

Stanton Nuclear Security Fellows Seminar

PANEL 4: Insiders and Outsiders

1. Benjamin Wilson, CISAC

Insiders and Outsiders: Nuclear Arms Control Experts in Cold War America

Objectives: A mutually exclusive distinction has persisted in the scholarly literature on the history of expertise in the United States since 1945. The distinction is between what is inside, and what is outside—that which is of the state, and that which is independent of (or even opposed to) the state. This project examines a community of technical expertise in Cold War America that cannot be sorted so easily, calling into doubt the monolithic, fixed character of the “nuclear state.” Nuclear arms control experts participated in a surprising range of activity over the course of three decades, within and outside of the structures of formal authority. The project argues that nuclear arms control experts between the 1950s and 1980s crossed many of the boundaries drawn by a traditional picture of the expert-state relationship.

Overview: It was around 1960 that arms control first emerged as a distinct field with a distinctive cast of characters. And yet arms control as it had developed by the beginning of the decade seemed to bear only a faint resemblance to the disarmament tradition that had preceded it in the 1950s. An early chapter of the project shows how this shift in thought and practice developed, by situating it in its social and institutional context—in particular, by describing the institutional and intellectual mixing of a group of Boston-area disarmament advocates, Washington policymakers, and RAND social scientists. Strategic arms control emerged quickly alongside a new theory of nuclear deterrence, within significantly overlapping groups of thinkers.

The intellectual history of nuclear arms control has largely been written as a history of ideas, untethered from a deeper social context. This chapter reinterprets the early history of arms control thought by placing it within a community of disarmament advocates, located mainly in the Boston area, during the late 1950s. Arms control ideas were neither a simple functional response to the events of the Cold War, nor did they spring from the properties of nuclear weapons technology. Local and contingent factors, too, shaped their history. In particular, the all-important idea of stability was contested within the early arms control community. Strategic analysts like Thomas Schelling preferred to think of stability as a more static phenomenon, applicable primarily to nuclear deterrence. But others, especially Jerome Wiesner—a control systems engineer and cyberneticist by background, and a participant in the Boston disarmament group—proposed to stabilize and correct the arms race through comprehensive arms control systems and processes of long-term dynamic feedback. These arguments and discussions took shape within a developing arms control milieu. In the summer of 1960 the American Academy of Arts and Sciences sponsored the first major unofficial conferences in the new field. This culminated in the

Academy's "summer study on arms control," fashioned in the style of the many Cold War summer studies that military technical consultants had participated in for years.

The second chapter examines the movement of technical expertise between the university and the defense bureaucracy in the early-to-mid 1960s, and its implications for the creation of scientific knowledge. New institutional arrangements were forged in an effort to tackle a range of specialized nuclear age problems. Unique government institutions were raised for the purpose, including the Defense Department's Advanced Research Projects Agency. And new not-for-profit organizations—occupying a niche between the government, the universities, and private corporations—channeled expertise from the civilian academic world to the realm of classified defense projects. This chapter centers on an elite group of advisors working for the Institute for Defense Analyses (IDA), a not-for-profit outfit consulting on a wide spectrum of missile age issues.

Public debate concerning nuclear weapons in the late 1950s and early 1960s had revolved around the issue of nuclear testing and the detrimental effects of radioactive fallout on human health. But in the late 1960s, more arcane arms control issues bearing on missile design and missile defense began to intersect with public concerns and public politics. The third chapter asks how and why these nuclear issues came up for such remarkable scrutiny and contestation in a relatively short time. I recount two key arms control issues of the late 1960s: the "Antiballistic Missile" (ABM), and the "Multiple Independently-targeted Reentry Vehicle" (MIRV). ABM was a system designed to shoot down incoming nuclear warheads with nuclear missiles, or "antimissile missiles." MIRV technology allowed one missile to carry several nuclear warheads, each to an independent target. To many arms controllers, ABM and MIRV were noxious for numerous reasons, but especially because these technologies offended their deeply held commitment to deterrence and stability. The arguments they offered against ABM usually stressed both its technical fallibility and its tendency to undermine stability by appearing to give the side with missile defenses an incentive to strike first. Arms controllers leapt into the political fray with these issues, providing testimony before Congressional committees, writing position papers, speaking at local rallies, and joining forces with groups of suburban homeowners who decried the military's appropriation of public land to put hydrogen weapons in their backyards. Yet other experts—especially the longtime foreign policy advisor Paul Nitze and his conservative allies—felt that missile defense was essential to American security and nuclear strength. This chapter shows how such arcane controversies within the arms control and nuclear strategy and policy worlds were suddenly propelled outward into a very divisive and very public controversy.

The fourth chapter charts the changing institutional structure of support for arms control expertise in the 1970s. It considers the impact of these changes on the arms control debates of the era following the conclusion of the first round of Strategic Arms Limitation Talks between the U.S. and the Soviet Union in 1972. Discussion among program officers at the Ford Foundation early in the decade described a growing need to replenish the stock of ideas and personnel in arms control. Among many, it was thought that arms control had suffered an intellectual decline in the decade or so since the field's founding. A new program of support had the enthusiastic backing of the foundation's president McGeorge Bundy, who had left his position as national security advisor a few years earlier. Initially the Ford Foundation began by supporting "regional" arms control seminars, the most active and successful

of which was based at the California Institute of Technology, featuring many experts from the nearby RAND Corporation. In the early 1970s, a few well-placed participants in the so-called California Seminar on Arms Control and Foreign Policy formulated an influential critique of nuclear deterrence and some of the precepts of strategic arms control. Their ideas would soon find a place in the policies of the Nixon administration.

In 1973 Nixon slashed the payrolls and the research budget of the most important voice for arms control (and home for arms control expertise) in the executive branch: the Arms Control and Disarmament Agency. Arms controllers were deeply troubled. The Ford Foundation's trustees decided that year to pursue a long-term, multi-million-dollar program of support for arms control research, filling the gap left by the government's retreat. The money was directed at the universities, where arms control had first flourished, and arms controllers soon built substantial academic institutions with Ford Foundation support. At Harvard in 1973, Paul Doty established the Program for Science and International Affairs, and similar ventures emerged at Stanford, MIT, and Cornell. Important arms control work flowed from these new programs—including (at MIT) some of the earliest and most vigorous criticisms of improved missile accuracy—and the legacy of these Ford-funded programs and centers remains with us today. The case of arms control, and its complicated patronage relationships with the state and with the foundations, requires putting aside some of our stock narratives about the "Cold War University." U.S. arms control was a complicated affair: a Cold War project, yet always pursued waveringly by the state; a child of the academy but raised specifically for application to public policy; and supported mainly by private money in the 1970s, the decade in which arms control's pursuit by the government at the international negotiating table was needed more desperately than ever.

As American politics splintered into a complex pattern during the late Cold War, the meaning of nuclear arms control, and the community that had once cohered around it, shifted in response. In the 1970s and 80s arms control was caught up in fractious debates, as issues that would have at one time been confined within elite circles continued to spill out into the public. The fifth chapter explores the controversy surrounding Ronald Reagan's announcement of the Strategic Defense Initiative (SDI) in 1983. Soon after SDI was made public, expert panels were formed within the government and by non-government organizations to assess the feasibility and wisdom of SDI. The focus here is on the work, internal politics, and controversial wider reception of a major critical study of SDI by the American Physical Society.

The APS study assembled the most thorough and pointed critique of the "directed energy" weapons technology under consideration and development by the Strategic Defense Initiative Organization (SDIO) and the federal weapons laboratories. Formed in 1984 and comprised of elite scientists with insider experience in missile defense—overseen by a review panel including several prominent first-generation arms controllers—all of the study group's members were cleared to view secret military information. But because the study was conducted chiefly for public release, this access came with complications and compromises. At the root was unease over perceptions of the study's objectivity: the study group's members were at pains to protect it; opponents were eager to attack. The Defense Department claimed the study group hadn't seen the most up-to-date information and was therefore unqualified to judge its programs authoritatively. The leadership of the American Physical Society, meanwhile, issued a

controversial statement condemning SDI—a statement the study group itself had not approved. As a result, the report was mired in a complex dispute from the very beginning. Its fate was quick dismissal by officials in power, though it had performed the increasingly non-governmental function of arms control: to fan the flames of public criticism of the government's most sophisticated nuclear weapons systems.

Research Design: My project concerns the political career of American expertise and the technical substance of arms control; but it is animated by the experiences, writings, statements, and social texture of the expert arms control community. Thus my dissertation, and the book manuscript I am developing from it, rely heavily on the personal papers and correspondence of the U.S. arms control experts. In working on my dissertation, I conducted archival work in seventeen separate personal collections, most of them based in university archives. I also used official records of the government (drawn especially from the John F. Kennedy Presidential Library & Museum and the Digital National Security Archive) and private philanthropic foundations (especially the Rockefeller and Ford Foundations). I have plans to conduct additional research in both personal and official/organizational collections that I was unable to visit during my doctoral research, including personal collections at the Hoover Institution at Stanford, and records housed at the Richard Nixon Presidential Library & Museum and the RAND Corporation. I am also beginning to conduct oral history interviews, beginning with a conversation with Thomas Schelling scheduled immediately following the Stanton Nuclear Security Seminar in Washington, DC. Later in the fall, I hope to speak on the record with Henry Rowen and John Lewis at Stanford, and to conduct several interviews in the Boston area in 2015.

Target Audience: The main audiences for this project include historians of American politics and society, historians of American science and technology, and historians interested in the role of the U.S. in the world.

Among policy-sensitive audiences, the primary contribution of this project is to outline some of the factors that have contributed to the successes and failures of the domestic community of arms control advocacy. One of the project's lessons is that arms control (and nuclear security generally) is not made of issues, arguments, and policy proposals alone. It is made of people, and the mixing of different kinds of expertise, supported financially within a framework of institutions. This lesson will not be entirely surprising for an organization like the Stanton Foundation; and yet it bears consideration in longer historical context. As the project discusses in detail, private foundations became the single most important source of support for U.S. arms control expertise in the 1970s, when hostile forces within the government attacked the executive-branch agency that had been created a decade earlier to pursue the goal of arms control.

2. Adam Mount, CFR

Nuclear Disarmament in the United States

Description: Since President Obama’s Prague speech of 2009, the prospect of nuclear disarmament has gained acceptance at the highest levels of government more than at any time since the 1940s. However, American policy on disarmament has never been the subject of academic study. To fill the gap, this book compares past nuclear debates with today’s movement and shows how each have significantly impacted U.S. nuclear posture. The book describes how U.S. policymakers at the highest levels have considered disarmament at length, often in moral and personal terms, and argues that though the debate has changed significantly, it is unlikely to disappear in the foreseeable future.

Overview: The history of nuclear weapons is at least as much about their restraint as it is about their proliferation, use, or value. Many observers now forget that the various forms of nuclear restraint—nonproliferation, test-bans, and non-use—were historically motivated by groups concerned with nuclear disarmament. The President’s 2009 speech is sometimes treated as a dangerous new proposition, but this reaction overlooks the United States’ consistent history of issuing rhetorical commitments to disarm as well as five cases in which the U.S. government has issued the commitment in a formal negotiation process. By describing the debates that led up to this commitment—at high levels inside the administrations and in prominent public discourse—the book would offer new research on critical cases in nuclear history and place the ongoing debate in much-needed context.

This task occupies the book’s first section and extends my dissertation research, which explained past commitments to disarm as a response to a moral norm of nuclear disarmament. The dissertation found that U.S. disarmament diplomacy in the four cases surveyed cannot be adequately explained without reference to the moral character of the disarmament norm, rejecting three null hypotheses:

- a) National leaders are not receptive to moral argumentation.
- b) Nuclear weapons states agree to nuclear disarmament to lock in relative gains from conventional superiority.
- c) The cost of issuing disarmament commitments is low.

The book will rework and extend these four cases (the 1946 Baruch Plan, the 1961 McCloy-Zorin accords, the NPT signing in 1968, and the 1987 summit at Reykjavik) to provide a context for contemporary debates. In each case, the status of the nuclear disarmament norm is compared against the internal policy process that led to the commitment in order to explain why the commitment occurred.

The book’s second section will describe the current nuclear disarmament movement and the constraints that it places on American nuclear diplomacy. Two features distinguish the ongoing debate from previous iterations: a lack of widespread public support and the prevalence of nonmoral arguments. In the wave of antinuclear movement of the 1980s, a million protestors filled the streets of New York City and millions more in Europe, as international relations scholars like Quester, Wohlstetter, Jervis, Mearsheimer, Bull, Bye, Russett, Singer, and Schelling all weighed in on nuclear disarmament and

nuclear ethics. By contrast, the wave of interest in nuclear disarmament that began in the late 2000s is conducted largely in Washington conference rooms by a familiar group of analysts from think tanks. Academia and the public have remained on the sidelines, while campus and activists groups have seen moderate success in membership. The current situation is notably different than previous iterations and has generated a major wave of prominent proponents for the issue. The combination of attention of policy analysts and continued interest from the White House has generated detailed and novel analytic work, but few policy changes. Neither the changing coalition of supporters nor the shift argumentative strategies have been adequately explained, but understanding the transition is important for making effective arguments on the issue and forecasting likely developments.

At the same time, the international community remains concerned about disarmament progress. The United States is intimately concerned with the result of the upcoming Nonproliferation Treaty review conference and the continued debate over a Middle East nuclear weapon free zone and both depend significantly on disarmament perceptions. The new movement on the Humanitarian Impact of Nuclear Weapons, which includes 146 states and a complement of NGOs, continues to gain momentum toward drafting a legal ban on nuclear weapons, which could impose still greater costs on the United States. Because differing types of proposals (multilateral, unilateral, a ban, or obsolescence) are likely to have differing consequences for U.S. interests, the second section will make an effort to chart the various proposals and estimate their effects.

In effect, the second section tests the null hypotheses that:

- a. Nuclear disarmament is a nonissue.
- b. Disarmament policy has little effect on U.S. interests.

The shorter third section will discuss the future of nuclear disarmament. The preceding discussion suggests that the issue is unlikely to evaporate—neither the international pressure nor the sporadic interest in the United States. Extrapolating from the arguments of the first two chapters does offer predictions about the types of argumentative strategies that are more likely to be successful and into how other countries are likely to react to American initiatives.

At the same time, the concluding sections will draw on earlier arguments to offer new possibilities for the policy community. For instance, many assume that material progress toward disarmament is stalled pending new bilateral steps with Russia to further reduce warhead numbers. In fact, there are a number of steps the United States could take that do not rely on unilateral reductions or on tenuous associations with related norms of nuclear restraint (like nuclear security or dropping a leg of the triad). Steps that demonstrate an expectation that the United States will one day have to meet safeguards under a disarmament treaty might fortify the credibility of existing disarmament commitments and gain diplomatic benefits. These steps include collating and selectively releasing nuclear data, renovating or building nuclear facilities to certain standards, and modifying new weapons systems to facilitate inspection. The United States might also choose to eliminate the tactical nuclear mission and move to an all-strategic arsenal. Adding specificity to the disarmament commitment—by endorsing a global multilateral treaty—might also help to constrain disarmament advocacy in ways consistent with U.S.

interests and to direct attention toward productive initiatives. Many of these steps are cost-saving, counterproliferative, or appealing for other reasons, but when linked to disarmament commitments could yield substantial diplomatic benefits.

Research design: The first, historical section consists of a deductive typological model.¹ The methodology compares coded values for the status of the disarmament norm to motives expressed in internal policy debates to determine the extent to which the norm influenced policy process. The status of the norm was determined by constructing a deductive typology of differing types of norms from a theory that drew on philosophical ethics. Next, the state of disarmament activism and debate was evaluated using primary and secondary sources to characterize the norm in the relevant period. Codings for the state of the norm were then compared to transcripts of the policy process then occurring inside the administration that would lead to the disarmament commitment. Secondary accounts and original archival research helped to closely process trace these cases, which were well documented in the 1945 and 1989 but were some of the first accounts of the McCloy-Zorin accords and the Nonproliferation Treaty policy process.

The second section will consist of interviews with advocacy groups, policymakers, former officials, and other figures who contribute to nuclear debates. This work will consume most of the year.

Product: The book is intended to contribute to international relations scholarship on nuclear issues but also appeal to a broader audience in the policy community and the public. To facilitate this, some of the theoretical work in the dissertation will be devolved into articles for an academic audience.

¹ George and Bennett 2005, 234–45.

3. Christopher Lawrence, CISAC

Citizens as Sensors: interpreting the knowledge products of “democratized intelligence”

Objectives: The growing availability of information technologies is inducing a shift in the way knowledge about nuclear activities is generated and transmitted. This study aims to characterize the evolving epistemic community associated with nuclear intelligence.

Overview: In the fall of 2011, a small team of students at Georgetown University produced a report titled China’s Underground Great Wall. Inspired by their professor Phillip Karber, they utilized new information technologies to collect satellite imagery, acquired shake maps from the US Geological Survey, and translated thousands of pages of Chinese military documents and blog posts. The report illuminated a massive network of collapsed underground tunnels in China’s Sichuan Province, and made the striking claim that China may possess ten times as many nuclear weapons as mainstream estimates suggest.¹ In the small media sensation that followed, the public descended from a plane of epistemic stability regarding China’s nuclear arsenal, into a confusion in which defense intellectuals could repeatedly claim that no one has “any idea how big China’s arsenal is, except for China”. The report offered no new information to policy makers or the public, but media coverage told a uniform story: renegade student analysts use new technologies to upstage complacent mainstream experts.^{2 3} Charmed by the aesthetic appeal of this techno-democratic underdog story, congress quickly circulated the report, and later devoted new funds and STRATCOM studies to reassess the veracity of China’s nuclear posture.⁴ Bewildered nuclear-security experts have referred to this as the “Karber effect”.⁵

Arms-control advocates have romanticized for decades the prospect of “societal verification”, whereby elements of civil society would supplement institutional structures to help monitor nuclear activities worldwide. As early as the first Pugwash conference, activists and scientists have suggested that a nuclear-educated global citizenry would make clandestine nuclear development all but impossible.⁶ This lofty vision remained largely abstract throughout the Cold War, but with renewed talk of arms-reduction treaties and global transparency, the romance of “societal verification” is reawakening, and allying with more contemporary discourses that celebrate the democratizing potential of information technologies.

The technical environment has indeed changed dramatically. Data sources once available only to highly secretive and centralized intelligence agencies - satellite imagery, ground-based photographs of built objects - and powerful analysis tools like Google SketchUp are now freely available. In addition, social-

¹ Karber, P. China's Underground Great Wall. in 1–357 (2011).

² Stephens, B. China's Underground Great Wall. *Wall Street Journal* 1–5 (2012).

³ Wan, W. Georgetown students shed light on China’s tunnel system for nuclear weapons - The Washington Post. *The Washington Post* 1–6 (2011).

⁴ National Defense Authorization Act; FY 2013. 1–681 (2012).

⁵ Hunt for China's secret nukes: Obama orders the Pentagon to find ways to “neutralize” store of up to 3,000 nuclear weapons. *Dailymail.co.uk* 1–6 (2013).

⁶ Szilard, L. The First Pugwash. *The Scientist* 1–3 (1987).

media modes of interaction between geographic-information systems (GIS) and users have arisen in the forms of Wikimapia, Panoramio and Google-Earth layers, which allow scattered users to post pictures and descriptions of mapped objects. This constitutes a new vehicle for the creation of knowledge about nuclear activities. Citizen hobbyists across the globe are increasingly using these tools to monitor treaty-relevant nuclear facilities. Activist organizations and NGOs are also mobilizing these technologies, often to spy on their own countries. In light of these developments, policy makers and verification practitioners are predicting a “new era of transparency”, heralded by remote-sensing and social-media technologies that “engage citizens in the treaty-verification challenge” and “increase trust between citizens and their governments”.^{7 8}

These celebrations of “citizen intelligence” tend to anonymize both the producers and users of knowledge. Citizen participants are represented as faceless “sensors” in a GIS array, which can be “crowd-sourced” in order to “uncover ground truth” about nuclear activities. As such, new writing on this topic focuses on how policy makers and practitioners can mobilize citizens to participate in verification activities.^{9 10} I want to begin from the fact that they are already participating, and consider how policy makers and the public should interpret the contributions of citizen analysts. When do they constitute a genuine value added for treaty verification? Will citizen activities create “more transparency”, uncover hidden dangers and increase trust? Or will societal verification become a venue for eccentric characters to self-identify with contentious but unsubstantiated claims, fomenting suspicion and disrupting the epistemic task? Under close examination, all of these effects can be seen at work. To what extent should diverse citizen contributions inform policy and public perception at large?

These concerns arise out of an alternative concept of knowledge and objectivity, by which knowledge is deemed objective not for its immune transportability across different contexts and interests, but for the depth of its acknowledged connection to the particular contexts and interests in which it is created or mobilized.¹¹ Before deciding what a satellite image means to us, we should consider the many things it could have meant for the person and machinery that acquired it; for the journalist and medium that reported it; in the forums in which it was discussed; to the careers that it launched. This line of inquiry runs directly orthogonal to the popular discourse emerging in arms-control circles about ‘democratized intelligence’ which treats nuclear information as a homogenous utility function, and begs for more of it.

The project I propose will investigate recent examples of citizen participation in the creation of nuclear intelligence. I will focus on three question areas:

- Who are the new participants? How do they self identify? Do they interact or overlap with traditional structures of treaty verification? What do they imagine they are contributing to, and how do they hope their contributions will be utilized?

⁷ Gottemoeller, R. *From the Manhattan Project to the Cloud: Arms Control in the Information Age*. 1–17 (2012).

⁸ Pabian, F. *The New Geospatial Tools: Global Transparency Enhancing Safeguards Verification*. 1–10 (2010).

⁹ Hinderstein, C. & Hartigan, K. Societal Verification: Leveraging the Information Revolution for Arms Control Verification. in *Institute for Nuclear Materials Management, 53rd Annual Meeting* 1–9 (2012).

¹⁰ Ibrahim, J. K., Rajagopalan, R. P. & Ibrahim, I. S. The potential and pitfalls of societal verification | *Bulletin of the Atomic Scientists*. *Bulletin of the Atomic Scientists* 1–4 (2013).

¹¹ Haraway, D. *Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective*. 1–13 (2010).

- How do the meanings of nuclear facts change in transit across social and professional boundaries? What inflections do they acquire from the identities and aspirations of their handlers?
- How are the new knowledge products consumed? Do they influence the positions of public officials in substantive ways? Do they bring a genuine “value added” to assessments about nuclear activities, or simply offer new rhetorical resources to legitimize policy?

These three angles will allow me to follow items of “evidence” from situated origins, through de-contextualization, and onto the determinant-landscapes of war and peace. I will explore these questions by drawing on the science-studies, critical-geography and political-communication literatures, as well as my own experience in verification technology. I’ll look at contemporary examples ranging from the disclosure of nuclear facilities by Iranian dissident groups and international NGOs,¹² to the construction of nuclear-North-Korea Google-Earth layers by economics students in the US.¹³ Each episode reveals not just faceless observational tools, but colorful characters who weave their identifications and desires into the stories they tell about clandestine nuclear activities. These potent ingredients are not higher-order perturbations on otherwise apolitical knowledges. They are the building blocks of knowledge, and they have important implications for how policy makers and analysts should interpret citizen-produced intelligence.

Working Hypothesis: I am concerned with the transmission of information about nuclear activities - knowledge, photos, “evidence” - across social and professional boundaries. Popular narratives about “democratized intelligence” would hold that information will traverse these boundaries by force of its genuine “value added” to various empirical endeavors. My hypothesis runs counter to this: often the motive forces that thrust information across social and professional boundaries derive from the identities and narratives associated with their transmission. Along these lines, the Karber episode serves as the paradigmatic case: the story that gives the infamous Karber Report the legs required to breach boundaries is not contained in the report. Rather, the story is about the breach itself. This is not an instance of boundary “transparency” or free information flows, but of information born of the boundary. Likewise, I fear that “societal verification” and “techno-transparency” will amount an eruption of “evidence” about “deviant nuclear activities” out of the contested interstices between professional and lay communities, and the technologies out of which their identities/knowledges are built.

Theoretical frameworks and research activities: The analytic framework I deploy will draw on various lines of scholarship, and I will review these literatures in the early stages of the project. I’ll start with scholarship from science-and-technology studies on regimes of perceptibility and imperceptibility,^{14 15}

¹² Albright, D. & Hinderstein, C. Iran: Furor over Fuel. *Bulletin of the Atomic Scientists* 1–4 (2003).

¹³ Ramstad, E. Gulags, Nukes and a Water Slide: Citizen Spies Lift North Korea’s Veil. *Wall Street Journal* 1–4 (2009).

¹⁴ Mol, A. *The Body Multiple*. 1–44 (2007).

¹⁵ Murphy, M. *Sick Building Syndrom and the Problem of Uncertainty: Environmental Science, Technoscience, and Women Workers*. (Duke University Press, 2006).

data diversity,¹⁶ and the construction of lay expertise.^{17 18} Some of these studies highlight the effects of analytical tools and data structures on vision and visibility, while others trace interactions between conventional knowledge institutions and diverse lay-enthusiast communities. I'll also cover critical-geography and political-information literatures,^{19 20} which investigate interactions between policy makers and different forms of information about the worlds they govern.

My main empirical task is to familiarize myself with the technologies and usercommunities themselves. I can begin by following online activity on Wikimapia, Panoramio, and other GIS/social media environments, with an eye out for opportunities to engage with users. I should also becoming versed in various GIS softwares and 3-d modeling tools like SAGA GIS and 3dVIA. I ultimately want to engage with the communities by interviewing members or even participating in their activities. My knowledge about nuclear science and security will aid greatly in these interactions.

I'll also need to understand how citizen participants interface with more conventional structures of knowledge creation. I can draw on my connections at the National Labs, and in various academic departments such as the Program on Science and Global Security at Princeton, to develop a framework for how different examples of citizen-produced knowledge are (or are not) incorporated into expert assessments. Later, I will follow these assessments into policy making and public awareness by analyzing policy documents, news stories, and statements made by public officials.

At stake for policy makers:

- How can we develop a workable epistemology in this environment? How should the authority of evidence be evaluated? How do the identifications and aspirations of citizen participants influence how we observe and understand nuclear programs?
- How do we imagine the future of secrecy and the control of information in intelligence circles, labs, and governments? Is citizen participation in treaty verification ominous for the security of sensitive information? On the other hand, to what extent does secrecy stifle potentially fruitful exchanges in this new environment?
- Can the conclusions drawn be applied across cultures? Or will social contingencies lead to imbalances in the availability of citizen resources to different nations?

The relevance of knowledge about nuclear activities for policy is self-evident. In a technically complex area, policy makers must understand the epistemic communities that help define the problems we face as a nation. As new information technologies cause relevant knowledge communities to evolve in complex ways, policy makers and security practitioners must adapt as

¹⁶ Bowker, G. C. Biodiversity Datadiversity. *Social Studies of Science* 30, 643–683 (2000).

¹⁷ Epstein, S. The Construction of Lay Expertise: Aids Activism and the Forging of Credibility in the Reform of Clinical Trials. *Science, Technology, and Human Values* 20, 408–437 (1995).

¹⁸ Ellis, R. & Waterton, C. Environmental Citizenship in the Making: The Participation of Volunteer Naturalists in UK Biological Recording and Biodiversity Policy. *Science and Public Policy* 1–11 (2004).

¹⁹ *Critical Geographies*. 1–745 (Praxis (e)Press, 2008).

²⁰ Haas, P. M. Introduction: Epistemic Communities and International Policy Coordination. *International Organization* 1–36 (2007).

well. This work will deploy diverse theoretical and empirical tools to help characterize these important changes, and help policy makers interpret new ways in which identities and aspirations can influence how nuclear programs are understood.

4. Magdalena Stawkowski, CISAC

Radioactive Knowledge: State Control of Scientific Information in Post-Soviet Kazakhstan

Objectives: Despite the fact that for much of the twentieth century the field of anthropology in the United States was shaped by the nuclear age, until recently, the human effects of nuclear weapons testing was seldom the topic of ethnographic inquiry. This early anthropological silence may seem surprising given that many of the canonical ethnographies come from the Pacific Islands, a region overwhelmingly shaped by the U.S. and French nuclear weapons testing programs. When anthropologists eventually set out to address the social effects of nuclear weapons, mostly in the early 1990s, they focused their research on the human cost of nuclear weapons development and the resulting environmental degradation, specifically emphasizing the plight of communities hosting the nuclear military-industrial complex. Although in the United States environmental contamination and the plight of communities are generally well documented, in the Soviet context this literature is mostly lacking. My dissertation fills this gap. As such, it is an ethnographic account of the legacies of the Soviet atomic bomb project in Kazakhstan, their disastrous health effects, and the formation of a nuclear landscape, largely structured and narrated by those most affected by its Cold War, military-industrial complex.

Overview: When anthropologists (and those who are sympathetic to the anthropological approach) eventually turned their attention to nuclear weapons in the early 1990s, they specifically focused their research on the human cost of nuclear weapons development and the resulting environmental degradation by emphasizing: 1) the plight of communities; 2) risk perception analysis; and 3) the culture of nuclear weapons laboratories/production facilities (Ackland 1999; Alcalay 1992; Barker 1997, 2004; Brown 2013; Carucci 1997; Dalton et al.; 1999; Eden 2004; Garb 1997; Garb and Komarova 1999; Gusterson 1996; Hecht 2012; Iversen 2012; Johnston 1994, 2007; Krasniewicz 1992; Kuletz 1998; Lifton 1967; Masco 2004, 2006; Petryna 2002; Stephens 1995; de Vries and Seur 1997; Welsome 1999; Werner and Purvis-Roberts 2007, 2014; and Zonabend 1993).

Anthropologist Barbara Rose Johnston (1994, 2007), for example, brought to light the devastating health effects to communities that hosted nuclear weapons development and who participated, often unknowingly, in secret human radiation experiments. Even though the Cold War has ended, Johnston makes an important point that the nuclear program, including uranium mining and processing, development of nuclear weapons, and their testing, has created “radiogenic communities” that bear the brunt of radioactive pollution. Communities hosting nuclear industries, Johnston shows, suffer from increased rates of cancers or other debilitating diseases and decreased life spans. Anthropologist Holly Barker’s (1997, 2003) charge is to “play a critical role in witnessing and documenting human environmental rights abuses” among the Marshall Islanders (2003:138). Specifically, she explores the sociocultural context of nuclear environmental disasters, focusing on histories of this as told from the perspective of Marshall Islanders themselves. Barker’s work also describes how the U.S. government has consistently avoided responsibility for continuing health and environmental problems. Anthropologist

Joseph Masco (2006) looks at multiple legacies of the atomic project in New Mexico and how they interact on the local, national, and global level. Specifically, he explores the shifting perceptions of radioactive environments themselves, including the human body as such.

Despite some new directions in U.S. anthropology, there are only a small number of studies dealing specifically with the subject of *Soviet* era nuclear legacies. What has been done focuses primarily on Russia and Ukraine (Garb 1997; Garb and Komarova 1999; Petryna 2002).¹ Paula Garb and Galina Komarova (1999) for example, explore the history of environmental activism in Chelyabinsk, Russia, a major nuclear industrial complex and home to the Mayak plutonium reprocessing plant, the largest nuclear facility in the country. Since Mayak's inception in 1948, a number of large accidents have contaminated the area exposing over a half a million people to radiation at least twenty times higher than the Chernobyl disaster (Garb 1997; Larin 1999). Garb and Komarova's (1999) work also shows how a network of Russian activists forced the environmental and social problems linked with the nuclear industry to light in Russian politics. In the Ukrainian context, Anthropologist Adriana Petryna's (2002) *Life Exposed: Biological Citizens after Chernobyl* explores Chernobyl-related illnesses as a political-economic question. She shows how the dismantling of the Soviet command economy and a harsh market transition created a paradoxical social formation where "the damaged biology of a population has become the grounds for social membership and the basis for staking citizenship claims" (Petryna 2002:5). Petryna's case study offers a useful context for Kazakhstan where the ability of the Semipalatinsk Nuclear Test Site communities to confront and understand their past, present, and future is constrained by their access to information and limited power in decision-making processes. Outside of Russia and Ukraine, Sharon Stephens (1995) uncovers the impacts of the Chernobyl disaster on children in the Norwegian Sami regions. As for Kazakhstan specifically, the only anthropological studies are by Cynthia Werner and Kathleen Purvis-Roberts (2007) who examine "risk perception," or people's subjective understanding of risk informed by their social context, at the Semipalatinsk Nuclear Test Site.

My dissertation is an ethnographic account of the lesser-known histories of the Soviet atomic bomb project in Kazakhstan and their disastrous health effects told by those most affected by the rise and collapse of its military-industrial complex. In it, I explore how local inhabitants of the test site region cope with their own present-day nuclear challenges in a complicated arena of post-Soviet economic transformations. I engage with and expand upon the work of Petryna (2002) particularly by contextualizing how abrupt market transitions and scientific knowledge influence everyday survival in Kazakhstan's nuclear zone. Unlike Petryna's research, however, my work has revealed something quite different. Residents around the nuclear test site 'embrace' radiation as a sign of genetic resilience, rather than accentuating illness to access state resources. My dissertation thus offers a necessary and historicized perspective on the complex web of political, economic, scientific, and social dynamics that enable human inhabitation of a radioactive landscape. I argue that the newly emerging strategies for survival reflect a new social order of the Kazakh state: that order embraces a nuclear future by agreeing

¹ Only with the fall of the Soviet Union were non-local scholars allowed to conduct nuclear related research in the area. Although most studies focus on Russia, anthropologist Cynthia Werner (2007, 2013) is one of the few people to write about the plight of communities affected by the Semipalatinsk Nuclear Test Site in Kazakhstan. In addition to the studies on the Soviet nuclear legacy mentioned above, the following groups and authors have also produced policy-oriented analyses on nuclear contamination in the post-Soviet context: Feshbach and Friendly 1992, Leeuwen 1995, Warner and Kirchmann 2000.

to accept funding to become a Global Nuclear Fuel Bank and a dumping ground for much of the West's toxic waste, while at the same time publicly lamenting its Soviet nuclear past. In my work, I address the ways people have learned to engage with the nuclear test site's past and present techno-political state practices, scientific expertise, and authority, and how their experiences of health, suffering, and notions of well-being constitute a new kind of post-socialist identity. I expect to find that present-day regional, political, and economic developments of the nuclear test site produce, in tandem, specific material and social realities that structure human experience in the region.

Drawing on sixteen months of fieldwork in the Semipalatinsk Nuclear Test Site region and using the 1949-1989 Soviet testing program as an important historical context, I ask and address three interrelated questions: (1) How do Kazakh villagers envision themselves in a post-Soviet, post-nuclear testing, free-market social-economic order? (2) How do the consequences of radiation, human survival, and anxieties about low-dose exposure operate in contemporary Kazakhstan? and (3) How do long-standing scientific debates about the effects of low-dose radiation exposure contribute to biological conceptions of human bodies in the post-Soviet context?

Research Design: This is a mixed-methods dissertation drawing on critical medical anthropology and its theoretical approach to health, underscoring how lives are made, unmade, and then remade under dramatic social, political, and economic pressures. During sixteen months of fieldwork in Kazakhstan, in addition to preliminary two-month research trips in 2007 and 2009, both qualitative and quantitative data was collected for this project. The primary methodological approach was participant-observation, structured and informal interviews with individuals living near or on the nuclear test site, scientists, medical doctors, and NGOs working in the region. This research was supplemented with archival research in Kazakhstan and the United States, as well as extensive consultation with primary and secondary sources of Soviet, Russian, and Kazakh origin. My final research product will be a peer-reviewed article and a book manuscript.

Target Audience and Policy Contributions: The primary audiences for this work are scholars of cultural anthropology, policymakers, and communities affected by nuclear testing. Research in anthropology that addresses the relationships between health and socioeconomic inequalities between countries, international policy, and along ethnic lines has demonstrated effectively how different national, multinational, and global institutions can greatly influence the socio-cultural identities of marginalized populations. Competing claims to 'truth' furthermore, raise questions about how local interpretations and actions are influenced by state and international level policy decisions. In the post-9/11 world where the emergence of the security state is coupled with the renaissance of nuclear power, anthropologists can play a critical role in helping to explain emergent social, political, and economic configurations. My research attempts to make sense of dynamic tensions and frictions between state-sponsored agendas and demands made by communities that suffered because of nuclear testing. Indirectly, my findings speak to current debates about human radiation exposure such as that which occurred in 2011 in Fukushima, Japan.

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