the scientist as a public figure during the Cold War.[9] The chapters in this volume both interrogate the entanglements of science institutions and scientific discovery with politics and media and also explore the role and contributions of a multiplicity of media products to the Cold War.

Science and Expert Knowledge in the Cold War

Science on Screen and Paper: Media Cultures of Knowledge Production in Cold War Europe explores in what ways science and media were central to the making of the Cold War as well as to the lived experiences of persons in divided Europe. The chapters illuminate the impact of the ideological and scientific competition between the United States and the USSR on individual

lives, as well as geopolitical and cultural differences between societies on both sides of the Iron Curtain. The production, circulation, and reception of knowledge, as well as control over these processes, shaped events and experience on both sides. As historian Michael Gordin has argued, the Cold War was as much about "knowledge about knowledge"—what kind of knowledge was circulated, who possessed it, and who did not—as it was about the knowledge itself, as understood in a political, scientific, and media production context.[10]

Historian Odd Arne Westad has emphasized that the Cold War was as much about the "control and improvement" of the Global South and other areas as it was about politics and ideology. He notes: "It is to me less meaningful to talk about patterns of US or Soviet domination as 'empires,' than to describe them in a specific temporal sense."[11] Building on Westad's insight that we must see the Cold War as part of a longer trajectory of human history—shaped by colonialism, imperialism, discrimination, racism, and the geopolitical divisions between the Global North and South, as well as East and West—this volume also contextualizes the production and exchange of knowledge within preexisting patterns of dominance and control, oppression and restricted access. The studies of transnationally produced media and films by Evan Torner, Sarah Stein, and Jan Uelzmann importantly shed new light on the control of knowledge and information as well as on marginalizing and oppressive representations of non-European peoples and Persons of Color in Cold War–period media.

In short, hegemony over knowledge and information was not only contested between the two ideological camps of state socialism and capitalism. In the last decade, the authors of *The Cambridge History of the Cold War* have accordingly examined the origins, crises, and ending of the Cold War and determined that it was not a monolithic era, frozen in time, but rather one shaped by evolving, dynamic political and cultural processes as well as transnational protagonists and institutional relations.[12] Historians of science Naomi Oreskes and John Krige have advocated for looking at science more broadly and at knowledge production more specifically, taking into account cultural origins in dialogue with given societies.[13] Adopting media and media representations as our lens is how we propose to contribute to such (re)contextualizations.

An important intervention made by Oreskes and Krige has been to raise the question of the extent to which the space and arms races, ideological animosities, and instances of collaboration changed the content and/or the character of the scientific knowledge that was produced during the Cold War.[14] Sheila Jasanoff, a leading voice in science and technology studies, concurs, arguing that scientific knowledge and society are coproduced and coexist.[15] In other words, knowledge production and its material carriers are products of social life and the media that shapes it. This perspective must become central to our understanding of media knowledge production in the Cold War. Jasanoff

further suggests that we may only gain explanatory power and insight into scientific processes by thinking of natural and social orders as produced together.[16] In agreement with Jasanoff, Lorraine Daston argues that disciplinary boundaries between the history of science, science and technology studies, and other fields must be challenged and overcome.[17] Our volume responds to the appeals of these scholars to establish vital connections that link science and knowledge production to media and politics in the second half of the twentieth century.

Media Cultures of Knowledge Production

Within the framework of the Cold War, "media cultures of knowledge production" emerge at the intersection of media studies and science and technology studies. The multidimensional relationship between science and media—or, as we are saying, media cultures of knowledge—is not a new phenomenon, and it impacted politics and the public throughout the Cold War period. Focusing on this approach allows us to reflect on the ways in which scientific discourse was adapted or critiqued in film, audiovisual, and print media in divided Europe.

Scientific knowledge and its distribution have been significantly reconceptualized since the 1990s, as Peter Weingart and other scholars identified a "new arrangement between science and media."[18] Weingart has characterized the new status quo by the "pre-publication of results in the media, the role of media prominence in relation to scientific reputation, and the initiation of catastrophe discourses in order to catch public attention."[19] In contrast, the ideal form of knowledge production in the twentieth century, according to historian Paul Forman, was a combination of cultural core values, such as "general assent in modernity: proceduralism, disinterestedness, autonomy, and solidarity."[20] Forman argues that, in the 1960s, closed scientific communities, laboratory teams, and academic organizations bowed out of their influence on the interpretations of scientific problems, and mass media began taking center stage. Building on Forman's observations, Edgar Grande furthermore highlights the processes of "medialization," or the rising influence of media in all social spheres, as well as new forms of communicating knowledge production to the public.[21]

Cold War media representations of scientists and scientific research not only proliferated new forms of knowledge but also were steeped in the tensions, conflicts, and convergencies of different political agendas and policies. Film as a medium, for example, traveled across geopolitical borders and evolved in several different genres to reach various audiences and respond to different ideological and educational purposes. With the idea of genres, we

introduce a crucial distinction between three types of nonfictional, specifically scientific films, which are of particular importance to some of the chapters that focus on Germany: science films (*Wissenschaftsfilme*); technical research films (*technischer Forschungsfilme)*, a subgenre of the science film; and educational films (*Lehrfilme* or *Unterrichtsfilme*).[22] Science films were part of the interaction between media and research, and they connected scientific innovations and technological changes with national (and nationalist) agendas. These are films made to support and visualize research on scientific topics and experimental practices. They may or may not be used outside of the lab—e.g., for university or professional education.

Educational or pedagogical films were films made to help teach science subjects in schools, mostly at the primary and secondary level. A subcategory here are the health and hygiene films. Because of their use in the classroom they also had impact as instruments of social policies.[23]

Until recently, scholarly interest has gravitated toward the (geo)political, diplomatic, and military functions of science and scientists more than on media or institutional histories.[24] Science and technology studies of the Cold War have recently turned to "science diplomacy," as a subcategory of "soft power," in order to reveal and situate new high-profile protagonists that operated on both the state-sponsored and supranational levels. Simone Turchetti, on the one hand, has investigated how the promotion of scientific collaboration among national research groups can become a powerful tactic to strengthen relations between nonpolitical actors and to counter political divisions.[25] Alison Kraft and Carola Sachse, on the other hand, have pointed out that scientists are now "emphasizing the 'common language of science' as a means to transcend national and ideological allegiances," which has the potential to constitute "a new kind of transnational, cross-bloc scientific diplomacy involving—and made possible by—elite scientists."[26] Kraft, Sachse, and Turchetti agree that scientists have productively shaped the rising international critique related to environmental issues and climate change, the use of nuclear weapons, and nuclear power, along with other social justice movements.[27]

Building on such key studies, *Science on Screen and Paper* seeks to bolster what has been marginal engagement by scholars with nonfiction, nonmainstream films and the politics and agencies that shaped science and education programs in Cold War Europe. The chapters in the volume interrogate a range of important questions: How do we conceive of the Cold War as shaped by evolving, intertwined cultural and ideological processes instead of as static phenomenon? What can the intersections of scientific research with media representations reveal about international relations and transnational exchanges that took place during the Cold War? What types of organizations, institutions, and protagonists played pivotal roles in connecting the laboratory

to the screen or printing press? How did state funding influence science programs and their popularization in the media? How were scientists consulted in view of setting policies? How were scientific breakthroughs and discoveries communicated to the public?

To begin answering such questions, *Science on Screen and Paper* explores historical situations that reveal the process of appropriation, medialization, and popularization of science in various countries via various forms of media. Our objective is twofold: to disclose ways in which scientific knowledge was utilized for knowledge production and ideological purposes during the Cold War, and to explore ways in which media simultaneously shaped scientific discourse and/or experimental practices.[28] Spanning a wide range of media—from PR materials and print journals to educational and science films to children's magazines and television—the contributions in this volume seek not to ignore or marginalize differences between media but rather to focus on intersectional themes and common strategies in representing science. Taking the unique history of each type of media into account, each chapter highlights overlaps and mutual influences among distinct media representations of science with regard to narratives, representations, and aesthetics. The volume thus combines contextualized media archaeology with in-depth media analysis. Anchored in the history of knowledge, film, and media analysis, it aims to begin developing an archive to help understand how moving images represented, produced, impacted, and transformed scientific knowledge and epistemic practices in the Cold War.

The volume is centered on Germany and other European countries. While it thus offers good coverage of Eastern and Western European examples, the important contribution made by chapters on print and audiovisual media in North and South must not be overlooked. In approaching their topics, these fold theories of knowledge production and critical race and postcolonial theories into an interdisciplinary media studies approach. Finally, in our attempt to facilitate comparisons of Cold War approaches to science, media, and knowledge production in different political and temporal contexts, we chose to group the chapters by topic, not by national focus.

Why Do Media Representations of Science Matter?

Media representations have produced knowledge and contested the promise of scientific objectivity, while at the same time foregrounding often contentious relationships between narrative and visual presentations of information. Media representations, as defined in this volume, are images and narratives created in different historical and political contexts of the long twentieth century. Around 1900, methods of visualization, such as filming experiments,

increasingly became part of scientific practices in diverse fields, including biological studies of animal and human behavior. In the post-war era, scientists made observations of molecular and biochemical processes, and neurological imaging procedures. In the process, educators, journalists, and filmmakers entered laboratories and scientific institutes and their communities to apply their training and skills to the visualization of scientific work. One aim was to disseminate the knowledge of technology and scientific innovation among wider audiences; another goal was to explore experimental processes and methods for the creation of scientific evidence. As Juliane Scholz's contribution to this volume demonstrates, such collaborations among media, science organizations, and researchers often continued over long periods of time, sometimes surviving war, political crises, and changes of government and ideology before and after 1945. In a similar consideration of longevity, Mario Schulze's chapter tracing the materiality of film demonstrates ways in which the medium was manipulated and recycled to attend to changing political demands during the course of the Cold War.

Science on Screen and Paper foregrounds a variety of agents and audiences involved in science-related media representations, thus building on media studies scholarship by authors such as Stuart Hall, Christian Bonah, Anja Laukötter, Shani Orgad, and Myra Macdonald, to name but a few.[29] Bonah and Laukötter have argued that visual media are not merely "a mirror or expression of the things they depict, (. . .) media and art are endowed with their own distinct, interactive, performative power."[30] Several chapters in this volume, notably those by Darina Volf, Doru Aurel Pop, Sophia Gräfe and Kerrin von Engelhardt, and Ettore Costa, productively engage with underlying power structures, asking how media representations of science and scientists have negotiated concepts of self and other, of authenticity and objectivity, science fiction and propaganda. Power, as Orgad has observed, can emerge through "players (institutions, groups, individuals) [who] increasingly compete for visibility and voice," as well as "through the projection of symbolic representations on to the global media space."[31] Indeed, as Hall has argued, visibility in the media images and narratives becomes "a means of claiming recognition and exercising power."[32] In other words, he continues, representations are not mere images or reflections but also interpretations that frame our understanding of the world and our lived reality. Chapters by Evan Torner, Sarah Stein, and Jan Uelzmann bring Hall's scholarship on uncovering the politics behind the "work" done by representations into dialogue with studies on Cold War media and representation of non-European peoples from the Global South. Like other scholars who have responded to Hall's reframing of media representations and explored them in a global context, these authors study their role in both local and national contexts while accounting for alterity, identity, positionality, and political position.[33]

This volume also advances our understanding of media representations by approaching them in their relationship to science and economic, social, and political power. "Power relations are encoded in media representations," Orgad writes, "and media representations in turn produce and reproduce power relations by constructing knowledge, values, conceptions, and beliefs."[34] This leads us to the idea of representations as social constructs. This fundamental idea, proposed by Myra MacDonald, among others, destabilizes the way in which we see media; from this point of view, media simultaneously cite, depict, reflect, and represent scientific knowledge and discoveries. In other words, the very act of representation—let alone the various genres or types of media representations—often subtly, but nevertheless intrinsically, participates in the reproduction and contestation of existing power relations. While this phenomenon certainly existed well before the Cold War, in this period, as many of the contributions to this volume illustrate, it was amplified and reached a new level of sophistication.

Science on Screen and Paper thus seeks to both open a forum and provide methodologies for developing a critical understanding of the media representations of scientists and scientific knowledge during the Cold War. To this end, the chapters in this volume perceptively foreground the importance of science, nongovernmental institutions, and the changing patterns of production, distribution, and receptions of different media forms, genres, and formats. Doru Aurel Pop's chapter, for example, approaches the significance of scientific advancement and the space race for sci-fi literature through the lens of "anticipation"—a concept completely foreign to Western and Western European science fiction. Sandra Schnädelbach looks at how scientific and pseudoscientific knowledge was disseminated in the 1960s and 1970s, focusing on the example of "suggestology"—a learning technique that originated on the fringe of the European continent and swept up Eastern European audiences via television. Josephine Diecke takes a different approach, positioning her chapter at the intersections of environmental and media studies; she argues that, as scientific concepts became more mediated and popularized, they also entered public ecological and political debates. Sophia Gräfe and Kerrin von Engelhardt trace and describe government institutions that largely focused on the aesthetics and didactics of educational films, seeking the most effective use of cinematic images to optimize learning processes in various social settings.

Research institutions in Cold War Europe developed their own active communications with public stakeholders in order to maintain steady funding for their projects and secure their image as guarantors of scientific progress and modernization. Juliane Scholz's and Mario Schulze's chapters insightfully interrogate these processes. These authors demonstrate that, as research institutions came under public scrutiny, they had to legitimize their need for state funding by explaining and publicizing their scientific inventions and potential

applications for new technologies. This trend toward professionalized communication strategies on the part of science institutions engendered internal PR and communications departments, as well as science journalism, which evolved in the 1970s and 1980s—all of which fostered the public reach of their work.[35] To expose the vagaries of making scientific information public knowledge, but also its appropriation for propaganda purposes, Ettore Costa interrogates the rhetoric used in Italian communist media. In addition, Uelzmann's and Stein's chapters in this volume engage with these topics to reveal understudied uses of film, such as West German PR films and French educational films produced for postcolonial Africa. Like Torner, these authors expose and critique the underlying political nature of state-sponsored films in a context of decolonization and persisting Eurocentrism and racism.

Organization and Scope of the Volume

Science on Screen and Paper thus offers a series of in-depth case studies at the intersection of science and media studies as it investigates relationships between scientific achievements, film, television, and institutional and individual actors in science and politics. The outlook is international, covering East and West Germany, Romania, Bulgaria, Italy, and France, but also Guinea, Burkina Faso, the Soviet Union, and the United States. The three sections are organized to group chapters that interact with one another. There are, of course, also important intersections and interconnections between chapters in different sections as well, and we hope that readers will discover even more points of comparison themselves. Part 1, "Institutional and Industrial Contexts," focuses on the appropriation and reuse of scientific films by educational institutions and the dissemination of scientific knowledge from scientists and labs to the wider public. Part 2, "Imaginaries of Self and Other," explores the role that science-fiction media—including feature films, literature, and print media like newspapers and popular science journals—played with respect to science and in Cold War cultural diplomacy. Part 3, "Science in Public and Educational Media," interrogates the educational agendas that informed film, audiovisual, and print media production, focusing in particular on propaganda, Eurocentrism, and disguised racism, and provides a critical engagement with capitalist and socialist states.

Part I: Institutional and Industrial Contexts

The three chapters included in this part focus on specific scientists and film officials who legitimized and popularized film production for research purposes, thus shedding light on institutional and industrial contexts in East and

West Germany and the United States. Two of the chapters focus on the problematic reuse of scientific films in educational and science institutions after World War II and on their transnational movements and distribution. The last chapter in this section focuses on the role of scholarly debates in science publications and print media and recounts how they, in turn, influenced larger political debates on environmental issues; it also analyzes the institutionalization and archival preservation of research films in East Germany.

The volume opens with Juliane Scholz's study of postwar West Germany, focusing on institutional transformations and the appropriation of science films that had been made in the Third Reich. "Whitewashing the Nazi Past: Continuity and Transformation in Scientific Cinematography in Germany, 1934–56" looks at one of the advocates for the recycling of these films, Gotthard Wolf, who—after a career in the Nazi film industry—spearheaded founding the Institute for Scientific Film (IWF) in Göttingen. In 1949, Wolf advocated for distinguishing the political propaganda of Nazi nonfictional *Kulturfilme* (culture films) and commissioned *Unterrichtsfilme* (educational films) from *Wissenschaftsfilme* (science films), which focused mostly on research experiments and therefore, he claimed, had only scientific functions that were free of propaganda. After World War II, Wolf's definition constituted a successful exculpatory strategy in the attempt to absolve himself and his colleagues from political incrimination. By tracing the evolution of science films through their iterations during the Nazi period and in postwar scientific organizations in West Germany, Scholz outlines how science films, specifically the subgroups "technical research films" and "medical films" used in military research and to legitimate "eugenic" policies during World War II, were repurposed during the Cold War for educational purposes.

In "Flow Vis for the Space Race: German Science Films in U.S. Education during the Cold War," Mario Schulze adopts a different vantage point in examining the international reappropriation of research films. He focuses on the US-based National Committee for Fluid Mechanics Film (NCFMF), led by Ascher H. Shapiro, an MIT professor of mechanical engineering. Cosponsored by the Ford Foundation and the National Science Foundation, the NCFMF produced one of the most extensive US educational film programs during the Cold War. Though the films attempted to represent science as a nonideological endeavor, Schulze demonstrates that they were deeply enmeshed in the politics of the Cold War. In creating educational materials for US students and professionals, the NCFMF used film sequences made for military purposes before World War II that were later instrumentalized by the Nazis. Schulze's analysis of the circulation, instrumentalization, and distribution of science films across decades and governments helps us trace the materiality and mediality of scientific knowledge; categories of research and educational film also become more tangible and distinct—both in their ideological implications

and for our understanding of how films functioned as political instruments in the Cold War.

Turning our attention to institutional contexts on the other side of the Iron Curtain, Josephine Diecke's "Raw Film Manufacturing: Between Economic Efficiency and Environmental Awareness in East Germany" looks at raw film stock production in the GDR in relation to evolving debates on pollution and environmental issues. The author analyzes professional discussions about manufacturing, environmental pollution, and economic efficiency in the trade journal *Bild und Ton* (Image and Sound), which circulated in the GDR from 1948 to 1992. Despite its finite resources, the East German economy was able to maintain production for the lucrative markets for chemical and film production. Although water pollution and other harmful side effects of chemical processes were public by the 1970s, changes in favor of environmental protection were not enacted until the 1980s. Diecke's important study draws connections between the chemical and film industries while demonstrating that short-term industrial efficiency was ultimately more important to the GDR than the incentive of long-term sustainability.

Part II: Imaginaries of Self and Other

The four chapters in part 2 trace the works of filmmakers and authors who created utopian and dystopian visions of the future, as well as of self and other, within their respective national contexts, in Bulgaria, Romania and the Soviet Union, the United States, and the GDR. These studies demonstrate that science magazines and sci-fi films and novels popularized expert knowledge in the process of legitimizing or critiquing national ideologies, racial biases, and alterity. They alternately endorsed and perpetuated or criticized and scrutinized both Western capitalism and Eastern communisms. Within socialist countries, the lively export of science and sci-fi texts and films and exchange of ideas—on topics ranging from science in the service of peace, to the psychedelic revolution and parascience—did not preclude racial bias and discrimination on screen and paper, however. Critically assessing the transnationalism of such exchanges, the chapters in this section indicate that, however forward-thinking or modern they were, popular media representations of science and sci-fi remained tainted by colonial and racist imaginary.

In "Between Cooperation and Competition: Cold War Imaginaries and Representations of US-Soviet Encounters in Space," Darina Volf argues that cultural and media imaginaries in both East and West oscillated between dreams of productive cooperation and the reality of competitive national displays. Focusing on cinematic representations of cooperation and competition, she demonstrates how fictional films actually influenced space exploration practices and the development of space technologies. Volf analyzes "socio-

technical imaginaries" of space cooperation in three films—one Soviet, one US, and the first East German–Polish coproduction. In envisioning technological innovations, such sci-fi films and television shows presented fantasies of what was technologically attainable and disseminated normative views on what was socially desirable. Over the course of the 1960s, these views helped bolster the idea of space cooperation, which gradually replaced the previously dominant perception of space as an arena for national and systemic competition. Bringing in examples from opposing US and Soviet national media outlets, Volf argues that media coverage contributed to the further spread of imaginaries originating in sci-fi films. As the ideal of space cooperation was articulated as the desirable norm in the mass media, it increasingly formed public expectations of national space programs.

In "Postcolonial Science Heroes in East German Science-Fiction Films," Evan Torner offers a different approach, applying the early sci-fi concept of "science heroes" to four canonical East German science-fiction films. As the socialist bloc embraced antiracist internationalism as an ideology and as an aesthetic strategy, attempts were made in some of these films to represent a post-racist future. Nevertheless, Torner argues, these films reveal the latent whiteness inherent in European socialist culture. The author then traces the ways in which tropes of the sci-fi genre lend themselves to a patriarchal, colonial understanding of science and the cosmos—in keeping with the actual oppressed social circumstances of BIPOC in the GDR. His interrogation of the bias inherent in sci-fi films by Eastern European, socialist partners reveals that these films rely on tokenism and the image of the white savior. In a brief look at the context of German and Eastern bloc sci-fi, as well as the production and reception of the four films, the chapter highlights the understated postcolonial regimes in the films, which confirm a socialist multicultural white mindset.

In "The Culture of Anticipation and Science Fiction in Socialist Romania," Doru Aurel Pop analyzes how Romanian science-fiction cinema was born and evolved under Romania's socialist regime. The popularization of space fiction coincided with the popularization of science and the modernization of Romanian society. Pop adopts an interdisciplinary approach that couples film analysis with an explanation of the political and historical contexts. As a case study, the author explores Ion Popescu-Gopo's science-fiction films made at the state-owned Buftea Film Studios. Moving between text and film, this chapter links the Romanian sci-fi genre to a genre known as *film de anticipație* (anticipation films). "Anticipation" was a notion that Romanian authors borrowed from French literary theory to develop the concept of scientific anticipation literature. Alongside a review of sci-fi literature widely available in socialist Romania, Pop's analysis interprets a larger cultural phenomenon in Romania, which he calls a "culture of anticipation"; cultural expressions of this phenomenon included anticipation almanacs, books popularizing science, and

science-fiction novels and comics, all of which influenced social interactions under socialism.

In "(Un)Healthy Tunes: Body, Mind, and Music on Socialist Television," Sandra Schnädelbach focuses on a set of television programs, shown in the GDR in the late 1970s and 1980s, which popularized "suggestology," a pseudoscientific method of knowledge acquisition developed in Bulgaria. Schnädelbach demonstrates that TV broadcasts on "suggestology" had an impact far beyond Bulgaria and became part of an international scientific competition. Building on Soviet psychological research on hypnosis and suggestion, suggestology claimed that it accessed the hidden resources of the brain by means of relaxation techniques and sensory, especially acoustic stimulation. Introduced by a team led by psychotherapist Georgi Lozanov in the mid-1960s, the research field of suggestology and its pedagogical application, suggestopedia, were particularly present in East German science TV shows of the 1970s. In addition to providing a fascinating excursion into the history of Soviet and Eastern European pedagogical research, this chapter argues that suggestopedia touched the core of the Cold War preoccupation with "brainwashing" and found applications in neurology as well as psychology.

Part III: Science in Public and Educational Media

The contributions in part 3 share an interest in how film and media products were employed for educational purposes in different national and international contexts. They point to both the potency and pitfalls of media once harnessed for education beyond national borders. The first chapter explores the ideological underpinnings of representations of the space race in print media put out by the Italian Communist Party (PCI). The second chapter examines the role of science films in GDR education and research, skillfully incorporating discussions taking place in the trade magazine *Bild und Ton* (Image and Sound). Taken together, these chapters demonstrate that, even when scientific achievements were highjacked for ideological purposes, audiovisual and print media invited a differentiated reception in both East and West. The second set of chapters offers a comparative look at PR and educational films about Africa, one made in France and the other in West Germany. Each country engaged in educational and aid projects in Africa and made films about them. The chapters offer very different insights into Western European relations with Africa in the early postcolonial period, however, as France—a former colonizer—and West Germany—a nation with colonial history—had different motives for offering aid. Ultimately, though, neither treated their African counterparts as equals, demonstrating that racism still unified Western European attitudes and media on Africa.

In "Science for Children and Adults: The Space Race in the Publications of the Italian Communist Party, 1957–64," Ettore Costa analyzes communist discourses on the Cold War's space race by reviewing the media coverage in periodicals published by the PCI. His analysis of articles in the children's magazine *Il Pioniere* (The pioneer) and the adult magazine *Rinascita* (Rebirth) reveals how Italian communists understood the space race and the role that science played in their view of themselves and the world. Unsurprisingly, the periodicals celebrated the Soviet Union as the vanguard of scientific progress, which proved the superiority of the socialist system. Interrogating the type of scientific information that was selected and how it was invested with political significance through rhetoric, Costa focuses on the illocutionary and perlocutionary aspects of print articles to uncover the goals of writers; letters from readers reveal the effect of events and articles on the audience. He contrasts a range of ideological tropes and arguments of Soviet origin, which were used by Italian communist authors, against representations of the space race in the rest of Italian and Western media, which relied primarily on ideas and modes of representing scientific knowledge developed in the United States. Costa concludes that the impetus to recenter communist ideology around scientific progress and achievements was linked to the need of post-Stalinist leaders to disentangle communism's associations with repression and exploitation.

In "'Effective Films": Science Film and Education in East Germany," Sophia Gräfe and Kerrin von Engelhardt tackle the crucial position that science and education films occupied within the GDR cinematographic landscape. Gräfe and von Engelhardt trace the evolution of East German pedagogical theory, which drew heavily on Ivan Pavlov and other Soviet theorists. Given the economic challenges facing a nation rebuilding after war, a great deal of attention was spent on using educational films to make the subject matter useful and teaching methods effective. Involved in the idea of effective teaching, of course, was instilling the students with the correct political line and attitudes. Institutions were developed to explore film aesthetics and didactics in order to optimize effective teaching and learning in various settings. This mission, in turn, led to the emergence of a distinct field of research at universities and professional academies, focusing specifically on the educational impact of film. In an effort to encourage more research into this subject, the authors provide a comprehensive account of the East German institutions that were involved, as well as current archives that hold educational and research science films and related matter.

In "German Technology and Education for 'Young Nations': Cold War Politics and Aesthetics of Development Aid in Two West German Governmental PR Films of 1961," Jan Uelzmann analyzes the politics behind the filmed rep-

resentation of West German (FRG) developmental aid to Guinea. The author points out that prior to the rise in popularity of and access to television, public relations films played a crucial role in the domestic diplomacy of Konrad Adenauer's administration. At the same time, they also played a role in asserting West Germany's place on the world stage, especially in the eyes of the former Western Allies. The chapter focuses on two examples filmed in 1961, one about visiting the FRG's capital city, Bonn, and one about the Foreign Office. Uelzmann's close analysis of these films shows that, in making their case to the predominantly white West Germans, they presented racist and Eurocentric worldviews, advocating for white European supremacy over peoples and places indiscriminately represented onscreen as "Africans" and "Africa." Uelzmann interrogates the progressive rhetoric used in the films, which list the FRG's advanced and successful economics, technology, and educational system to favorably distinguish West Germany from the socialist states (most notably the GDR) that were competing for influence in decolonialized countries. Finally, the author links the Adenauer administration's combination of democratic rhetoric and persistent racist and colonial modes of thinking to continuities in the careers of Nazi-era officials in West German governmental structures.

In the volume's final chapter, "French Educational Films for Africa: The Question of Decolonization in the 1960s and 1970s," Sarah Stein explores the evolution of French film policy for former colonies in the 1960s and early 1970s and the production of educational films to assist in aid projects. The chapter focuses on the case of two films, produced for screenings in Upper Volta (today Burkina Faso) by the International Audiovisual Consortium (CAI), created in 1961 by the French government to provide former African colonies with newsreels and educational films. The films were created within a complex, international production framework. Stein traces the history of this framework, from the early influence of the high-ranking colonial administrator Robert Delavignette, who wrote *Service Africain* in 1946, to France's National Center of Cinematography (CNC) and film diplomacy and decolonization, to the postcolonial moment in the 1960s when CAI made the two films in question with scenes shot in Upper Volta. Leaning on the work of media theorist Eef Masson, Stein's film analysis accounts for the implicit viewer addressed by the film, analyzes the rhetorical means used to attract and motivate viewers, and uncovers the creation of references to the nonfilmic world. In the process, she exposes connections between postcolonial cultural policy initiatives and colonial-institutional ties and presents ways in which these films invited viewers—whether in France or Burkina Faso—to adopt specific Eurocentric behaviors and modes of living.

Conclusion

Science on Screen and Paper extends and complements the existing scholarship on Cold War media representations of science and scientists by looking at parallel period developments in countries in Eastern and Western Europe. To the more familiar fields of Cold War studies and science studies, the chapters in this volume add an overdue comparative dimension by considering, for instance, decades-long trajectories of films produced within scientific contexts, or how media representations in various print journals, PR films, and television were affected by Cold War politics. As editors, we have attempted to give voice to both emerging and well-established scholars from all over Europe in an effort to broaden our shared fund of experience and perspectives. The contributions selected for this volume were accordingly written by scholars based and working in eastern and western, northern and southern Europe, as well as in the United States.

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Juliane Scholz is a postdoctoral researcher and graduate coordinator at the Leibniz Centre for Contemporary History in Potsdam, Germany. Her research focuses on twentieth-century German, European, and US-American social, cultural, and media history. She studied cultural sciences, media studies and psychology at the University of Leipzig, where she completed her dissertation on the professional histories of screenwriters in the United States and Germany in 2014. She has served as a senior lecturer and postdoctoral researcher at the University of Leipzig and the Max Planck Institute for the History of Science in Berlin. Her recent publications on the social history of the Max Planck Society sheds light on working conditions in the academic field and the professionalization of science communication.

Notes

1. Mainstream cinema and television continue to churn out biopics of scientists who worked during the Cold War. Often considered "box office hits" and nominated for Academy Awards, these films largely employ clichéd Cold War representations of science and scientists and heavily emphasize fictionalized personal stories to enable audiences to identify with the protagonists. Examples in the last ten years include: *Einstein and Eddington* (2008, dir. Peter Moffat, UK; *The Imitation Game* (2014, dir. Morten Tyldum, US); *Hidden Figures* (2016, dir. Theodore Melfi, US); *Charlatan* (2020, dir. Agnieszka Holland, Czech Republic/Ireland/Slovakia/Poland); *Tesla* (2020, dir. Michael Almereyda, US); *Radioactive* (2019, dir. Marjane Satrapi, UK); and, most recently, *Oppenheimer* (2023, dir. Christopher Nolan, US/UK).
2. Some historians argue that the concept of a "Cold War" was linked to the creation of the atomic bomb, from its inception, by scientists who had perceived the possibility of nuclear weapons. For this discussion, see Oreskes and Krige, *Science and Technology in the Global Cold War*; Vowinckel, Payk, and Lindenberger, *Cold War Cultures: Perspectives on Eastern and Western European Societies*.
3. Orwell, "You and the Atomic Bomb." For similar definitions, also see Westad, "The Cold War and the International History of the Twentieth Century."
4. "Dual use" technologies were defined by the US National Research Council as "technologies intended for civilian application that also can be used for military purposes." See Forge, "A Note on the Definition of 'Dual Use.'"
5. Kraus, *Von der Uranspaltung zur Göttinger Erklärung*.
6. See "Pugwash Conferences in Science and World Affairs"; Kraft, *From Dissent to Diplomacy*; Kraft and Sachse, *Science, (Anti-)Communism and Diplomacy*.
7. Nehring, "Remembering War, Forgetting Hiroshima."
8. Van Dongen, *Cold War Science*.
9. On the competing discourses and definitions of both science and scientists as public figures, see Hacking, "What About the Natural Sciences?" On the impact that government-sponsored projects had on scientists' work, see Oreskes, "Science in the Origins of the Cold War."
10. Gordin, *Red Cloud at Dawn*, 29.
11. Westad, *The Global Cold War*, 5.
12. Leffler and Westad, *The Cambridge History of the Cold War*.
13. Oreskes and Krige, *Science and Technology in the Global Cold War*.
14. Oreskes, "Science in the Origins of the Cold War," 17.
15. Jasanoff, *States of Knowledge*.
16. Jasanoff, *States of Knowledge*, 2–3.
17. Jasanoff, "Reconstructing the Past, Constructing the Present"; Daston, "Science Studies and the History of Science."
18. Weingart, "Science and the Media."
19. Weingart, "Science and the Media," 869.
20. Forman, "On the Historical Forms of Knowledge Production," 72.
21. For a detailed discussion of "medialization," see Grande, "Die neue Governance der Wissenschaft."
22. For definitions of "research film" and "science film" as well as the concepts of "reusing" and "recycling" films, see Sattelmacher, Schulze, and Waltenspül, "Introduction: Reusing Research Film."

23. See Schmidt, *Medical Films, Ethics, and Euthanasia in Nazi Germany*.
24. See, e.g., McCauley, *The Origins of the Cold War, 1941–1949*; Wettig, *Stalin and the Cold War in Europe*; Bridger, *Scientists at War*.
25. Turchetti, *Greeting the Alliance*, 5. Also see Roberts, "Science, Peace and Internationalism."
26. Kraft and Sachse, *(Anti-)Communism and Diplomacy*, 5 and 22.
27. Kraft, Nehring, and Sachse, "The Pugwash Conferences and the Global Cold War"; Turchetti and Roberts, *The Surveillance Imperative*.
28. On the twentieth century as the "age of techno-science," see Pestre, "Regimes of Knowledge Production in Society."
29. See, for instance, Orgad, *Media Representations and the Global Imagination*; Gaycken, *Devices of Curiosity*; Mitman and Wilder, *Documenting the World*.
30. Bonah and Laukötter, *Body, Capital, and Screens*, 14.
31. Orgad, *Media Representations and the Global Imagination*, 5.
32. Hall, *Representation*, 1–11.
33. See, for instance, Couldry, Hepp, and Krotz, *Media Events in a Global Age*; Machin and Van Leeuwen, *Global Media Discourse*; Robertson, *Mediated Cosmopolitanism*.
34. Orgad, *Media Representations and the Global Imagination*, 25.
35. See: Höhn, *Wissenschafts-PR*; Kohring, *Die Funktion des Wissenschaftsjournalismus*; Göpfert, "The Strength of PR and the Weakness of Journalism."

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