

MARGARET E. KOSAL
ASSOCIATE PROFESSOR
SAM NUNN SCHOOL OF INTERNATIONAL AFFAIRS
GEORGIA INSTITUTE OF TECHNOLOGY

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ASSOCIATE PROFESSOR
SAM NUNN SCHOOL OF INTERNATIONAL AFFAIRS

I. Earned Degrees

Ph.D. Chemistry, 2002
University of Illinois at Urbana-Champaign
Advisor: Ken Suslick; 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 History

Associate Professor
Sam Nunn School of International Affairs
Georgia Institute of Technology, Atlanta GA
August 2015 -

Joint Faculty Affiliate
Savannah River National Laboratory (SRNL), Department of Energy
Aiken, SC
June 2022 - 2025 (*in residence at SRNL June 2022-June 2023*)

Assistant Professor
Sam Nunn School of International Affairs
Georgia Institute of Technology, Atlanta GA
August 2008 - July 2015

Senior Advisor (GS-15)
Office of the Chief of Staff of the Army, Strategic Studies Group
Headquarters Department of the Army, Department of Defense, Washington, DC
July 2012 - July 2013 (*on leave from Georgia Tech*)

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 Assistant Secretary for Nuclear, Chemical, and Biological Defense (ASD(NCB))
Office of Secretary of Defense, Department of Defense, Washington, DC
September 2005 - August 2007

Fellow
Center for International Security and Cooperation (CISAC)
Stanford University
September 2004 - August 2005

Margaret E. Kosal, PhD

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

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

III. Honors and Awards

- 1) Recognized by NATO for one of its Top Books of 2021 for *Disruptive and Game Changing Technologies in Modern Warfare: Development, Use, and Proliferation*
- 2) Provost's Emerging Leaders Program, AY 2018-2019
- 3) IAC Georgia Power Professor of Excellence, Fall 2017
- 4) Senior Adjunct Scholar to the Modern War Institute at the U.S. Military Academy (West Point), 2016-2017
- 5) Certificate of Recognition & Appreciation, Program Executive Office for Intelligence Electronic Warfare & Sensors, U.S. Army, 2016
- 6) CETL Class of 1969 Teaching Scholar, 2015-2016
- 7) CETL/BP Junior Faculty Teaching Excellence Award, 2015
- 8) Ivan Allen College Gold Star Award in Recognition of the Highest Level of Accomplishment in Research, Spring 2013, Spring 2015, Spring 2018, Spring 2023
- 9) Ivan Allen College Platinum Star Award in Recognition of the Highest Level of Accomplishment in Research, Spring 2024
- 10) Dean Griffith Teaching Recognition – "Thank a Teacher" Award, *received every year at GT though 2021*
- 11) Georgia Tech Junior Faculty Outstanding Undergraduate Research Mentor Award, 2014
- 12) Ivan Allen Jr. Legacy Faculty Award, 2012
- 13) INTAGO Faculty of the Year, 2010
- 14) University of Illinois at Urbana-Champaign Recent Alumni Award, 2007
- 15) Office of the Secretary of Defense Award for Excellence, 2007
- 16) Certificate of Achievement, Assistant to the Secretary of Defense for Chemical and Biological Defense, Office of the Secretary of Defense, 2007
- 17) American Association for the Advancement of Science (AAAS) Science & Technology Policy Fellowship, 2005-2007
- 18) American Chemical Society's *Chemical and Engineering News* Top 2002 Supramolecular Chemistry research paper
- 19) Society of Porphyrins and Phthalocyanines Dissertation Research Award, 2001

IV. Research, Scholarship, and Creative Activities

Indicate with an asterisk those that resulted from work done at Georgia Tech and put the names of student co-authors in boldface.

A. Published Books, Book Chapters, and Edited Volumes

List all books or parts of books published. Include only those accepted or in-press and indicate their status.

A1. Books

- 1) Kosal, M.E., *Nanotechnology for Chemical and Biological Defense*, Springer Academic Publishers: New York, June 2009.

A2. Refereed Book Chapters

- 1) * Kosal, M.E., "Emerging Chemical and Biological Technologies: Security & Policy Challenges," *Responsible Conduct in Chemistry Research and Practice: Global Perspectives*, E. Tratas Contis, D. J. Phillips, and L. Brown, Editors, Oxford University Press (part of ACS series), London UK, 2019, pp 51-68.
- 2) * Kosal, M.E., "Emerging Science and Technologies: Strategy, Security, and Governance," in *Science, Technology, and Art in International Affairs*, R. Marlin-Bennett, J.P. Singh, and M. Carr, Editors, Routledge, 2019, pp 50-68.
- 3) * Kosal, M.E., "Anticipating the Biological Proliferation Threat of Nanotechnology: Challenges for International Arms Control Regimes" in *New Technologies and the Law of Armed Conflict*, H. Nasu and R. McLaughlin, Editors, TMC Asser: Holland, 2014, pp 159-174.
- 4) * Kosal, M.E., "Near Term Threats of Chemical Weapons Terrorism," in *Globalization and WMD Proliferation: Terrorism, Transnational Networks and International Security*, J. Russell and J. Wirtz, Editors, Routledge, 2009, pp 63-78.
- 5) * 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*, E. Fisher, C. Selin, C. and J. Wetmore, Editors, Springer Academic Publishers: New York, 2008, pp 157-173.
- 6) Kosal, M.E., "Chemical Weapons Destruction and the Public Response," in *Towards the Elimination of the Chemical Weapons*, E. Haru and R. Thakur, Editors, UN University Press, Netherlands, 2006, pp 118-149.
- 7) 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*, K. Kadish, K. Smith, and R. Guilard, Editors, Academic Press: New York, 2000, 6, pp 41-131.

A3. Edited Volumes

- 1) * Kosal, M.E., Editor, *Proliferation of Weapons- and Dual-Use Technologies: Diplomatic, Information, Military, Economic Approaches*, 'Advanced Sciences and Technologies for Security Applications' series, Springer Academic Publishers, August 2021. (348 pages)
<https://www.springer.com/us/book/9783030736545>
10 student-authored or co-authored chapters

- 2) * Kosal, M.E., Editor, *Disruptive and Game Changing Technologies in Modern Warfare: Development, Use, and Proliferation*, 'Advanced Sciences and Technologies for Security Applications' series, Springer Academic Publishers, October 2019. (222 pages)
<https://www.springer.com/us/book/9783030283414>
8 student-authored or co-authored chapters
Reviewed in Defence Studies, 2020, 20(3), 290-293.
- 3) * Kosal, M.E., Editor, *Technology and the Intelligence Community: Challenges and Advances for the 21st Century*, 'Advanced Sciences and Technologies for Security Applications' series, Springer Academic Publishers, April 2018. (290 pages)
<http://www.springer.com/us/book/9783319752310>
14 student-authored or co-authored chapters

B. Refereed Publications and Submitted Articles

List all refereed journal publications, then refereed conference proceedings, and then other refereed materials. Include those accepted or submitted and indicate their status.

B1. Published and Accepted Journal Articles

- 1) * **Attal-Juncqua, A.**, M.E. Kosal, G. Kwik-Gronvall, et. al., "Shaping the Future US Bioeconomy Through Safety, Security, Sustainability, and Social Responsibility," *in press at Trends in Biotechnology*, 2024,
<https://www.sciencedirect.com/science/article/pii/S0167779923003372>
- 2) * Kosal, M.E., "How COVID-19 is Reshaping US National Security Policy," *Politics and the Life Sciences*, 2024, 43:1, pp 83-98, doi:10.1017/pls.2023.13
- 3) * Kosal, M.E., and **J. Putney**, "Neurotechnology and International Security: Predicting Commercial and Military Adoption of Brain-Computer Interface (BCI) in the US and China," *Politics and the Life Sciences*, 2023, 42(1), pp 88-103,
<https://www.doi.org/10.1017/pls.2022.2>
- 4) * Kosal, M.E. "CRISPR & New Genetic Engineering Techniques: Emerging Challenges to Strategic Stability and Nonproliferation," *Nonproliferation Review*, 2021, 27(4-6), pp 389-408, <https://www.tandfonline.com/doi/full/10.1080/10736700.2020.1879464>
- 5) * **Morrell, S.C.** and Kosal, M.E., "Military Deception and Strategic Culture: The Soviet Union and Russian Federation," *Journal of Information Warfare*, Summer 2021, 20(3), pp 134-152,
<https://www.jinfowar.com/journal/volume-20-issue-3/military-deception-strategic-culture-soviet-union-russian-federation>
- 6) * Kosal, M.E. and **J.H. Huang**, "Security Implications and Governance of Cognitive Neuroscience Research: Results from an Ethnographic Survey of Researchers," *Politics and the Life Sciences*, Spring 2015, 34(1), pp 93-108.
- 7) * Kosal, M.E., "A New Role for Public Health in Bioterrorism Deterrence," *Frontiers in Public Health*, December 2014, 2(278), pp 1-4, doi: 10.3389/fpubh.2014.00278,
<http://journal.frontiersin.org/article/10.3389/fpubh.2014.00278/full>.
- 8) Kosal, M.E., "Near-Term Threats of Chemical Weapons Terrorism," *Strategic Insights*, July 2007, 6, pp 1-4.

- 9) Suslick, K.S. and M.E. Kosal, et al., "Seeing Smells: Development of an Optoelectronic Nose," *Química Nova*, 2007, 30, pp 677-681.
- 10) Kosal, M.E., "Terrorism Targeting Industrial Chemical Facilities: Strategic Motivations and the Implications for U.S. Security," *Studies in Conflict and Terrorism*, 2006, 29, pp 719-751.
- 11) Kosal, M.E. and D.A. Anderson, "An Unaddressed Issue of Agricultural Terrorism – A Case Study on Feed Security," *Journal of Animal Science*, 2004, 82, pp 3394-3400.
- 12) Suslick, K.S. and M.E. Kosal, et al., "Microporous Porphyrin Solids," *Accounts of Chemical Research*, 2005, 38, pp 283-321.
- 13) Kosal, M.E., J-H. Chou, and K.S. Suslick, "A Calcium-Bridged Porphyrin Network," *J. Porphyrins and Phthalocyanines*, 2002, 6, pp 377-383.
- 14) Kosal, M.E., J-H. Chou, S.R. Wilson, and K.S. Suslick, "A Functional Zeolite Analogue Assembled From Metalloporphyrins," *Nature Materials*, 2002, 1, pp 118-124.
- 15) Suslick, K.S., N.A. Rakow, M.E. Kosal, and J-H. Chou, "The Materials Chemistry of Porphyrins and Metalloporphyrins," *J. Porphyrins and Phthalocyanines*, 2000, 4, pp 407-434.
- 16) Kosal, M.E. and K.S. Suslick, "Microporous Porphyrin and Metalloporphyrin Materials," *Solid State Chemistry*, 2000, 152, pp 87-101.
- 17) Brunner, R.S., Kosal, M.E., K.S. Suslick, R. Lamche, O. Marti, and J.O. White, "Near-Field Scanning Optical Microscopy (NSOM) of Zinc-Porphyrin Crystals," *Ultramicroscopy*, 2000, 84, pp 149-155.

B2. Conference Presentation with Proceedings (Refereed)

- 1) Suslick, K.S.; Kosal, M.E.; McNamara, W.B.; Sen, A.; Rakow, N.A., "ChemSensing: A Colorimetric Array Detector," *9th International Symposium on Olfaction and Electronic Nose (ISOEN '02) Proceedings*, D'Amico A.; DiNatale, C, eds., IEEE: Baltimore, 2003, pp 46-52.
- 2) 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.

B3. Other Refereed Material

- 1) * *Assessing and Improving Strategies for Preventing, Countering, and Responding to Weapons of Mass Destruction Terrorism: Chemical Threats*, National Academies of Science Consensus Study Report, 2024 (7 Chapters, ~87,000 words)

Both the unclassified report and the classified annex have passed independent peer-review. Documents passed security review. Expected June 2024 publication. Kosal served as vice-chair of study and was lead author of chapters on (1) Adequacy of Strategies to Identify Chemical Threats; (2) Methodology to Assess Strategies; (3) Cross-Cutting Findings, Conclusions, and Recommendations; and contributed to all chapters in design, writing, and editing. Kosal and four other study members contributed equally to the classified annex, which is significantly shorter.

- 2) * Kosal, M.E., and L. Carlson, "Preventing Weapons of Mass Destruction Proliferation - Leveraging Special Operations Forces to Shape the Environment," Joint Special Operations University (JSOU) monograph series, January 2017, <https://jsou.libguides.com/c.php?g=83714&p=4276517>.

- 3) * Kosal, M.E., "C-WMD Strategy Gaps – Capacities, Capabilities, and Collaboration," *PRISM*, 2018, 7(3), pp 50-67.
- 4) * Bonin, S., P.D. Millett, M.E. Kosal, and A.V. Feofanov, "Security Implications of Synthetic Biology and Nanobiotechnology: A Risk and Response Assessment of Advances in Biotechnology," United Nations Interregional Crime and Justice Research Institute (UNICRI), 2011 (101 pages).

B4. Submitted Journal Articles (with Date of Submission)

- 1) * Kosal, M.E., "Emerging Technologies and New Voices in Nuclear Debates: Fusion and Nonproliferation," *PS: Political Science and Politics*, submitted March 2024.
- 2) * Kosal, M.E., "AI: Untangling Emerging Threats, Policy, and Hype Related to WMD Proliferation" *under review at The Nonproliferation Review*, submitted February 2024.
- 3) * Kosal, M.E., "Emerging Technologies & International Security: the Illustrative Cases of Nanobiotechnology," *under review at Journal of Strategic Studies*, submitted December 2023.

B5. Submitted Edited Volumes (with Date of Submission)

- 1) * Kosal, M.E., Editor, "Innovate for Future Threats: Disruptive Innovation Efforts and Uses of the Technology Environment by State and Non-state Actors," *under review at The Routledge*, submitted March 2024. **11 student- or fellow-authored chapters**
- 2) * Kosal, M.E., Editor, "Emerging Technologies and Future of Conflict Deterrence: Governance, Development, Diplomacy, and Armed Conflict," *under review at Springer*, submitted December 2023. **12 student- or fellow-authored chapters**

C. Other Publications and Creative Products

List all other publications and creative products/activities that are not otherwise included in Sections IV. A. and B. Indicate whether these are refereed or not. These products may include exhibitions, competitions, performances, professional practice/studio work, software, patents, designs, compositions, scholarly editions, posters, artifacts, datasets, and other non-refereed publications.

C1. Other Book Chapters / Parts of Books

- 1) * Kosal, M.E., "Artificial Intelligence: Unpacking Technical, Political, Rhetorical, and Security Factors," in *Proliferation of Weapons- and Dual-Use Technologies: Diplomatic, Information, Military, Economic Approaches*, Kosal, M.E., Editor, Springer Academic Publishers, August 2021, pp 17-32.
- 2) * **Tennenbaum, M.** and Kosal, M.E., "The Interplay Between Frugal Science and Chemical and Biological Weapons: Investigating the Proliferation Risks of Technology Intended for Humanitarian, Disaster Response, and International Development Efforts," in *Proliferation of Weapons- and Dual-Use Technologies: Diplomatic, Information, Military, Economic Approaches*, Kosal, M.E., Editor, Springer Academic Publishers, August 2021, pp 153-204.
- 3) * Kosal, M.E., "Emerging Life Sciences: New Challenges to Strategic Stability," in *Disruptive and Game Changing Technologies in Modern Warfare: Development, Use, and Proliferation*, M.E. Kosal, Editor, Springer Academic Publishers, October 2019, pp 31-48.

- 4) * Kosal, M.E. and **J.W. Stayton**, “Meta-materials: Threat to the Global Status Quo?” in *Disruptive and Game Changing Technologies in Modern Warfare: Development, Use, and Proliferation*, M.E. Kosal, Editor, Springer Academic Publishers, October 2019, pp 135-154.
- 5) * Kosal, M.E. articles on “Nano-Biotechnology,” in *Encyclopedia of Bioterrorism Defense*, R.A. Zilinskas and R. Katz, Editors, Revised and updated chapters on “Anti-Material Agents” and “Biological Simulants,” Wiley: New York, 2011.
- 6) * Kosal, M.E., articles on *Department of Defense; Security; Ethical Issues of Nano-Weapons; and Iran* for *Encyclopedia of Nanoscience and Society*, D. Guston, Editors, Sage Publishers: Thousand Oaks CA, 2010 (total 34 pages).
- 7) * Kosal, M.E. and A. Stulberg, article on *Russia*, *Encyclopedia of Nanoscience and Society*, D. Guston, Editor, Sage Publishers: Thousand Oaks CA, 2010.
- 8) Kosal, M.E., “Near Term Threats of Chemical Weapons Terrorism,” in *Globalization and WMD Proliferation: Terrorism, Transnational Networks and International Security*, J. Russell and J. Wirtz, Editors, Routledge, 2009, pp 63-78.
- 9) Kosal, M.E., “Chemical Terrorism,” in *Weapons of Mass Destruction and Terrorism*, R.D. Howard and J.F. Forest, Editors, McGrawHill/Contemporary Learning Series, Inc.: New York, 2007, pp 581-595.
- 10) Kosal, M.E., articles on “Biological Simulants” and “Anti-material Agents,” for the *Encyclopedia of Bioterrorism Defense*, Wiley: New York, June 2005.
- 11) Kosal, M.E., “Bioweapons Detectors,” in *Biological Weapons*, C.F. Naff, Editor, Greenhaven Press: New Haven, 2006, pp 109-117.
- 12) Cassagrande, R. and M.E. Kosal, “Detection of Bioterrorist Agents,” *Encyclopedia of Bioterrorism Defense*, R.A. Zilinskas and R. Pilch, Editors, Wiley: New York, June 2005.

C2. Non-Refereed Journal Publications

- 1) * Kosal, M.E., “Emerging Technologies and NATO’s Expansion,” *Transatlantic Policy Quarterly*, Spring 2023, 22(1), pp 96-105, <http://transatlanticpolicy.com/article/1200/emerging-technologies-and-natos-expansion>
- 2) * Kosal, M.E., “Game-Changing Biotechnology: Security, Proliferation, & Governance Challenges,” *Issues and Insights*, 21(1), pp 34-48, 2021, <https://pacforum.org/programs/issues-insights>
- 3) * Kosal, M.E., “Emerging Life Sciences and Possible Threats to International Security,” *Orbis*, 2020, 64, pp 599-614, <https://doi.org/10.1016/j.orbis.2020.08.008>
- 4) * Kosal, M.E., “AI and the Global Security Environment,” *Security Index*, 7(12), 2020, <https://pircenter.org/en/articles/2221-7390754/print/1>
- 5) * Kosal, M.E., “Existential Threats from Nanotechnology,” *Bulletin of the Atomic Scientists*, November 2019, pp 290-294, <https://tandfonline.com/doi/full/10.1080/00963402.2019.1680054>
- 6) * Jordan, J.E., M.E. Kosal, and L. Rubin, “Strategic Illogic of Counterterrorism,” *Washington Quarterly*, Winter 2017, 39(4), pp 181-192.
- 7) * Kosal, M.E. “The Security Implications of Nanotechnology,” *Bulletin of Atomic Scientists*, July/August 2010, pp 58-69.

- 8) Kosal, M.E. "Art or Bioterrorism? Implications of the Kurtz Case for Research Science and for Limiting Terrorist Threats," *INESAP Bulletin*, December 2004, 24, pp 85-91.
- 9) Kosal, M.E. "Is Small Scary? Nanotechnology Research in an Age of Terrorism," *Bulletin of Atomic Scientists*, September/October 2004, 60, pp 38-64.

C3. Other Publications

- 1) * Kosal, M.E., "Risks of Nanobiotechnology: Analysis of Technical and Geopolitical Factors," SIPRI Emerging Technology Risk Governance Workshop Proceedings, 2023.
- 2) * Kosal, M.E., "Emerging Technologies and a new NATO Strategic Concept: Challenges, Things to Watch Out For, and Needs." Working Paper. NATO Strategic Concept Seminar, United States Military Academy at West Point, 3-4 February 2022.
- 3) * Kosal, M.E., "Assessing Threats of SynBio – Three Challenges," *NCT Magazine*, July 2021, <https://nct-magazine.com/nct-magazine-july/assessing-threats-of-synbio-three-challenges/>
- 4) * Kosal, M.E., "Synthetic Biology Opportunities for the Army: Strategic Foresight for Research & Development for the Future Military Operating Environment," final report for US Army Research Laboratory, May 2021 (26 pages).
- 5) * Kosal, M.E., "NATO and Emerging Technologies," invited commentary for the European Leadership Network (ELN), 13 January 2020, <https://www.europeanleadershipnetwork.org/commentary/nato-and-emerging-technologies/>
- 6) * Kosal, M.E. and **H. Regnault**, "Emerging Technologies and the Future of Warfare," *The Cipher Brief*, 7 November 2019, <https://www.thecipherbrief.com/column/academic-incubator/emerging-technologies-and-the-future-of-warfare>
- 7) * Kosal, M.E. H-Diplo/ISSF Article Review 114, "The Future of Chemical Weapons: Implications from the Syrian Civil War," March 2019, <https://networks.h-net.org/node/28443/discussions/4084042/h-diploissf-article-review-114-kosal-%E2%80%9Cfuture-chemical-weapons>
- 8) * Kosal, M.E. and Breedlove, P., "Emerging Technologies and National Security: Russia, NATO, & the European Theater," *Governance in an Emerging World*, Hoover Institution, Stanford University, Palo Alto CA, February 2019, <https://www.hoover.org/research/emerging-technologies-and-national-security-russia-nato-european-theater>
- 9) * Kosal, M.E., "Horsepox Synthesis Case – Balancing Science and Security," *Infectious Disease News*, March 2018, <https://www.healio.com/infectious-disease/vaccine-preventable-diseases/news/>
- 10) * Kosal, M.E., "Is the US Prepared for an Attack with a Weaponized Biothreat Like Smallpox?" *Infectious Disease News*, January 2018, <https://www.healio.com/infectious-disease/emerging-diseases/news/>
- 11) * Kosal, M.E., review of *Bioinsecurity and Vulnerability*, by N.N. Chen and L.A. Sharp, Editors, School for Advanced Research Press, *Politics and the Life Sciences*, Spring 2017, 36(1), pp 54-55, <http://www.bioone.org/doi/abs/10.1017/pls.2017.2>
- 12) * Edited and wrote introduction for a special virtual issue on "Chemical Weapons: Politics, Science, Diplomacy, and Emerging Issues and Challenges" for *Politics and the Life Sciences*,

- Spring 2017, <https://www.cambridge.org/core/journals/politics-and-the-life-sciences/virtual-issues/politics-and-the-life-sciences-virtual-issue-2>
- 13) * Kosal, M.E., "Regulating Genetic Research and Applications," *Issues in Science and Technology*, Summer 2016, pp 9-10, <http://issues.org/32-4/forum-31/>
 - 14) * Kosal, M.E., "Military Applications of Nanotechnology: Implications for Strategic Security I," Center on Contemporary Conflict, Naval Postgraduate School, January 2015 (90 pages) <https://calhoun.nps.edu/handle/10945/45129?show=full>
 - 15) * Clunan, A., R. Hsueh, M.E. Kosal, and K. Rodine-Hardy, "Nanotechnology in a Globalized World: Assessment of an Emerging Technology," Center on Contemporary Conflict, Naval Postgraduate School, June 2014. (100 pages) Kosal was lead author on ~25% of the document.
 - 16) * Kosal, M.E. "The Suspected Syrian Chemical Attacks: What Now?" *Bulletin of Atomic Scientists*, 22 August 2013, <http://thebulletin.org/suspected-syrian-chemical-attacks-what-now>
 - 17) * Kosal, M.E., review of *The Making of the Digital World* by J.K. Rennstitch, Palgrave MacMillan, *International Studies Review*, June 2009, 11, pp 365-367.
 - 18) * Kosal, M.E., 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, pp 132-135.
 - 19) * 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, pp 492-495.
 - 20) * Kosal, M.E. and **Huang, J.Y.** "The Security Implications of the Neurosciences," *Bulletin of Atomic Scientists*, July 2008, <http://thebulletin.org/security-impact-neurosciences>.
 - 21) Ackerman, G.P.; Kosal, M.E, et. al; "Assessing Terrorist Motivations for Attacking Critical Infrastructure," UCRL-TR-227068, LLNL, January 2007 (273 pages), <https://e-reports-ext.llnl.gov/pdf/341566.pdf>.
 - 22) Kosal, M.E, and **Baker, M.**, "Osmium Tetroxide – A New Chemical Terrorism Weapon?" *CNS Research Story*, 13 April 2004.
 - 23) Kosal, M.E. "The Basics of Chemical and Biological Weapons Detectors," *CNS Research Story*, 24 November 2003.
 - 24) 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, p 9.
 - 25) Bremer Mærli, M.; Kosal, M.E. "A More Troubling Nuclear Threat: Unsecured Fissile Material," *The Public I*, January 2003, p 16.
 - 26) 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) Report, Urbana IL, June 1998, pp 11-14.

D. Presentations

List all conference presentations (separate keynote and invited from submitted), invited seminars, scholarly presentations, etc.

D1. International Keynote & Invited

- 1) "Malign Influences on Nonproliferation Norms & International Security: the case of Russian Dis- and Mis-information on Chemical and Biological Weapons" *Cognitive Dominance: Information, Disinformation, and Influence in Great Power Competition*, Swedish Defence University, Stockholm Sweden, 15-16 April 2024.
- 2) "Emerging Technologies and Chemical Proliferation," *Project Anthracite Symposium: Assessing the WMD Capability of the DPRK*, RUSI, London UK, 9 April 2024.
- 3) "Dual-use challenges related to drug discovery and development: AI/Generative Chemistry, Bionanotechnology, and Neurotech" *CB Futures 2040: Exploring the Defence and Security Considerations of Future Developments in Chemical and Biological Weapons*, Wilton Park UK, 10-12 January 2024.
- 4) "International Security and Emerging Developments in Neurotechnology," *The Royal Society's Summit on Neural Interfaces*, London UK, 13 September 2023.
- 5) *Keynote: "Cognitive Warfare and the Future of Conflict," NATO Partnership for Peace (PfP) Emerging Security Challenges Working Group Annual Conference*, Sofia Bulgaria, 29 August 2023.
- 6) "Neurotechnologies and International Security," Geneva Centre for Security Policy (GCSP), Geneva Switzerland, 23 May 2023.
- 7) "Emerging Technologies & the Future of Warfare: Brain Computer Interfaces," United Nations (UN) Institute for Disarmament Research (UNIDIR) Brain-Computer Interfaces Series, Geneva Switzerland, 12 April 2023. *Virtual*.
- 8) "Risks of Nanobiotechnology: Analysis of Technical and Geopolitical Factors of Emerging Technologies," SIPRI Emerging Technology Risk Governance Workshop, Stockholm Sweden, 17-18 February 2023.
- 9) "The Threat of SynBio and Designer Pathogens," CBRNe Society Annual Meeting, Leiden, The Netherlands, 2 August 2021. *Virtual due to COVID*
- 10) "Technology and the Future of Warfare," Centre for AI and Digital Ethics, School of Engineering, University of Melbourne, Melbourne Australia, 30 July 2020. *Virtual due to COVID*
- 11) "Artificial Intelligence and the Future of Warfare," Canadian Forces College, Toronto Ontario, 3 December 2019.
- 12) "Convergence, Emergence, Disruption, Transformation: How to Make Sense of Future Weapons?" *Developments in Science & Technology: What Impact on Conventional Weapons Control*, Berkshire UK, 8-9 March 2018.
- 13) "Emerging & Disruptive Technologies – Science, Diplomacy, and Deterrence," Asan Institute, Seoul South Korea, 5 September 2017.

- 14) "Strategy, Technology, and Governance: Security Challenges of Emerging Technologies for the 21st Century," *Ethical, Legal and Social Implications of Emerging Military Technologies Conference*, University of Melbourne School of Law, Melbourne Australia, 29-30 May 2017.
- 15) "Big Data Analytics, the Life Sciences, & Transnational Security Threats" *Open Source and Big Data Methodologies for Nonproliferation Workshop*, Vienna Austria, 27 January 2015.
- 16) *Keynote*: "Strategy, Technology, and Governance: Security Challenges of Emerging Technologies for the 21st Century," *Nanotechnology for Security & Defense (NanoSD 2014)* International Conference, Ávila Spain, 23-26 September 2014.
- 17) *Keynote*: "The Impact of Technology Trends on Security: Uncertainty, Complexity, and Interdependence," *School of International Futures (SOIF)*, Wilton Park UK, 11-14 August 2014.
- 18) *Keynote*: "Nanotechnology, Biotechnology, and the Cognitive Neurosciences," Australian Centre for Military and Security Law *Symposium on New Technologies and the Law of Weaponry*, Australian National (ANU) College of Law, Canberra Australia, 3-4 September 2012.
- 19) "Brain Wars: The Security Challenges of Applications of Advanced Cognitive and Neurosciences for Weapons and Military Uses," *Brain Waves: Neuroscience, Conflict and Security*, The Royal Society (UK), London UK, 12 May 2011. My work was cited in The Royal Society (UK) report *Brain Waves: Neuroscience, Conflict and Security*, February 2012, <https://royalsociety.org/policy/projects/brain-waves/conflict-security/>
- 20) "Nanotechnology for Biological Defense: Detection, Protection, Decontamination, and Medical Countermeasures," *United Nations Experts' Workshop on Synthetic Biology and Nanobiotechnology Risks and Responses Assessment*, Palais des Nations, Geneva Switzerland, 28 June 2010.
- 21) *Keynote*: "Nanotechnology and International Security," *First International Nanotechnology Congress*, Quito Ecuador, 11 June 2010.
- 22) "International Policy and Governance Challenges of Nanotechnology and Emerging Technologies," Bilkent University, Ankara, Turkey, 17 May 2010.
- 23) *Keynote*: "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*, Turin Italy, 24-25 March 2010.
- 24) "Bionanotechnology and Security: Is Small Scary?" *International Conference on Emerging and Disruptive Technologies*, Singapore, 14-15 September 2009.
- 25) "From Sarin to Ice Cream: Chemical Terrorism in the 21st Century," *Consortia Seminar on Terrorism and Chemical and Nuclear Weapons*, Norwegian Defence Research Establishment (NDRE) and Norwegian Institute of International Affairs (NUPI), Oslo, Norway, 14 June 2004.
- 26) *Society of Porphyrins and Phthalocyanines Dissertation Award Lecture*: "PIZA-1: Functional Zeolite Analogue Assembled From Metalloporphyrins," *2nd International Conference on Porphyrins and Phthalocyanines*, Kyoto Japan, June 2002.
- 27) *Keynote*: "Smell-Seeing: A New Approach to Artificial Olfaction," *Eurodeur-Airodeur*, Paris France, 19 June 2001.

D2. Domestic Keynote & Invited

- 1) "Emerging Technologies and Existential Risk," Stanford Existential Risks Initiative (SERI) Symposium, Stanford CA, 2 April 2024
- 2) "Health Securitization and Countering Biological Weapons Proliferation," USAF Center for Strategic Deterrence Studies, Maxwell AFB, Montgomery AL, 10 November 2023.
- 3) "Emerging Tech and NATO," Department of International Security, Air War College, Maxwell AFB, Montgomery AL, 8 November 2023.
- 4) "Disinformation and WMD," Schar School of Policy and Government, George Mason University, Fairfax VA, 26 October 2023.
- 5) "Malign Influences on Nonproliferation Norms & International Security," Russia Malign Influence on International Security, CITS University of Georgia, 22 August 2023.
- 6) "The Geopolitics of Science Mis- and Dis-Information," Special Symposium sponsored by the American Chemical Society Division of Chemical Information (CINF) on *Combating Science Mis- and Dis-Information*, American Chemical Society (ACS) National Meeting, San Francisco CA, 15 August 2023.
- 7) *Opening Conference Talk "Implications of WMD CBRNE Science on Policy,"* Gordon Research Conference (GRC) on Nonproliferation, *Counterproliferation and Disarmament Science*, Ventura CA, 9 July 2023.
- 8) "Game-Changing & Disruptive Biotechnology: Opportunities & Mitigating Security Threats," James Madison University, 4 November 2022.
- 9) "National and International Security Dimensions of Artificial Intelligence and Biotechnology," American Association for the Advancement of Science (AAAS) Forum on Science and Technology Policy, Washington, DC, 26 October 2022.
- 10) *Keynote: "Biotech, AI, and Autonomy: Needs, Capabilities, and Threats,"* *Barriers to Biotechnology Modernization Study Group*, US Department of Defense, 22 July 2021. *Delivered virtually.*
- 11) "Geopolitical and National Security Implications of Emerging Technologies," The Governance of Emerging Technologies, Johns Hopkins University, Baltimore MD, 8 June 2022.
- 12) "The Emerging WMD Threat" National Intelligence University, Bethesda MD, 7 June 2022.
- 13) "Disruptive Technologies at Sea," *Cushing International Law Conference*, Naval War College, Newport RI, 16 May 2022.
- 14) "Chemical and Biological Weapons Threats: Science, Public Health, Policy," Johns Hopkins Bloomberg School of Public Health, Baltimore MD, 11 May 2022.
- 15) *Keynote: "National Security, Emerging Technologies, and Higher Education,"* *Symposium on U.S. Higher Education and National*, University of North Georgia, Dahlonega GA, 6-7 April 2022.
- 16) "New Weapons & the Ukraine Conflict," *to be given at John Reilly Center for Science, Technology, and Values, University of Notre Dame, 21 March 2022, postponed due to COVID-19.*
- 17) "Strategic Factors Surrounding the Development of Emerging & Disruptive Technologies" National Security Affairs, Naval Postgraduate School, Monterey CA, 15 February 2022.

- 18) "Emerging Technologies, National Security, and a new NATO Strategic Concept," at *NATO Strategic Concept Seminar*, U.S. Military Academy at West Point NY, 2-4 February 2022.
- 19) "US Perspectives, New Threats, and Return of Great Power Politics," at *Transatlantic Approaches to Global Arms Control: Tackling the Threat of Chemical Weapons*, virtual event hosted by the Global Governance Institute (Brussels, Belgium) and the Stimson Center (Washington, D.C.), 2 December 2021.
- 20) "Emerging Technologies: Opportunities and Risks for the US Army," *to be given at Future Armed Conflict: Implications for the Law of War, Army Futures Command and Lieber Institute for Law & Land Warfare at US Military Academy (West Point), Austin TX, originally scheduled 23 September 2021, delayed due to COVID.*
- 21) "Russian and Emerging Technologies in Context of Great Power Competition," National Security Affairs, Naval Postgraduate School, Monterey CA, 18 August 2021.
- 22) "Geopolitics of Emerging Technology," Savannah River National Lab, Aiken SC, 04 August 2021.
- 23) "Synthetic Biology Opportunities for the Army: Strategic Foresight for Research & Development for the Future Military Operating Environment," Army Research Laboratory, Adelphi MD, 26 April 2021.
- 24) "Future of the Nuclear Triad," Program on Arms Control & Domestic and International Security, University of Illinois at Urbana-Champaign, Urbana Illinois, 18 November 2020.
- 25) "Emerging Technology: Law, Tech, and War," Emory Law School, Emory University, Atlanta GA, 4 November 2020.
- 26) "Emerging Technology and National Security," Foreign Policy Research Institute, Philadelphia PA, 2 November 2020.
- 27) "Emerging Technologies and Deterrence," *21st Century Technologies, Geopolitics, and the US-Japan Alliance: Recognizing Game-Changing Potential*, organized by Pacific Forum (Hawaii); the U.S. Embassy, Tokyo; and Aoyama Gakuin University, 12 October 2020.
- 28) "International Security in a Changing Arctic: Science, Technology, and Geopolitics," *Circling the Arctic: Security and the Rule of Law in a Changing North* conference, Annenberg Public Policy Center (APPC) and University of Pennsylvania School of Law, University of Pennsylvania, 1-3 October 2020.
- 29) "Technology Innovation and National Security," Pacific Forum (Hawaii), 25 June 2020. *Delivered via Zoom due to COVID.*
- 30) "Democratization of Emerging Technologies at Scale," at National Academies of Sciences, Engineering, and Medicine Board on Intelligence Community Studies' *Workshop on Emerging Technology Intersections and Partnerships for Counterproliferation*, 27 February 2020, Washington, D.C.
- 31) "Chemistry and Beyond," School of Chemical Sciences, University of Illinois at Urbana-Champaign, Urbana IL, 18 October 2019.
- 32) "International Security and Legal Challenges of Nanotechnology" *Ethical Challenges in the Development of New Weaponry* Conference, Center for Ethics and the Rule of Law (CERL), University of Pennsylvania School of Law, Philadelphia PA, 26 September 2019.

- 33) "Cyber Competition and the Changing Strategic Environment," *Strategic Competition in Cyberspace: Challenges and Implications Workshop*, Center for Global Security Research, Lawrence Livermore National Laboratory, Livermore CA, 10-11 July 2019.
- 34) "Emerging Technologies and National Security: Russia, NATO, & the European Theater," *Governance in an Emerging World*, Hoover Institution, Stanford University, Palo Alto CA, 25 February 2019.
- 35) "Epistemic Infrastructure: Revisiting Knowledge Systems and Practice," invited contributor to roundtable at International Studies Association (ISA) Annual Meeting, San Francisco CA, 7 April 2018.
- 36) "The National Nanotechnology Initiative and other Innovative Governance Measures for Nanotechnology" *The Challenge of Emerging Technologies: Exploring New Solutions and Governance for Countering WMD*, National Defense University, Washington, DC, 22 February 2018.
- 37) "Strategy, Disruptive Technology, & Deterrence: the 3rd Offset," STRATCOM Deterrence Conference, Offut Air Force Base NE, 26 July 2017.
- 38) "WMD & Emerging Technologies Education & Research," Deterrence Education Research Conference, Maxwell Air Force Base, AL, 12 July 2017.
- 39) "International and Domestic Mechanisms for Managing Dual Use Research of Concern," *Workshop on Dual Use Research of Concern: Options for Future Management*, National Academies of Sciences, Engineering, and Medicine, Washington, DC, 4 January 2017.
- 40) *Keynote: "Disruptive Technology & Future Operational Environments,"* U.S. Army Program Executive Office (PEO) Intelligence, Electronic Warfare & Sensors (IEW&S) *Senior Leader Summit*, Aberdeen Proving Ground, MD, 15 December 2016.
- 41) "Deterring Bioterrorism," Modern War Institute's War Studies Conference, *Reassessing Deterrence in the 21st Century*, U.S. Military Academy at West Point NY, 13-15 November 2016.
- 42) "Future Operational Environment and Technologies for the Army," AUSA's Institute of Land Warfare *Forum on Army Ground Combat Platforms*, Arlington VA, 1 November 2016.
- 43) "Bioterrorism & Biodefense," Department of Political Science, Augusta University, Augusta GA, 24 October 2016.
- 44) "Strategic Stability and Emerging Biotechnologies," *Symposium on Export Control of Emerging Biotechnologies*, Monterey Institute of International Studies (MIIS), Monterey CA, 19 October 2016.
- 45) "From Beakers to Bombs: At the Intersection of National Security and Technology," *Symposium on the Science and Life of the Suslick Group*, University of Illinois at Urbana-Champaign, Urbana IL, 13 August 2016.
- 46) "Threat Forecasting, Technology Watching, and Horizon Scanning," Defense Threat Reduction Agency's (DTRA) *Chemical and Biological Defense Science and Technology Conference*, St. Louis MO, 13 May 2015.
- 47) "Emerging Technologies and Diffusion of Innovation: Security Challenges for the 21st Century," Special Symposium co-sponsored by the ACS Committee on International Activities (IAC), the ACS Division of Analytical Chemistry, and the ACS Committee on Public

Relations and Communications (CPRC), *The Interface of Chemical and Biological Sciences International Disarmament Efforts*, American Chemical Society (ACS) National Meeting, Denver CO, 22 March 2015.

- 48) "The Impact of Technology Trends on Security: Uncertainty, Complexity, and Interdependence," International Development and International Affairs Department, University of Southern Mississippi, Long Beach MS, 16 October 2014.
- 49) "Emerging Technologies and National Security," American Association for the Advancement of Science (AAAS) Annual *Forum on Science and Technology Policy*, Washington, DC, 1-2 May 2014.
- 50) *Keynote: "Threats, Opportunities and Strategic Gaps in 21st Century CBRN Defense" Joint Civil & DoD CBRN Symposium on Chemical, Biological, Radiological, and Nuclear (CBRN) Defense*, Alexandria VA, 11-12 March 2013.
- 51) *Keynote: "Nanotechnology and Diffusion of Innovation: National Security Challenges for the 21st Century" Nanotechnology for Defense (NT4D)*, Summerlin NV, 6-10 August 2012.
- 52) "From Chemistry to National Security," Political Science Department, United States Air Force Academy, Colorado Springs CO, 20 April 2012.
- 53) "Science Diplomacy in the Global Information Age," invited panel at International Studies Association (ISA) Annual Meeting, San Diego CA, 1-4 April 2012.
- 54) "CBRN Security Culture at Academic Institutions: How to Balance Academic Freedoms with Needs for Security," *In Search of Universal and Sustainable CBRN Security Culture Workshop*, Center for International Trade and Security (CITS), University of Georgia, Athens GA, 6 February 2012.
- 55) "From Chemistry to International Security (aka from beakers to bombs)," Department of Sociology and Political Science and Department of Chemical Engineering, Tennessee Tech University, Cookeville TN, 4 October 2011.
- 56) *Chaired and Organized Workshop on "Nanotechnology, Security, & US-EU Approaches to Governance" 7-8 April 2011. Spoke on "Strategic Approaches to Regulating Biosecurity Risks of Nanotechnology by the European Union."*
- 57) "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, Tempe AZ, 4 February 2010.
- 58) *Keynote: "Nanotechnology and Defense," Symposium on Emerging Technologies, Military Operations, and National Security*, the Consortium on Emerging Technologies, Military Operations, and National Security (CETMONS), Phoenix AZ, 5-6 February 2010.
- 59) "Strategic Significance of Emerging Technologies in Asia," Director of National Intelligence Centers of Academic Excellence Colloquium on National Security, Atlanta GA, 24 February 2010.
- 60) *Keynote: "Deterrence, Policy, and Strategic Security Implications of Synthetic Smallpox," Over the Horizon Workshop on Synthetic Smallpox*, Alexandria VA, 29-30 June 2009.
- 61) "Nanotechnology and Security: Dual Use Issues in Emerging Science," American Chemical Society's International Programs Symposium, Washington, DC, 9-11 April 2009.

- 62) "Al Qa'eda and Unconventional Weapons" *Global Futures Forum*, Department of National Security Affairs, Naval Postgraduate School, Monterey CA, 24 September 2008.
- 63) "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*, University of Georgia, Athens GA, 11 August 2008.
- 64) "Biotechnology and Nanotechnology: Considering the International Security Implications of Emerging Sciences," *Conference on Science and Global Security*, Massachusetts Institute of Technology, Boston MA, 24 July 2008.
- 65) "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, Belfast ME, 17-18 July 2008.
- 66) "Nanotechnology for Biochemical Sensors" *Government Microelectronics and Critical Technology (GOMACTech) Conference*, Las Vegas NV, 17 March 2008.
- 67) "Terrorism Targeting Industrial Chemical Facilities: Strategic Motivations and Implications for U.S. Security," School of Public and International Affairs, George Mason University, Fairfax VA, 26 November 2007.
- 68) "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, Champaign IL, 25 October 2007.
- 69) "Will There Be an A.Q. Khan of Nanotechnology?" at the *Symposia on Biosecurity and Training for the Federal Workforce*, Baltimore MD, 8 May 2007.
- 70) "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, Ripon WI, 26-27 April 2007.
- 71) *Keynote: "Transformational Science for Defense," NanoNexus Conference and Competition*, Oak Ridge National Laboratory, Oak Ridge TN, 3 April 2007.
- 72) "Innovations Technology for Nonproliferation and Arms Control Through Nanotechnology," *New Proliferation Challenges Conference*, Nonproliferation and Arms Control Technology Working Group (NPAC TWG), McLean VA, 28 March 2007.
- 73) "Biosecurity and Nanotechnology" Center for Science, Technology, and Security Policy (CSTSP), American Association for the Advancement of Science (AAAS), Washington, DC, 1 March 2007.
- 74) "Nanobiotechnology for Defense," *The Future of Nano-Biotechnology: Imagine the Possibilities*, NVTC Nanotechnology & BioMedTech Committees, McLean VA, 14 February 2006.
- 75) *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, Ithaca NY, 11 October 2006.
- 76) "Chemical and Biological Weapons Detectors: Beyond Detection to Attribution," Draper Laboratory, Cambridge MA, 1 April 2005.

- 77) "New Roles for Biological and Chemical Agent Detectors in International Security," Sandia National Laboratory International Programs, Albuquerque NM, 21 February 2005.
- 78) "Preventing a Bioterrorist Attack," *Biology and Security National Symposium*, Student Pugwash, George Washington University, Washington, DC, 11-14 July 2004.
- 79) "The Technical Challenges of Biological and Chemical Weapons Verification," *Conference on Public Policy and Biological Threats*, University of California Institute on Global Conflict and Cooperation (IGCC), University of California at San Diego (UCSD), La Jolla CA, 22 July 2004.
- 80) "Colorimetric Sensor Arrays as End-of-Service-Life Indicators," *End-of-Service-Life Indicators for Mask Filters Workshop*, Army Research Office and U.S. Army Soldier Biological Chemical Command (SBCCOM), Panama City FL, October 2002.

D3. Submitted

- 1) "Strategic Implications of Extraterrestrial Discovery: A Multi-disciplinary Analysis of International Policy and Security" (with **Daiana Alagirova**, *Nunn School*) and "Frugal Science as Disruptive Technology: Democratization of Emerging Technologies at Scale," International Studies Association (ISA) Annual Meeting, Chicago IL, 2-5 April 2025.
- 2) "Converging Technologies and Risk: AI, Nanotechnology, and Biotechnology," Cambridge Conference on Catastrophic Risk, Centre for the Study of Existential Risk, Cambridge University, Cambridge UK, 17-18 September 2024.
- 3) "Emerging Technologies and International Security" American Political Science Association (APSA) annual meeting, Philadelphia PA, 5-8 September 2024.
- 4) "Predicting Commercial and Military Adoption of Emerging Technologies: Brain-Computer Interface (BCIs) in US and China" and "Emerging Technologies & Geopolitics: The Illustrative Case of Nanobiotechnology," International Studies Association (ISA) Annual Meeting, San Francisco CA 3-6 April 2024.
- 5) "Frugal Science and Chemical and Biological Weapons: Investigating the proliferation risks of technology intended for humanitarian, disaster response, and international development efforts," International Studies Association (ISA) Annual Meeting, Toronto Canada, 28 March 2019.
- 6) "Disinformation Campaigns and Strategic Culture: The Soviet Union and Russian Federation," International Studies Association (ISA) Annual Meeting, Toronto Canada, 30 March 2019, (with **Sara Morrell**, *Nunn School student*)
- 7) "Targeted Physical and Cyber Attacks on US Electricity Infrastructure," International Studies Association (ISA) Annual Meeting, San Francisco CA, 5 April 2018.
- 8) "Emerging Technologies and Existential Security Risks" *Governance of Emerging Technologies Conference*, Arizona State University, Tempe AZ, 17-19 May 2017.
- 9) "Emerging Life Sciences: New Challenges to Strategic Stability," Association for Politics and the Life Sciences (APLS) Annual Conference, Chicago IL, 5 April 2017.
- 10) "Emerging Science and Technologies: Diplomacy, Security, and Governance," Society for the Study of Nanoscience and Emerging Technologies (S.NET) Conference 2016, Bergen Norway, 12-15 October 2016.

- 11) "Counter-WMD Strategy Gaps: Capacities, Capabilities & Collaboration" and "Emerging Science and Technologies: Diplomacy, Security, and Governance" International Studies Association (ISA) Annual Meeting, Atlanta GA, 16-19 February 2016.
- 12) "Terrorist Attacks on U.S. Electricity Infrastructure," (*student co-author Jenna McGrath, Public Policy*) Energy Policy Research Conference, Santa Fe NM, 8 September 2016.
- 13) "Biological Weapons Nonproliferation for the 21st Century: A Shift of Responsibility from Nation-states to Individual Researchers?" Association for Politics and the Life Sciences (APLS) Annual Conference, Madison WI, 23-24 October 2015.
- 14) "Biology, Big Data, and International Security: Assessing Global Risks from Converging Technologies," Society for the Study of Nanoscience and Emerging Technologies (S.NET) Conference 2015, Montreal Canada, 18-21 October 2015.
- 15) "Biology, Big Data, and International Security," Atlanta Conference on Science, Technology, and Innovation Policy, Atlanta GA, 17-19 September 2015.
- 16) "Big Data, Social Media, & Chem-Bio Events," at the Defense Threat Reduction Agency's (DTRA) 2015 Chemical and Biological Defense Science and Technology Conference, St. Louis MO, 12 May 2015.
- 17) "Biology, Big Data, and International Security," (w/Thomas Preston) International Studies Association (ISA) Annual Meeting, New Orleans LA, 18-21 February 2015.
- 18) "Security Implications of Cognitive Neuroscience Research: Results from an Ethnographic Survey of Researchers," Association for Politics and the Life Sciences (APLS) Annual Conference, Atlanta GA, 17-18 October 2014.
- 19) "Nanotechnology and International Security: The Russian Federation," and "The Counter-WMD Strategy-Operations Gap," International Studies Association (ISA) Annual Meeting, Toronto, Canada, 26-29 March 2014.
- 20) "Russian Nanotechnology: Innovation & Security" and "Strategy, Technology, and Governance: Shifting Responsibility from Nation-states to Individuals," Society for the Study of Nanoscience and Emerging Technologies (S.NET) Conference, Northeastern University, Boston MA, 27-29 October 2013.
- 21) "Strategy, Technology, and Governance: Shift of Responsibility from Nation-states to Individuals," Atlanta Conference on Science and Innovation Policy, Atlanta GA, 27 September 2013.
- 22) "Weapons of Mass Destruction and Nuclear Trafficking in Emerging Media" (*w/Adam Thigpen, Nunn School student*) and "Strategy, Technology, and Governance: Shift of Responsibility from Nation-states to Individuals," International Studies Association (ISA) Annual Meeting, San Francisco CA, 3-6 April 2013.
- 23) "Digital Gaming and Weapons of Mass Destruction: Adherence to International Laws and Treaties," (*w/Adam Thigpen*) Popular Culture Association/American Culture Association National Conference in Washington, DC, 27-30 March 2013.
- 24) "Security and Gaming: The Portrayal of Acquisition & Use of Nuclear and Chemical Weapons" (*w/Sapphire Liu, Nunn School student*) Popular Culture and World Politics v. 5.0, Hobart and William Smith Colleges, Geneva New York, 9-11 November 2012.

- 25) “Nanotechnology and Diffusion of Innovation: Russia” (w/**Elizabeth Cupido**, *Nunn School student*) 10th Annual NanoTechnology for Defense Conference (NT4D), Summerlin, Nevada, 9 August 2012.
- 26) “Biological Weapons Nonproliferation for the 21st Century,” International Studies Association (ISA) Annual Meeting, San Diego CA, 1-4 April 2012.
- 27) “Bridging Science and Security: Challenges to Nanotechnology Threat Anticipation” and “The Security Implications of Cognitive Neuroscience Research,” Society for the Study of Nanoscience and Emerging Technologies (S.NET) Conference, Tempe AZ, 7-10 November 2011.
- 28) “ Hamas, Hezbollah, and the Pursuit of WMD Terrorism,” (w/**Lucia Bird**, *Nunn School student*) International Security Studies Section of ISA and the International Security and Arms Control Section of APSA (ISSS/ISAC) Annual Conference, Irvine CA, 14 October 2011.
- 29) “Security Implications of Cognitive Neuroscience Research,” (w/**Jonathan Huang**, *Nunn School student*) International Security Studies Section of ISA and the International Security and Arms Control Section of APSA (ISSS/ISAC) Annual Conference, Irvine CA, 14 October 2011.
- 30) “State Support of Terrorism and WMD Use,” (w/**Lucia Bird**) 2011 Defense Threat Reduction Agency (DTRA) Basic Research Technical Review Conference, Springfield VA, 20 July August 2011.
- 31) “The Role of Discourse in the Contested Commons of Radical Islam & WMD Terrorism” (w/**Shawn Finnell**, *Nunn School student*) International Studies Association (ISA) Annual Meeting, Montreal, Canada, 16-19 March 2011.
- 32) “Weapons of Mass Destruction in Gaming: Strategic versus Tactical Use in Call of Duty: Modern Warfare II (COD) and Massive Action Game (MAG),” (w/**Sapphire Liu & Jared Fry**, *Nunn School students*) International Studies Association (ISA) Annual Meeting, Montreal, Canada, 16-19 March 2011.
- 33) “The Role of Discourse in the Contested Common of Radical Islam & WMD Terrorism,” (w/**Shawn Finnell**, *Nunn School student*) International Security Studies Section of ISA and the International Security and Arms Control Section of APSA (ISSS/ISAC) Annual Conference, Providence RI, 14-16 October 2010.
- 34) “Will There be an AQ Khan of Nanotechnology? Anticipating Biological Proliferation Threats from a Revolutionary Technology,” Society for the Study of Nanoscience and Emerging Technologies (S.NET) Conference, Darmstadt, Germany, 29 September - 2 October 2010.
- 35) “Nanotechnology for Detection of and Medical Countermeasures Against Biological Warfare Agents: Policy and Programmatics,” *2nd Annual Georgia Nanotechnology in Infectious Diseases Symposium*, Emory University Atlanta GA, 1 April 2010.
- 36) “Probing the Strategic Significance of Nanotechnology in Iran,” (w/**Amira Mouna**, *Nunn School student*) International Studies Association (ISA) Annual Meeting, New Orleans LA, 16-20 February 2010.
- 37) “Bioterrorism Deterrence: Polio and the Threat of Biological Terrorism,” (w/**Katherine Lange**, *Nunn School student*) International Studies Association (ISA) Annual Meeting, New Orleans LA, 16-20 February 2010.

- 38) "Bioterrorism Deterrence: the Role of Public Health in Security," (w/**Ana Terson**; Nunn School student) Atlanta Conference on Science, Technology, and Innovation Policy, Atlanta GA, 3 October 2009.
- 39) "Predicting Nuclear Proliferation: Toward a Unified Field Theory," *Transforming the Nuclear Weapons Complex (NWC) to Address 21st Century Security Threats Forum*, Georgia Institute of Technology, Atlanta GA, 30 March 2009.
- 40) "Will There be an AQ Khan of Nanotechnology? Anticipating Biological Proliferation Threats from a Revolutionary Technology," International Studies Association (ISA) Annual Meeting, New York NY, 15-18 February 2009.
- 41) "Emerging Chemical and Biological Terrorism Threats," *Chemical & Biological Terrorism Defense*, Gordon Research Conference (GRC), Galveston TX, 18-23 January 2009.
- 42) "Assessing the Potential International Security Threats of Nanotechnology," Atlanta Conference on Science, Technology, and Innovation Policy, Atlanta GA, 19 October 2007.
- 43) "Science and Technology Initiatives within the Defense Department's Chemical and Biological Defense Program," *Sackler Colloquium on Nanomaterials in Biology and Medicine: Promises and Perils*, National Academy of Sciences (NAS), Washington, DC, 10 April 2007.
- 44) "Nanotechnology in International Security," International Security Studies Section of ISA and the International Security and Arms Control Section of APSA (ISSS/ISAC) Annual Conference, Tucson AZ, 27 October 2006.
- 45) "Revolutionary Innovation in Chemical and Biological Defense," *7th Targeted Nanodelivery: Enabling Targeted Therapies and Non-Invasive Imaging Conference*, Baltimore MD, 13 October 2006.
- 46) "Transforming Defense Science & Technology: the Case for Nanotechnology," *Defense Policy Fellows Briefing*, American Association for Advancement of Science (AAAS), 23 March 2005, Washington, D.C.
- 47) "Shifting Trends in Chemical Terrorism: from Radical Islamists to Homegrown Terrorists," *Chemical and Biological Terrorism Defense*, Gordon Research Conference, 31 January - 3 February 2005, Buellton CA.
- 48) "Chemical Terrorism in the 21st Century," American Chemical Society (ACS) Western Regional Meeting, Sacramento CA, 28 October 2004.
- 49) "Whither More Biosafety Level Four Labs? U.S. Civilian Biodefense Initiatives," *Summer Symposium of Science and World Affairs*, Moscow, Russia, July-August 2003.
- 50) "Vapor Sensing Using Nanotechnology," *Nanotechnology Industry Workshop*, Center for Nanoscale Science and Technology, Urbana IL, May 2003.
- 51) "SmellSeeing: a New Tool for Detection of Volatile Chemicals," *17th International Forum on Process Analytical Chemistry & 11th International On-Site Analysis Conference*, Scottsdale AZ, January 2003.
- 52) "Rapid Colorimetric Evaluation of Bacterial Metabolites," *9th International Symposium on Olfaction and Electronic Nose (ISOEN '02)*, Rome, Italy, October 2002.
- 53) "Colorimetric Sensors for Rapid Detection of Chemical and Biological Warfare Agents," *Summer Symposium of Science and World Affairs*, Urbana IL, July 2002.

- 54) "SmellSeeing: A Colorimetric Electronic Nose," 2nd International Conference on Porphyrins and Phthalocyanines, Kyoto, Japan, June 2002.
- 55) "A Colorimetric Electronic Nose: 'SmellSeeing'," *Symposium on Sensors for Biological Research and Medicine*, NIH National Institute of Biomedical Imaging and Bioengineering BECON, Bethesda MD, June 2002.
- 56) "Smell-Seeing: a New Tool for Identification of Volatile Organic Compounds," Pitt-Con, New Orleans LA, March 2002.
- 57) "Bis-Pocket Porphyrin Liquid Crystals: Entries in Molecular Switches & Non-Fullerene Nanotubes," Frederick Seitz Materials Research Laboratory DOE Program Review, Urbana IL, June 2000.
- 58) "Characterization of Porphyrin Materials by NSOM and AFM," American Chemical Society (ACS) National Meeting, Anaheim CA, March 1999.
- 59) "Novel Calcium Porphyrin Carboxylate Materials," Tetrapyrrole Gordon Research Conference (GRC) *poster*, Santa Barbara CA, October 1998.
- 60) "Porphyrin Carboxylate Network Solids," IXth Midwest Organic Solid State Chemistry Symposium, Manhattan KS, June 1998.
- 61) "Porphyrin Polyanion Salts as Building Blocks for Network Solids," American Chemical Society (ACS) National Meeting, Las Vegas NV, September 1997.

E. Grants and Contracts

E1. As Principal Investigator

- 1) Title: Expertise and Experience to Develop and Execute Savannah River National Laboratory (SRNL) Nonproliferation Applied Science Center (NASC)
 Agency/Company: SRNL
 Total Dollar Amount: up to \$843,000
 Role: PI
 Collaborators: None
 Period of Contract: 6/1/2022 – 5/31/2025
 Share: 100%
- 2) Title: Georgia Tech US Navy Executive Fellowships
 Agency/Company: OPNAV, US Navy, DoD
 Total Dollar Amount: \$300,814
 Role: PI
 Collaborators: None
 Period of Contract: 8/1/2019 – 7/31/2025
 Share: 100%
- 3) Title: Georgia Tech Air Force Fellows
 Agency/Company: US Air Force, DoD
 Total Dollar Amount: \$288,525
 Role: PI
 Collaborators: None
 Period of Contract: 8/1/2018 – 7/31/2027

- Share: 100%
- 4) Title: Georgia Tech U.S. Army War College Senior Service College Fellowships (*renewal*)
Total Dollar Amount: \$240,044
Period of Renewed Contract: 8/1/2018 – 7/31/2026
Role: PI
Collaborators: None
Share: 100%
 - 5) Title: Georgia Tech U.S. Army War College Senior Service College Fellowships on (1) Science, Technology, & the Future of Armed Conflict & (2) Army Counter Weapons of Mass Destruction Strategy & Functions
Agency/Company: HQDA, US Army
Total Dollar Initial Award: \$119,400
Period of Contract: 8/1/2015 – 7/31/2018
Share: 100%
 - 6) Title: Understanding the Strategic Significance of Military Applications of Nanotechnology
Agency/Company: Project on Advanced Systems and Concepts for Combatting (WMD PASC), US Navy
Total Dollar Amount: \$125,743
Role: PI
Collaborators: None
Period of Contract: 5/1/2012 – 8/30/2013
Share: 100%
 - 7) Title: Educating a Biotechnology Policy & Security Workforce
Agency/Company: Georgia Tech FIRE Fund for Transformative Research and Education
Total Dollar Amount: \$34,000
Role: PI
Collaborators: Robert Butera (co-PI)
Period of Contract: 3/14/2011 – 6/13/2013
Share: 80%
 - 8) Title: Toward a Strategic Vision in Emerging Basic Sciences
Agency/Company: Army Research Office, DoD
Total Dollar Amount: \$91,000
Role: PI
Collaborators: None
Period of Contract: 7/1/2008 – 6/30/2010
Share: 100%
 - 9) Title: Unified Field Theory of Proliferation: Toward a Meta-Theory Predicting Nuclear Expansion
Agency/Company: SAIC
Total Dollar Amount: \$25,000
Role: PI
Collaborators: None
Period of Contract: 8/1/2008 – 12/31/2008
Share: 100%

- 10) Title: Nanotechnology Threat Anticipation: Building a Technical Framework for Assessing Offensive versus Defensive Technology Pathways
Agency/Company: Office of the Director of National Intelligence's Intelligence Advanced Research Projects Activity (IARPA)
Total Dollar Amount: \$10,084
Role: PI
Collaborators: None
Period of Contract: 11/1/2007 – 2/28/2008
Share: 100%
- 11) Title: Waiting for a 'Clear Signal' Technical Considerations for Effective Policy to Implement Chemical and Biological Detectors for First Responders and Law Enforcement /Award #2004-IJCX-0050
Agency/Company: U.S. National Institute of Justice (NIJ), Department of Justice
Total Dollar Amount: \$283,589
Role: PI
Collaborators: None
Period of Contract: 9/1/2004 – 12/31/2005
Share: 100% (*declined in order to accept Stanford fellowship*)
- 12) Title: Monitoring of Trace Toxic Air Pollutants, SBIR Award #68D03014
Agency/Company: U.S. Environmental Protection Agency (EPA)
Total Dollar Amount: \$69,750
Role: PI
Collaborators: Avijit Sen (co-PI)
Period of Contract: 4/2003 – 9/2003
Share: 50%
- 13) Title: Detection of Potential Chemical Agents of Terrorist Use in Aqueous Solutions, SBIR Award #0232524
Agency/Company: U.S. Food and Drug Administration (FDA)
Total Dollar Amount: \$87,000
Role: PI
Collaborators: None
Period of Contract: 1/2000 – 6/2003
Share: 100%
- 14) Title: Development of Colorimetric Sensor Array for the Detection of Chemical Agents in Liquids (Water, Water/Ethanol): Feasibility Phase, Award #F63375
Agency/Company: U.S. Food and Drug Administration (FDA) Center for Food Safety and Nutrition (CFSAN) Contract
Total Dollar Amount: \$17,000.
Role: PI
Collaborators: None
Period of Contract: 11/2002 – 3/2003
Share: 100%
- 15) Title: Real-Time Detection of Nitroaromatic Explosives, SBIR Award #DMII 0215088
Agency/Company: National Science Foundation (NSF)
Total Dollar Amount: \$99,000

Role: PI
Collaborators: None
Period of Contract: 7/2002 – 2/2003
Share: 100%

E2. As Co-Principal Investigator

- 1) Title: Human Digital Twins in the Military Operating Environment
Agency/Company: DARPA Exploratory Models of Human-AI Teams (EmHAT) program
Total Dollar Amount: \$999,994
Role: Contributor
Collaborators: Courtney Crooks (PI - GTRI)
Period of Contract: 4/2024 – 9/2025
Share: 6% (\$59,811)
- 2) Title: Navigating the Nexus: Climate Change, Clean Energy, and Nuclear Nonproliferation
Agency/Company: GT FY 21 Seed Grant Program – Building Teams and Moving Teams Forward
Total Dollar Amount: \$26,000
Role: Co-PI, with Rachel Whitlark (INTA)
Period of Performance: February – July 2023
Share: 50%
- 3) Title: Risk of Combined Physical-Cyberattacks Against Electricity Infrastructure
Agency/Company: SEI Energy in an Information Age Seed Grant program
Total Dollar Amount: \$50,000
Role: Co-PI
Collaborators: Valerie Thomas (Co-PI ISYE)
Period of Contract: 4/1/2016 – 3/31/2017
Share: 20%
- 4) Title: Multidisciplinary Modeling of Socio-economic Influence on Adversarial Intent to Acquire, Proliferate and Use Chemical, Biological, Radiological and Nuclear Weapons
Agency/Company: Defense Threat Reduction Agency (DTRA), DoD
Total Dollar Amount: \$689,497
Role: Co-PI
Collaborators: C.S. Deo (PI-Mechanical Engineering) and S. Dhongde (co-PI, then-Rochester Institute of Tech-Economics; now GT-Economics)
Period of Contract: 4/1/2009 – 3/31/2013
Share: 26% (\$181,196)
- 5) Title: Colorimetric Gas Sensor for Medical, Consumer and Industrial Applications
Agency/Company: Illinois Tech Challenge, State of Illinois
Total Dollar Amount: \$291,125
Role: co-PI
Collaborators: William McNamara (PI) and Avijit Sen (co-PI)
Period of Contract: 9/2002 – 8/2005
Share: 30% (\$87,390)

E3. As Senior Personnel or Contributor

- 1) Part of the GT team that contributed to the successful proposal led by Batelle Memorial Institute to manage the Department of Energy's Savannah River National Laboratory as the Battelle Savannah River Alliance (BSRA).
- 2) Title: Biomanufacturing Self-cooling Bioconstruction Materials for Greener Cities
Agency/Company: Bioindustrial Ideas Lab funding (internal GT)
Total Dollar Amount: \$15,000
Role: Contributor
Collaborators: Saad Bhamla (ChBE), Lily Cheung (ChBE) & Meisha Shofner (MSE)
Period of Contract: 1/2022 – 6/2022
Share: 10%
- 3) Title: Securing America's Future Economy in Bio-Industrial Manufacturing: SAFE BIM
Agency/Company: Bioindustrial Ideas Lab funding (internal GT)
Total Dollar Amount: \$5,000
Role: Contributor
Collaborators: Valerie Thomas (ISYE), Michael Chang (BBISS), Matthew Realf (ChBE) & Chuck Zhang (ISYE)
Period of Contract: 1/2022 – 6/2022
Share: 10%
- 4) Title: Army Research Laboratory Partnership Intermediary Agreement (PIA)
Agency/Company: US Army
Total Dollar Amount: IQID
Role: Contributor
Collaborators: GTRI
Period of Contract: 8/2020 – 7/2025
Share: \$30,392 (AY2020)
- 5) Title: Developing Australia's Legal Response to Military and Security Applications of Nanotechnology
Agency/Company: Australian Research Council
Role: Contributor
Collaborators: Tom Faunce and Hitoshi Nasu (ANU)
Total Dollar Amount: \$95,680 (Australian \$)
- 6) Title: Materials Science and Engineering Experience for Undergrads
Agency/Company: National Science Foundation (NSF)
Total Dollar Amount: unknown
Role: Contributor
Collaborators: GT-MSE
Period of Contract: 2009-2012
Share: \$6,250
- 7) Title: Georgia Tech European Union Center of Excellence, Transatlantic Partnerships and Challenges of the Nanotechnology Revolution
Total Dollar Amount: unknown
Role: Contributor
Collaborators: Vicki Birchfield (PI, INTA)

Period of Contract: 2007-2009
Share: 10,820€

E4. Pending Proposals

- 1) Title: The Security and Safety Implications of Cell-Free Systems for Biomanufacturing
Agency/Company: DoD BioMADE
Total Dollar Amount: \$700,000
Role: Co-PI
Collaborators: Kate Adamala (Univ of Minnesota, Biological Sciences)
Period of Contract: 5/1/2024 – 4/30/2026
Share: 16% (\$109,943)
**** Received notice of from sponsor of intent to fund, 23 April 2024. GT OSP is in negotiations on contracting.****
- 2) Title: Microbial-origin food production technologies for low resource environments
Agency/Company: DoD BioMADE
Total Dollar Amount: \$699,082
Role: Co-PI
Collaborators: Sheetal Shah and Angela Turner (Cosmic Eats, Inc., Cary NC)
Period of Contract: 5/1/2024 – 9/2025
Share: 12% (\$83,245)
- 3) Title: Engineering Intelligent Organoid Systems
Agency/Company: NSF Emerging Frontiers in Research and Innovation (EFRI)
Total Dollar Amount: \$1,940,570
Role: Contributor
Collaborators: Corey Wilson (PI-ChBE) & Matthew Realff (ChBE)
Period of Contract: 8/2024 – 7/2028
Share: 2% (\$38,330)

E5. Proposals Submitted but Not Funded (Last Two Years)

- 1) Title: Frugal Science as Disruptive Technology: Democratization of Emerging Technologies at Scale
Agency/Company: CIA Chaotic Good Program
Total Dollar Amount: \$78,159
Role: PI
Collaborators: none
Period of Contract: 7/2023 – 6/2024
Share: 100%
- 2) Title: Engineering pathogen resistant drinking water microbiomes
Agency/Company: NSF Emerging Frontiers in Research and Innovation (EFRI)
Total Dollar Amount: \$1,999,986
Role: Co-PI
Collaborators: Ameet Pinto (PI, CE), William Ratcliff (BIO), Lutgarde Raskin (U Michigan), & Xiaoxia “Nina” Lin (U Michigan)
Period of Contract: 4/2023 – 3/2027
Share: 3% (\$52,318)

F. Other Scholarly and Creative Accomplishments

List all other scholarly and creative accomplishments such as invention disclosures, start-up companies, etc. that are not listed elsewhere.

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

G. Societal and Policy Impacts

Present a brief list of the broader impacts of your scholarship, and elaborate on them in your personal statement; include testimony before legislative committees or other public bodies, expert witness roles, and press and media coverage, if appropriate.

G1. International

G1a. Invited Briefings to International Organizations, Track II diplomacy efforts, United Nations Bodies, etc.

- 1) * "Emerging Neurotechnologies and the Future of Warfare," NATO Multilateral Cooperation and Development Committee (MCDC) in partnership with NATO-Allied Command Transformation (NATO-ACT) and German Institute for Defence and Strategic Studies, **Hamburg Germany**, 23 March 2022. Via Zoom
- 2) * "Emerging Technologies and Artificial Intelligence in Nuclear Governance," Council for Security Cooperation in the Asia Pacific (CSCAP) Nuclear Energy Experts Group, **Singapore**, 6-7 February 2020.
- 3) * "New Dimensions of Risk Reduction: AI and Strategic Stability," as part of Track II dialogues on *Reducing Nuclear Risks During Great Power Competition*, organized by Center for Strategic and International Studies (CSIS) and PIR Center, **Moscow Russia**, 10-11 December 2019.
- 4) * "The Future of Warfare," *Seoul Defense Dialogue*, **Seoul ROK**, 7 September 2017. *Deputy Defense Secretary level meeting + Track 1.5 meeting.*
- 5) * "Nanotechnology – Emerging Applications for the Protection against Chemical Warfare Agents," Organisation for the Prohibition of Chemical Weapons (OPCW), **The Hague, The Netherlands**, 9 November 2009. *The OPCW is the implementing organization for the Chemical Weapons Convention (CWC).*

G1b. Policy Papers and Other Documents Prepared for International Organizations, Track II diplomacy efforts, United Nations Bodies, etc.

- 1) * Kosal, M.E. "Verification for the 21st Century: Summary and Recommendations," paper presented at the 7th Biological Weapons Convention Review Conference, **Geneva Switzerland**, 13 December 2011.
- 2) * Kosal, M.E., "The Role of Biological Verification as Part of 21st Century International Security Strategy: Scope and Structural Challenges to Effective Verification and the BWC, BioWeapons Prevention Project (BWPP)'s Biological Weapons Convention RevCon Project, **Geneva Switzerland**, 7 September 2011.

G2. US Government, Congressional Committees, Other Policymakers/Policy Fora

G2a. Invited Briefings

- 1) “Assessing and Improving Strategies for Preventing, Countering, and Responding to Weapons of Mass Destruction Terrorism: Chemical Threats,” briefing to Deputy Assistant Secretary of Defense for Nuclear and Countering Weapons of Mass Destruction Policy (N-CWMD), Washington DC, *to be given July 2024*.
- 2) “Assessing and Improving Strategies for Preventing, Countering, and Responding to Weapons of Mass Destruction Terrorism: Chemical Threats,” briefing to House Armed Services and Senate Armed Services Committees, Washington DC, *to be given 12 June 2024*.
- 3) “Assessing and Improving Strategies for Preventing, Countering, and Responding to Weapons of Mass Destruction Terrorism: Chemical Threats,” briefing to House Committee on Foreign Affairs and Committee on Foreign Relations, Washington DC, *to be given 13 June 2024*.
- 4) * “Implications for US National Nuclear Security of IAEA Policy on Environmental Sampling,” DOE NNSA Nonproliferation Office of International Nuclear Safeguards, Washington DC, 11 May 2023.
- 5) * “Navigating the Nexus: Nuclear Nonproliferation, Clean Energy, and Climate Change Initial Findings and Use of Data Analytics for NPAC Policy,” NNSA Office of Nonproliferation and Arms Control (NA-24), Washington DC, 24 January 2023.
- 6) * “Navigating the Nexus: Nuclear Nonproliferation, Clean Energy, and Climate Change,” NNSA Prevent, Counter, and Respond—A Strategic Plan to Reduce Global Nuclear Threats (NPCR) Review, Washington DC, 12 December 2022.
- 7) * *Invited panelist* on “Bio-Futures 2050: DoD Impacts and Opportunities” briefing to DoD senior leaders, 19 January 2022. Via Zoom.
- 8) * “Chemical Weapons Forensic Attribution,” US Government Accountability Office (GAO), 1 December 2021. Via Zoom.
- 9) * *Invited briefing* to Special Operations Command (SOCOM), McDill Air Base, Tampa FL, 23 April 2020 (via BlueJeans virtual platform), part of the Sam Nunn Security Program yearlong project on “Strategic Implications of Emerging Dual-Use Technologies and their Role in Future Military Operating Environments.”
- 10) * *Invited briefing* to Special Operations Command (SOCOM), McDill Air Base, Tampa FL, 1 May 2019, part of the Sam Nunn Security Program yearlong project on “The Future of Conflict Deterrence: the Multidimensional Nature of Conflict Prevention and Readiness.”
- 11) * *Invited briefing* to Special Operations Command (SOCOM), McDill Air Base, Tampa FL, 2 May 2018, part of the Sam Nunn Security Program yearlong project on “Weapons Technology Proliferation.”
- 12) * *Invited briefing* to Special Operations Command (SOCOM), McDill Air Base, Tampa FL, 30 April 2017, part of the Sam Nunn Security Program yearlong project on “Development, Use, and Proliferation of Disruptive and Game-Changing Technologies.”
- 13) * *Invited participant* at the US Military Academy Senior Conference on “The 70th Anniversary of the National Security Act: An Agenda for Policymakers,” West Point NY, 23-25 April 2017.

- 14) * *Public briefing in conjunction with public release of FBI-UN-AAAS Working Group Report "National and Transnational Security Implications of Big Data in the Life Sciences,"* Washington DC, 11 December 2014.
- 15) * *Briefing on "The Future of WMD: Updated," Johnny Appleseed VII: Combating WMD for Military Educators,* USAF Counterproliferation Center, Atlanta GA, 28 June 2011.
- 16) * *Briefing to Senate Homeland Security Committee on "Nanotechnology for Revolutionary Chemical and Biological Defense and Homeland Security,"* as part of NBER's *Science for the Good: the R&D Agenda for the New Administration and Congress,* Washington DC, 2 March 2009.
- 17) * *Briefing to the Third Army/US Army Central (ARCENT) on "Nanotechnology for Chemical and Biological Defense,"* Ft McPherson, Atlanta GA, 23 October 2008.
- 18) * *Briefing to Professional Staff of the Commission on the Prevention of WMD Proliferation and Terrorism on "Reducing the Terrorist Threat from Improvised Through Advanced Chemical and Biological Agents,"* Arlington VA, 5 September 2008.
- 19) * *Briefing to National Intelligence Council (NIC) on "Scientific & Technology Challenges to Realize Revolutionary Breakthroughs in Nanotechnology,"* McLean VA, 17 November 2008.
- 20) * *Briefing to National Security Agency/Central Security Service on "Emerging Technology, Terrorism, and US Defense,"* Fort Eisenhower (nee Fort Gordon), Augusta GA, 7 November 2008.
- 21) * *Chaired and organized "Symposium Toward a Strategic Vision for DoD's Chemical and Biological Defense,"* Atlanta GA, 7-8 August 2008.
- 22) * *"The Future of WMD," Johnny Appleseed IV: Combating WMD for Military Educators,* USAF Counterproliferation Center, Atlanta GA, 25 July 2008.
- 23) *"Strategic Research Directions in Chemical and Biological Defense," Transformational Countermeasures Technology Initiative Symposia,* Arlington VA, 12 July 2007.
- 24) *"The DoD Chemical and Biological Defense 2030 Workshop and Study – Results and Recommendations," Nanoelectronic Devices for Defense and Security Symposia,* Arlington VA, 21 June 2007.
- 25) *"DoD Chemical and Biological Defense Program Nanotechnology Initiative," Emerging Contaminants Nanotechnology Forum,* Arlington VA, 14 June 2007.
- 26) *Briefing to Director of National Intelligence (DNI) Biological Sciences Experts Group (BSEG) on "Bionanotechnology Threat Assessment,"* Washington DC, 25 April 2007.
- 27) *"Emerging Technology for the DoD's Chemical and Biological Defense Program," Joint Senior Leaders Course (O-5 through General Officers and Senior Civilians),* Ft Leonard Wood MO, 27 July 2007.
- 28) *Briefing to the FBI's Bay Area Terrorism Working Group (BATWinG) on "WMD Terrorism Threat Assessment: Emerging Trends in Improvisation,"* Oakland CA, 23 May 2005.
- 29) *Briefing to the CIA's Center for Weapons Intelligence, Nonproliferation and Arms Control (WINPAC) on "Feed Security: an Unaddressed Agricultural Terrorism Risk,"* Langley VA, 24 March 2005.
- 30) *Briefing to the DOE National Nuclear Security Agency Office of Nonproliferation Research and Development (NNSA NA-22) on "From Radical Islamists to Homegrown Terrorists: Shifting Trends in Chemical Terrorism,"* Washington DC, 23 March 2004.

G2b. Policy Papers, Reports, and Other Documents

- 1) * Kosal, M.E., “Navigating the Nexus: Nuclear Nonproliferation, Clean Energy, and Climate Change Initial Findings and Use of Data Analytics for NPAC Policy,” policy paper requested by DOE NNSA NA-20 Leadership, Washington DC, January 2023.
- 2) * Cheatham, A.G. E.J. Degen, M.E. Kosal, J.E. Pauls, and J.T. Reese, “Testing Assumptions about the Role of Land Power in 2030: Design and Employ the Force,” Chief of Staff of the Army, Strategic Studies Group I, June 2013 (153 pages). Kosal was lead author for portions on “Counter-WMD Strategy, Policy, and Effects;” “Evolving, New, and Emerging Technology;” and Recommendations “Own the Counter-WMD Mission,” which accounts for ~25% of the document.
- 3) * Kosal, M.E. Contributor: FBI-UN-AAAS Working Group Report “National and Transnational Security Implications of Big Data in the Life Sciences” November 2014, Washington, DC (91 pages). Kosal authored portions on international governance, ~15 pages.
- 4) * Kosal, M.E. and K.J. Dennison, *Toward a Strategic Vision in Basic Sciences for Chemical and Biological Defense*, DoD DTRA-CB/JSTO, December 2008 (67 pages).
- 5) * Kosal, M.E., “Chemical Terrorism: Review of US Policies to Implement Recommendations of the 9-11 Commission,” September 2008, Washington, D.C. (30 pages).

G3. Press and Media Coverage

International: BBC, NTV-Russia (declined), Voice of America, Al Jazeera, *South China Morning Post*, *The Guardian* (UK), *The Epoch Times*, *Anadolu Ajansı* (Türkiye), *L'Orient-Le Jour* (Lebanon); EMBO Reports (extensively cited in the *Science and Society* section)

“New video series on biosecurity risks and emerging technology,” Stockholm International Peace Research Institute (SIPRI) <https://www.sipri.org/news/2023/new-video-series-biosecurity-risks-and-emerging-technology> Kosal is the only American featured among the 6 speakers selected for the video series.

Domestic: CBS News, CNN HLN News, Fox News, CNBC, *Los Angeles Times*, *NY Times*, Politico, Wired, Slate, Vox, *Kitsap Sun* (Washington State), Phys.org

Local: Atlanta Journal-Constitution

Featured podcast or long form radio interviews:

“Emerging technologies and national security,” Machine Learning in the Sciences Podcast, 17 May 2024

“Hidden Dangers: How WMDs and Emerging Tech Shape Our World - Dr. Margaret Kosal,” Rekindi Podcast (Australia), 3 May 2023

“Battle for your brain’: What the rise of brain-computer interface technology means for you,” *On Point*, WBUR (Boston), 17 March 2023

“Emerging Technologies and Future of WMD, Interview with Dr. Margaret Kosal,” Authors of Mass Destruction podcast, 25 July 2021

H. Other Professional Activities

- 1) *Invited Member*, External Experts Group, Royal Uniformed Services Institute (RUSI), London UK, 2024. *Advisory group on Global Security and Global WMD projects for the world's oldest defence and security think tank.*
- 2) *Invited Expert Reviewer*, AI-LLM CBRN-related evaluative exercise, Imagine Frontier, Spring 2024. *Activity initiated in response to the Presidential Executive Order on AI (October 2023). Part of a group of 4 US experts on chemical and biological security selected to act as reviewers for report to the National Security Council.*
- 3) Nominated and elected **Chair** of the **Gordon Research Conference** (GRC) on Nonproliferation, Counterproliferation, and Disarmament Science, August 2023 (*biennial international conference on science, technology, & policy of WMD nonproliferation*).
- 4) Appointed **Chair, US National Academies of Science, Engineering, and Medicine** (NASEM) Committee on Engaging Scientists in Shared Responsible Innovation in Neuroscience in Southeast Asia, 2023-present.
- 5) Appointed to the **National Security Advisory Board** Member (NSAB), Savannah River National Lab (2023-2026). *The other board members are the former Principal Deputy Administrator of the National Nuclear Security Agency (Madelyn Creedon); former Deputy Administrator for Defense Programs, NNSA (Don Cook); and the former Deputy Director of National Reconnaissance Office (General Sue Mashiko, USAF (ret)).*
- 6) Appointed **Vice-Chair, US National Academies** Committee on Assessing and Improving Strategies for Preventing, Countering, and Responding to Weapons of Mass Destruction Terrorism: Chemical Threat, 2022-2024.
- 7) *Invited Expert*, “Toxic Temptations: Red Teaming the Chemical Weapons Threat Landscape,” Center for Advanced Red Teaming, SUNY at Albany, 2023.
- 8) Appointed Committee Member, **US National Academies** Committee on Assessing and Improving Strategies for Preventing, Countering, and Responding to Weapons of Mass Destruction Terrorism: Biological Threats (2022-2023).
- 9) *Invited Member*, **NATO** Multinational Capability Development Campaign (MCDC) Committee on Human Performance, Spring 2022.
- 10) *Expert Consultant*, Johns Hopkins Center for Health Security Project on Assessing Evidence from an Investigation of Biological Events, 2022.
- 11) *Invited Member*, “Barriers to Biotechnology Modernization” Tri-Service Study Group, US Department of Defense, June 2021 – January 2022.
 - Appointed Co-Chair of Committees on (1) Species Eradication & De-extinction, and on (2) Off-World Medicine and Biotechnology (i.e., 3D organ printing in low-resource, low-gravity environments)
- 12) *Appointed Member*, Center for Arms Control and Non-Proliferation Scientists Working Group on Biological and Chemical Security, Washington DC, 2021-present.
- 13) *Invited Member*, Stimson Center, Non-Proliferation Cheminformatics Compliance Tool (NCCT), Advisory Board Member, 2021-present.
- 14) *Elected Member*, BioMADE (Bioindustrial Manufacturing and Design Ecosystem) Safety, Security, Sustainability, and Social Responsibility (4S) Executive Committee, October 2021-present.
- 15) *Invited Member*, FBI Working Group on Export Control of Emerging Biotechnologies, 2016.

- 16) *Subject Matter Expert*, Department of Homeland Security (DHS), Chem-Bio Weapons Horizon Scanning Project, 2016.
- 17) Invited Participant to the National Security Forum, Air War College, US Air Force, July 2019.
- 18) Appointed DoD Homeland Defense & Security Information Analysis Center SME, 2014-2021
 - *“Featured Subject Matter Expert” for Summer-Fall 2016*
 - *Community on-line Discussion Leader, September 2015*
- 19) *Invited Member*, FBI-AAAS Big Data, the Life Sciences, and National Security Working Group, lead on *“Governance, including technical, legal (international and domestic), and community approaches”* committee January-December 2014.
- 20) Advised NanoAssociation for Natural Resources and Energy Security, NANRES, 2011-2013.
- 21) *Appointed Associate* to the **US National Intelligence Council**, 2008-2011.
- 22) *Visiting Professor*, Instituto Altos Estudios Nacionales (IAEN, National Institute of Advanced Studies), **Quito Ecuador**, Summer 2010.
- 23) Advised, Counterinsurgency Director, Cost Assessment and Program Evaluation, Office of the Secretary of Defense, 2010.
- 24) Advised Arab Materials Science & Nanotechnology Network (AMSNN), 2009.
- 25) Advised Science and Technology Policy Institute (an FFRDC affiliated with the Institute for Defense Analysis) on nanotechnology for defense and security, 2009.
- 26) *Invited Member*, US Government Panel on Synthetic Nucleic Acid Screening Framework, NAIAD NIH, 2008.
- 27) *Special Technical Advisor* on nanotechnology for DIA Directorate of Analysis, China Forces Branch, 2007-2009.
- 28) *Appointed Member*, Chemical and Biological Incident Response Force (CBIRF) Tech Board, Naval Surface Warfare Center (NSWC) Indian Head, MD, 2006-2008.
- 29) *Executive Secretary*, Nonproliferation and Arms Control Technology Working Group (NPAC TWG), 2005-2007 (*reporting to National Security Council*).
- 30) *DoD CDBP Representative* to the National Nanotechnology Initiative (NNI) Nanoscale Science and Engineering Technology (NSET) Subcommittee, 2005-2007.
- 31) *Member*, DC Biosecurity Group, AAAS Center for Science Technology and Security Policy (CSTSP), 2005-2012.
- 32) *Member*, DIA WMD Integrated Product Team (IPT), 2005-2007.
- 33) *VIP Observer and Controller* to DHS’ TOP OFF-3 national full-scale exercise (*chemical, biological and vehicle borne improvised explosive device (VBIED) terrorism incidents*), New London CT and Washington, DC, 4-8 April 2005
- 34) *Member*, FBI’s Interstate Chemical Terrorism Working Group, 2003-2005.
- 35) Faculty, UCSD Public Policy and Biological Threats Program, Summer 2004.
- 36) *Adjunct Professor*, Executive Leaders Program, Center for Homeland Defense and Security, Naval Postgraduate School, January 2004 - June 2004.
- 37) *Visiting Scholar*, Northwestern University, Feinberg School of Medicine, January 2002 - May 2003.

V. Education

A. Courses Taught

List course taught at Georgia Tech. (Most recent first and include the last six years. Do not include CIOS scores here.)

Spring 2024	INTA/NRE 6720	Politics, Tech & Proliferation	6 students
Fall 2023	INTA 4007/8803	Intelligence and International Security	29 students
Fall 2021	INTA 8000	Sci, Tech & Intl Affairs I	9 students
Spring 2021	INTA 8001	Sci, Tech & Intl Affairs II	6 students
Fall 2020	INTA 2042	Intro to Global WMD	15 students
Fall 2020	INTA 8000	Sci, Tech & Intl Affairs I	6 students
Spring 2020	INTA 3111/6111	US Defense Policy/ US Foreign Security Strategy	30 students
Spring 2020	INTA 8001	Sci, Tech & Intl Affairs II	11 students
Fall 2019	INTA 4007/8803	Intelligence and International Security	17 students
Fall 2019	INTA 8000	Sci, Tech & Intl Affairs I	11 students
Spring 2019	INTA 2042	Intro to Global WMD	18 students
Spring 2019	INTA 8001	Sci, Tech & Intl Affairs II	10 students
Fall 2018	INTA 4007/8803	Intelligence and International Security	22 students
Fall 2018	INTA 8000	Sci, Tech & Intl Affairs I	10 students
Spring 2018	INTA 2040	Sci, Tech & Int'l Affairs	30 students
Spring 2018	INTA 8001	Sci, Tech & Intl Affairs II	13 students
Spring 2018	ECE 2811, 2812, 3811, 3812, 4811, & 4812-VV9	<i>VIP Undergrad Research Program on 21st Century Security Challenges</i>	15 students
Fall 2017	INTA 2042	Intro to Global WMD	45 students
Fall 2017	INTA 8000	Sci, Tech & Intl Affairs I	12 students
Fall 2017	ECE 2811, 2812, 3811, 3812, 4811, & 4812-VV9	<i>VIP Undergrad Research Program on 21st Century Security Challenges</i>	18 students
Spring 2017	INTA 8001	Sci, Tech & Intl Affairs II	8 students
Spring 2017	ECE 2811, 2812, 3811, 3812, 4811, & 4812-VV9	<i>VIP Undergrad Research Program on 21st Century Security Challenges</i>	16 students
Fall 2016	INTA 8000	Sci, Tech & Intl Affairs I	8 students
Fall 2016	ECE 2811, 2812, 3811, 3812, 4811, & 4812-VV9	<i>VIP Undergrad Research Program on 21st Century Security Challenges</i>	16 students
Spring 2016	INTA 2042	Intro to Global WMD	101 students
Spring 2016	INTA 8001	Sci, Tech & Intl Affairs II	14 students
Fall 2015	INTA 8000	Sci, Tech & Intl Affairs I	14 students
Spring 2015	INTA 4500-A	21 st Century Security Challenges <i>Senior Capstone</i>	14 students
Spring 2015	INTA 8001	Sci, Tech & Intl Affairs II	9 students
Fall 2014	INTA 4803	Counterinsurgency & Small Wars	16 students
Fall 2014	INTA 8000	Sci, Tech & Intl Affairs I	13 students
Summer 2014	INTA 4050	International Affairs & Tech Policy	12 students
Spring 2014	INTA 4500-B	21 st Century Security Challenges <i>Senior Capstone</i>	12 students
Spring 2014	INTA 8001	Sci, Tech & Intl Affairs II	8 students

Fall 2013	INTA 2040	Sci,Tech & Int'l Affairs	111 students
Fall 2011	INTA 2040	Sci,Tech & Int'l Affairs	45 students
Spring 2011	INTA 2040	Sci,Tech & Int'l Affairs	79 students
Spring 2011	INTA 3101/8803-K	Challenge of Terrorism	49 students
Fall 2010	INTA 4500-B	Counterinsurgency & Small Wars <i>Senior Capstone</i>	18 students
Fall 2010	INTA 8803-K	21 st Century Deterrence	8 students
Spring 2010	INTA 2040	Sci,Tech & Int'l Affairs	82 students
Spring 2010	INTA 8803-K	Problems of Proliferation	5 students
Fall 2009	INTA 2040	Sci,Tech & Int'l Affairs	91 students
Fall 2009	INTA 8803-K	Counterinsurgency & Small Wars	17 students
Spring 2009	INTA 2040	Sci,Tech & Int'l Affairs	93 students
Fall 2008	INTA 2040	Sci,Tech & Int'l Affairs	38 students
Spring 2008	INTA 2040	Sci,Tech & Int'l Affairs	91 students
Fall 2007	INTA 4803/8803-K	Emerging Tech & Security	4 students

B. Individual Student Guidance

List all Postdoctoral Fellows, Ph.D. students, M.S. Thesis students, and undergraduate students supervised/advised. Explicitly indicate any co-advisement relationships. For Ph.D. and M.S. Thesis students, include date of graduation and title of thesis and, if known, the current position of the graduate students. For graduate students currently supervised, indicate the semester advisement began, their progression through appropriate exams, title of their project/dissertation, and current position if available. Provide any indicators you have of the quality of your mentorship.

B1. Ph.D. Students

- 1) Mr. Wes Meredith, "US and Chinese Great Power Competition in Africa," Fall 2019 – Summer 2023. Currently Lt. Colonel US Air Force, serving at USAFRICOM, Stuttgart Germany.
- 2) Mr. Jon Schmid, "Determinants of Military Technology Innovation and Diffusion," Fall 2015 – Spring 2018. Currently Political Scientist at RAND, Pittsburgh PA.
- 3) Mr. Jonathan Huang, "When Opportunity Doesn't Knock: Examining Military Non-Investment in Emerging Technologies," Spring 2008 – Spring 2017. Currently Senior Systems Engineer at Raytheon, Tucson AZ.

B2. M.S. Students (Indicate Thesis Option for Each Student)

- 1) Ms. Daiana Alagirova, "Strategic Space Policy," Spring 2024, Fall 2024
- 2) Ms. Ruslana Kochmar, "The Case for Hydrogen and Nuclear Cogeneration: The new piece of the energy puzzle in the context of Russian aggression," Georgetown School of Foreign Service, Summer 2022. Currently Longnecker & Associates, Inc, Washington DC.
- 3) Ms. Brooke Schumacher, "Navigating the Nexus: Nuclear Nonproliferation and Clean Energy in Developing Countries," GT Public Policy, Summer 2022. *Joint with Alice Favero (PubPol)* Currently Lt US Air Force.
- 4) Mr. Jarret Schultz, "Potential Applications of Quantum Computing and Effects on National Security," Fall 2020-Spring 2021. *Joint with Tom Conte (Computing)*. Currently Engineer at Microsoft, Seattle WA.

- 5) Ms. Ming “Sherry” Chen, “Cyber Capabilities: A U.S. vs. Russian Workforce Outlook” Fall 2017. Currently Cyber Threat Intelligence Analyst at Alaska Airlines, San Francisco CA.
- 6) Ms. Sara Harmouch, “ISIL and the Threat of Cyber Terrorism,” Fall 2016. Currently Senior Consultant, Tom Sanderson Consulting, Washington DC.
- 7) Ms. Elizabeth Cupido, “Nanotechnology and Security,” Spring 2012. Currently Director of Transportation at ShipBob, Miami FL.
- 8) Ms. Tiffany DeLeon, “Terrorism and WMDs in Latin America,” Spring 2011, Fall 2011. *Presented work on “WMD Terrorism in Latin America,” at the 2011 Defense Threat Reduction Agency (DTRA) Basic Research Technical Review Conference, Springfield VA, 18 August 2010.* Currently Export Traffic Line Manager for Latin America, MSC, Charleston SC.
- 9) Mr. Anthony Boyles, “Defense Technology Policy,” Spring 2011. Currently Data Scientist at Deloitte, Marietta GA.
- 10) Mr. Christopher Vucich, “Terrorism and Insurgency in Africa” Spring 2010, Summer 2010, Fall 2010. *Presented 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, Springfield VA, 18 August 2010.* Currently Joint Operations Specialist, Camber Corporation, Stuttgart Germany.
- 11) Mr. Bryan Murphy, “Law Enforcement and Governance: the Role for Counterinsurgency Theory” Summer 2010. Current position unknown.
- 12) Ms. Shawn (nee Finnell) Punancy, “Radical Islam & WMD Discourse” Spring 2010 Summer 2010. *Presented 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, Springfield VA, 18 August 2010.* Currently Intelligence and Risk Expert, Delta Airlines, Atlanta GA.
- 13) Ms. Jessica Gibson, “Bioterrorism Preparedness Training and Assessment Exercises for Local Public Health Agencies,” Fall 2008. Currently Operational Planner, FEMA, Denver CO.

B3. Undergraduate Students

In Fall 2016, Spring 2017, Fall 2017, & Spring 2018, the majority of my independent study students were transitioned to my Vertically-Integrated-Projects (VIP) Team

- 1) Ms. Sydney Roseman, “Synthetic Biology & Security,” Summer 2024
- 2) Ms. Rikita Bhardwaj, “Emerging Biotech & Security,” Spring 2024, Summer 2024, Fall 2024
- 3) Mr. Ethan Masters, “Navigating the Nexus: Clean Energy, Climate Change, & Nuclear Proliferation,” Summer 2022 (*co-advised with Prof Whitlark*)
- 4) Mr. Jacob Young, “Navigating the Nexus: Clean Energy, Climate Change, & Nuclear Proliferation,” Summer 2022 (*co-advised with Prof Whitlark*)
- 5) Ms. Anika Gouhl, “Biopower and Biotech in International Affairs,” Fall 2019, Spring 2020
- 6) Ms. Le T. Changivy, “Terrorism & Trafficking,” Spring 2019
- 7) Ms. Amy McGaughey, “Study of CBW Terrorism,” Fall 2018
- 8) Ms. Emily Morgan, “The Genome’s Role in International Affairs,” Summer 2018
- 9) Ms. Sara Schimdt, “Predicting the Proliferation of Lethal Autonomous Weapons Systems,” Fall 2017, Spring 2018.

- 10) Ms. Mallory Bryan, "International Security and Art," Fall 2016 (*IAC Dean's Internship Program*)
- 11) Ms. Ashley Tofil, "North Korea's CBW Threat," Fall 2016
- 12) Mr. David C. Alman, "Implications of Electronic and Cyber Warfare on National Strategy," Spring 2016, Fall 2016. Currently US Air Force.
- 13) Ms. Sara Morrell, "How Culture Impacts Military Tactics and Command Structure," & "Disinformation Campaigns and Hierarchical Culture: The Soviet Union and Russian Federation," Fall 2015, Spring 2016, Fall 2016, Spring 2017, Fall 2017. Currently PhD Student, Department of Political Science, Northeastern University, Boston MA.
- 14) Murry Smith, "The Military and Higher Education: Probing the Perceptual Myths of Representation," Summer 2016. Currently Action Officer – Portfolio Development Office, Global Security Directorate, Savannah River National Lab, Aiken SC.
- 15) Mr. Joshua Jacob, "Iran, Rogue States, and Nuclear Power," Spring 2014, Fall 2014
- 16) Ms. Anna Hunter, "Arms Race of the 21st Century: Nuclear Weapons Free Zones and US Pivot to Asia," Spring 2014
- 17) Mr. Danny Thai, "Military Deterrence Analysis: Military Reductions & National Security," Spring 2014
- 18) Mr. Andrew Wirt, "The Norms of WMD (Dis)Use," Spring 2014
- 19) Mr. Gillen Heisler, "Deterring the Dragon: AirSea Battle and Military Modernization," Fall 2013
- 20) Ms. Shaudie Fassih, "State Collapse and International Responses to Regimes with Nuclear Programs (DPRK & Iran)," Spring 2012, Spring 2013, Fall 2013, Spring 2014. *1st Place Best Oral Presentation 2015 Georgia Tech Undergraduate Research Symposium*. Currently Senior Legal Counsel for South America, The Coca-Cola Company, Atlanta GA.
- 21) Ms. Sapphire Liu, "Digital Gaming and WMD Defense" Fall 2010, Spring 2011, Fall 2011, Spring 2012. *SAIC Undergraduate Scholarship recipient for research in Spring 2011*. Currently Creative Engineer, Yuga Labs, Los Angeles CA.
- 22) Mr. Adam Thigpen, "Security and Gaming" Summer 2011, Fall 2011, Spring 2012. *2nd place Oral Presentation 2013 Undergraduate Research Symposium; Outstanding oral presentation awardee from the Ivan Allen College, 2012 Undergraduate Research Symposium*. Currently Principal Application Security Engineer
- 23) Mr. Ryan Forman, "Al Qa'eda & Unconventional Weapons" Fall 2011, Spring 2012
- 24) Mr. Chris Tanner, "Nanotechnology and Security: Strategic Significance of Nanotechnology in China," Spring 2012. *Student presented poster on "Nanotechnology and Composite Materials: Chinese Defense-Related Research and Development" at the 10th Annual NanoTechnology for Defense Conference (NT4D), 6-10 August 2012, Summerlin, Nevada.*
- 25) Ms. Danielle Sharpe, "Deterring BioTerrorism: Re-Emerging Infectious Disease and Deterrence Theory," Spring 2012
- 26) Ms. Lucy Tucker, "Bionanotechnology & Proliferation: Challenges at the Intersection of Technology and International Security," Spring 2012. Currently Manufacturing Engineer, Abbott Laboratories
- 27) Ms. Lucia Bird, "Hamis, Hezbollah, and WMD's" Fall 2010, Spring 2011, Fall 2011. *Selected to present at "Cadet/Student Conference on Terrorism, Insurgency and Asymmetric Conflicts," Combating Terrorism Center, United States Military Academy at West Point,*

- March 2012. Completed PhD at the University of North Carolina at Chapel Hill in 2019. Currently at the US State Department.
- 28) Ms. Sarah Grace Parr, "Nuclear Proliferation & International Conflict" Fall 2010, Spring 2011, Fall 2011
 - 29) Ms. Patti Murphy, "The Security Implications of Advanced Neuroscience, Pharmaceuticals, and the Cognitive Sciences" Summer 2010, Fall 2010, Spring 2011, Fall 2011. *Presidential Undergraduate Research Award (PURA) recipient for Fall 2011*. Currently Postdoctoral Fellow in the Department of Stem Cell and Regenerative Biology, Harvard University.
 - 30) Mr. Graham Sweeney, "Nanotechnology and Security: Russia" Summer 2010, Fall 2010, Fall 2011, *SAIC Undergraduate Scholarship recipient for research in Summer 2010*.
 - 31) Ms. Kamna Bohra, "Biological Weapons Verification" Summer 2011, Fall 2011
 - 32) Ms. Chirley Quillian, "21st Century Security Challenges," Fall 2011
 - 33) Ms. Rebecca Hong, "Military Nanotechnology" Fall 2011
 - 34) Mr. Eric Matson, "Deterring Bioterrorism" Fall 2011
 - 35) Mr. Connor Pigott, "Nanotechnology & International Security: Russia" Fall 2011
 - 36) Ms. Anika Polson, "Radical Islam and WMD Terrorism" Fall 2011
 - 37) Ms. Yao Ying "Biotech in Gaming" Fall 2011
 - 38) Mr. Sahan Jayasumana "Emerging Technology and Terrorism" Summer 2011
 - 39) Mr. Wesley Griggs, "Iran and WMD Proliferation" Fall 2010, Spring 2011
 - 40) Mr. Jared Fry, "WMD in Gaming" Spring 2010, Summer 2010, Fall 2010, Spring 2011, *Presidential Undergraduate Research Award (PURA) recipient for Spring 2011*
 - 41) Mr. RJ Paulisick, "Nano and Nuclear Technology: The Implications of an Emerging Technology on Nuclear Energy and Nuclear Weapons" Fall 2010
 - 42) Mr. Vincent Chan, "Nanotechnology and Security: Strategic Significance of Nanotechnology in China" Summer 2010
 - 43) Mr. Adam Weiss, "Nanotechnology Policy and Security: Israel" Spring 2010
 - 44) 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*.
 - 45) Ms. Amira Mouna, "Bionanotechnology and Security" Spring 2009, Summer 2009, Fall 2009. *SAIC Undergraduate research award recipient*. Currently Founding Partner at The Menges Group (Health care advisory), Washington DC.
 - 46) 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*. Currently Foreign Area Officer, State Department
 - 47) Ms. Katherine Murphy, "Regulation of Nanotechnology in Europe and US" Fall 2009
 - 48) Mr. Mitchell Watkins, "Al Qa'eda and Unconventional Weapons" Summer 2009, Fall 2009
 - 49) Ms. Rasha Nahab, "Biotechnology Policy and the Life Sciences" Summer 2009
 - 50) Ms. Ana Terron, "Deterring Bioterrorism: Re-Emerging Infectious Disease and Deterrence Theory" Spring 2009. Currently Senior Engineer at Oracle,

- 51) Ms. Nikita Basandra, "Bionanotechnology and Security: Strategic Significance of Bionanotechnology in Iran" Spring 2009
- 52) Mr. Kemp Anderson "Al Qa'eda and Unconventional Weapons" Spring 2009
- 53) Ms. Sophia Ahmed, "Pakistan & the Role of International Institutions for Security" Fall 2008, Spring 2009
- 54) Ms. Katherine Ruth Landers, "Emerging Biotechnologies and International Security" Fall 2008

B4. High School Students

- 1) Ms. Pranaya Balaji, Walton High School in Marietta GA, "Emerging Biotech and Anti-Material Agents: Security and Governance Challenges," Summer 2023, Fall 2023, Spring 2024. *Selected as a Stamps Presidential Scholar at Georgia Tech as part of incoming fall 2024 class.*

B5. Service on Thesis or Dissertation Committees

- 2) Ms. Zoe Gastrum, Public Policy.
- 3) Mr. Julian Marx, "Medical Intelligence and Public Health," Ecole du Val-de-Grace, Sorbonne Université, France.
- 4) Mr. Dowan Kim, "Biological Programming for Memory Structure and Bio-Cryptography," Chemical and Biomolecular Engineering.
- 5) Mr. Karim Farhat, "Explaining US Cybersecurity Policy Integration Through a National Regime Lens," Public Policy. Currently Tech Policy Analyst, The Cohen Group, Rockville MD.
- 6) Mr. Brian Stewart, "Entanglement of National Space Systems: Implications for Deterrence and Stability," Nunn School. Currently MAJ US Space Force serving as instructor at the USAF Academy, Colorado Springs, CO.
- 7) Ms. Rana Shabb, "The Private Sector and Civil Conflict: Leveraging Economic Sectors for Peace," Nunn School. Currently Associate Director, Middle East, in the Conflict Resolution Program at The Carter Center, Atlanta GA.
- 8) Ms. Anmol Soni, "Driving Green: Policy adoption, employment effects and public perception of electric Vehicles," Public Policy, dissertation defended Spring 2020. Currently Assistant Professor, Department of Public Administration, Louisiana State University, Baton Rouge LA.
- 9) Mr. Pete Exline, "Optimization of Activation Foil Passive Neutron Detectors," Nuclear Engineering, Georgia Tech, dissertation defended May 2019. Currently Colonel US Army, serving as Director J10 US SOCOM, Ft McDill, Tampa FL.
- 10) Ms. Jenna McGrath, "Public Policy to Address Security Vulnerabilities in the Energy Sector," Public Policy, dissertation defended October 2018. Currently National Security Systems Analyst, Lawrence Livermore National Laboratory, Livermore CA.
- 11) Mr. Shai Bernstein, "A Model for Adding Interoperability into Force Planning Methods," Aerospace Engineering, dissertation defended June 2017. Currently Co-Founder and Chief Product Officer, Cargo Spectre, Boston MA.
- 12) Ms. Yujia He, "Re-control the Market for Strategic Power: China's Reregulation of Its Rare Earth Industry," Sam Nunn School of International Affairs, dissertation defended April 2016. Currently Assistant Professor, Patterson School of Diplomacy and International Commerce, University of Kentucky, Lexington KY.
- 13) Ms. Rongrong Liu, "A Microcosm of the Global Nonproliferation Governance: A Study on the Role of Industries in Chemical Nonproliferation Regimes," School of Public and International

Affairs, University of Georgia, dissertation defended October 2015. Currently, Director Global Pediatric Medicine, St. Jude Global Operations, Memphis TN.

- 14) Major Christine Buchner, "The American Cyborg: How Biotechnology Aims to Enhance the American Soldier," Master of Arts in Security Studies (Defense Decision-Making, and Planning and Strategic Studies), Naval Postgraduate School, Monterey CA, thesis defended May 2014. Currently, Colonel US Army, Commander US Army Medical Department Activity (MEDDAC), Ft Drum, NY.

B6. Mentorship of Postdoctoral Fellows or Visiting Scholars

- 1) Colonel Matt McGraw, "Professionalizing the Joint Collection Workforce," US Army, AY2023-2024
- 2) Lieutenant Colonel Jason Constantine, "The Role of the National Guard Bureau's State Partnership Program (SPP) in Shaping the Future of the International Order," US Air Force, AY2023-2024
- 3) Commander Michael Hammond, US Navy, AY2023-2024
- 4) Lieutenant Colonel Casey Naputi, "Change the Paradigm: Army Intelligence in Direct Support of NGOs," US Army, AY2022-2023
- 5) Lieutenant Colonel Ross Dotzlof, "Peace Engineering: Advancing the Interests of the Engineering Community in a Complex World," US Air Force, AY2022-2023
- 6) Captain Tom Petersen, "Public Opinion and US Foreign Policy Toward China," US Navy, AY2021-2022
- 7) Colonel Eric Christiansen, "Staying Competitive; A Quantum Leap into Modernization," US Army, AY2021-2022
- 8) Lieutenant Colonel Adolfo Gorbea, "Attrition Warfare in the Era of Durable Disorder," US Air Force, AY2021-2022
- 9) Lieutenant Colonel Eric Nylander, "Impacts of Dual-Use Technology in the Future Operating Environment," US Army, AY2020-2021
- 10) Lieutenant Colonel Matt Psilos, "Project Mercury," US Air Force, AY2020-2021.
- 11) Commander Steve Yenias, "Indo-Pacific Security through the lens of the U.S.-Taiwanese Relationship," US Navy, AY2020-2021
- 12) Commander Raul Acevedo, US Navy, "Future of Nuclear Deterrence," AY2019-2020
- 13) Lieutenant Colonel Don Brooks, US Army, "Assessing US Space Command's role in countering Russian anti-access and area-denial (A2AD) capabilities to ensure access in the European region," AY2019-2020
- 14) Lieutenant Colonel John Wagemann, US Air Force, "US Air Force and Artificial Intelligence: How the USAF can learn from past technology to secure the future," AY2019-2020
- 15) Lieutenant Colonel Octavia T. Coleman, US Army, "Rebalancing the U.S. Military, Army, Logistics to Meet the Demands of Large-Scale Ground Combat Operations," AY2018-2019
- 16) Lieutenant Colonel Christopher Sheffield, US Air Force, "Geopolitical Concerns of an Independent United States Space Force: A United States – China Perspective," AY2018-2019
- 17) Colonel Dan R. Brue II, "Getting the Message Through – Security Challenges of Coalition Communications," AY2017-2018

- 18) Colonel T. Christopher Petty, US Army, "Protecting Army Aviation and Enabling Military Dominance Through Disruptive Innovation," AY2016-2017
- 19) Colonel Lonnie Carlson, US Army, "Preventing Weapons of Mass Destruction Proliferation: Leveraging Special Operations Forces to Shape the Environment," AY2015-2016
- 20) Colonel Michael S. Quinn, US Army, "The Domestic Biological Medical Countermeasure Program: A Coalition of the Willing," AY2015-2016
- 21) Dr. KJ Dennison, "Biodefense Practice, Beliefs, and Perceptions by Life Sciences," Fall 2007 – Fall 2008. Currently Visiting Assistant Professor at Oxford College of Emory University, Atlanta GA.

C. Educational Innovations and Other Contributions

List all other significant educational innovations and activities such as new educational programs, new courses developed, mentoring programs, continuing education, laboratory experiments and instructional materials developed, participation in any doctoral committees, and participation in interdisciplinary teaching activities, etc.

- 1) Co-lead on US State Department Diplomacy Lab project on "Malign Use of AI Technology in Europe by State and Non-State Actors" with Vicki Birchfield, INTA and Courtney Crooks, GTRI & SCP. Cross-listed graduate course in International Affairs, School Cybersecurity and Privacy for Summer, and Computer Science for Fall 2024. Will be collaborating with and briefing Foreign Service Officers who will be deploying to posts in Europe and Asia in 2025.
- 2) Contributing Faculty for EAS/CHEM/BIOL 8802 Seminal Papers in Astrobiology, Spring 2020, Spring 2021
- 3) Mentor for GTRI Research Faculty Teaching Fellow, 2020
- 4) Lead, Nunn School Collaborative Program with Cipher Brief, 2019 –
- 5) Director, Sam Nunn Security Program, July 2015 – December 2021
- 6) Created and lead an undergraduate VIP (Vertically Integrated Projects) Team on "21st Century Security Challenges," Fall 2016, Spring 2017, Fall 2017, and Spring 2018, of 15-25 undergraduates from across Georgia Tech. GT military fellows were integrated into the courses/VIP project to serve as mentors and received final briefings from undergraduate students.
- 7) US Military Academy External Senior Mentor for Department of Defense & Strategic Studies Senior Capstone (DS497 – Strategic Studies Capstone), Spring 2014. Final product "A Study of the Challenges of Mobility in Dense Urban Terrain."
- 8) Associate Director, Sam Nunn Security Program, September 2013 – July 2015
- 9) Founded and led the Nunn School Security Journal Club. Lead monthly workshop for INTA graduate students in which two recent papers from leading international relations journals are discussed, 2011 – 2014
- 10) Visiting Professor, Master's program on Security and Defense, Instituto Altos Estudios Nacionales (IAEN, National Institute of Advanced Studies), Quito Ecuador. Developed and taught course on "Threats to Security, Technology, and Information Society," Summer 2010 (36 students)
- 11) Accompanying Faculty, Georgia Tech Southeast Asia Study Abroad, May-June 2014
- 12) Accompanying Faculty, Georgia Tech East Asia Study Abroad, May-July 2012

New Courses Developed

- 1) INTA 8813 “Global WMD Policy” for online MSIS, for Fall 2024
- 2) INTA 4500-A “21st Century Security Challenges,” Spring 2014
- 3) INTA 2042 “Intro to Global WMD Issues,” Spring 2016
- 4) INTA 8803-K “Deterrence in the 21st Century,” Fall 2010
- 5) INTA 8803-K “Counterinsurgency and Small Wars,” Fall 2009
- 6) INTA 4803-K/8803-K “Emerging Technologies and Security,” Fall 2007
- 7) Developed and lead “Workshop on Technology, Policy, and Entrepreneurship,” for the GT School of Materials Science Engineering Summer Research Experience for Undergrads (REU), July 2009, July 2010, July 2011, & July 2012

Courses Redesigned or Significantly Overhauled

- 1) INTA 3111/6111 “US Defense Policy/US Foreign Security Strategy,” Spring 2020
- 2) INTA 4007 “Intelligence and International Security,” Fall 2018
- 3) INTA 8000/8001 “Science, Technology, and International Affairs” I & II, Fall 2015
- 4) INTA 4050 “International Affairs and Tech Policy” Summer 2014
- 5) INTA 3103 “Challenge of Terrorism” Spring 2011
- 6) INTA 3102 “Problems of Proliferation” Spring 2010

VI. Service

List all national and international contributions of service and positions of leadership in the profession.

A. Professional Contributions

- Selected to serve as inaugural **senior mentor** to **AAAS AI Fellows** to advise the inaugural cohort of rapid response Congressional AI fellows as they help craft legislation, in particular policies related to AI and emerging technologies, May 2024 –
- **Editor-in-Chief**
 - 1) *Politics and the Life Sciences*, 2017-2020
- **Editorial Board Member**
 - 2) *Politics and the Life Sciences*, 2020 – present
 - 3) *Global Security: Health, Science, and Policy*, 2015 – present
 - 4) *Journal of Defense Management*, 2011 – present
 - 5) *Journal of Strategic Security*, 2009 – present
 - 6) *Studies in Conflict & Terrorism*, 2007 – 2017
- **Advisory Board Member**
 - 1) *Political Slyce (PSlyce)* (Israel), 2022 – present
 - 2) *ANU Journal of Law and Technology* (Australia), 2019 – 2021
- **NASEM Consensus Study Report Reviewer**
 - 1) “A Strategic Vision for Biological Threat Reduction,” Policy and Global Affairs Division, Committee on International Security and Arms Control, and Committee on Enhancing Global Health Security through International Biosecurity and Health Engagement, December 2019

- 2) “Biodefense in an Age of Synthetic Biology,” Division on Earth and Life Studies, Board on Chemical Sciences and Technology, and Board on Life Sciences, December 2017
- **Technical and Programmatic Reviewer**
 - 1) Invited member of selection committee and program reviewer, EU Cyber & Leiden University’s Institute of Security and Global Affairs “Emerging and Disruptive Digital Technologies: Regional Perspectives,” 2023
 - 2) External reviewer, Security Policy Studies (SPS) program academic program review, Elliott School of International Affairs, George Washington University, 26 April 2018
 - 3) University of Miami Collaborative Institutional Training Initiative (CITI Program) on Dual Use Research of Concern (DURC), August 2015
 - 4) National Science Foundation, Proposal Review Panelists
 - a. Engineering Directorate, Small Business Innovative Research (SBIR) Program Phase I: March 2010, August 2010, September 2011, April 2013, September 2013, August 2014, March 2015, September 2015
 - b. Engineering Directorate, Small Business Innovative Research (SBIR) Program Phase II: November 2014
 - c. Science, Technology, and Society (STS) Program, April 2014
 - 5) Australian Research Council proposals, 2011 – 2013
 - 6) Shota Rustaveli National Science Foundation (the country of Georgia’s NSF), 2011 – 2013, 2015
 - 7) AAAS
 - a. Annual Conference, Public Policy Symposia, 2012, 2013, 2015, 2019 – present
 - b. Research Competitiveness Program, 2010, 2011
 - c. Science and Technology Policy Fellowship Program Applicants, 2007 – present
 - d. BMENA Scientific Exchange (part of Cooperative Threat Reduction Programmatic activities executed through AAAS CSTP), 2013
 - 8) DoD Chemical and Biological Defense Physical S&T Research Program, 2007, 2008, 2011
 - 9) Defense Threat Reduction Agency (DTRA) Basic Research Program, 2007, 2008, 2009, 2011
 - 10) Program Review Committee, 2010 NanoTechnology for Defense Conference, 2010
 - 11) Ethical, Legal, and Social Implications (ELSI) of Nanotechnology Program, National Science Foundation (NSF), Winter 2007
 - 12) Materials for Forensic Sensing S&T Program Assessment Team, Office of Naval Research, Fall 2006
 - **Scholarly Reviewer**

The Nonproliferation Review; Strategic Security; Terrorism & Political Violence; Journal of American Chemical Society (JACS); Sustainability; Biosensors; Global Studies Review, World Medical & Health Policy; Biomaterials; Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science; Strategic Studies, Yearbook of Nanotechnology; Sustainability; Journal of Strategic Trade Control, PS: Political Science & Politics; Frontiers in Political Science; Journal of Law and the Biosciences; Georgetown CSET; Wiley, Cambridge University Press, University of Chicago Press, Georgetown University Press, Harvard University Press,

Princeton University Press, Routledge, Stanford University Press, John Hopkins University Press, and Oxford University Press

- **Chair and/or Discussant at Professional & Scholarly Conferences**

- 1) Chair and Discussant panel on “Emerging Technologies and Their Implications for International Security” at International Studies Association (ISA) Annual Meeting, San Francisco CA, 3-6 April 2024.
- 2) Discussant at US National Academies of Science workshop on “Implementing Good Clinical Laboratory Practices in Low- and Middle-Income Nations in South and Southeast Asia,” 14, 16, & 18 June 2021.
- 3) Chair and Discussant panel on “Information and Psychological Warfare” and chair for panel on “Nuclear Defense and Deterrence,” International Studies Association (ISA) Annual Meeting, Toronto Canada, 30 March 2019.
- 4) Chair panel on “Signaling and Deterrence,” International Studies Association (ISA) Annual Meeting, San Francisco CA, 4 April 2018.
- 5) Chair panel on “Mechanisms for Managing Dual Use Research of Concern,” *Committee on Dual Use Research of Concern: Options for Future Management*, National Academies of Science, Washington DC, 4 January 2018.
- 6) Chair panel on “Nuclear Weapons, Nonproliferation, and Foreign Policy,” International Studies Association (ISA) Annual Meeting, Atlanta GA, 18 March 2016.
- 7) Chair panel on “Mass Violence,” Association for Politics and the Life Sciences (APLS) Annual Conference, Madison WI, 23-24 October 2015.
- 8) Chair panel on “Scientific and Social Assessment of Emerging Technologies for a Sustainable Society” the Society for the Study of Nanoscience and Emerging Technologies (S.NET) Conference 2015, Montreal Canada, 18-21 October 2015.
- 9) Invited Moderator and Discussion Leader, Department of Defense (DoD) Homeland Defense and Security Information Analysis Center (HDIAC) online forum discussion on implications of 9/11 attacks on security and civil liberties, 07 September 2015.
- 10) Chair panel on “Weapons: Procurement, Trade and Implications for Security Governance,” and Discussant panel on “International Organizations In Conflicts,” International Studies Association (ISA) Annual Meeting, New Orleans LA, 18-21 February 2015.
- 11) Chair and Discussant panel on “Resources, Governance, and Globalization;” Discussant panel on “Technology and the Changing Face of War;” and Discussant panel on “Technology, Security, and Drones;” at International Studies Association (ISA) Annual Meeting, Toronto Canada, 26-29 March 2014.
- 12) Chair panel on “Governing Nanotechnology in a Globalized World: Strategic Assessments of Disruptive Technology” at Society for the Study of Nanoscience and Emerging Technologies (S.NET), Northeastern University, Boston MA, 27-19 October 2013.
- 13) Chair and Discussant panel on “Differential Rates of Technology and Norm Diffusion: The Case of the Chemical and Biological Weapons Prohibition Regimes Colleagues;” Chair for panel on “Guns, Butter and Strategy: Trade-offs and Technological Diffusion;” and Chair for panel on “Drone Wars: Implications of a New Military Technology” at International Studies Association (ISA) Annual Meeting, San Francisco CA, 3-6 April 2013.

- 14) Discussant panel on “Cybersecurity” and on “Nuclear Policy in Comparative Perspective,” and Chair panel on “Nuclear Policy in Comparative Perspective” at International Studies Association (ISA) Annual Meeting San Diego CA, 1-4 April 2012.
- 15) Chair and Discussant panel on “Biosecurity and Neuroscience,” at the International Security Studies Section of ISA and the International Security and Arms Control Section of APSA (ISSS/ISAC) Annual Conference, Irvine CA, 14 October 2011.
- 16) Discussant panel on “Remote Control? The Ethics of Distance in Military Conflicts,” Discussant panel on “Analyzing the Foreign Policy of Nonproliferation,” Chair panel on “Communicating in Crisis and Conflict”, and Chair panel on “Danger and Diplomacy on the Korean Peninsula,” International Studies Association (ISA) Annual Meeting, Montreal Canada, 16-19 March 2011.
- 17) Chair and Discussant panel on “Emerging Assessments,” Society for the Study of Nanoscience and Emerging Technologies (S.NET), Darmstadt Germany, 29 September - 2 October 2010.
- 18) Discussant panel on “Space Weapons,” International Studies Association (ISA) Annual Meeting, New Orleans LA, 16-20 February 2010.
- 19) Discussant panels on “The Politics of High Technology” and on “Cyber-Terrorism, National Security, and International Communication,” International Studies Association (ISA) Annual Meeting, New York NY, 15-18 February 2009.

- **Other Professional and Scholarly Service Activities**

- 1) *Review Coordinator*, U.S. National Academies of Science, Engineering, and Medicine (NAEM) report on “Engaging Scientists in Central Asia on Data Governance Principles for Life Science Data,” Fall 2023
- 2) *Organizer*, ISA Working Group on “Strategic Foresight & International Relations for the 21st Century,” ISA Annual Convention 2016, Atlanta GA
- 3) *External Member*, Army War College Professor of Technology and National Security Search Committee, 2020
- 4) Georgia Tech Representative to Southeastern Center for Emerging Biologic Threats (SECEBT), 2009 – 2012
- 5) *Invited Participant* to international roundtable on “The Military Application of Neuroscience” hosted by the *Bulletin of Atomic Scientists*, August-October 2008

B. Public and Community Service

List all public and community service activities that are professionally related.

B.1 Public Talks

- 1) *Organizer and Speaker*, 3rd Annual Middle Georgia National Security Forum on “Sustainment of Industry in a Digital World,” Warner Robins GA, 16-17 October 2024.
- 2) “Emerging Technologies, Security, and Governance,” Great Decisions Lecture, Georgia Council on International Visitors (GCIV), 15 February 2024.
- 3) *Organizer and Speaker*, 2nd Annual Middle Georgia National Security Forum on “Innovation: Connecting Generations,” Warner Robins GA, 20 October 2023.

- 4) “Emerging Technologies and National Security: Artificial Intelligence (AI), Machine Learning, & Autonomy,” Atlanta Council on International Relation (ACIR), Atlanta GA, 22 September 2021.
- 5) “Emerging Life Sciences and Possible Threats to International Security,” Osher Lifelong Learning Seminar Series, Emory University, 9 February 2021.
- 6) “Implications of Nanotechnology for National Security and Defense,” Atlanta Council on International Relation (ACIR), Atlanta GA, 20 April 2017.
- 7) “Terrorism and the Middle East: the Threat of Weapons of Mass Destruction,” Brenau University, Braselton GA, 2 November 2016.
- 8) “Opportunities and Threats at the Intersection of Technology and National Security,” 6th Annual *World Affairs Council of Atlanta Young Leaders Conference*, Atlanta GA, 1 February 2014.
- 9) *Panelist & Speaker* “Women’s Leadership in the Cyber World: Emerging Issues and Trends in Cybersecurity,” Women in Leadership Distinguished Scholars Series, Atlanta GA, 22 October 2015.
- 10) “Defense Technology,” Great Decisions Forum, Foreign Policy Association coordinated through Georgia State University, Atlanta GA, 24 March 2014.
- 11) “Girls and Women in Science: A 20-Year Perspective” Institute for Mathematics & Computer Science (IMACS) Magazine, 15 September 2011.
- 12) “Al Qa’eda and WMD Terrorism” at Columbus Georgia Tech Alumni Network, Columbus GA, 20 March 2012.

B2. Other Activities

- 1) Mentored two Atlanta Public Schools (APS) high school students who were part GT’s Institute for Electronics and Nanotechnology (IEN) and Southeastern Nanotechnology Infrastructure Corridor (SENIC) APS’ Gifted Internship Program, Spring 2017
- 2) Volunteer Judge, US Army Cybermission (science, math, and technology competition for secondary school-age US Army dependents), 2008 – 2015

C. Institute Contributions

List all committee involvement and leadership, and other activities within Georgia Tech, indicate whether Institute, college, or school/department level. Internal contributions to other organizations for which you were previously employed, if any, may be included. Do not list service on thesis or dissertation committees (should be listed under IV.B5).

C1. Institute-level Committees

- 1) GT Institute Research Awards Committee, AY2023 – present
- 2) Ivan Allen College Representative to Internal Advisory and Ambassador Board (IAAB) for the Interdisciplinary Research Institute (IRI) Institute for Matter and Systems (IMS). This is the newly combined Institute for Electronics and Nanotechnology (IEN) and Institute for Materials (IMat), Spring 2024 – present
- 3) Appointed member, Georgia Tech First-Generation Advisory Council, Spring 2024 – present
- 4) Culture of Respect: Preventing sexual violence @GT Committee, 2023 – present; Education subcommittee 2024 -

- 5) EVPR's National Lab Engagement Committee & GT Liaison to Savannah River National Laboratory, Spring 2021 – present
- 6) GT Representative on the BRSA/SRNL University Partnership Management Committee, Spring 2022 – present
- 7) GT Office of Undergraduate Education's Prestigious Fellowships Interview Committee, Fall 2021, Fall 2023
- 8) Georgia Tech, Welfare and Safety Committee, Standing Committee of the Faculty Senate AY 2009 – 2012, AY 2013 – 2015, & AY 2023 – 2026 (Chair 2011 – 2012, 2013 – 2014)
- 9) Reviewer, GT EVPR Seed Grants, Spring 2021, Fall 2021, Spring 2022
- 10) Faculty Communications Advisory Board, GT Institute Communications 2021 – 2022
- 11) GT President's Scenario Planning Task Force (SPTF), Fall 2020
- 12) Provost's Emerging Leaders Advisory Board, 2020 – 2021
- 13) GT Office of Diversity, Inclusive Leaders Academy, Spring 2020 (*interrupted due to COVID*)
- 14) Member, GT Excel Program advisory board (the 4-year certificate program for students with intellectual and developmental disabilities), 2019 – 2022
- 15) GT EVPR COVID-19 Seed Grant Program Review, Spring 2020
- 16) GT Parking & Transportation Advisory Committee (PTAC), 2019 – 2022
- 17) Faculty Guide, Stamps Presidential Scholars, 2017 – 2022
- 18) Grand Challenges Faculty Fellow, AY2015 – 2016 & AY 2016 – 2017
- 19) CETL/BP Junior Faculty Teaching Excellence Award Selection Committee, 2016, 2017
- 20) Georgia Tech Federal Jackets Fellowship Selection Committee, 2016
- 21) Georgia Tech Energy on the Hill Internship Program Selection Committee, 2016
- 22) Georgia Tech, Sexual Violence Prevention Alliance (SVPA), Faculty Representative, 2015 – 2022
- 23) GT Undergraduate Research Spring Symposium Judge, 2012, 2015, 2018
- 24) Reviewer, Sigma Xi Undergraduate Research Award Committee, 2010

C2. College-level Committees

- 1) USAID Science for Development Fellows Workshop reviewer / selection committee, 2024
- 2) Ivan Allen College (IAC) Diversity, Equity, and Inclusion Council, 2020 – 2021
- 3) Ivan Allen College (IAC) Dean Search Committee, AY2019 – 2020
- 4) Ivan Allen College Writing Group Convener, Summer 2015
- 5) Reader and Judge, IAC GTRIC Paper Competition, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021
- 6) Reviewer, IAC Small Grants for Research and Internal Research Proposals, 2011, 2012, 2014, 2020, 2022

C3. School-level Committees

- 1) Director of Graduate Studies & Chair Graduate Curricula Committee, AY2024 – (*pending final processing through GT HR*)
- 2) INTA Periodic Review Committee, AY2023 - 2025
- 3) INTA Steering Committee, AY2008 – 2012, AY 018 – 2022, & AY2023 – 2025
- 4) INTA Faculty Search Committee – IPE, 2022
- 5) INTA Diversity & Inclusion Committee, 2020 – present

- 6) INTA IAST PhD Qualifications Exam Committee, 2020
- 7) INTA Awards Committee (Chair AY 2014-2015), 2014 – 2017
- 8) INTA Undergraduate Curricula Committee, 2013 – 2018
- 9) INTA IR & Theory PhD Qualification Exam Committee, 2010 – 2012, 2015
- 10) INTA Faculty Search Committee – IR Security specialist, AY2014 – 2015 and AY2015 – 2016
- 11) INTA Faculty Search Committee – European Union specialist, AY2009 – 2010, AY2010 – 2011
- 12) Nunn School Chair Search Committee, AY2018 – 2019

C4. Other Committee Service

- 1) Organizing Committee Member & Moderator, *Information Warfare in an Era of Great Power Competition* Symposium, February 2022, GTRI Advanced Concepts Lab (ACL)
- 2) GT Astrobiology Fellows Program Selection Committee, 2021 – 2023
- 3) Member, program committee of Atlanta Conference on Science and Innovation Policy 2017
- 4) Faculty Advisor, GT TechPro, Graduate Student Organization, 2017 – 2021
- 5) Faculty Advisor, BOPSOP, Undergraduate Student Service Organization, 2016 – 2019
- 6) Faculty Associate, GT Grand Challenges Freshman Program, Fall 2013 – 2017
- 7) Faculty Partner for Hopkins Freshman Residence Hall, 2008 – 2011

C5. Guest Lectures and Other Institutional Activities

- 1) Panelist on “Practicing Integration” at *Humanizing STEMM for the 21st Century: A Faculty Futures Symposium*, IAC, 13 March 2023
- 2) Speaker, “Emerging Technology and International Security: from Chemistry to Geopolitics,” GT School of Chemistry and Biochemistry Colloquia, 5 November 2020
- 3) Panelist on “Leading a Successful Research Program,” at event for new faculty sponsored by GT EVPR’s office, 21 January 2020
- 4) Speaker, “The Geopolitics of the Rare and Not-So Rare Elements,” College of Sciences *Frontiers in Science* Lecture Series, 12 November 2019
- 5) Speaker, “So You Think You Want to Work for the Government,” Stamps Presidential Scholars Dialogue Series, 30 September 2019
- 6) Speaker, “Emerging Technologies & Security: Probing the Geopolitical, Ideational, and Organizational Factors of Robotics, Machine Learning, & Artificial Intelligence,” GT Institute for Robotics & Intelligent Machines (IRIM), 21 August 2019
- 7) Jordan, J.E., M.E. Kosal, and L. Rubin, “Why is the US in Niger?” *GT Amplifier*, 25 October 2017, <http://www.news.gatech.edu/expert/post/why-us-niger>
- 8) Respondent, “On Spying: A Historical Perspective on Trump and Russian Interference in the US Election,” Innovation and Collaboration in Liberal Arts, Science, and Technology (ICLAST) Lecture Series, with Kristie Mackracis (HSOC), 2 February 2017
- 9) Speaker and panelist, “Careers at the Science/Policy Interface” at the Georgia Tech Graduate Student Government Association and Center for the Enhancement of Teaching and Learning (CETL) Career, Research, and Innovation Development Conference (CRIDC), 5 March 2015 & 9 February 2017
- 10) Panelist, “Security and the Exploration of Space,” *The Future of Life – Here on Earth and Elsewhere, jointly sponsored workshop*, GT College of Engineering, College of Sciences, and the Ivan Allen College of Liberal Arts, 22 October 2016,
- 11) Organized and moderated ICLAST panel on “The Liberal Arts, Technology, and National Security,” 26 February 2016

- 12) Speaker, CISTP-INTA panel discussion "Iran's Nuclear Deal: Triumph of Diplomacy or Dangerous Precedent?" 9 September 2015
- 13) Speaker, INTA Hour on "Trends in WMD Terrorism: Radical Islamists, Sovereign Citizens, and Rogue Ophthalmologists," 5 February 2015
- 14) Speaker, IAC Advance Lunch/Discussion on "Productive Faculty Outcomes: Success with Multiple Roles," 5 November 2014
- 15) Speaker, SIR Undergrad Honor Society panel discussion "US Government Responses to the Ebola Outbreak in West Africa," 6 October 2014
- 16) Speaker, "Global Health Security: Deterring Bioterrorism, Infectious Disease, Development, & the Public Health-Military Nexus," Innovation and Collaboration in Liberal Arts, Science, and Technology (ICLAST) Lecture Series, organized by School of Literature, Media, and Communication (LMC), 3 October 2014
- 17) "The War We Won't Expect. What's Scariest: Unknown Technologies Used to Wage War in the Future, or the Lack of Tools and Policy to Anticipate Them?" *Georgia Tech Alumni Magazine*, May 2014
- 18) Moderator and dialogue participant, discussion with Professor Abbas Milani on Iran's nuclear program, 14 April 2014
- 19) Speaker, Faculty Research Panel, 125th Anniversary Founders Day, "Security and Technology," 13 March 2014
- 20) Speaker, Policy@Tech Speakers Series, "Strategy, Technology, & the US Military: Observations at the Academia-Policy Nexus," 26 February 2014
- 21) Panelist, IAC Advance Lunch/Discussion on "Writing Research Proposals for External Funding: Keys for Success," 17 October 2013
- 22) Speaker, "Nanotechnology: Is Small Scary?" History, Technology, and Society (HSoC) Speaker Series, 30 September 2013
- 23) Speaker, CISTP-INTA panel discussion "Obama's Syrian Dilemma: Explicating the Challenges Confronting the US and Global Communities," 16 September 2013
- 24) Speaker, Nunn School Fall 2013 Seminar Series, "Strategy, Technology, and the Future of US Ground Forces," 27 August 2013
- 25) Speaker, Policy@Tech Speakers Series, "BioDefense Transformation: from the Green Line to the Transformational Medical Technologies Initiative," 24 January 2012
- 26) Speaker, Georgia Tech Center for the Study of Women, Science and Technology (WST) Learning Community Dinner on "From Science to International Security (aka from beakers to bombs)," 28 November 2011
- 27) Speaker, IAC Advance Lunch/Discussion on "Livability and Productivity: Enhancing the GT Environment for Faculty - Views from IAC Faculty," 25 October 2011
- 28) Speaker, "Nanotechnology for Chemical and Biological Defense: Policy, Programmatics, and Threat Anticipation," Nano@Tech Seminar Series, Marcus Nanotechnology Building, 27 October 2009
- 29) Speaker, Georgia Tech Model United Nations Conference, "S&T, Security, and Risk in the 21st Century," 17 October 2011
- 30) Speaker, Nuclear and Radiological Engineering Symposia, "Predicting Nuclear Proliferation: Theory, Policy, and Role for Engineers," Woodruff School of Engineering, Georgia Institute of Technology, 23 April 2009
- 31) Invited Participant in "Leadership Lunch Series" on "The Spectrum of Career Opportunities for PhD Scientists" sponsored by the Center on Materials and Devices for Information Technology and Research and the School of Chemistry and Biochemistry, 6 October 2008

- 32) Speaker, CISTP-INTA Colloquium on Chemical and Biological Weapons, "The Shifting Faces of Chemical Weapons: Improvised Chemical Terrorism," 6 November 2007
- 33) Speaker, INTA Undergrad Students Organization (IASO), "Weapons of Mass Destruction: Science and Technology to Respond to Global Proliferation Threats," 11 October 2007