



Left to Right: The Stanley Center's 2019 Accelerator Initiative participants Jen Spindel, Kathryn Dura, Grace Liu, Sylvia Mishra, and Chantell Murphy share their work and take questions during a panel discussion in November 2019, in Washington, DC.

Next Gen on Nukes and Tech

A Conversation with Five Emerging Experts

By Luisa Kenausis

The

nuclear weapons field has long suffered from a lack of diversity in its top ranks, and in recent years, a growing number of organizations have taken on the challenge of cultivating a more diverse community of experts.

For our part, the Stanley Center for Peace and Security launched the Accelerator Initiative in 2019, offering a unique professional development opportunity to a small group of early career women working in nuclear, technology, or international security policy.

From a pool of highly qualified nominees, five women were selected to participate in the 2019 Accelerator Initiative. As the first cohort of participants, these women contributed to high-level discussions on a range of topics. Each participant is also working on a policy research paper on a topic of her choice relating to nuclear weapons and emerging technology. The Stanley Center will publish these papers in summer 2020.

We took a few minutes to speak with them about their experiences as part of the initiative and to get an update on their careers more broadly. The following excerpts are edited for length and clarity. The full interviews are available on our website.

Sylvia Mishra

Sylvia Mishra is pursuing doctoral studies in political science at the Schar School of Public Policy and Government at George Mason University. Her research focuses on nuclear strategy and nonproliferation, Southern Asian security, and emerging and disruptive technologies. She was an India-US Fellow at New America, a Scoville Fellow at the Nuclear Threat Initiative, Visiting Fellow at the James Martin Center for Nonproliferation Studies,

Nuclear Scholar at CSIS, and Carnegie New Leader at the Carnegie Council for Ethics and International Affairs. Mishra holds a BA in political science from Hindu College, University of Delhi; an MSc in international relations from the London School of Economics and Political Science; and an MA in nonproliferation and terrorism studies from the Middlebury Institute of International Studies.

What got you interested in nuclear policy? When did you decide to make it your career?

In the past, I worked at a think-tank in New Delhi on India-US defense and security cooperation and US policy in South Asia. When I received an opportunity to participate in a conference on nuclear weapons issues in Vienna, I was told that nuclear weapons issues are hard security topics dominated by men and a technical subject beyond my ability to grasp or present a paper on. I was asked to pass on the opportunity to a male colleague. I refused to do so and instead prepared well for the conference in Vienna. Eventually, I was selected to join the James Martin Center for Nonproliferation Studies as a visiting fellow to work on nuclear dynamics in South Asia and emerging technologies—specifically underwater drones. Since that day, I work doubly hard to hone my craft in the nuclear and emerging technologies field while advocating for the need for greater diversity of gender and thoughts on national security issues.

Tell us about your research paper.

The research paper, “Emerging Technologies and Strategic Stability in South Asia,” aims to research the integration



Military vehicles carrying underwater drones travel past Tiananmen Square during a military parade on October 1, 2019, in Beijing, China. (Reuters/Jason Lee) Accelerator Sylvia Mishra works on nuclear dynamics in South Asia and emerging technologies like the drones seen here.

of emerging technologies with strategic weapons and its impact on the balance of power in conflictual dyads like China-India and India-Pakistan. The research paper showcases causation: integration of emerging technologies with strategic weapons can lower the nuclear threshold, shorten decision-making timelines, and will create cascading strategic competition and security dilemmas in China, India, and Pakistan.

What are you working on now apart from the paper?

I am completing a project on the impact of social media on crisis escalation during the Pulwama-Balakot crisis. The thrust of the report, “High Stress, High Stakes: Information War and Its Impact on Crisis Escalation during the Pulwama-Balakot Crisis,” is to examine how digital media platforms augment crisis escalation and to investigate whether social media can act as a voice of restraint and reason or instead push countries to the brink of war.

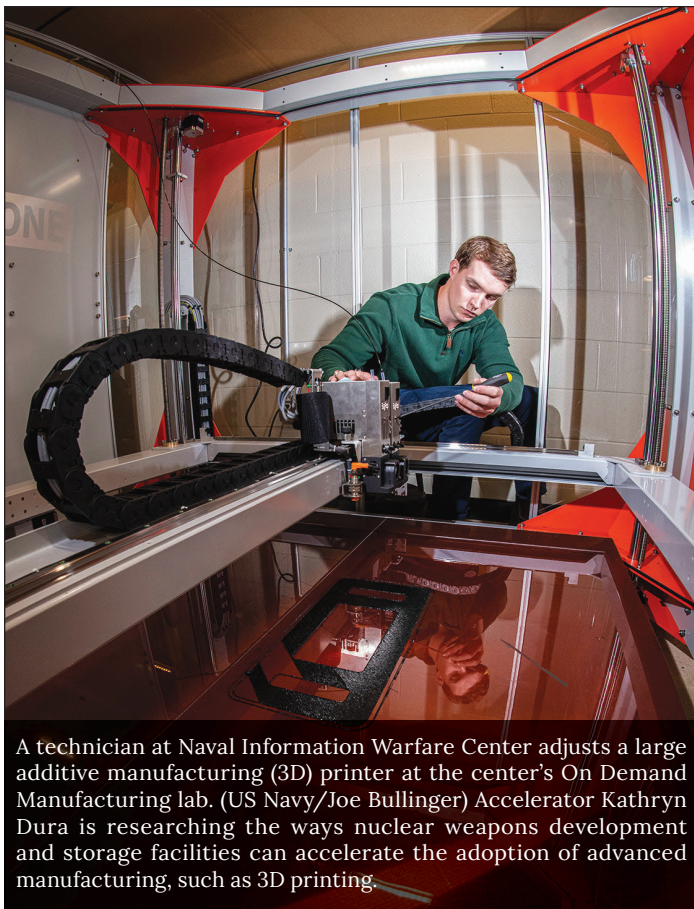
Recently, I coauthored a report, *Breaking Barriers: Best Practices for the Advancement and Inclusion of Women in STEMM and National Security*, published by CRDF Global. The report makes the case that organizational policies need to be expanded and new policies implemented to revitalize focus on inclusion and diversity of gender, color, culture, and thoughts. It identifies six barriers that stymie the advancement and inclusion of women in STEMM (Science, Technology, Engineering, Mathematics, and Medicine) and security. The report highlights a few best practices for understanding and combating these barriers.

Kathryn Dura

Kathryn Dura is an intelligence analyst for the US Navy. She graduated from the University of Pennsylvania in 2018 with a double major in international relations and modern Middle Eastern studies and a minor in mathematics. As a student, she conducted research with Dr. Michael Horowitz on national cruise missile, fighter aircraft, unmanned vehicle, and ballistic missile capabilities. After graduating, she worked as a Joseph S. Nye Jr. Technology and National Security Research Intern at the Center for a New American Security (CNAS), where she researched trends and applications of artificial intelligence, machine learning, and cyberbased disinformation campaigns to develop policy recommendations for the US government and industry leaders.

What were you working on when you decided to apply for the Accelerator Initiative?

In the nine months prior to applying to the Accelerator Initiative, I completed undergrad, moved to a new city, interned at the Center for a New American Security, and started a new position as an analyst for the US Navy. During my time in undergrad and at CNAS, I was immersed in the academic, think-tank, policy-oriented communities, where I had many opportunities to conduct research and pursue personal projects. It was a large adjustment to leave the familiarity with academia and enter the world of federal government and the military. At the time of application, I was still learning the ropes of my new position, not the least of which was learning the necessary acronyms! Therefore, I was thrilled at the



A technician at Naval Information Warfare Center adjusts a large additive manufacturing (3D) printer at the center's On Demand Manufacturing lab. (US Navy/Joe Bullinger) Accelerator Kathryn Dura is researching the ways nuclear weapons development and storage facilities can accelerate the adoption of advanced manufacturing, such as 3D printing.

opportunity to apply for the Accelerator Initiative since it would allow me to keep a foot in the academic realm while allowing me to pursue a policy research project.

What question does your research paper look to answer?

My research paper asks: how can the nuclear weapons development and storage facilities efficiently implement a holistic approach toward advanced manufacturing to meet increased nuclear demand? In other words, my research provides actionable recommendations to accelerate the adoption of advanced manufacturing within the US nuclear enterprise. Over the course of the paper, I examine the current state of US nuclear infrastructure, define advanced manufacturing, and provide background on advanced manufacturing support and implementation across the public and private sectors. My proposal recommends looking beyond US borders to leverage international collaboration opportunities.

Do you have any advice for those starting out in the field?

For those like me, starting out in the field, I recommend seeking out every opportunity to develop as a professional, whether that means applying for jobs that you are unsure you are qualified for or voicing a comment during a meeting. When contemplating whether or not to apply for this Accelerator Initiative, I was doubtful that I would be accepted given my minimal professional experience and knowledge of nuclear policy. Even once accepted, these doubts surfaced prior to each Accelerator Initiative

event—but over the year, I came to realize that my experiences, analysis, and voice matter. By sharing my thoughts at the roundtables and presenting my research topic at the cohort panel, I gained professional and personal confidence in my abilities.

As an analyst who gets into the weeds of research and strives to provide policymakers with the most informed analysis possible, I found the Accelerator Initiative to be wholly complementary to my day job. While there are definite hurdles such as international travel, reporting requirements, and prepublication review, the development opportunity is undoubtedly worth every effort. Professionally, I was able to learn about perspectives outside of the military; personally, I was able to find my voice.

Chantell Murphy

Chantell Murphy is a Program Manager for nonproliferation and arms control research and development at Y-12 National Security Complex. Dr. Murphy has a PhD in nuclear engineering that focused on nuclear safeguards concerns for pyroprocessing. Prior to working at Y-12, she was a Nuclear Security Postdoctoral Fellow at Stanford University's Center for International Security and Cooperation. She worked at Los Alamos National Laboratory on international safeguards for advanced fuel cycle technologies and national security policy. Currently she is an N Square Innovator Network Fellow and an engineering consultant for Guide Star Engineering LLC. She earned her PhD from the University of New Mexico in 2018 and holds an MS in health physics from Georgetown University and a BS in physics from Florida State University.

How did you become interested in nuclear policy as a career?

While I was getting my master's in health physics, one of the requirements was to do an internship in nuclear nonproliferation. I did not know what that meant at the time, but through great connections and luck, I ended up working on the Project on Nuclear Issues at the Center for Strategic and International Studies. This internship provided a deep dive into all things related to nuclear weapons policy and technology. I made it my career when I realized there is a space for science, technology, and policy to commingle and produce applicable solutions to big problems.

When you decided to apply for the Accelerator Initiative, what were you working on?

I was working as a nuclear security postdoctoral fellow at the Center for International Security and Cooperation looking at a wide array of issues at the intersection of nuclear technology and policy, such as nonproliferation concerns for new nuclear fuel cycle processes and working with Russian nuclear scientists on the future of

nuclear energy. I was also interested in expanding my network to include underrepresented groups working on nuclear issues and work on more-forward-thinking ideas. The Accelerator Initiative provided an excellent opportunity for both!

Did you meet anyone or attend any events that influenced your interests, or helped solidify them?

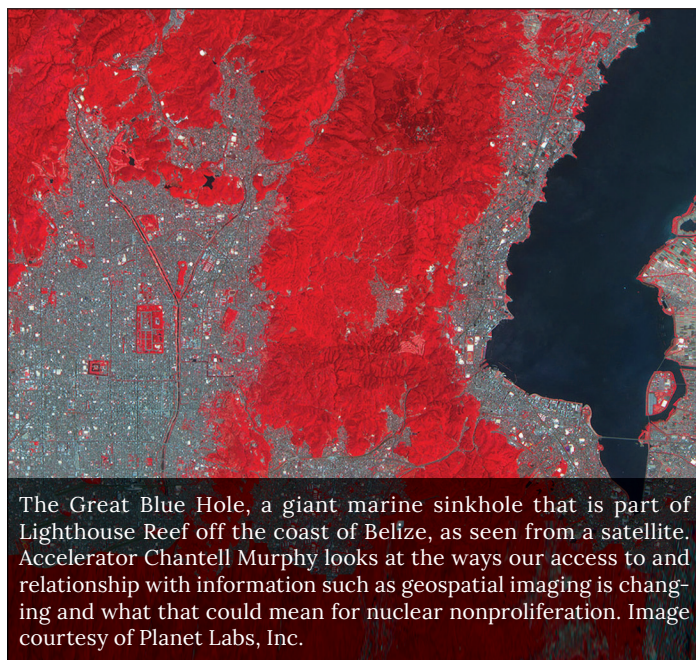
Definitely. I enjoyed the workshops on applying an ethical framework for decision making in open-source analysis and journalism, specifically for geospatial imaging. There are so many nuances about the way technology is changing our access to and relationship with data and information that it is difficult to really understand the societal implications. This is an important dialogue to have, and I am grateful to have been invited to participate in the early stages.

What is your research paper about?

My research paper is about the democratization of disruptive technologies and the impacts on nuclear nonproliferation. Specifically, in the geospatial imaging community, information and analysis techniques that were tightly held by the intelligence community are now available to the public. The gut reaction may be this is a good thing since more information leads to better decision making and creates a more equal playing field, but in many cases the “public” includes a small privileged subset of people predominately from Western society who are not vetted and are only accountable to themselves.

What would you say to someone new to the field?

My advice is to build a strong network of supportive friends whom you admire and respect, to question everything, and to make sure that what you are working on is in line with your core values; don’t compromise your fundamental belief structure.



The Great Blue Hole, a giant marine sinkhole that is part of Lighthouse Reef off the coast of Belize, as seen from a satellite. Accelerator Chantell Murphy looks at the ways our access to and relationship with information such as geospatial imaging is changing and what that could mean for nuclear nonproliferation. Image courtesy of Planet Labs, Inc.

Jen Spindel

Jen Spindel is an Assistant Professor of international security at the University of Oklahoma and a Research Fellow at Dartmouth College. Her research focuses on national security, foreign policy, and the conventional weapons trade. Dr. Spindel received her PhD in political science from the University of Minnesota and her BA from Colgate University. She has been awarded the Kenneth Waltz Dissertation Prize from the American Political Science Association for the best doctoral dissertation nationally in the area of security studies.

What got you interested in nuclear policy? When did you decide to make it your career?

I have always been interested in international affairs and conflict, and after spending a year substitute teaching, I decided to go to graduate school for a PhD in political science. I was really interested in the earlier works on nuclear coercion and deterrence—work by Thomas Schelling and Robert Jervis—and wanted to figure out how to understand many of those dynamics in the conventional weapons world. While writing my dissertation, I kept seeing similarities and overlaps between conventional and nuclear strategy, deterrence, perceptions—pretty much everything. I was unable to tackle the nuclear side in my dissertation, but that interest has always been there for me, and I knew at some point in my career I would want to focus more directly on nuclear arms and technology.

Did any of the events you attended solidify or influence your interests?

All of the events! I feel like I learned so much from all of the Accelerator Initiative events that I will be processing through it for a long time. One of the events that most surprised me was the one about using distributed ledger technology (DLT) for nuclear safeguards. I went into that event thinking that bitcoin—as the example of DLT I was more familiar with—was kind of pointless and could not be scaled up to a point where it would actually be useful. I received a crash course in what DLT is, how it works, and the ways that it could revolutionize nuclear monitoring and safeguards. That sort of sparked my interest in perceptions of cybercapabilities, and how those perceptions will affect nuclear stability. How much misperception is really out there, and how does misperception create differing incentives for action?

I also got a lot out of the session on the militarization of AI (artificial intelligence). I felt like my role was sometimes to step back and ask about the broader societal and political implications of technological change. And I was really pleased with how receptive the technological and subject matter experts were to those questions. That experience helped convince me that there is a real need to figure out how to bring social science research and methods to

bear on pressing questions about technological change in development, in a way that tries to do justice to both the technology and the social science.

Tell us about your research paper.

My policy paper is about how perceptions of cybercapabilities can affect nuclear security. From the information environment surrounding the 2016 US election to targeted phishing emails that shut down billion-dollar companies, cybercapabilities are increasingly used to affect how people think about the world around them. I am interested in how perceptions of cybercapabilities will affect the nuclear realm. If, for example, states fear that adversaries could interfere with their nuclear command and control, does this increase incentives to use nuclear weapons? What does the general public think about risks in cyberspace, and can public opinion be a push toward conflict or a brake on escalatory processes?

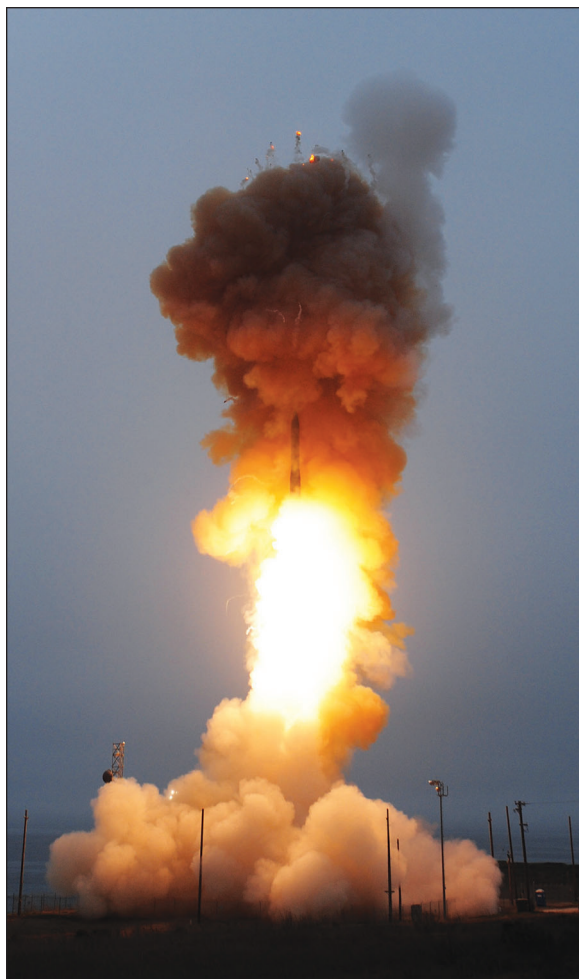
What advice do you have for those starting out in the field?

It can feel kind of intimidating to break into this world, especially as a young woman. One of the hardest things

for me has been making the move to claim my expertise and feel comfortable using that expertise to contribute to discussions. I have found a lot of support along the way from women (and many men) at various stages in their careers. So my biggest piece of advice is to reach out! I have found people very willing to talk and almost universally happy to share advice and support the careers of junior women. The other piece of advice is to recognize your knowledge and expertise, and start putting yourself out there, whether writing for a blog, participating in Twitter conversations, or whatever. It is a great way to get ideas out there and start becoming a known quantity.

Grace Liu

Grace Liu is a Fellow at the James Martin Center for Nonproliferation Studies (CNS). She specializes in open-source methods and geospatial analysis with a background in East Asia. Her research focuses on the intersection between emerging technology and nuclear accountability. Her publications include using emerging geospatial technology to characterize uranium production and



The nuclear triad is contingent on maintaining land-based, sea-based, and airborne strategic nuclear missiles, which together reduce the likelihood that a preemptive attack by an enemy could eliminate a nation's retaliatory capability—thereby increasing nuclear deterrence.



Clockwise from left: An operational test launch of an unarmed Minuteman III intercontinental ballistic missile from Vandenberg Air Force Base. (US Air Force/Joe Davila) Sailors assigned to the nuclear-powered attack submarine USS Virginia stand topside. (US Navy/Steven Hoskins) A B-2 Spirit aircraft can deliver nuclear munitions anywhere on the globe. (US Air Force/Tristin English)



A missile combat crew commander performs a simulated key turn of the Minuteman III weapon system during a Simulated Electronic Launch-Minuteman test inside the launch control center at a missile alert facility in Nebraska. During such a test, crew members are responsible for sending commands to the missiles in the launch facility. (US Air Force/Christopher Ruano) Accelerator Jen Spindel asks if states fear their adversaries could interfere with their nuclear command and control, does that increase incentive to use nuclear weapons?

developing machine learning algorithms to monitor satellite imagery of weapons-of-mass-destruction sites. She previously led the Geo4Nonpro project. She holds an MA in nonproliferation and terrorism studies from the Middlebury Institute of International Studies (MIIS) and an MBA and BA from the University of New Mexico.

How did you become interested in nuclear policy as a career?

My interest in nuclear policy was a result of what I like to call a “perfect storm.” Because of my family background, I focused on North Korea for some of my undergrad experience, and growing up in Los Alamos, New Mexico, made nuclear issues very familiar. I started grad school at MIIS around the time that North Korea’s nuclear program really started ramping up. Thanks to my Korean-language skills and geospatial background, I was really lucky to be able to join the super OSINT team at CNS, which at the time included Jeffrey Lewis, Melissa Hanham, and Dave Schmerler. I loved being able to integrate my previous experience and skills into an incredibly active account, and especially to be able to share our work and analysis process with an engaged policy audience.

Did you meet anyone or attend any events that influenced your interests, or helped solidify them?

Absolutely! One highlight was getting to talk with Lord Des Browne, whom I had met briefly through the CTBTO (Comprehensive Nuclear-Test-Ban Treaty Organization) Youth Group. I ran into him one morning before one of the AI events and was lucky enough to have breakfast one on one. It was inspiring to hear about his career and perspectives on the future of nuclear policy, and he was very receptive to hearing about my projects and perspectives. It ended up being one of the most impactful mentoring experiences I have ever had.

What is your research paper about?

My paper explores the possibility for hyperspectral imagery to be used as a means to monitor uranium-production activities in the future.

Do you have any advice for those starting out in the field?

This is an incredibly small and close-knit field, so there is a big chance you will get to meet the “big wigs” and interact with colleagues who are located around the world over and over again. This is great because you will get to forge working relationships and even friendships, and probably call on some of those to collaborate on future projects or initiatives—make sure you take advantage of those opportunities.



Luisa Kenausis is Program Assistant for nuclear weapons at the Stanley Center for Peace and Security and coordinates the Accelerator Initiative. Before joining the center, Kenausis was a Scoville Fellow at the Center for Arms Control and Non-Proliferation. She received a BS in nuclear science and engineering and political science from the Massachusetts Institute of Technology.

A project of the Stanley Center for Peace and Security, the Accelerator Initiative offers a unique mentorship and career-development opportunity to a small cohort of early career women working in nuclear, international security, or technology policy. Policy papers from the 2019 Accelerator Initiative participants will be published by the Stanley Center in summer 2020.

For more information, please visit the Accelerator Initiative’s web page: www.stanleycenter.org/accelerator.