Emerging and Disruptive Threats
For Army War College Faculty Development
Executive Short Course

31 July 2019
US ARMY WAR COLLEGE
122 FORBES AVENUE
CARLISLE, PA 17103
Goal: To inform the Army War College faculty of the strategic implications of Cyber, Space, Information, and Emerging Technologies (Artificial Intelligence, Machine Learning, and Big Data)

0830-0850  Registration
US Army Heritage and Education Center | 950 Soldiers Drive | Carlisle, PA

0850-0900  Introduction
US Army Heritage and Education Center
- Colin P. Clarke, Assistant Teaching Professor, Institute for Politics and Strategy, Carnegie Mellon University

0900-1200  Morning Sessions:
US Army Heritage and Education Center

Cyber
“Technology and the Policy of Cyber War”
  - Pre-readings:

Space
“Complex Air and Missile Attack in an Era of Great Power Competition”
- Thomas Karako, Senior Fellow, International Security Program | Director, Missile Defense Project, Center for Strategic and International Studies (CSIS) | Fellow, Carnegie Mellon University Washington Semester Program
  - Pre-readings:
Emerging Technologies

“The Impact of AI on Cybersecurity”

- **Lujo Bauer**, Professor, Electrical and Computer Engineering, Carnegie Mellon University

“Emerging Technologies and International Security”

- **Colin P. Clarke**, Assistant Teaching Professor, Institute for Politics and Strategy, Carnegie Mellon University
- Pre-readings:

1215-1315 Lunch Break

**US Army War College Main Campus | Root Hall Cafeteria | Mary Walker Room**

1330-1530 Afternoon Sessions:

- **CMU faculty and AWC Subject Matter Experts will facilitate discussions**

**US Army War College Main Campus | Root Hall and Upton Hall**

**Department of Command, Leadership, and Management (DCLM)**

- **Leadership of a Technical Workforce** – How is it different, how is it the same?
- **Defense Management** – Workforce management and weapons systems’ cybersecurity

**Department of National Security and Strategy (DNSS)**

- **Theory** – Applicability of the theories of war in space and cyberspace
- **Policy and Strategy** – Analysis of national, defense, and other agency policies and strategies for cyber, space, and emerging technologies; impact on national security

**Department of Military Strategy, Planning, and Operations (DMSPO)**

- Incorporating cyberspace and space operations into defense plans and operations
- Emerging Technologies’ impact on military operations

1530-1540 Closing Remarks

- **Colin P. Clarke**, Assistant Teaching Professor, Institute for Politics and Strategy, Carnegie Mellon University
INSTRUCTORS
Lujo Bauer is a Professor of Electrical and Computer Engineering, and of Computer Science, at Carnegie Mellon University. He received his B.S. in Computer Science from Yale University in 1997 and his Ph.D., also in Computer Science, from Princeton University in 2003. Dr. Bauer is a member of CyLab, Carnegie Mellon's computer security and privacy institute, and serves as the director of CyLab's Cyber Autonomy Research Center.

Dr. Bauer's research examines many aspects of computer security and privacy, including developing high-assurance access-control systems, building systems in which usability and security co-exist, and designing practical tools for identifying software vulnerabilities. His recent work focuses on developing tools and guidance to help users stay safer online and on examining how advances in machine learning can (or might not) lead to a more secure future.

Dr. Bauer served as the program chair for the flagship computer security conferences of the IEEE (S&P 2015) and the Internet Society (NDSS 2014) and is an associate editor of ACM Transactions on Privacy and Security.

**Education**

Ph.D., 2003
Computer Science
Princeton University

M.A., 1999
Computer Science
Princeton University

B.S., 1997
Computer Science
Yale University
Colin Clarke
Teaching Professor, Institute for Politics and Strategy

Colin P. Clarke is an assistant teaching professor in the Institute for Politics and Strategy (IPS) at Carnegie Mellon University, where he also has responsibilities with the Institute for Strategic Analysis (ISA) and serves on the executive board for the Masters of Information Technology Strategy (MITS) program.

Before coming to CMU, Clarke spent nearly a decade at the RAND Corporation where he was a senior political scientist focusing on terrorism, insurgency and criminal networks. At RAND, Clarke directed studies on ISIS financing, the future of terrorism and transnational crime, and lessons learned from all insurgencies between the end of WWII and 2009. He was also a member of the Pardee RAND Graduate School (PRGS) faculty.

He is also an associate fellow at the International Centre for Counter-Terrorism (ICCT), a non-resident Senior Fellow at the Foreign Policy Research Institute (FPRI), and a fellow at the Program on Extremism at George Washington University.

Clarke has briefed his research at a range of national and international security forums, including the U.S. Army War College, US Air Force Special Operations School, Society for Terrorism Research International Conference, the Global Counterterrorism Forum (GCTF) and the Counter ISIS Financing Group (CIFG), which is part of the Global Coalition to Defeat ISIS. He has served as an expert witness on terrorism related topics, testifying before Congress on several occasions. In 2011, he spent several months as an analyst with Combined Joint Interagency Task Force-Shafafiyat at ISAF headquarters in Kabul, Afghanistan, working for LTG H.R. McMaster, the former U.S. National Security Advisor.

He appears frequently in the media, has been quoted in The New York Times, The Washington Post, and The Wall Street Journal, and has published his research in Foreign Affairs, Foreign Policy, The Atlantic, Politico, Lawfare, and numerous scholarly journals, including Small Wars & Insurgencies, Historical Methods, and Military Operations Research.

Dr. Thomas Karako is a senior fellow with the International Security Program and the director of the Missile Defense Project at the Center for Strategic and International Studies (CSIS), where he arrived in 2014. His research focuses on national security, missile defense, nuclear deterrence, and public law. For 2010–2011, he was an American Political Science Association Congressional Fellow, working with the professional staff of the House Armed Services Committee and the Strategic Forces Subcommittee on U.S. strategic forces policy, nonproliferation, and NATO. Karako is also currently an adjunct professor in the Strategic Studies Program in the School of Foreign Service at Georgetown University, and a fellow with the Institute for Politics and Strategy of Carnegie Mellon University. He received his Ph.D. from Claremont Graduate University and his B.A. from the University of Dallas.

Expertise:
Defense Strategy and Capabilities, Defense and Security, Geopolitics and International Security

Associated Programs:
International Security Program, Missile Defense Project

Recent Publications:
Isaac Porche is a research scientist and chief engineer at General Dynamics Mission Systems. Previously, he worked as a senior engineer at the RAND Corporation and program director for the Homeland Security Operational Analysis Center. He also served as associate director of the RAND Arroyo Center's Forces and Logistics Program. His areas of expertise include acquisition, homeland security, cybersecurity network and communication technology, intelligence, surveillance, and reconnaissance (ISR); information assurance, big data, and cloud computing. He has led research projects for the US Navy, US Army, the Department of Homeland Security (DHS), the Joint Staff, and the Office of the Secretary of Defense. He is a member of the US Army Science Board, serving on the data-to-decisions panel and the tactical cyber panel. He has assessed collaboration and information-sharing issues, and modeling and simulation of tactical network communication technologies. For the Navy, he studies ISR issues and led the TCPED study as well as the AoA for the DCGS-N and MTC2 programs of record. He has published articles in the *Military Operations Research* on "The Impact of Networking on Warfighter Effectiveness" (2007) and “Game-Theoretic Methods for Analysis of Tactical Decision-Making Using Agent-Based Combat Simulations" (2009). His RAND publications include The Impact of Network Performance on Warfighter Effectiveness (with Bradley Wilson, 2006); Navy Network Dependability: Models, Metrics, and Tools (Porche et al., 2010); and Finding Services for an Open Architecture: A Review of Existing Applications and Programs in PEO C4I (Porche et al., 2011). Porche has served as a consultant for Automotive News. He received his Ph.D. in electrical engineering and computer science from the University of Michigan.

**Research Focus:**
- Big Data; Cyber Warfare; Homeland Security Legislation; Military Acquisition and Procurement; Military Information Technology Systems; Netcentric Warfare; Social Media Analysis; United States Army; United States Navy

**Concurrent Non-General Dynamics Positions:**
- Senior Fellow, George Washington University Center for Cyber & Homeland Security; Adjunct Instructor, Carnegie Mellon University Institute for Politics and Strategy; University of Michigan Electrical and Computer Engineering Advisory Council

**Selected Publications:**
• Isaac R. Porche, III, et al., *Cyber Power Potential of the Army’s Reserve Component*, RAND (RR-1490), 2017

**Honors & Awards:**
• 2011 and 2012 Silver Award, RAND
• 2008 Bronze Award, RAND
• 2005 Finalist, Best Paper, 10th International Command and Control Research and Technology Symposium

**Recent Media Appearances:**
*Interviews:* Defense News; Investor's Business Daily; Pittsburgh Post-Gazette; Pittsburgh Tribune-Review; Washington Times
*Commentary:* Bulletin of the Atomic Scientists; Future Force; Newsweek; Project Syndicate; San Francisco Chronicle; U.S. News & World Report