

*Woodruff Nuclear & Radiological Engineering and Medical Physics  
Programs Seminar*

# **"Predicting Nuclear Proliferation: From Technological Determinism to Strategic Culture."**

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**Wednesday, April 23, 2009**

**Molecular Science & Engineering (MS&E, Room 3201A)**  
(901 Atlantic Drive – directly across from Neely)

**11:00 am to 12:00 pm**

***REFRESHMENTS WILL BE SERVED***

## **Abstract**

The United States has achieved supremacy in military elements of national power. Competitors and adversaries (states and non-state actors) have pursued capabilities with an aim of gaining temporary or strategic superiority. Preventing the acquisition, demonstration and employment WMD by hostile actors is of strategic importance for the US. With regard to nuclear weapons, the importance of proactive counterproliferation efforts described as "preventing our enemies from threatening us, our allies, and our friends with WMD" has been a key part of national security strategy. This conclusion has been reiterated in recent high-profile reports on limiting the threat of WMD proliferation and terrorism and the recently released Defense Science Board (DSB) report and recommendations, which highlighted the challenges of predicting, preventing, dissuading, deterring, and interdicting the spread of nuclear weapons as "a special case." In attempting to forecast the spread on nuclear weapons, there is a critical vulnerability of the current lack of an adequate theoretical model regarding nuclear proliferation and the potential consequences for military planning and countermeasure capability development. This work presents efforts to synthesize a meta-theory spanning across technological determinism and social science-based theories to identify and predict those who are likely to seek nuclear weapons as means to gain temporary superiority in national power. Prior work has been done toward this challenge; nonetheless, previous approaches have suffered critical deficits in considering impact of variables across multiple levels of analysis from the individual to the state and accounting for unexpected events, such as the fall of the Soviet Union. This study recognizes that the intentional decision to acquire, to demonstrate, or to employ nuclear weapons by either a nation or a non-state actor is inherently a human decision. The threat reduction community needs a model or template to understand how such decisions might be made and which countries to focus on, which key players within

those countries matter, and how they think and perceive the world – how the human terrain impacts nuclear proliferation.

## **Biosketch**

**Dr. Margaret Kosal** is currently an Assistant Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology. Previously, Dr. Margaret E. Kosal was the Science and Technology Advisor within the Office of the Secretary of Defense (OSD). Kosal received her doctoral degree in Chemistry from the University of Illinois at Urbana-Champaign (UIUC), emphasizing nano-structured materials, and has lectured nationally and internationally on both technical and international security subjects. In 2000, Kosal co-founded a sensor company, where she led research on biological, chemical, and explosive detection and spearheaded efforts toward the real-world applications of the technology. Previously, Kosal has held positions at Stanford University's Center for International Security and Cooperation (CISAC), Northwestern University's Feinburg School of Medicine, and the Monterey Institute of International Studies' (MIIS) Center for Nonproliferation Studies (CNS), as well as teaching at the Naval Postgraduate School (NPS). She has been recognized across the U.S. federal government for her leadership as part of the interagency Nonproliferation and Arms Control Technology Working Group, formerly a DoD representative to the group charged with leading the National Nanotechnology Initiative; and in the NATO Nanotechnology for Defense Working Group. Dr. Kosal is currently completing the book on nanotechnology that explores scenarios and strategies toward the benefits and potential proliferation threats of nanotechnology and other emerging sciences for national security.