

**MARGARET E. KOSAL**  
**ASSISTANT PROFESSOR**  
**SAM NUNN SCHOOL OF INTERNATIONAL AFFAIRS**

**I. EARNED DEGREES**

Ph.D. Chemistry, 2001  
University of Illinois at Urbana-Champaign  
Dissertation: *Porphyrin Network Materials: Chemical Exploration in the Supramolecular Solid-State*

B.S. Chemistry, with Honors, 1995  
University of Southern California, Los Angeles CA

**II. EMPLOYMENT**

Assistant Professor  
Sam Nunn School of International Affairs  
Georgia Institute of Technology, Atlanta GA  
August 2008 - present

Visiting Assistant Professor  
Sam Nunn School of International Affairs  
Georgia Institute of Technology, Atlanta GA  
August 2007 - July 2008

Science & Technology Advisor  
Office of the Deputy Assistant for Chemical and Biological Defense and Chemical Demilitarization Programs  
Office of Secretary of Defense  
Department of Defense, Washington, DC  
September 2005 - August 2007

Science Fellow  
Center for International Security and Cooperation, Stanford CA  
Institute for International Studies  
Stanford University  
September 2004 - August 2005

August 2003 - 2004  
Adjunct Professor  
Post-doctoral Fellow  
Center for Nonproliferation Studies, Monterey CA  
Monterey Institute of International Studies

Visiting Scientist  
School of Chemical Sciences  
University of Illinois at Urbana-Champaign, Urbana IL  
June - August 2003

Co-founder and Senior Scientist  
ChemSensing, Inc., Urbana IL  
December 2000 - May 2003

Graduate Research Assistant  
School of Chemical Sciences  
University of Illinois at Urbana-Champaign, Urbana IL  
August 1995 - May 2001

### III. TEACHING

#### A. COURSES

- INTA 2040: “Science, Technology, and International Affairs” Spring 2008 (91 students), Fall 2008 (38 students), Spring 2009 (93 students), Fall 2009 (91 students), Spring 2010 (82 students), Spring 2011
- INTA 3101: “Challenge of Terrorism” Spring 2011
- INTA 4803-K/8803-K: “Emerging Technologies and Security” Fall 2007 (4 students)
- INTA 4500-B: “Counterinsurgency and Small Wars” Fall 2010 (18 students)
- INTA 8803-K: “Counterinsurgency and Small Wars” Fall 2009 (17 graduate students)
- INTA 8803-K: “Problems of Proliferation” Spring 2010 (5 graduate students)
- INTA 8803-K: “21<sup>st</sup> Century Deterrence” Fall 2010 (8 graduate students)

#### B. INDIVIDUAL STUDENT GUIDANCE

##### Postdoctoral:

- Dr. KJ Dennison, Fall 2007 - Fall 2008

##### Ph.D.:

- Mr. Jonathan Huang, “Cognitive Sciences, Theory, and Institutions” Spring 2008-present, qualifying exams passed February 2010

##### M.S.

- Mr. Christopher Vucich, “Terrorism and Insurgency in Africa” Spring 2010, Summer 2010, & Fall 2010. *Student presented supervised work on “Al-Qa’eda & WMD: AQIM Plague Breakout and the UK Ricin Plot,” at the 2010 Defense Threat Reduction Agency (DTRA) Basic Research Technical Review Conference 18 August 2010, Springfield, VA.*
- Mr. Bryan Murphy, “Law Enforcement and Governance: the Role for Counterinsurgency Theory” Summer 2010
- Ms. Shawn Finnell, “Radical Islam & WMD Discourse” Spring 2010 & Summer 2010. *Student presented supervised work on “Al Qa’eda & WMD: Analysis of Chlorine Bombs in Iraq and the “Mubtakkar” Plot,” at the 2010 Defense Threat Reduction Agency (DTRA) Basic Research Technical Review Conference 18 August 2010, Springfield, VA.*
- Ms. Jessica Gibson, “Bioterrorism Preparedness Training and Assessment Exercises for Local Public Health Agencies,” Fall 2008

##### Undergraduates:

- Mr. Wesley Griggs, “Iran and WMD Proliferation” Fall 2010, Spring 2011
- Ms. Sapphire Liu, “Security and Gaming” Fall 2010, Spring 2011  
*SAIC Undergraduate Scholarship recipient for research in Spring 2011*
- Mr. Jared Fry, “WMD in Gaming” Spring 2010, Summer 2010, Fall 2010, Spring 2011  
*Presidential Undergraduate Research Award (PURA) recipient for Spring 2011*
- Ms. Lucia Bird, “ Hamas, Hezbollah, and WMD’s” Fall 2010, Spring 2011
- Ms. Sarah Grace Parr, “Nuclear Proliferation & International Conflict” Fall 2010, Spring 2011
- Ms. Patti Murphy, “The Security Implications of Advanced Neuroscience, Pharmaceuticals, and the Cognitive Sciences” Summer 2010, Fall 2010, Spring 2011
- Mr. RJ Paulisick, “Nano and Nuclear Technology: The Implications of an Emerging Technology on Nuclear Energy and Nuclear Weapons” Fall 2010
- Mr. Graham Sweeney, “Nanotechnology and Security: Russia” Summer 2010 & Fall 2010  
*SAIC Undergraduate Scholarship recipient for research in Summer 2010*
- Mr. Vincent Chan, “Nanotechnology and Security: Strategic Significance of Nanotechnology in China” Summer 2010
- Mr. Adam Weiss, “Nanotechnology Policy and Security: Israel” Spring 2010
- Ms. Katherine Lange “Deterring Bioterrorism: Re-Emerging Infectious Disease and Deterrence Theory” Summer 2009, Fall 2009, & Spring 2010

*Presidential Undergraduate Research Award (PURA) recipient & outstanding poster presentation awardee from the Ivan Allen College at the Georgia Tech 2010 Undergraduate Research Symposium*

- Ms. Amira Mouna, “Bionanotechnology and Security” Spring 2009, Summer 2009, & Fall 2009. *SAIC Undergraduate research award recipient*
- Mr. Ted Danowitz, “Nanotechnology and Security: Strategic Significance of Nanotechnology in China” Summer 2009 & Fall 2009  
*Outstanding oral presentation awardee from the Ivan Allen College at the Georgia Tech 2010 Undergraduate Research Symposium*
- Ms. Katherine Murphy, “Regulation of Nanotechnology in Europe and US” Fall 2009
- Mr. Mitchell Watkins, “Al Qa’eda and Unconventional Weapons” Summer 2009 & Fall 2009
- Ms. Rasha Nahab, “Biotechnology Policy and the Life Sciences” Summer 2009
- Ms. Ana Terron, “Deterring Bioterrorism: Re-Emerging Infectious Disease and Deterrence Theory” Spring 2009
- Ms. Nikita Basandra, “Bionanotechnology and Security: Strategic Significance of Bionanotechnology in Iran” Spring 2009
- Mr. Kemp Anderson “Al Qa’eda and Unconventional Weapons” Spring 2009
- Ms. Sophia Ahmed, “Pakistan & the Role of International Institutions for Security” Fall 2008 & Spring 2009
- Ms. Katherine Ruth Landers, “Emerging Biotechnologies and International Security” Fall 2008

### C. OTHER TEACHING ACTIVITIES

Newly Developed Courses:

- INTA 8803-K: “Deterrence in the 21<sup>st</sup> Century” Fall 2010
- INTA 8803-K: “Counterinsurgency and Small Wars” Fall 2009
- INTA 4803-K/8803-K: “Emerging Technologies and Security” Fall 2007
- Developed and lead “Workshop on Technology, Policy, and Entrepreneurship,” Materials Science and Engineering Department Summer Research Experience for Undergrads (REU), July 2009, July 2010

Redesigned course:

- INTA 3102/8803: “Problems of Proliferation” Spring 2010

Visiting Professor, IAEN, Quito Ecuador:

- “Threats to Security, Technology, and Information Society,” Master’s program on Security and Defense, Instituto Altos Estudios Nacionales (IAEN, National Institute of Advanced Studies), Quito Ecuador, Summer 2010 (36 students)

## IV. SCHOLARLY ACCOMPLISHMENTS

### A. PUBLISHED BOOKS AND PARTS OF BOOKS

#### A1. BOOKS

Kosal, M.E, Nanotechnology for Chemical and Biological Defense, Springer Academic Publishers: New York, June 2009, 179 pages.

#### A2. REFEREED BOOK CHAPTERS

Kosal, M.E., “Nanotechnology for Chemical, Biological, and Radiological Detection and Protection,” in Applications of Nanoscale Science and Nanotechnology to Food Systems, Chen, H., ed. Wiley-Blackwell: New York, *forthcoming 2011 (30 pages)*.

Kosal, M.E., “Scenarios for Anticipating Emerging Technology: Nanotechnology for Chemical and Biological Defense 2030 Workshop and Study,” in The Yearbook of Nanotechnology in Society -

Volume 1: Presenting Futures, Fisher, E.; Selin, C.; Wetmore, J. eds., Springer Academic Publishers: New York, **2008**, 157-173.

Kosal, M.E., "Near Term Threats of Chemical Weapons Terrorism," in Globalization and WMD Proliferation: Terrorism, Transnational Networks and International Security, Russell, J.; Wirtz, J. Routledge, **2007**, 63-78.

Kosal, M.E. "Chemical Weapons Destruction and the Public Response," in Towards the Elimination of the Chemical Weapons, Haru, E. and Thakur, R. eds., UN University Press, Netherlands, **2006**, 118-149 – 2 citations

Chou, J-H.; Kosal, M.E.; Nalwa, H.S.; Rakow, N.A; Suslick, K.S. "Applications of Porphyrins and Metalloporphyrins to Materials Chemistry," in The Porphyrin Handbook, Kadish, K.; Smith, K.; Guillard, R., eds.; Academic Press: New York, **2000**, 6, pp. 41-131 – 73 citations.

### **A3. OTHER PARTS OF BOOKS**

Kosal, M.E. articles on "Nano-Biotechnology," (8 pages) for the Encyclopedia of Bioterrorism Defense, Zilinskas, R.A.; Katz, R/ eds.; Revised and updated chapters on "Anti-Material Agents" (7 pages) and "Biological Simulants," (4 pages) Wiley: New York, **2011**.

Kosal, M.E, articles on *Department of Defense; Security; Ethical Issues of Nano-Weapons*; and *Iran* for Encyclopedia of Nanoscience and Society, edited by David Guston, Sage Publishers: Thousand Oaks CA, **2010** (total 34 pages).

Kosal, M.E, Stulberg, A. article on *Russia*, Encyclopedia of Nanoscience and Society, edited by David Guston, Sage Publishers: Thousand Oaks CA, **2010** (6 pages).

Kosal, M.E., "Chemical Terrorism," in Weapons of Mass Destruction and Terrorism, Howard, R.D. and Forest, J.F., eds. McGrawHill/Contemporary Learning Series, Inc.: New York, **2007**, 581-595.

Kosal, M.E. articles on "Biological Simulants" (6 pages) and "Anti-material Agents," (3 pages) for the Encyclopedia of Bioterrorism Defense, Wiley: New York, June **2005**.

Kosal, M.E., "Bioweapons Detectors," in Biological Weapons, Naff, C.F., ed., Greenhaven Press: New Haven, **2006**, 109-117.

Cassagrande, R.; Kosal, M.E. "Detection of Bioterrorist Agents," (9 pages) Encyclopedia of Bioterrorism Defense, Zilinskas, R.A.; Pilch, R., eds., Wiley: New York, June 2005.

## **B. REFEREED PUBLICATIONS**

### **B1. REFEREED JOURNAL PUBLICATIONS**

Kosal, M.E. "The Contested Commons of WMD Terrorism and Radical Islam," *at review at Studies in Conflict and Terrorism*.

Kosal, ME.; Wagner, J.E.; Massoomi, F. "Gap Analysis and Recommendations to Improve Preparedness for a Chemical Attack Involving Organophosphate Compounds," *at review at Critical Care*.

Suslick, K.S.; Kosal, ME.; et al. "Seeing Smells: Development of an Optoelectronic Nose," *Quimica Nova*, **2007**, 30, 677-681 – 15 citations.

Kosal, M.E. "Terrorism Targeting Industrial Chemical Facilities: Strategic Motivations and the Implications for U.S. Security," *Studies in Conflict and Terrorism*, **2006**, 29, 719-751 – 3 citations.

Kosal, M.E., "Near Term Threats of Chemical Weapons Terrorism," *Strategic Insights*, **2006**, 5, 56-70 – 2 citations.

Kosal, M.E.; Anderson, D.A. "An Unaddressed Issue of Agricultural Terrorism – A Case Study on Feed Security," *Journal of Animal Science*, **2004**, 82, 3394-3400 – 14 citations.

Suslick, K.S.; Kosal, M.E.; et al. "Microporous Porphyrin Solids," *Accounts of Chemical Research*, **2005**, 38, 283-321 – 150 citations.

Kosal, M.E.; Chou, J-H.; Suslick, K.S. "A Calcium-Bridged Porphyrin Network," *J. Porphyrins and Phthalocyanines*, **2002**, 6, 377-383 – 17 citations.

Kosal, M.E.; Chou, J-H.; Wilson, S.R.; Suslick, K.S. "A Functional Zeolite Analogue Assembled From Metalloporphyrins," *Nature Materials*, **2002**, 1, 118-124 – 174 citations.

Suslick, K.S.; Rakow, N.A.; Kosal, M.E.; Chou, J-H. "The Materials Chemistry of Porphyrins and Metalloporphyrins," *J. Porphyrins and Phthalocyanines*, **2000**, 4, 407-434 – 35 citations.

Kosal; M.E.; Suslick, K.S. "Microporous Porphyrin and Metalloporphyrin Materials," *J. Solid State Chemistry*, **2000**, 152, 87-101 – 43 citations.

Brunner, R.S.; Kosal, M.E.; Suslick, K.S.; Lamche, R.; Marti, O.; White, J.O. "Near-Field Scanning Optical Microscopy (NSOM) of Zinc-Porphyrin Crystals," *Ultramicroscopy*, **2000**, 84, 149-155 – 3 citations.

## **B2. OTHER REFEREED PUBLICATIONS**

Suslick, K.S.; Kosal, M.E.; McNamara, W.B.; Sen, A.; Rakow, N.A. "ChemSensing: A Colorimetric Array Detector," 9<sup>th</sup> International Symposium on Olfaction and Electronic Nose (ISOEN '02) Proceedings, D'Amico A.; DiNatale, C, eds., IEEE: Baltimore, **2003**, pp. 46-52.

Suslick, K.S.; Kosal, M.E.; Rakow, N.A.; Sen, A. "Smell-Seeing: A New Approach to Artificial Olfaction," Eurodeur-Airodeur 2001 Proceedings, Paris **2002**.

## **C. OTHER PUBLICATIONS**

Kosal, M.E. "The Security Implications of Nanotechnology," *Bulletin of Atomic Scientists*, July/August **2010**, 66, 58-69.

Kosal, M.E. "Strategic Approaches to Regulating Biosecurity Risks of Nanotechnology by the European Union," Post-EUCE Travel Grant Research Report, June **2010** (12 pages).

Kosal, M.E. "Probing the Strategic Significance of Nanotechnology in Iran," paper presented at the International Studies Association (ISA) Annual Meeting, 17 February **2010**, New Orleans LA (16 pages).

Kosal, M.E. "Bioterrorism Deterrence: Polio and the Threat of Biological Terrorism," paper presented at the International Studies Association (ISA) Annual Meeting, 19 February **2010**, New Orleans LA (23 pages).

M.E. Kosal, "Bionanotechnology and Iran" paper presented at the 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA, 3 October **2009** (9 pages).

Kosal, M.E., "Bioterrorism Deterrence: the Role of Public Health in Security," paper presented at the 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA, 2 October **2009** (10 pages).

Kosal, M.E. "Bionanotechnology and Security: Is Small Scary?" paper presented at the International Conference on Emerging and Disruptive Technologies, Singapore, 14 September **2009** (16 pages).

Kosal, M.E. and Cole, K., invited review of The Making of the Digital World by J.K. Rennstitch, Palgrave McMillan, *International Studies Review*, June **2009**, 11, 365-367.

Kosal, M.E., invited review of Chemical Warfare Agents: Chemistry, Pharmacology, Toxicology, and Therapeutics, by James A. Romano, Jr., Brian J. Lukey, and Harry Salem (editors), CRC Taylor & Francis, *International Journal of Toxicology*, March/April **2009**, 28, 132-135.

Kosal, M.E. "Will There be an AQ Khan of Nanotechnology? Anticipating Biological Proliferation Threats from a Revolutionary Technology," paper presented at the International Studies Association (ISA) Annual Meeting, 17 February **2009**, New York, NY (23 pages).

Kosal, M.E., "Unified Field Theory of Proliferation: Toward a Meta-Theory Predicting Nuclear Expansion," white paper prepared as part of SAIC-funded project, January **2009** (25 pages).

Kosal M.E. and Dennison, K.J. *Toward a Strategic Vision in Basic Sciences for Chemical and Biological Defense*, Report from the Symposium, December 2008 (67 pages).

Kosal, M.E., "Chemical Terrorism: Review of US Policies to Implement Recommendations of the 9-11 Commission" September 2008 (30 pages).

Kosal, M.E. review of *Bioviolence: Preventing Biological Terror and Crime* by B. Kellman, Cambridge University Press, *Review of Policy Research (RPR)*, September 2008, 25, 492-495.

Kosal, M.E. and Huang, J.Y. "The Security Implications of Cognitive Science Research," *Bulletin of Atomic Scientists*, July 2008 (7 pages).

Kosal, M.E. "Assessing the Potential International Security Threats of Nanotechnology," paper presented at the Atlanta Conference on Science, Technology, and Innovation Policy, 19 October 2007, Atlanta GA (19 pages).

Kosal, M.E. "Art or Bioterrorism? Implications of the Kurtz Case for Research Science and for Limiting Terrorist Threats," *INESAP Bulletin*, December 2004, 24, 85-91.

Kosal, M.E. "Is Small Scary? Nanotechnology Research in an Age of Terrorism," *Bulletin of Atomic Scientists*, September/October 2004, 60, 38-64.

Baker, M.; Kosal, M.E. "Osmium Tetroxide – A New Chemical Terrorism Weapon?" *CNS Research Story*, 13 April 2004.

Kosal, M.E. "The Basics of Chemical and Biological Weapons Detectors," *CNS Research Story*, 24 November 2003.

Kosal, M.E. "The U.S. Response to WMD Beyond Iraq: the First CWC Review Conference and the NPT Preparatory Conference," *The Public I*, June 2003, 9.

Bremer Mærli, M.; Kosal, M.E. "A More Troubling Nuclear Threat: Unsecured Fissile Material," *The Public I*, January 2003, 1, 16.

Kosal, M.E.; Brunner, R.S.; Suslick, K.S.; White, J.O. "Unusual Fluorescence Behavior of Zinc Porphyrin Crystals as Characterized by NSOM," *Frederick Seitz Materials Research Laboratory Department of Energy (DOE) Program Review (cover)*, Urbana IL, June 1998, 11-14.

#### D. PRESENTATIONS

"The Role of Discourse in the Contested Commons of Radical Islam & WMD Terrorism" and "WMD in Gaming: The Implications of Virtual Biological, Chemical, and Nuclear Weapons For Training, Education, and Preparedness" to be given at *International Studies Association (ISA) Annual Meeting, 16-19 March 2011, Montreal. Discussant, panel on "Remote Control? The Ethics of Distance in Military Conflicts" and panel on "Analyzing the Foreign Policy of Nonproliferation."* Chair panel on "Communicating in Crisis and Conflict" and panel on "Danger and Diplomacy on the Korean Peninsula."

"The Role of Discourse in the Contested Common of Radical Islam & WMD Terrorism," International Security Studies of ISA and the International Security and Arms Control Section of APSA annual meeting, 14-16 October, Providence, RI. Chair, panel, on *Religion, Diplomacy, and the Use of Force*.

"Will There be an AQ Khan of Nanotechnology? Anticipating Biological Proliferation Threats from a Revolutionary Technology," The Society for the Study of Nanoscience and Emerging Technologies (S.NET), 29 September - 2 October 2010, Darmstadt, Germany. Chair & discussant, panel on *Emerging Assessments*.

**Invited speaker** "Nanotechnology for Biological Defense: Detection, Protection, Decontamination, and Medical Countermeasures," United Nations experts' workshop on *Synthetic Biology and Nanobiotechnology Risks and Responses Assessment*, 28 June 2010, Palais des Nations, Geneva, Switzerland.

**Keynote speaker** “Nanotechnology and International Security,” *First International Nanotechnology Congress*, 11 June 2010, Quito Ecuador.

**Invited Speaker** “International Policy and Governance Challenges of Nanotechnology and Emerging Technologies,” Bilkent University, 17 May 2010, Ankara Turkey.

“Nanotechnology for Detection of and Medical Countermeasures Against Biological Warfare Agents: Policy and Programmatic,” 2nd Annual Georgia Nanotechnology in Infectious Diseases Symposium, Emory University, 1 April 2010, Atlanta GA.

**Keynote speaker** “Global Nanotechnology Threats: Science, Technology, and Policy for Reducing the Threat of Proliferation, Crime, and Terrorism,” United Nations Interregional Crime and Justice Research Institute (UNICRI) experts workshop on *Synthetic Biology and Nanobiotechnology Risks and Responses*, 24-25 March 2010, Turin, Italy.

“Strategic Significance of Emerging Technologies in Asia,” Director of National Intelligence Centers of Academic Excellence Colloquium on National Security, 24 February 2010, Atlanta GA.

“Probing the Strategic Significance of Nanotechnology in Iran,” and “Bioterrorism Deterrence: Polio and the Threat of Biological Terrorism” International Studies Association (ISA) Annual Meeting, 16-20 February 2010, New Orleans LA. Discussant, panel on *Space Weapons*.

**Keynote Speaker** “Nanotechnology and Defense,” Workshop on Emerging Technologies, Military Operations, and National Security, the Consortium on Emerging Technologies, Military Operations, and National Security (CETMONS), 5-6 February 2010. Phoenix AZ.

**Invited Speaker** “Nanotechnology for Chemical and Biological Defense: Policy, Programs, and Threat Anticipation,” Center for Nanotechnology in Society and Consortium for Science, Policy & Outcomes, Arizona State University, 4 February 2010, Tempe AZ.

**Invited Speaker** “Nanotechnology – Emerging Applications for the Protection against Chemical Warfare Agents,” Organisation for the Prohibition of Chemical Weapons (OPCW), 9 November 2009, The Hague, The Netherlands.

“Nanotechnology for Chemical and Biological Defense: Policy, Programmatic, and Threat Anticipation,” Nano@Tech Seminar Series, Marcus Nanotechnology Building, 27 October 2009.

**Invited Speaker** “Nanotechnology for Chemical and Biological Defense” 3<sup>rd</sup> Army/US Army Central, 23 October 2009, Ft McPherson GA.

**Invited Speaker** “Bionanotechnology and Security: Is Small Scary?” International Conference on Emerging and Disruptive Technologies, 14-15 September 2009, Singapore.

“Bionanotechnology and Iran,” Atlanta Conference on Science, Technology, and Innovation Policy, 3 October 2009, Atlanta GA.

“Bioterrorism Deterrence: the Role of Public Health in Security,” Atlanta Conference on Science, Technology, and Innovation Policy, 2 October 2009, Atlanta GA.

**Keynote Speaker** “Deterrence, Policy, and Strategic Security Implications of Synthetic Smallpox,” at the Over the Horizon Workshop on Synthetic Smallpox, 29-30 June 2009, Alexandria VA.

“Predicting Nuclear Proliferation: Theory, Policy, and Role for Engineers,” Nuclear and Radiological Engineering Symposia, Woodruff School of Engineering, Georgia Institute of Technology, 23 April 2009, Atlanta GA.

**Invited Speaker** “Nanotechnology and Security: Dual Use Issues in Emerging Science” American Chemical Society, International Programs Symposium, 9-11 April 2009, Washington, D.C.

“Predicting Nuclear Proliferation: Toward a Unified Field Theory” Transforming the Nuclear Weapons Complex (NWC) to Address 21<sup>st</sup> Century Security Threats Forum, Georgia Institute of Technology, 30 March 2009, Atlanta GA.

**Invited Speaker** “Nanotechnology for Revolutionary Chemical and Biological Defense and Homeland Security,” Science for the Good: the R&D Agenda for the New Administration and Congress, National Bureau of Economic Research (NBER), 2 March 2009, Washington, D.C.

“Will There be an AQ Khan of Nanotechnology? Anticipating Biological Proliferation Threats from a Revolutionary Technology,” International Studies Association (ISA) Annual Meeting, 15-18 February 2009, New York, NY. Discussant, panel on *The Politics of High Technology*. Discussant, panel on *Cyber-Terrorism, National Security, and International Communication*.

“Emerging Chemical and Biological Terrorism Threats,” Chemical & Biological Terrorism Defense Gordon Research Conference (GRC), 18-23 January 2009, Galveston TX.

**Invited Speaker** “Scientific & Technology Challenges to Realize Revolutionary Breakthroughs in Nanotechnology” National Intelligence Council (NIC), 17 November 2008, McLean VA.

**Invited Speaker** “Emerging Technology, Terrorism, and US Defense” National Security Agency/Central Security Service, 7 November 2008, Fort Gordon GA.

**Invited Speaker** “Al Qa’eda and Unconventional Weapons” Global Futures Forum, Department of National Security Affairs, Naval Postgraduate School, 24 September 2008, Monterey CA.

**Briefing staff of the Congressionally-chartered Commission on the Prevention of WMD Proliferation and Terrorism** on reducing the threat from chemical and biological agents from (a) traditional and improvised chemical proliferation and terrorism; (b) traditional and genetically-engineered biological proliferation and terrorism; (c) the need for the USG to anticipate threat and risks from emerging technologies, including synthetic genomics and bio-nanotechnology; and (d) reducing the motivation to pursue WMD terrorism, 5 September 2008, Arlington VA.

**Invited Speaker** “Chemical and Biological Weapons: Proliferation Issues and Threats” Summer Nonproliferation Institute’s “Preparing the Next Generation for Teaching, Research, and Public Service in Nonproliferation Policy” at the University of Georgia, 11 August 2008 Athens, GA.

**Invited Speaker**, “Will There Be an AQ Khan of Nanotechnology? Considering the International Security Implications of an Emerging Science” Conference on Science and Global Security, Massachusetts Institute of Technology, 24 July 2008, Boston, MA.

**Invited Speaker** “The Future of WMD,” at “Johnny Appleseed IV” Combating WMD for Military Educators, USAF Counterproliferation Center, 25 July 2008, Atlanta, GA.

**Invited Speaker** “Al Qa’eda and Unconventional Weapons,” Tomorrow’s Proliferation Pathways: Weak States, Rogues, and Non-States, School of Policy and International Affairs, University of Maine, 17-18 July 2008, Belfast ME.

**Plenary Speaker** on “Nanotechnology for Biochemical Sensors” at Government Microelectronics and Critical Technology (GOMACTech) Conference, 17 March 2008, Las Vegas, NV.

“Terrorism Targeting Industrial Chemical Facilities: Strategic Motivations and Implications for U.S. Security,” School of Public and International Affairs, George Mason University, 26 November 2007, Fairfax VA.

“The Shifting Faces of Chemical Weapons: Improvised Chemical Terrorism,” CISTP Colloquium on Chemical and Biological Weapons, 6 November 2007, Atlanta GA.

“Weapons of Mass Destruction: Science and Technology to Respond to Global Proliferation Threats,” INTA Undergrad Students Organization (IASO), 11 October 2007, Atlanta GA.

**Invited Speaker** “Emerging Technologies and Future Proliferation Threats in a Globalized World,” Arms Control, Disarmament and International Security (ACDIS) Program and Center for Nanoscale Science and Technology, University of Illinois at Urbana-Champaign, 25 October 2007, Champaign, IL.

“Assessing the Potential International Security Threats of Nanotechnology,” Atlanta Conference on Science, Technology, and Innovation Policy, 19 October 2007, Atlanta GA.

“Department of Defense Chemical and Biological Defense Program,” Joint Senior Leaders Course (O-5 through General Officers and Senior Civilians), 27 July 2007, Fort Leonard Wood MO.

*Invitation to speak on Threats of Chemical and Biological Terrorism* at the CBRN/Terrorism Threat Convergence Project Workshop, Center for Asymmetric Threat Studies (CATS), Swedish National



Defence College, 21-22 August 2007, Stockholm Sweden. *Declined invitation (all expenses covered) due to start of classes at Georgia Tech.*

“Nanotechnology for Chemical and Biological Defense 2030: Strategic Research Directions,” Transformational Countermeasures Technology Initiative Kick-Off Meeting, 12 July 2007, Arlington VA.

**Plenary Speaker** on “The DoD Nanotechnology for Chemical and Biological Defense 2030 Workshop and Study – Results and Recommendations,” Nanoelectronic Devices for Defense and Security Symposia, 21 June 2007, Arlington VA.

“DoD Chemical and Biological Defense Program Nanotechnology Initiative,” Emerging Contaminants Nanotechnology Forum, 14 June 2007, Arlington, VA.

**Invited Speaker** “Will There Be an A.Q. Khan of Nanotechnology?” National Science Foundation (NSF) and National Security Agency (NSA) Symposia on Biosecurity and Training for the Federal Workforce, 8 May 2007, Baltimore MD.

**Invited Speaker** “Bionanotechnology Threat Assessment,” Director of National Intelligence (DNI) Biological Sciences Experts Group (BSEG), 25 April 2007, Washington, D.C.

**Invited Speaker** “Weapons of Mass Destruction: Science & Technology to Respond to Global Proliferation Threats” and “From Scientist to International Security (*aka from beakers to bombs*),” Ripon College, 26-27 April 2007, Ripon WI.

“Science and Technology Initiatives in Nanotechnology within the Defense Department’s Chemical and Biological Defense Program,” National Academy of Sciences (NAS) Sackler Colloquium on Nanomaterials in Biology and Medicine: Promises and Perils, 10 April 2007, Washington, D.C.

**Keynote Speaker and Idea to Product® (I2P) Judge**, “Transformational Science for Defense,” NanoNexus Conference and Competition, Oak Ridge National Laboratory, 3 April 2007, Oak Ridge TN.

“Innovations Technology for Nonproliferation and Arms Control Through Nanotechnology,” Nonproliferation and Arms Control Technology Working Group (NPAC TWG) Conference “New Proliferation Challenges,” 28 March 2007, McLean VA.

**Invited Speaker** “Biosecurity and Nanotechnology” DC Biosecurity Group, sponsored by the American Association for the Advancement of Science (AAAS) Center of Science, Technology, and Security Policy (CSTSP), 1 March 2007, Washington D.C.

“Responding to the New Chemical and Biological Weapons Threats,” US-UK Joint Venture Operations Group (JVOG), February 2007, Arlington VA.

“Will There Be an A.Q. Khan of Nanotechnology?” International Security Studies Section (ISSS) of International Studies Association and International Security and Arms Control section (ISAC) of American Political Science Association Annual Conference, 27 October 2006, Tucson AZ.

“Revolutionary Innovation in Chemical and Biological Defense,” 7th Targeted Nanodelivery: Enabling Targeted Therapies and Non-Invasive Imaging Conference, 13 October 2006, Baltimore MD.

**Bovay Lecture on History and Ethics in Engineering**, “Security and the Very Small,” School of Electrical Engineering and Computer Science and the Peace Studies Program, Cornell University, 11 October 2006.

**Invited Speaker** “Is Small Scary? Nanotechnology and National Defense,” Terrorism, Transnational Networks and WMD Proliferation, Center for Contemporary Conflict, Naval Postgraduate School, 25-27 July 2006, Monterey CA.

“Nanobiotechnology for Defense,” The Future of Nano-Bio Technology: Imagine the Possibilities, NVTC Nanotechnology & BioMedTech Committees, 14 February 2006, McLean VA.

**Invited Speaker** “Chemical Weapons Terrorism: Near-Term Threats and Responses,” Globalization and WMD Proliferation Networks, Center for Contemporary Conflict, Naval Postgraduate School, 29-30 June 2005, Monterey CA.

“WMD Terrorism Threat Assessment: Emerging Trends in Improvisation,” *FBI-sponsored* Bay Area Terrorism Working Group (BATWinG), 23 May 2005, Oakland, CA.

“The Shifting Face of Chemical Terrorism,” Center for International Security and Cooperation (CISAC) Science and Technology Seminar, Stanford CA, 19 April 2005, Stanford CA.

**Invited Speaker** “Feed Security: an Unaddressed Agricultural Terrorism Risk,” DCI Center for Weapons Intelligence, Nonproliferation and Arms Control (WINPAC), 24 March 2005, Langley VA.

“Chemical and Biological Weapons Detectors: Beyond Detection to Attribution,” Draper Laboratory, 1 April 2005, Cambridge MA.

“Transforming Defense Science & Technology: the Case for Nanotechnology,” American Association for Advancement of Science (AAAS), Defense Policy Fellows Briefing, 23 March 2005, Washington, D.C.

**Invited Speaker** “From Radical Islamists to Homegrown Terrorists: Shifting Trends in Chemical Terrorism,” DOE National Nuclear Security Agency, (NNSA), 23 March 2004, Washington, D.C.

**Invited Speaker** “New Roles for Biological and Chemical Agent Detectors in International Security,” Sandia National Laboratory International Programs, 21 February 2005, Albuquerque NM.

“Shifting Trends in Chemical Terrorism: from Radical Islamists to Homegrown Terrorists,” Chemical and Biological Terrorism Defense Gordon Research Conference *poster*, 31 January - 3 February 2005, Buellton CA.

“The Changing Face of Chemical Terrorism,” American Chemical Society (ACS) Western Regional Meeting, 28 October 2004, Sacramento CA.

**Keynote Speaker**, “From Sarin to Ice Cream: Chemical Terrorism in the 21<sup>st</sup> Century,” Norwegian Defence Research Establishment (NDRE) and Norwegian Institute of International Affairs (NUPI) Consortia Seminar on Terrorism and Chemical and Nuclear Weapons, 14 June 2004, Oslo Norway.

**Invited Panel Chair and Speaker**, “Preventing a Bioterrorist Attack,” Student Pugwash Biology and Security National Symposium, 11-14 July 2004, George Washington University, Washington, DC.

“The Technical Challenges of Biological and Chemical Weapons Verification,” University of California Institute on Global Conflict and Cooperation’s (IGCC) Conference on Public Policy and Biological Threats, 22 July 2004, University of California at San Diego (UCSD).

“An Insider’s View of Biological and Chemical Weapons Detector Research and Development,” Center for Nonproliferation Studies Seminar, Monterey Institute of International Studies, 20 November 2003, Monterey CA.

“Whither More Biosafety Level Four Labs? U.S. Civilian Biodefense Initiatives,” 15<sup>th</sup> Annual International Summer Symposium of Science and World Affairs, July-August 2003, Moscow Russia.

“Vapor Sensing Using Nanotechnology,” Nanotechnology Industry Workshop, Center for Nanoscale Science and Technology, May 2003, Urbana IL.

“SmellSeeing: a New Tool for Detection of Volatile Chemicals,” 17<sup>th</sup> International Forum on Process Analytical Chemistry & 11<sup>th</sup> International On-Site Analysis Conference, January 2003, Scottsdale AZ.

**Invited Speaker** “Colorimetric Sensor Arrays as End-of-Service-Life Indicators,” Army Research Office and U.S. Army Soldier Biological Chemical Command, End-of-Service-Life Indicators for Mask Filters Workshop, October 2002, Panama City FL.

“Rapid Colorimetric Evaluation of Bacterial Metabolites,” 9<sup>th</sup> International Symposium on Olfaction and Electronic Nose (ISOEN ’02), October 2002, Rome Italy.

“Colorimetric Sensors for Rapid Detection of Chemical and Biological Warfare Agents,” 14<sup>th</sup> Annual International Summer Symposium of Science and World Affairs, July 2002, Urbana IL.

**Society of Porphyrins and Phthalocyanines Dissertation Award Lecture**, “PIZA-1: A Functional Zeolite Analogue Assembled From Metalloporphyrins,” 2<sup>nd</sup> International Conference on Porphyrins and Phthalocyanines, June 2002, Kyoto Japan.

“SmellSeeing: A Colorimetric Electronic Nose,” 2<sup>nd</sup> International Conference on Porphyrins and Phthalocyanines, June 2002, Kyoto Japan.

“A Colorimetric Electronic Nose: ‘SmellSeeing’,” NIH National Institute of Biomedical Imaging and Bioengineering BECON Symposium on Sensors for Biological Research and Medicine, June 2002, Bethesda MD.

“Smell-Seeing: a New Tool for Identification of Volatile Organic Compounds,” Pitt-Con, March 2002, New Orleans LA.

**Invited Plenary Lecture**, “Smell-Seeing: A New Approach to Artificial Olfaction,” Eurodeur-Airodeur, June 2001, Paris France.

“Bis-Pocket Porphyrin Liquid Crystals: Entries in Molecular Switches & Non-Fullerene Nanotubes,” Frederick Seitz Materials Research Laboratory DOE Program Review, June 2000, Urbana IL.

“Characterization of Porphyrin Materials by NSOM and AFM,” 217<sup>th</sup> American Chemical Society National Meeting, March 1999, Anaheim CA.

“Novel Calcium Porphyrin Carboxylate Materials,” Tetrapyrrole Gordon Conference *poster*, October 1998, Santa Barbara CA.

“Porphyrin Carboxylate Network Solids,” IXth Midwest Organic Solid State Chemistry Symposium, June 1998, Manhattan KS.

“Porphyrin Polyanion Salts as Building Blocks for Network Solids,” 214<sup>th</sup> American Chemical Society National Meeting, September 1997, Las Vegas NV.

## E. OTHER SCHOLARLY ACCOMPLISHMENTS

Suslick, K.S.; Kosal, M.E.; Rakow, N.A.; Sen, A. “Colorimetric Artificial Nose Having an Array of Dyes and Method of Artificial Olfaction,” U.S. Patent No 7,261,857 B2 (2007) – 11 citations.

## V. SERVICE

### A. PROFESSIONAL CONTRIBUTIONS

#### **Editorial Board Member**

*Journal of Strategic Security*, 2009 - present

*Studies in Conflict & Terrorism*, 2007 - present

Reviewer *Biosecurity and Bioterrorism Defense*, University of Chicago Press, Harvard University Press, and the University of Chicago Press.

**Program Review Committee** 2010 NanoTechnology for Defense Conference, 3-5 May 2010, Atlanta GA

**Chair** “Symposium Toward a Strategic Vision for Chemical and Biological Defense, 7-8 August 2008, Atlanta GA.

**Invited Participant** in international roundtable on “The Military Application of Neuroscience” hosted by the Bulletin of Atomic Scientists, August-October 2008.

**Chair** Department of Defense “Nanotechnology for Chemical and Biological Defense for 2030 Workshop and Strategic Study” 2007-2008.

Special Technical Advisor on nanotechnology for DIA/Directorate of Analysis, China Forces Branch, 2007 - 2009.

Chemical and Biological Incident Response Force (CBIRF) Tech Board, Naval Surface Warfare Center (NSWC) Indian Head, MD, 2006-2007.

DC Biosecurity Group, sponsored by the AAAS Center for Science Technology and Security Policy (CSTSP), 2005 - present.

VIP Observer and Controller to TOP OFF-3 national full scale exercise (*chemical, biological and vehicle borne improvised explosive device (VBIED) terrorism incidents*), New London CT and Washington, D.C., 4-8 April 2005.

Faculty, UCSD Public Policy and Biological Threats Program, Summer 2004.

FBI's Bay Area Terrorism Working Group (BATWinG), 2003-2005.

Interstate Chemical Terrorism Working Group, 2003-2005.

Technical and Programmatic Reviewer

National Science Foundation, Proposal Review Panel, March 2010, August 2010

AAAS Research Competitiveness Program, 2010

AAAS Annual Conference, Public Policy Symposia, 2010

AAAS Science and Technology Policy Fellowship Program Applicants, November 2007, 2008, 2009

DoD Chemical and Biological Defense Physical S&T Research Program, Winter-Spring 2007, 2008

Defense Threat Reduction Agency Review Board, 2009

Defense Threat Reduction Agency (DTRA) Basic Research Program, Spring 2007, 2008, 2009

Ethical, Legal, and Social Implications (ELSI) of Nanotechnology Program, National Science Foundation (NSF), Winter 2007

Materials for Forensic Sensing S&T Program Assessment Team, Office of Naval Research, Fall 2006

**B. CAMPUS CONTRIBUTIONS**

Welfare and Safety Committee, Georgia Institute of Technology, 2009-2012

INTA Steering Committee, 2008 – present

Faculty Search Committee – European Union specialist, Spring 2010, Fall 2010

Faculty Freshman Partner for Hopkins freshman residence hall, 2008 - present

**C. OTHER CONTRIBUTIONS**

- Atlanta Police Department Civilian Police Academy (Class #15), September - December 2009, Graduation February 2010, Atlanta City Hall
- Associate National Intelligence Council, 2008 to present
- Volunteer Judge, US Army *Cybermission* (science, math, and technology competition for students of soldiers in grades six through nine), 2008, 2009, 2010
- DoD Representative to the National Nanotechnology Initiative (NNI) Nanoscale Science and Engineering Technology (NSET) Subcommittee, 2005-2007
- DoD Executive Secretary, Nonproliferation and Arms Control Technology Working Group (NPAC TWG), 2005-2007
- Member, Defense Intelligence Agency (DIA) WMD Integrated Product Team (IPT), 2005-2007
- DoD CBDP Representative to the DoD Emerging Contaminants Nanotechnology Working Group, 2005-2007
- Adjunct Professor, Naval Postgraduate School, Monterey CA, January - July 2004
- Visiting Scholar, Feinberg School of Medicine, Northwestern University, Chicago IL, July 2002 - June 2003
- Champaign City Public Works Advisory Board, 2002-03
- Champaign County Tech Community Development Board, 2001-2003

## VI. GRANTS AND CONTRACTS

### A. AS PRINCIPAL AND CO-PRINCIPAL INVESTIGATOR

#### *Pending:*

DoD DTRA, "Military Applications of Nanotechnology," 1/1/2011-12/31/2014, \$383,842.

NSF CAREER "Emerging Technology and Security," 6/1/2011-5/31/2015, \$563,249.

DHS S&T Directorate "Educating a Biotechnology Policy & Homeland Security Workforce," with Robert Butera, Laboratory for Neuroengineering, School of ECE, Georgia Tech, 1/1/2011-12/31/2012, \$563,477.

#### *Funded:*

DoD Defense Threat Reduction Agency Basic Research, "Multidisciplinary Modeling of Socio-economic Influence on Adversarial Intent to Acquire, Proliferate and Use Chemical, Biological, Radiological and Nuclear Weapons," Co-PI with Profs C.S. Deo (GT-Mechanical Engineering) and S. Dhongde (Rochester Inst Tech-Economics), 04/01/2009-03/31/2011, total award \$689,497; Kosal portion \$181,196.

Army Research Office, "Study & Symposium Toward a Strategic Vision in Emerging Basic Sciences," 7/2008-6/2010, \$91,000.

SAIC, "Unified Field Theory of Proliferation: Toward a Meta-Theory Predicting Nuclear Expansion," 8/2008-12/2008, \$25,000.

Office of the Director of National Intelligence's Intelligence Advanced Research Projects Activity (IARPA), "Nanotechnology Threat Anticipation: Building a Technical Framework for Assessing Offensive versus Defensive Technology Pathways," 11/2007-2/2008, \$10,084

U.S. National Institute of Justice (NIJ) Award #2004-IJCX-0050 "Waiting for a 'Clear Signal' Technical Considerations for Effective Policy to Implement Chemical and Biological Detectors for First Responders and Law Enforcement," 09/2004 – 12/2005, \$283,589 (*declined in order to accept Stanford fellowship*).

U.S. Environmental Protection Agency (EPA) SBIR Award #68D03014 "Monitoring of Trace Toxic Air Pollutants," 04/2003 – 09/2003, \$69,750.

U.S. FDA SBIR Award #0232524 "Detection of Potential Chemical Agents of Terrorist Use in Aqueous Solutions," 01/2000 – 06/2003, \$87,000.

U.S. Food and Drug Administration (FDA) Center for Food Safety and Nutrition (CFSAN) Contract #F63375 "Development of Colorimetric Sensor Array for the Detection of Chemical Agents in Liquids (Water, Water/Ethanol): Feasibility Phase," 11/2002 – 03/2003, \$17,000.

Illinois Tech Challenge, "Colorimetric Gas Sensor for Medical, Consumer and Industrial Applications," Co-PI with Dr. William McNamara, 09/2002 – 08/2005, \$291,125.

National Science Foundation (NSF) SBIR Award #DMII 0215088 "Real-Time Detection of Nitroaromatic Explosives," 07/2002 – 02/2003, \$99,000.

Travel awards (*from various organizations*): \$18,550

**Total funded \$1,169,194**

## B. AS INVESTIGATOR

### *Pending:*

Defense Advanced Research Projects Agency (DARPA) “Biomedical Optimization Decision Aid (BODA) Project,” PI: Max Mehlman, Case Western Reserve University, 2011-2012.

### *Funded:*

Australian Research Council, “Developing Australia’s Legal Response to Military and Security Applications of Nanotechnology,” with Hitoshi Nasu (PI) and Tom A. Faunce, Australian National University College of Law, 2011-2013, \$95,680 (Australian \$), Kosal portion \$7,500.

National Science Foundation (NSF) Summer Research Experience for Undergrads, “Materials Science and Engineering Experience for Undergrads,” 2009-2013, Kosal portion: \$6,250.

Georgia Tech European Union Center of Excellence, “Transatlantic Partnerships and Challenges of the Nanotechnology Revolution,” PI: Vicki Birchfield, Kosal portion 10,820€

## VII. HONORS AND AWARDS

- INTAGO Faculty of the Year, 2010
- Next Generation Fellow, Robert S. Strauss Center for International Security and Law at the University of Texas, 2010
- University of Illinois at Urbana-Champaign Alumni Award, 2007
- Office of the Secretary of Defense Award for Excellence, 2007
- American Association for the Advancement of Science (AAAS) Science & Technology Fellowship, 2005-2007
- American Chemical Society’s *Chemical and Engineering News* Top 2002 Supramolecular Chemistry research paper
- Society of Porphyrins and Phthalocyanines Dissertation Research Award, 2001

An academic degree is a qualification awarded to students upon successful completion of a course of study in higher education, usually at a college or university. These institutions commonly offer degrees at various levels, usually including bachelor's, master's and doctorates, often alongside other academic certificates and professional degrees. The most common undergraduate degree is the bachelor's degree, although in some countries there are lower level higher education qualifications that are also