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Introduction by Barbara Czarniawska

Eglė Rindzevičiūtė. *The Power of Systems: How Policy Sciences Opened Up the Cold War World.*
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Introduction by Barbara Czarniawska, University of Gothenburg

As historian György Péteri observed in 2004, British Prime Minister Winston Churchill's immensely popular metaphor of the iron curtain was actually a poor representation of post-war realities.¹ The division could better be described as a nylon curtain, as the West bombarded the East with consumerist messages, where nylon, quite literally, played a significant role, even as propaganda and dissenters' stories were flying in the opposite direction. There was little if any demand for realist representations, especially those that contradicted common beliefs—which is why Eglė Rindzevičiūtė's study of the cooperation between U.S. and Soviet scientists during the Cold War is so important, not least in the present political situation.

Rindzevičiūtė's study arose, as do many insightful investigations, from curiosity: "... how was it possible that both Soviet and US governmental elites embraced the same scientific methods of governance, gathered under the umbrella names of cybernetics, systems analysis, and, later, policy sciences" (2)? What is more, they did not do it in parallel and in secret, which would be easier to understand, but in direct cooperation in the International Institute of Applied System Analysis, founded in 1972 by the Soviet Union and the United States, and located, for neutrality's sake, near Vienna. Indeed, it is hard not to agree with the author when she says that "[t]he case of IIASA is quite remarkable, because this is where the competing development theories—the US modernization theory and the Soviet theory of scientific-technical revolution—converged to legitimize an institutional innovation" (108).

The reviews that follow my introduction describe in detail various aspects that contribute to the excellence of Rindzevičiūtė's research: the impressive analysis of literature within technical sciences, sociology, history, political sciences, and management and organization studies, with excursions into popular culture; the fascinating field material, and the ambitious theorizing, all of which make her book a perfect model for studies in historical sociology and political sciences. In addition, I would like to emphasize the message summarized in the title: the power of systems. The late 1960s and early 1970s witnessed a perhaps unprecedented love story, stronger than the Cold War itself: a total enchantment with systems theory and with cybernetics as the science of control, based on systems theory. Although the origins of systems thinking are to be found in the 1920s (Ludwig von Bertalanffy in Austria, Alexander Bogdanov and Vladimir Vernadskii in Russia and Soviet Union), it was first applied during and after World War II. From its military, space science, and industrial applications, systems theory moved practically everywhere, including psychology, psychiatry, anthropology, and semiotics, to mention but a few fields. As promised by Norbert Wiener, cybernetics would explain "control and communication in the animal and the machine," as the title of his 1948 book announced.² Who could resist such a promise? And although cybernetics may have impinged on

¹ György Péteri, "Nylon Curtain—Transnational and Transsystemic Tendencies in the Cultural Life of State-Socialist Russia and East-Central Europe," *Slavonica* 10:2 (2004): 113-123.

² Norbert Wiener, *Cybernetics: or Control and Communication in the Animal and the Machine*. (Cambridge: MIT Press, 1948).

religion (as suggested by the subtitle of Wiener's 1964 book),³ its natural target was politics. This is where it landed, to be studied by Eglė Rindzevičiūtė.

One unique characteristic of Rindzevičiūtė's book is the smooth passage between stories of the past and stories of the present, from historical documents to field observations and conversations with living people. Descriptions of global changes in the political sphere are deftly woven together with life stories (I especially appreciated a story about Alexei Kosygin—an accountant-like Soviet Prime Minister). Organizational settings are painted with words, but also illustrated with photos; quotes from interviews are artfully selected (...“ambiguity was a resource. What is systems analysis? This is what IIASA does. What does IIASA do? Applied systems analysis” 91).

I found two of Rindzevičiūtė's reasonings especially promising (from the point of view of my own interests). The first is her differentiation between governance as control and governance as guidance. This topic is far from mere historical relevance; it can and should be discussed and studied in continuation. The second is her comparison of two scientific projects: a nuclear winter simulation and the acid rain model. Rindzevičiūtė's discussed possible explanations for the fact that in spite of its spectacular results, the nuclear winter simulation failed in the sense that it had no impact on actual policies, whereas the acid rain model succeeded. One could also consider the possibility that the former was but a simulation, whereas the latter was based on actual data.

Rindzevičiūtė's conclusions are both innovative and provocative: The Cold War was not merely an obstacle for East-West relations; it was also an opportunity. The apolitical think tank, IIASA, created new approaches to policy, and the apparently victorious search for certainty revealed the crucial role of uncertainty and ambivalence. Not many historical tales end this way, which can only be described as daring.

Participants:

Dr Eglė Rindzevičiūtė is Associate Professor of Criminology and Sociology at Kingston University London, UK. She is the author of *The Power of Systems: How Policy Sciences Opened up the Cold War World* (Cornell University Press, 2016) and the editor of *The Struggle for the Long-Term in Transnational Science and Politics: Forging the Future* (Routledge, 2015), with Prof. Jenny Andersson. Dr Rindzevičiūtė has published articles in such journals as *Modern Intellectual History*, *Slavic Review*, *The International Journal of Cultural Policy*, *Current Anthropology*, and *Cahiers du Monde russe*.

Barbara Czarniawska is Senior Professor of Management Studies at Gothenburg Research Institute, University of Gothenburg, Sweden. She takes a feminist and processual perspective on organizing, recently exploring connections between popular culture and practice of management, and the robotization of work. She is interested in techniques of fieldwork and in the application of narratology to organization studies. Recent books in English: *A Theory of Organizing* (second edition, 2014), *Social Science Research from Field to Desk* (2014) and *A Research Agenda for Management and Organization Studies* (editor, 2016).

Jenny Andersson is CNRS Research Professor at Sciences Po in Paris. She was the Principal Investigator of the ERC funded Futurepol project, within which both Eglė Rindzevičiūtė's *The Power of Systems* and

³ Wiener, *God & Golem, Inc.: A Comment on Certain Points Where Cybernetics Impinges on Religion*. (Cambridge: MIT Press, 1964).

Andersson's recent *The Future of the World. Futurology, Futurists and the Struggle for the Post Cold War Imagination* (Oxford University Press, 2018) were written.

Claudia Aradau is Professor of International Politics in the Department of War Studies, King's College London. Her research has developed a critical political analysis of security practices. Among her publications are *Politics of Catastrophe: Genealogies of the Unknown* (with Rens van Munster, 2011) and *Critical Security Methods: New Frameworks for Analysis* (co-edited with Jef Huysmans, Andrew Neal and Nadine Voelkner, 2015). She is currently writing a book on algorithmic reason and the new government of self and other.

Paul Rubinson is Associate Professor of History at Bridgewater State University. He is the author of *Redefining Science: Scientists, the National Security State, and Nuclear Weapons in Cold War America* (University of Massachusetts Press, 2016), and *Rethinking the American Antinuclear Movement* (Routledge, 2018).

The main argument of Eglė Rindzevičiūtė's book is that Soviet scholars through the collaborative International Institute of Applied Systems Analysis (IIASA), engaged in a form of neutral exchange around a project of systems-cybernetic inspired scientific governmentality. The systems approach, she argues, permitted Soviet scholars to speak scientifically about the Soviet system, as well as to project its possible forms of openings and closures. As such, system-cybernetics became a pervasive metaphor for the political world of the Soviet system, its economy and social relations, and, perhaps most clearly, for the relationship between ideology and science. In her account, IIASA becomes the stage for something other than its 'high modernist' debates about energy predictions, nuclear winter, or climate science – it becomes the stage for a gentle scientific probing of the limits of the possible, and for the reassertion, albeit timid, of the world of science in an era of ideological confrontation.

While the great strength of *The Power of Systems* is to show the interplay between this world of science and the diplomatic world of power relations, where Soviet technocrats also empowered themselves with the notion of system both to strengthen their own positions, and achieve gradual forms of opening between the USSR and the capitalist world (as in the case of the notorious Dzhermen Gvishiani), who networked with American planners since the mid-1960s on, it is interesting that Rindzevičiūtė's emphasis on science and technocratic expertise and her focus on an already highly diplomatic transnational arena leads her possibly to downplay the tensions inherent to this notion of high modern expertise in the Communist world. The notion of expertise played a role in attempts at achieving a certain critical distance from the pervasive domain of planning for disciplines such as mathematics, economics, or applied sociology in the period after Joseph Stalin's death.

In the coming decade, as the period of Thaw ended, these disciplines were again reigned in, and ideas of expertise as something possibly autonomous to the 'system' were once again incorporated into the system. Political historians such as the Czech historian Michal Kopecek or Vitezslav Sommer¹ have spoken therefore of reform communism and used the term *consolidation regimes*, to describe the way that social science was yet again domesticated as a means of consolidation of state power after 1968, and turned into a form of governmental expertise that put a premium on areas such as policy science, management studies, and economics as the new tools of governance for the system. At this point in time, it would seem that the capacity of scholars to use the metaphor of the system to describe scientifically the Soviet world was hollowed out.

Rindzevičiūtė's account of somehow enlightened mathematicians and programmers using the neutral language of modelling and forecasting to hide a potentially subversive critique perhaps downplays a more acute political history of science in the socialist bloc in these formative years. In other nations in the Socialist bloc, where conditions of repression were different and where forms of public spaces did exist and transnational connections also had a different vitality, cybernetic predictions of the future of the system, the parallel existence of different systems, or radical system change, were in fact important forms of dissidence. Rindzevičiūtė's argument ultimately is that policy expertise, grounded in transnational networks addressing the 'common problems' of the two blocs and speaking the language of cybernetics, allowed for bringing a level

¹ Vitezslav Sommer, "Forecasting the post Socialist future. Prognostika in Late Socialist Czechoslovakia, 1970-1989," in J. Andersson and E. Rindzevičiūtė, *The Struggle for the Long Term in Transnational Science and Politics: Forging the Future* (London: Routledge, 2015): 144-168.

of openness into Soviet governmentality by projecting possible futures. It is as much a fascinating argument as a deeply original reading of Soviet science-policy relations in this period.

Review by Claudia Aradau, King's College London

Egle Rindzevičiūtė's book sheds light on the transnational politics of technoscience during the Cold War. Through extensive archival research, memoir literature, and interviews with scientists and research administrators, she traces the contingent construction of transnational governance through the concepts, networks, and instruments of systems analysis. In this review, I want to focus on two sets of contributions that make the book indispensable reading for studies of politics and international relations. First, the book shatters dichotomies that govern past and present readings of Russia-in-world politics. As the author argues, Cold War histories have "much to discover about the processes that cut across political divides" (184). This has important ramifications for the present and sets the book in the tradition of a transdisciplinary "history of the present,"¹ which also transcends the boundaries of sociology, science and technology studies, or history. Second, the book offers a more nuanced understanding of the relationship between science and politics. If Bruno Latour has famously quipped that "science is politics by other means," *The Power of Systems* untangles more complex and ambiguous relations between science and politics.²

Rindzevičiūtė starts from the logical but unexpected premise in the context of most writing on the Cold War that "Soviet technocrats, just like US technocrats, gained authority from their military success during World War II, but they also selectively discarded this military legacy" (16). International Relations scholars have shown how U.S.-Soviet relations during the Cold War were rendered in the mode of 'othering.' In his excavation on the Russian 'other,' Iver Neumann argues that the dichotomy of civilised/barbarian underpinned narratives of democratic versus totalitarian or authoritarian and "had affinities to a number of others such as free/unfree, market/plan, West/East, defensive/offensive."³ *The Power of Systems* starts by troubling these dichotomies and taken for granted assumptions about politics, science, the U.S. and the Soviet Union by proposing "a historical sociology of the forging of scientific governance across the Iron Curtain in the 1960s–1980s" (17).

The book starts from a premise of similarity rather than antagonism. Beyond and beneath the politics of Cold War enmity, not only were similar methods of governance drawing on cybernetics and systems theory deployed in both the U.S. and the Soviet Union, but sciences across both sides of the Iron Curtain cooperated in transnational arenas. Rindzevičiūtė's book focuses on one such institution, which has not received attention in accounts about either the science or politics of the Cold War: The International Institute of Applied Systems Analysis (IIASA) or the East-West Institute. The IISA was an "extraordinary creation of scientific and policy elites, an organization, the history of which not only provides a fascinating angle on East-West relations, but also reveals the late Soviet engagement with governance as an intellectual project, an aspect which tends to be neglected" (18).

¹ I use 'history of the present' in Michel Foucault's sense here. Michel Foucault, *Discipline and Punish: The Birth of the Prison* (London: Penguin, 1991 [1977]).

² Bruno Latour, *The pasteurization of France* (Cambridge: Harvard University Press, 1993).

³ Iver B Neumann, *Uses of the Other: 'The East' in European identity formation* (Minneapolis: University of Minnesota Press, 1999), 103.

The book offers a fascinating microsociology of the Institute, telling the story of transnational science-making that emerged through the mundane collaborations of scientists, computers, and interfaces, as well the processes of political selection in the Soviet Union or the Soviet scientists' indignities of having to pay back 70% of their salaries. As Rindzevičiūtė puts it, this is a “system-cybernetics governmentality” as “an assemblage of discourses, state and nonstate organizations, technologies, and social networks” (22). The system-cybernetic governmentality produced new rationalities and technologies of governing across U.S.-Soviet divides. In so doing, Rindzevičiūtė argues, it also “transformed the very character of control” (28) through the ambivalent and unintended effects of an “epistemology that underscored uncertainty, informality, and reflexivity” (34).

Two actors played a key role in the setting up of the IISA: President Lyndon B. Johnson on the US side and Prime Minister Alexei Kosygin on the Soviet side. The idea of the institute was proposed in 1967 at a Glassboro Summit between Johnson and Kosygin. Rindzevičiūtė then disentangles a range of explanations about the attraction of cybernetics to the Soviet Union, particularly in the light of Marxist-Leninist ideas about the role of science. She is not interested in replicating analyses of the power of science as domination, the export of cybernetics from West to East, or further colonisation of science and civil life by the ‘military-industrial complex.’ What is particularly exciting about the book’s approach is the refusal to be caught in any dichotomies – perhaps a refusal also intrinsic to the very epistemology of ambiguity associated with cybernetics and systems theory. Building on STS “laboratory studies,” Rindzevičiūtė proposes to analyse the IISA “as a heterogeneous laboratory, where the Cold War world of the 1950s morphed into a new way of being and where the systems approach generated new forms of politics” (130).

The first chapters reveal the politics of setting up the IISA, becoming a transnational scientist, and building a “transnational systems community (73).” Then the book traces the development of global models at the IISA (Chapter 5) and their role in debates about the nuclear winter (Chapter 6) and acid rain (Chapter 7). The politics of the laboratory emerge in the interstices between the high politics of Cold War and the national politics of science. Inspired by science and technology studies, Rindzevičiūtė’s analysis offers a much more nuanced analysis than either discussions of the imperialism of science, the diffusion of ideas, or the colonisation of the future by systems theory.

At the time of the Cold War, science was political not only for the visions of social and political order it struggled over but also through its mundane politics of living and working together across boundaries. “Give me a laboratory and I will remake governance,” one could say paraphrasing Latour. The IISA did not quite remake Cold War governance, but it made possible the emergence of different ideas about governance. Rindzevičiūtė shows the IISA to have been inserted within transnational controversies about the role of models and systems theory, particularly in relation to the RAND development of cybernetics as ‘control.’ The similarity between the U.S. and USSR, with which the book starts, becomes the basis for the production of differences that matter. For instance, the analysis of a nuclear winter report led to the juxtaposition of two different understandings of governance as control and guidance, which led the Soviet scholar Nikita Moiseev to “redefine the conceptual premises of the governance of human activities by embedding it in a new, systemic connection with the environment” (179).

However, if the laboratory juxtaposed two versions of governance, I wonder about the wider debates around each of these versions of science and governance that were not localised at the Institute. On the one hand, the

RAND procedural version of rationality was not without its critics in the U.S. and beyond.⁴ On the other, the scientification of governance in the Soviet Union (and countries of the Soviet bloc) could also be inserted on the very terrain of Marxism-Leninism rather than undermining it. This is not surprising, as Rindzevičiūtė notes that the system-cybernetic governmentality was appropriated by different political ideologies, including most recently neoliberalism (214-215). The case of the 1972 *The Limits to Growth* report is particularly interesting, as it led to global debates between neo-Malthusian catastrophic thinking and criticisms of ideological thinking on the left. By placing the report within the laboratory of modelling, Rindzevičiūtė shows the politics of the instruments of science. Modelling need not uphold a catastrophic vision of the future.⁵ In Romania, a case with which I am more familiar, modelling was not criticised itself. Pavel Apostol, one of the philosophers directly involved with *la prospective* and another East-West collaboration around futures studies, set out to combine a dialectical approach with systems analysis. For Apostol, the *The Limits to Growth* report can contribute to a dangerous catastrophic imaginary which could lead to a call for a “social armistice”, thereby suspending the struggle for the structural and radical democratisation of late capitalist societies’.⁶ A second criticism that Apostol raises concerns the apolitical rendition of the heterogeneity of the world by eliminating social conflicts between different subsystems.

Of course, Apostol’s own political position was that the crisis that *The Limits to Growth* report brings to light requires more democratic and radical responses, which for him were equivalent to a socialist revolution. Yet, Apostol also embarked upon a critical reading of militarisation as central to the crisis and needing to be addressed by any radical response. In directly connecting modelling, systems analysis, and dialectics with revolutionary politics and a critique of militarism and capitalism, Apostol raised questions about how we understand laboratory politics. The IIASA seemed to flourish within the micro-connections around the ‘laboratory’ and, as the discussion on acid-rain models shows, through the painstaking construction of ‘neutrality.’ In so doing, I would suggest, the IIASA did not simply construct a version of system-cybernetic governmentality across the Iron Curtain, but also enacted a way of being anti-political. I wonder whether this way of being anti-political entailed a separation from activists and other radical movements, thus reclaiming the autonomy of the scientific field from political movements. If this reading is correct, then we can read different implications of the IIASA in relation to the politics of science during the Cold War.

The Power of Systems superbly shows how politics is not simply intrinsic to science, but is being made and remade in scientific practice through the (un)making of alliances within and beyond the laboratory, instruments and public staging. Nonetheless, independent of Apostol’s view on the socialist revolution, laboratory politics was ultimately also an anti-politics, which also limited the kinds of political questions asked and spaces of political action. As Rindzevičiūtė highlights, the U.S. and the Soviet Union looked for “apolitical channels of communication,” systems analysis itself was “an apolitical science of governance inside

⁴ Rens van Munster and Casper Sylvest have offered an in-depth analysis of critical thinking on nuclear weapons at the height of the Cold War through what they have called ‘nuclear realism’. Rens van Munster and Casper Sylvest, *Nuclear realism: Global political thought during the thermonuclear revolution*, (New York: Routledge, 2016).

⁵ For a discussion of catastrophic imaginaries and their implications for governing practices, see Claudia Aradau and Rens van Munster, *Politics of Catastrophe: Genealogies of the unknown* (Abingdon: Routledge, 2011).

⁶ Pavel Apostol, *Viitorul [The Future]* (Bucharest: Editura Stiintifica and Enciclopedica, 1977), 178 translation mine.

of the IIASA,” and Soviet policy sciences were “depoliticized with the aim of propelling Soviet military and industrial might to a bright future” (Epilogue *passim*). Therefore, the transnationalisation of systems analysis that the book traces can be read not only as a positive enactment in line with science and technology studies approaches to the laboratory politics of science, but equally as a limitation on the politics of science. Systems analysis enacts more ambiguous epistemologies, new objects of research across political boundaries, and new instruments of science. But in so doing, it also enacts limits upon the kinds of scientific claims that can be supported and what can be known of the world. If the scientists enact compositions of the world, these are nonetheless compositions that obscure as much as they reveal. After all, the world that the IIASA inhabited was also the world of the anti-Vietnam war movements, Non-Alignment, and anti-nuclear activism. Systems analysis was remarkably unsuited to tackling questions of militarism, not so much due to the military origins of operations research, but due to the depoliticising assumptions that were built within the models themselves.

By way of conclusion, I want to connect *The Power of Systems* with what Michel Foucault called the “history of the present,” a historical task of reading differences, interruptions, and continuities in ways that unsettle and potentially remake political subjectivity. To put it differently, “the present will become a readable object of transformative politics only through a genealogical account of its emergence that highlights the contingency of historical trajectories.”⁷ This is particularly important today, when the spectre of the Cold War has been resurrected, and Russia is not only represented in dichotomic but often in starkly ‘civilisational’ terms. At the same time, beyond and beneath these representations of a radically different ‘other’, both U.S. and Russian discourses in particular are formulated in an agnotological mode, producing ignorance and uncertainty about each other’s actions. Unknowability and uncertainty were also central to cybernetic epistemology. Rindzevičiūtė suggests that the East-West scientists’ response was an inventive and effective one: “Instead of *knowing*, East-West scientists were *doing*: creating an environment that enabled them to perform, to work together” (208, emphasis in the text). While there is not direct translation from past to present, the relation between knowing and doing is perhaps one of the more difficult ones that publics and scientists grapple with.

⁷ Martina Tazzioli, Sophie Fuggle, and Yari Lanci, ‘Introduction,’ in Foucault and the History of Our Present, ed. Sophie Fuggle, Yari Lanci and Martina Tazzioli (Basingstoke: Palgrave, 2015).

Review by Paul Rubinson, Bridgewater State University

The biophysicist Eugene Rabinowitch spent much of his career working to end the Cold War. Perhaps surprisingly, he often dismissed arms control measures, especially the Limited Test Ban Treaty of 1963. Treaties might go some way to preventing nuclear war, he admitted, but to end the Cold War, the superpowers needed to trust each other. Only then could meaningful disarmament take place. To encourage trust between Cold War enemies, Rabinowitch proposed, to no avail, U.S.-Soviet scientific cooperation on gigantic and prohibitively expensive scientific projects, such as space exploration or third world development.

As it turns out, Rabinowitch had the concept right, but got the science wrong. According to *The Power of Systems* by Eglė Rindzevičiūtė, something along the lines of Rabinowitch's idea actually occurred in the 1970s. Instead of space exploration or international development, however, U.S.-Soviet scientific cooperation took place in the relatively new discipline of systems analysis. Rindzevičiūtė focuses on the International Institute of Applied Systems Analysis (IIASA), a scientific think tank established on 4 October 1972, and housed in a renovated Austrian castle. Her book, which she describes as “a historical sociology of the forging of scientific governance across the Iron Curtain” (2), relies on material from Russian archives, the records of the IIASA, as well as memoirs from and interviews with those involved in order to explain the IIASA's origins, its intellectual and social life, and its influence on the Cold War. By taking part in this endeavor, scientists from both sides of the Iron Curtain cooperated during the Cold War, encouraging trust and the dissemination of new ways of seeing the world.

Rindzevičiūtė ties the content of IIASA scientific research directly to the end of the Cold War. For some time now, historians have examined the connections between the Cold War and science, especially physics. But other scholars, such as Rebecca Slayton and Douglas Weiner, have pushed this investigation further by looking at lesser-known disciplines, including computer science and environmental science.¹ Rindzevičiūtė broadens our understanding even further by analyzing the field of systems analysis, the science of forging or controlling technical structures and processes.

Part of Rindzevičiūtė's task is to introduce the reader to systems analysis, an admittedly broad and abstract field of science. She describes a system as a whole that is more than the sum of its parts, with a distinct boundary from its environment. A system is organized and follows rules; it might be an electric grid, a central heating unit, a biosphere, a frog, or even societies, governing structures, and ways of thinking. At its heart, systems analysis is goal-oriented, in search of a solution to a problem. In attempting to analyze such complex entities, systems analysis required computations achieved only by computer models. In the 1960s and 1970s, systems analysis appealed to U.S. and Soviet authorities because it expressed a form of modernity based on mastery over nature and human reason. For that same reason, systems analysis sounded ominous to many because of its potential to be used for social control. But systems analysis has many applications; one early IIASA project was “an innovative computer model of the spread of budworm pest in Canadian forests” (99).

¹ Rebecca Slayton, *Arguments that Count: Physics, Computing, and Missile Defense, 1949–2012* (Cambridge: MIT Press, 2013); Douglas R. Weiner, *A Little Corner of Freedom: Russian Nature Protection from Stalin to Gorbachev* (Berkeley: University of California Press, 2002).

Systems research at IIASA helped develop global governance, the neoliberal concept of scientific-based governance at a distance based on expertise and self-regulation, as an intellectual and social-technological project. But beyond its status as a scientific endeavor, the field mattered because, Rindzevičiūtė argues, Soviet authorities eventually adopted some of the techniques of systems analysis and global governance, hoping they would strengthen their control over society. But in fact these techniques eroded the authoritarian approach to governing and opened up the Soviet system to liberalism that eventually ended the Soviet experiment.

Although abstract, the science of IIASA was conducted and implemented by actual human beings. Bringing policy scientists together enhanced mutual predictability, while applied systems research articulated shared goals, actively forging interdependency and trust across the Iron Curtain. But what possessed U.S. and Soviet leaders to support a venture that was transnational and so at odds with the Cold War world and its rhetoric of hostility and competition? The promotion of systems analysis offered a chance to stay ahead of the curve as the world evolved. “Both the scientific-technical revolution and the idea of the imminent coming of postindustrial society formed an intellectual base for Eastern and Western regimes to develop new contact areas,” Rindzevičiūtė writes, “declaring them immune to ideological contestation” (71). Americans were interested in sharing policy sciences because the techniques encouraged a liberal market economy, while the Soviets hoped these techniques would help save money and improve efficiency and innovation.

For such an endeavor to succeed, however, it needed to be expressly apolitical, something most sciences were not during the Cold War. Only systems analysis rose above Cold War controversy, possibly since no one was quite sure what systems analysis was. Putting “systems analysis” in the IIASA’s name advertised its ideological neutrality and kept it out of controversy.

Externally, IIASA was an international organization. Internally, Rindzevičiūtė describes it as a family. The IIASA gave the Soviets access to Western colleagues and institutionalized systems research in Soviet academia. Informality and openness were valued; classified documents and projects were forbidden in order to prevent attempts at espionage. Rindzevičiūtė adds a human touch from her interviews: access to a photocopier, she finds, was the Soviets’ favorite part of the IIASA, while they were also slightly scandalized by U.S. scientists’ casual dress code. Culture shock aside, transnational interaction took place constantly, not just in intellectual discussion but also while commiserating over slow computers, for example.

In systems analysis, the planet is perceived as complex, interconnected system that requires transnational scientific cooperation to understand it. Global models, such as those analyzed at IIASA, looked at problems beyond national borders and over a long-term time frame and required computer models to perform analyses. Rindzevičiūtė offers two case studies, one on nuclear winter and the other on acid rain, to show how efforts to solve global problems transformed the Soviet Union. In the early 1980s, scientists began to investigate the effects of a nuclear war on the planet. The most publicized study, conducted by a team led by the astronomer Carl Sagan, reported that the global environmental damage from such a war, including fallout and the disruption of agriculture growing seasons, could kill more people than the direct effects of nuclear explosions, a plight described as “nuclear winter.” Some of the scientists who studied the phenomenon were “loosely coupled with IIASA” (153), Rindzevičiūtė writes, particularly a Soviet researcher named Vladimir Aleksandrov, who was able to visit the National Center for Atmospheric Research and learn modeling on U.S. computers, while in his free time flipping burgers on the grill with American scientists. The nuclear winter hypothesis that resulted from these transnational efforts “shook the world” and “left a deep intellectual legacy on modern governmentality,” Rindzevičiūtė writes (150). Ultimately, the notion that nuclear deterrence could be a suicidal policy transformed Cold War defense discourse, revealing the limits on human control of

the environment. Perhaps even more lasting, the East-West cooperation over computer-modeled systems sciences for the study of nuclear winter enabled scientists to see the impact of human activity on Earth, specifically climate change.

Nuclear winter research became the poster child for East-West cooperation and computer modeling. The Moscow Computer Center enabled interaction on developing nuclear winter models, and collaborated with the Scientific Committee on Problems of the Environment, an international scientific consortium that published an authoritative study of the environmental effects of nuclear war in the late 1980s. Sagan, meanwhile, traveled to the Soviet Union and ended up inviting scientists there to join the study of nuclear winter. One of these was Aleksandrov, who found himself among old friends while working on the project. Soviet scientists studying nuclear winter enjoyed a rare lack of restrictions in their research. Communist Party authorities tolerated this because nuclear winter studies showed U.S. nuclear policies, including the Strategic Defense Initiative (SDI), as encouraging a global conflict with no winners—a conclusion the Soviets were happy to endorse since they could not afford SDI. In the process, nuclear winter studies helped demonstrate the value of computer-based global modeling as a source of new ideas about governability and control, and worked their way into Soviet policy discussions. Seeing the biosphere as an area of global governance resonated within a government undertaking glasnost reforms in Soviet politics.

The Power of Systems concludes with a case study on acid rain, a “transboundary” problem which helped integrate the Soviet Union into “the common space of polluted Europe” (181). The study of acid rain was enabled by computer-based modeling of acidification developed at IIASA. But unlike nuclear winter studies, which enabled the Soviets to criticize U.S. nuclear policy, the Soviet government was uneasy about the acid rain issue. Nuclear winter studies, after all, produced hypothetical results, but the study of acid rain used real data that directly implicated the Soviets as polluters of the natural environment. Soviet officials faced a dilemma, as they wanted to disclose as little Soviet data as possible but also contribute meaningfully to European research on acid rain. Since polluting nations denied even the existence of acid rain, IIASA acted as a mediator and its neutrality was essential. Models of acid rain developed in these cooperative studies were eventually incorporated into actual Soviet policy making. In addition, the transnational connections forged in systems research turned into networks that suggested a path for a post-Soviet future.

As Soviet ideology slipped into the abyss in the early 1990s, the concept of global governance emerged from systems analysis and became a tool of East-West diplomacy. This transformation, Rindzevičiūtė argues, was only possible because of the IIASA, computer modeling, the development of the biosphere concept, and, most importantly, the process of systems analysis. And the very ambivalence of systems analysis was crucial: the knowledge derived from systems analysis could enable control as well as subversion. The notion of systems and common, global problems challenged the notion of a paranoid, insular Cold War world, and “smuggled” (207) a new epistemology into Soviet governance, which helped undermine Marxist-Leninist authority.

One inference to draw from Rindzevičiūtė’s work is the role of U.S. science in the creation and enforcement of U.S. hegemony. While Rindzevičiūtė makes it clear that the IIASA was inherently transnational, the effects of systems analysis research appear to be distinctly one-sided; after all, only one superpower dissolved in 1991. *The Power of Systems* suggests that this was the unintentional result of a transnational, cooperative, scientific endeavor, as the science of systems helped create a world that would soon find the United States without a rival, its status cemented as the center of world science. In pursuing common ground, scientists may have unknowingly reinforced the dominance of the United States in geopolitics and world science.

The book perhaps omits some Cold War context: Rindzevičiūtė repeatedly emphasizes how the transnational cooperation of the IIASA differed from Cold War hostility, but of course at the time the IIASA was active, the Cold War was undergoing détente. One might in fact see the IIASA as the epitome of the Cold War of the 1970s: just as the superpowers spent the late 1960s and 1970s signing landmark agreements in an attempt to maintain their primacy in a changing world, the investment in systems analysis perhaps marked a similar effort to remain at the top of the scientific-technical hierarchy. Rindzevičiūtė's work joins with Matthew Evangelista's *Unarmed Forces* in demonstrating how transnational scientific efforts shaped Soviet Cold War policy.² The reader might well wonder, however, how systems analysis affected the United States. If this concept could shake the foundations of the Soviet Union, surely it had some impact on the West.

The Power of Systems successfully brings together Cold War politics, transnational movements, and the history of science in the late twentieth century. Based on a novel framework and diverse sources, it breaks new ground in the historical study of nuclear winter and acid rain. Like the best works on science and geopolitics, the book blends human, technical, and political stories into a powerful argument. Rindzevičiūtė offers an explanation for the fall of the Soviet Union and the end of the Cold War that places far less emphasis on traditional actors frequently credited with the achievement, particularly Ronald Reagan, Mikhail Gorbachev, Soviet dissidents, and human rights activists. Scholars have long studied the role of science in attempts to end the Cold War, but Rindzevičiūtė's work offers a way of seeing science and scientists actually contributing to the end of the conflict.

² Matthew Evangelista, *Unarmed Forces: The Transnational Movement to End the Cold War* (Ithaca: Cornell University Press, 2002).

Author's Response by Eglė Rindzevičiūtė, Kingston University London

I thank H-Diplo for inviting me to respond to the forum, Jenny Andersson, Claudia Aradau, and Paul Rubinson for their thoughtful responses, and Barbara Czarniawska for writing the introduction.

The Power of Systems is a study of a particular historical trajectory of global governance as it was imagined, planned, and institutionalized through the interaction among East-West systems scientists and policy makers in the highly polarized political context of the Cold war. As a social scientist, I am interested in the power of institutions and epistemologies to mediate collective action. As a historian, I am interested in the 'lost Atlantis' of the recent past: that is, those elements of the past which are paradoxically invisible in the mainstream scholarship, although protagonists of those pasts might still be alive. I am also interested in the ways in which institutional autonomy can organizationally emerge in adverse contexts, such as Communist authoritarianism and international anarchy.

The book aims to speak to many different academic audiences. So far, its reception has been most pronounced in the history of economics, environmental history, international history, and the interdisciplinary study of technoscience and culture, which does not surprise me. However, I would like to emphasize the relevance of this study to work on the histories of empire and nationalism. *The Power of Systems* demonstrates that, in the Soviet context, the globally minded systems scholars came from political, academic, and social centres of power. Boasting prominent scientific lineages, many of them enjoyed political patronage and, from the 1970s, became firmly anchored in the national and transnational scientific networks. It is probably not surprising, therefore, that these scholars embraced global missions: their scientific initiatives were underpinned both with the sense of global citizenship and a desire to establish the parity, if not superiority, of Russian science.¹

In what follows, I will address some of the points raised by the reviewers and clarify my argument and choices.

I am very pleased to see that Rubinson links my study to Matthew Evangelista's *Unarmed Forces*: this seminal work inspired led me to reconstruct transnational relations among actors operating at different political and institutional levels. In a similar vein, the work by key historians of Soviet science, Loren Graham, Paul Josephson, and Slava Gerovitch, inspired me to weave big institutional stories with individual pathways.²

Rubinson writes that I use the case of Soviet systems analysis to explain "the end of the Cold War." However, "the end" is a very difficult concept in history writing, as clear-cut beginnings and ends of complex processes do not exist. For this reason, I used the phrase "Opening Up the Cold War World" in the title, but also

¹ For a struggle of ethnic Russians in the German-dominated academia in the Imperial Russia see, for instance, Nikolai Kremontsov, *With and Without Galton: Vasilii Florinskii and the Fate of Eugenics in Russia* (Cambridge: Open Book Publishers, 2018).

² Matthew Evangelista, *Unarmed Forces: The Transnational Movement to End the Cold War* (Ithaca: Cornell University Press, 2002), Loren Graham, *The Ghost of the Executed Engineer: Technology and the Fall of the Soviet Union* (Cambridge: Harvard University Press, 1996), Paul Josephson, *Red Atom: Russia's Nuclear Power Program from Stalin to Today* (Pittsburgh: The University of Pittsburgh Press, 2005), Slava Gerovitch, *From Newspeak to Cyberspeak: A History of Soviet Cybernetics* (Cambridge: The MIT Press, 2002).

because “opening up” refers to a broader construction of the field of scientific political thought and practice. It can be argued that détente can be understood as a component of “the Cold War world,” an attempt to manage ideological polarity and military tension between the great powers. As the recently deteriorated relations between the West and Russia demonstrate, it may be too early to declare the end of long-term confrontation. Nevertheless, I tried to show that it is possible to detect an “opening up” of international governmental imaginaries from the late 1950s to the late 1980s. Systems analysis helped East-West scholars articulate new governmental imaginaries, to use Sheila Jasanoff’s and Sam Hyun-Kim’s concept.³ Systems governance was not just a discourse, but a complex assemblage of practices, institutions, and technologies as well as a new understanding of the governmental mission – an assemblage that can be theorized as a form of governmentality.⁴

In a similar way, I tried to avoid deterministic models. Although Rubinson states that “systems analysis required computations achieved only by computer models,” I wanted to question the strong association of systems analysis and quantification. First, even computer modelling relied on soft skills and the ability to interpret complex and often erroneous data. Second, some forms of systems analysis relied on entirely qualitative methods, such as organizational ethnography, expressed in the cultural theory of risk by Michael Thompson at the International Institute of Applied Systems Analysis (IIASA).⁵

Rubinson also notes that “in the 1960s and 1970s, systems analysis appealed to U.S. and Soviet authorities because it expressed a form of modernity based on mastery over nature and human reason.” This statement does capture the spirit and beliefs of many policy makers in that period. However, I tried to reveal the moments which began to disturb this form of modernity: as I show, some systems scholars intentionally blurred the boundaries between human, machine, and the environment. They also intentionally and explicitly demonstrated the limits to decisions that could appear rational in the short but not in the long term, argued that even computers could never be precise, and dismissed the notion of linear control of complex systems.

Rubinson writes “Only systems analysis rose above Cold War controversy, possibly since no one was quite sure what systems analysis was.” In addition to systems analysis, as I show in the book and as is documented in the histories of international organization of science, there were several highly significant areas of international scientific collaboration that emerged since the 1950s, such as the International Geophysical Year (1957), the European Organization for Nuclear research (CERN, est.1954), Unesco’s Man and the Biosphere programme (MAB, est.1971), and Apollo-Soyuz Test Project (1975). The uniqueness of systems analysis is that this approach was relevant to virtually all of these scientific fields, including “management,” which was being quickly professionalized at that time. In this way, systems analysis tapped into what Luc Boltanski and Eve Chiapello described as the new spirit of capitalism.⁶ The IIASA, which was established in 1972, was in

³ Sheila Jasanoff and Sang Hyun-Kim, eds., *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power* (Chicago: The University of Chicago Press, 2015).

⁴ Foucault, Michel. “Governmentality.” In Graham Burchell, Colin Gordon and Peter Miller (eds), *The Foucault Effect: Studies in Governmentality* (London: Harvester Wheatsheaf, 1991).

⁵ Michael Thompson, Richard Ellis and Aaron Wildavsky, *Cultural Theory* (Boulder: Westview Press, 1990).

⁶ Luc Boltanski and Eve Chiapello, *The New Spirit of Capitalism* (London: Verso, 1999).

this way very much an expression of many facets of the shifts in science, politics, and also organization, all of which characterized the late twentieth century.

Rubinson writes “Externally, IIASA was an international organization. Internally, Rindzevičiūtė describes it as a family.” This must be corrected, because, as I show in Chapter Four, the metaphor of “family” was used by the directors and administrators of IIASA as an organizational device that made IIASA work and perform in a highly polarized context. In the context of highly formalized international cooperation, this metaphor was an expression of the use of informality as a compensatory mechanism to make a multilateral international organization perform in spite of cultural and political differences.

Computer-based simulations of the environmental effects of industrialization and military conflict were one of significant cases of performance. Rubinson puts it very well: “Nuclear winter studies, after all, produced hypothetical results, but the study of acid rain used real data that directly implicated the Soviets as polluters of the natural environment.” In the book I examine the ways in which scientific modelling data were made credible and actionable. Indeed, in some contexts, hypothetical or predictive data could be organizationally useful; however, my main point is that in both cases of empirical and hypothetical data, it was an international co-production of data that made it more convincing in the eyes of decision makers.

Rubinson perhaps somewhat overuses the word “only” when summarising my arguments. Although I did strive to emphasise the significance of systems analysis for international governance, I did not want to create the impression that systems analysis was the only factor that undermined Cold war polarity. As Rubinson put it, “as Soviet ideology slipped into the abyss in the early 1990s, the concept of global governance emerged from systems analysis and became a tool of East-West diplomacy. This transformation, Rindzevičiūtė argues, was only possible because of the IIASA, computer modeling, the development of the biosphere concept, and, most importantly, the process of systems analysis.” The reasons for the opening up of the Cold war governmental imaginaries that were followed by (and did not necessarily cause) the collapse of the Soviet Union were very many and complex, some going back to the transnational tradition of East European and Russian science,⁷ some due to nationalism⁸ and the mobilization of civil society through environmental movements,⁹ and some due to the unpredictable turn of international events and shifts in the global political economy toward information technologies.¹⁰ Systems analysis, I would argue, was able to articulate, embrace, and, to some extent, moderate these changes, but it would not make sense to think about the role of systems analysis along simplified, causal lines.

⁷ Kremmentsov.

⁸ Ronald Suny, *The Soviet Experiment: Russia, the USSR and the Successor States* (Oxford: Oxford University Press, 1997).

⁹ Douglas Weiner, *A Little Corner of Freedom: Russian Nature Protection from Stalin to Gorbachev* (Berkeley: The University of California Press, 2002); Jane Dawson, *Eco-nationalism: Anti-nuclear Activism and National Identity in Russia, Lithuania and Ukraine* (Durham: Duke University Press, 1996).

¹⁰ Manuel Castells and Emma Kiselyova, *The Collapse of Soviet Communism: A View from the Information Society* (Berkeley: University of California International and Area Studies, 1995).

I second Rubinson when he writes “The reader might well wonder, however, how systems analysis affected the United States. If this concept could shake the foundations of the Soviet Union, surely it had some impact on the West.” Recent work by Bentley Allen addresses some of these questions, as well as the growing body of histories of cybernetics and systems thinking.¹¹ This leads me to the important point stated by Claudia Aradau, who contrasts the argument laid out in *The Power of Systems* with that of Iver B. Neumann’s work on “othering” as a key strategy of the West dealing with the East.¹² Indeed, Neumann’s work contributed important historical analyses of the cultural and political genealogies of tension in East-West relations to the field of international studies. My work shows that there can be several different epistemological strategies employed at the same time. From the 1960s to the 1980s, “othering” of Russia and the Soviet republics continued at many political levels, particularly at the intergovernmental one. However, as I show, efforts to establish mutual predictability were expressed in scientific cooperation at the transnational level. The history of Cold war systems analysis as a vehicle for East-West cooperation teaches us that to think that a particular strategy can resolve international issues is but to simplify: in the case of the global application of systems analysis, the entire playing field for national and international governance was redefined.

In this respect, I could not put it better than Aradau: “At the time of the Cold War, science was political not only for the visions of social and political order it struggled over but also through its mundane politics of living and working together across boundaries. ‘Give me a laboratory and I will remake governance,’ one could say paraphrasing [Bruno] Latour. The IIASA did not quite remake Cold War governance, but it made possible the emergence of different ideas about governance.” Indeed, the case of IIASA demonstrates that the very meaning of “the political” was twisted and turned to create the semantic, institutional, and social resources necessary to enable international science and organization to work.

Here Aradau points the central issue: “The IIASA seemed to flourish within the micro-connections around the ‘laboratory’ and, as the discussion on acid-rain models shows, through the painstaking construction of ‘neutrality.’ In so doing, I would suggest, the IIASA did not simply construct a version of system-cybernetic governmentality across the Iron Curtain, but also enacted a way of being anti-political. I wonder whether this way of being anti-political entailed a separation from activists and other radical movements, thus reclaiming the autonomy of the scientific field from political movements.” This is quite right. As I indicate in *The Power of Systems* and, at a greater length, elsewhere in my subsequent publications,¹³ many leading Soviet systems scientists dissociated themselves from the dissidents, but also from activist environmental movements. A case in point here is the fall-out with astronomer and prominent science populariser Carl Sagan, because Sagan over-emphasized the catastrophic effects of nuclear winter, which was in fact only one among several scenarios.

¹¹ Bentley Allan, *Scientific Cosmology and International Orders* (Cambridge: Cambridge University Press, 2018), Clifford Siskin, *System: The Shaping of Modern Knowledge* (Cambridge: The MIT Press, 2016), Hunter Heyck, *Age of System: Understanding the Development of Modern Social Science* (Baltimore: Johns Hopkins University Press, 2015).

¹² Iver B Neumann, *Uses of the Other: ‘The East’ in European identity formation* (Minneapolis: University of Minnesota Press, 1999).

¹³ Egle Rindzevičiūtė, “Soviet Policy Sciences and Earth System Governmentality,” *Modern Intellectual History* (24 May 2018), 1-30. DOI: <https://doi.org/10.1017/S1479244318000161>.

Furthermore, as I argue in *The Power of Systems*, Soviet systems scholars mobilized what can be described as an elitist framework of the use of scientific expertise, resulting in liberalisation of governance without extensive democratic participation. This democratic deficit, which was evident particularly in the early stage of IIASA work in the 1970s, is easy to criticize in retrospect. However, one should not forget just how difficult it was to organize productive scientific activities transnationally in a highly polarized context. At IIASA, systems scientists avoided the escalation of polarization by, as Aradau puts it, “painstakingly constructing ‘neutrality’.” This is not to suggest, however, that systems scientists were naïve: much of what they presented as ‘neutral’ was not neutral at all and they knew it very well. As *The Power of Systems* shows, constructing neutrality in an international organization was a reflexive game. I want to be clear here: *The Power of Systems* does not offer a normative model of how science and politics could be organized internationally. It presents a reconstruction of one particular case of epistemological entrepreneurship, of creating a genuinely novel scientific knowledge and a new institution under vast constraints.

Aradau writes “If the scientists enact compositions of the world, these are nonetheless compositions that obscure as much as they reveal. After all, the world that the IIASA inhabited was also the world of the anti-Vietnam war movements, Non-Alignment, and anti-nuclear activism. Systems analysis was remarkably unsuited to tackling questions of militarism, not so much due to the military origins of operations research, but due to the depoliticising assumptions that were built within the models themselves.”

I agree with this; in the epilogue of the book I tried to theorize the symbiotic relationship of Soviet systems analysis, the military-industrial complex, and the Communist political elites with the help of Roland Barthes’s concepts of the “mainstream elite” and “avant-garde.” According to Barthes, avant-garde movements explicitly challenge the values of the mainstream elite but only to some extent, because they structurally depend on the power and consumption patterns of the elites.¹⁴ Similarly to this, Soviet systems scientists depended on the communist power elites for basic resources and funding.

However, what I wanted to show is that change in governmental epistemology could and did originate endogenously in important ways. This is part of debate on whether institutions can change endogenously. The case of IIASA and Soviet systems analysis indicates that they can.

Here my argument parts from the interpretation offered by Jenny Andersson, who proposes that *The Power of Systems* downplays “the tensions inherent to this notion of high modern expertise in the Communist world.” An important task of *The Power of Systems* was to question the thesis of “high modernism” that was proposed by James Scott and has been criticized by anthropologists of expertise and infrastructure.¹⁵ In the Soviet historiography, arguments that are made in a spirit of “high modernism” tend to rely on the cases drawn from

¹⁴ Roland Barthes, *Mythologies* (London: Vintage, 1993), 139.

¹⁵ James Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1999). For a criticism of Scott’s account of the governmentalization of expertise see Penny Harvey and Hannah Knox, *Roads: An Anthropology of Infrastructure and Expertise* (Ithaca: Cornell University Press, 2015). For a more complex view of the links between state governance and scientific expertise see Martha Lampland, “The Technopolitical Lineage of State Planning in Hungary, 1930-1956,” in Gabrielle Hecht et al, ed., *Entangled Geographies: Empire and Technopolitics in the Global Cold War* (Cambridge: The MIT Press, 2011) and Martha Lampland, *The Value of Labor: The Science of Commodification in Hungary, 1920-1956* (Chicago: University of Chicago Press, 2016).

Joseph Stalin's terror and brutal industrialization. However, the late Soviet period was characterized by a much greater institutional plurality, and even some autonomy in particularly strategic scientific areas. It is those moments that tend to be overlooked by scholars who follow a mainstream account of the ideological and political instrumentalization of scientific expertise. As Aradau notes, my work suggests that the East-West scientists' response to the challenge of governance under uncertainty and polarization was an inventive and effective one: "Instead of *knowing*, East-West scientists were *doing*: creating an environment that enabled them to perform, to work together" (208 emphasis in the text). It was not a perfect solution, but then no solution ever is. My hope is that *The Power of Systems* has at least documented a case of a remarkable scientific, social, and institutional capacity to generate liberal change under pressing circumstances: something that would benefit many cities, societies, and states.