

VOLUME 4 ♦ NUMBER 2

The Cyber Defense Review: Defending Forward

Colonel Andrew O. Hall



INTRODUCTION

Welcome to the Fall edition of *The Cyber Defense Review* (CDR). This tenth edition of the CDR is published in conjunction with the Army Cyber Institute's (ACI) International Conference on Cyber Conflict U.S. (CyCon U.S.), which takes place November 18-20, at the Crystal Gateway Marriott in Arlington, VA. The CyCon U.S. conference is the premier forum on cyber conflict. Just like the CDR, the CyCon U.S. conference provides a venue for fresh ideas, relevant and actionable content, insight into future trends, and access to industry, government, and military leaders, cyber innovators, and pioneers in the discipline. The conference promotes multidisciplinary cyber initiatives and furthers research and cooperation on cyber threats and opportunities. The CyCon U.S. conference is a collaborative effort between the ACI at West Point and the NATO Cooperative Cyber Defence Centre of Excellence and complements the CyCon Conference held every May in Estonia.

This year's CyCon U.S. theme is Defending Forward, which is also the Department of Defense's (DoD) 2018 Cyber Strategy. Defending Forward identifies the need for active preparedness in cyberspace by disrupting or halting malicious cyber activity at its source and degrading said activity before it can reach its intended victim. This preemptive strategy advocates defending resources, from military operations to financial institutions, in both the public and private sectors. Critical infrastructure and sectors of the economy that are considered vital to the nation's economic prosperity are consistently scrutinized and exploited by several well-known cyber tools and techniques.

We are excited to publish the CyCon U.S. conference papers in the Winter 2020 CDR. This Special Edition of the CDR will feature five technical and seven policy papers that dramatically provide texture and insight into the complicated Defending Forward strategy. Also, the CDR continues a proud relationship with JSTOR's Security Studies collection.

This is a work of the U.S. Government and is not subject to copyright protection in the United States. Foreign copyrights may apply.



Colonel Andrew O. Hall is the Director of the Army Cyber Institute at the United States Military Academy (USMA) located at West Point, New York. In his position as Director, Colonel Hall leads a 70-person multi-disciplinary research institute and serves as the Chairman of the Editorial Board for *The Cyber Defense Review* (CDR) journal; and Conference Co-Chair for the International Conference on Cyber Conflict U.S. (CyCon U.S.). He has a B.S. in Computer Science from the USMA, an M.S. in Applied Mathematics from the Naval Postgraduate School, and a Ph.D. in Management Science from the University of Maryland. Colonel Hall additionally teaches in the Department of Mathematical Sciences and the Department of Electrical Engineering and Computer Science at the USMA. Since 1997, Colonel Hall's military career has been focused on operations research and solving the Army's most challenging problems using advanced analytic methods. Colonel Hall also serves as the President of the Military Applications Society of the Institute for Operations Research and the Management Sciences. His research interests include Military Operations Research, Cyber Education, Manpower Planning, and Mathematical Finance.

This edition of the CDR carries the message of Defending Forward and is our most robust, diverse, and thought-provoking. The Fall CDR includes an exclusive leadership interview, leadership and professional commentaries, research articles, a research note, and our featured book review. We are honored to have the opportunity to interview GEN (Ret.) David Petraeus for this edition. He is a warrior and scholar and one of this country's premier strategic thinkers. This interview will be a must-read for all cyber leaders and practitioners. GEN Petraeus fielded relevant questions from a team of ACI research scientists on the viability of comprehensive security.

The Fall CDR features a leadership perspective article from Mr. Robert Schrier, the Chief of Staff of Asymmetric Operations Sector of Johns Hopkins Applied Physics Laboratory. Mr. Schrier is retired from DoD Senior Executive Service where he last served as the Deputy to the Commander, Cyber National Mission Force (CNMF), U.S. Cyber Command. In his powerful work "Case for Action - Changing the Focus of National Cyber Defense," Mr. Schrier challenges the nation to create processes and capabilities to prevent, deter, and preempt cyber-attacks against our critical infrastructure, as well as to interdict and counter those attacks.

Our Professional Commentary section begins with the article "Information Warfare and its 18th and 19th Century Roots" by MAJ Nathaniel Bastian, Ph.D. He is formerly of the ACI and now working as a Senior Data Scientist and AI Specialist within the Capability Delivery Directorate of the Joint Artificial Intelligence Center (JAIC). This critical commentary takes a penetrating look into the historical implications impacting today's Information Warfare landscape. Continuing with our Professional Commentaries, we have an excellent article by Kiersten E. Todt, Resident Scholar at the University of Pittsburgh's Institute for Cyber Law, Policy, and Security. In "Data Privacy and Protection: What Businesses Should Do," Ms. Todt gives readers three specific

mechanisms that companies should employ to ensure the privacy and protection of their customers and clients.

Our CDR readers will thoroughly enjoy all five scholarly research articles. Dr. Kamal Jabour, Air Force Senior Scientist for Information Assurance presents CDR readers with a paradigm shift from cybersecurity through network defense to mission assurance through information assurance. Dr. Greg Conti and Dr. Bob Fanelli from IronNet Cybersecurity presents a valuable study that explores the profound cyber threat from State actors. Ms. Hallie Coyne takes an exhaustive look at Edward Snowden and the origins of the General Data Protection Regulation (GDPR). The CDR showcases the work of Dr. Jacob Cox, COL Daniel Bennett, Ph.D., COL (Ret.) Scott Lathrop, Ph.D., LTC (Ret.) Christopher Walls, CW4 (Ret.) Jason LaClair, LTC Clint Tracy, and CW4 Judy Esquibel with their study of electronic warfare and cyber convergence. We feature two brilliant French cyber scholars, Dr. Rudy Guyonneau from Sopra Steria SA and LTC Arnaud Le Dez from Saint-Cyr Military Academy as they provide a breathtaking look at Artificial Intelligence and the future of cyber warfare.

The CDR continues with its high-velocity research note section with an exciting article from LTC David Beskow and Dr. Kathleen Carley, both from Carnegie Mellon University as they investigate geospatial disinformation campaigns. If you are looking for an exceptional cyber read, Mr. Philip Shackelford's review of "Dawn of the Code War" by John P. Carlin, sheds light on the cyber struggles the U.S. Government faces each day.

I'm delighted to announce the ACI's publication of *Nonsimplicity, The Warrior's Way* by Dr. Bruce West and Dr. Chris Arney. This essential scholarly work addresses what complexity science suggests are the appropriate changes and implications in policies, procedures, and principles for the individual within the military. We are also excited to announce that the CDR's Digital Editor is currently working on a more up-to-date and academic website that will continue to push the cyber conversation. I encourage our readers to submit research papers, commentaries, research notes, book reviews, or blogs on the CDR *ScholarOne* platform: <https://mc04.manuscriptcentral.com/cyberdr>.

Please check our Call for Papers announcement on the CDR website to submit articles on "Information Operations" for a themed Summer 2020 CDR: <https://cyberdefensereview.army.mil/>. Information Operations is critical to military leaders and policymakers as they develop strategies to support the nation. We welcome a multidisciplinary and international examination of this important topic.

I want to recognize the remarkable talent and creativity of Michelle Marie Wallace, Sergio Analco, Gina Daschbach, SGM Jeff Morris, Courtney Gordon-Tennant, and the special members of the West Point Class of '70 in shaping this important edition. As always, we are excited to continue the cyber conversation together!💙