

## Department of Electrical Engineering and Computer Science



***COL Andre Sayles, Ph.D***  
***Professor and Head,***  
***Department of Electrical Engineering and Computer Science***

The mission of the Department of Electrical Engineering and Computer Science is to educate cadets to be Army officers who understand, develop, and exploit current and future technologies. We ensure that our highly productive research programs support our curriculum, enhance the professional development of both cadets and faculty, and contribute to the fields of science and engineering important to the Department of Defense. Our 50 faculty members have superb qualifications in computer science, electrical engineering, information systems engineering, and information technology. The Photonics Research Center and the Information Technology and Operations Center have an outstanding track record of finding research opportunities that best support our mission, establishing funding programs, and then inviting faculty to support the project of choice with no overhead requirements or administrative burdens. This approach to department research has resulted in 100% faculty participation and up to 100 publications and presentations in a given year. At the same time, we are making a difference throughout the Defense community as well as in the Federal Government. Of particular note are our contributions to smart pixel technologies, optical and over-sampled analog to digital conversion, image processing, information assurance, science and engineering education, diversity, officer education needs in network-centric warfare, information technology, advanced technology classrooms, high speed communications, fiber optics, and the science and engineering underpinning numerous Army battlefield and automation systems. The quality of our scholarship and service is recognized by peers nationally and internationally.

Through the efforts of the Information Technology and Operations Center, USMA was re-designation as a Center of Academic Excellence in Information Assurance Education

by the National Security Agency (NSA). The Military Academy was the first-ever undergraduate institution to be so designated. The Information Technology and Operations Center also continues to be the driving force behind the annual Cyber Defense Exercise. The Cyber Defense Exercise challenges cadets from all five service academies to design, implement, and protect a sophisticated computer network from attack by a NSA-led red team. The winning academy is awarded the NSA Information Assurance Director's Trophy. This program has significantly raised the level of Information Assurance education and understanding for all participants and is being used as the model for both a multi-national Department of Defense exercise and a competition for civilian universities. Additionally, the Information Technology and Operations Center serves as the lead agency for the Annual IEEE Information Assurance Workshop, which brings together over 150 representatives from academia, industry and the federal government. The electrical engineering and computer science efforts in the Photonics Research Center continue to be singled out for excellence during reviews by outside agencies. Faculty members received several awards for excellence over the past year, while the teaching programs worked hard in completing an excellent accreditation visit.

**Information Technology Operation Center Projects:**  
**Center Director: LTC Ron Dodge, Ph. D**

**Information Operations**

***The Effects Based Assessment Support System***  
**MAJ Morel, LTC Mike Kwinn (ORCEN)**

**SPONSOR: Joint Forces Command, Multi-National Forces Headquarters, Iraq**

The Effects Based Assessment Support System (EBASS) was originally developed under the name of the Dynamic Planning and Assessment Support System (D-PASS) to aid Coalition Joint Task Force 180 in the Future Operations planning for Operation Enduring Freedom in Afghanistan. EBASS, a joint effort between the ITOC and ORCEN, has been selected for use in the Standing Joint Forces Headquarters by JFCOM and is being evaluated Future Combat Systems by the PM Ground Combat Command and Control. The application is being field tested in Terminal Fury 2004 (PACOM exercise) and by the Multi-National Force Headquarters in Iraq.

*M. Kwinn, J Brence, T Morel, E Pohl, and R Deckro, "Assessment in Afghanistan using Value Focused Thinking", Presented at Military Operations Research Society Symposium, June 2004*

*M. Kwinn, J Brence, T Morel, E Pohl, and R Deckro "Operation Enduring Freedom Assessment System Development", Briefing to the Defense Analysis Seminar XII, Seoul, South Korea"*

***Non-Line-Of-Sight Launch System (NLOS-LS)***  
**MAJ Fernando Maymi, Dr. John James**

**SPONSOR: Program Manager, Ground Combat Command and Control**

The Army is developing a family of inexpensive tactical cruise missiles known as the Non-Line-Of-Sight Launch System (NLOS-LS). The Navy recently decided to incorporate this system into their state-of-the-art Littoral Combat Ship. The thrust of current joint efforts is in understanding how NLOS-LS will best support both land and littoral operations. The goal for this year is to model the route planning and target-seeking aspects of missile performance

*Hill, J., James, J., Maymi, F., Manz, P., "A Framework for Comparing Command and Control Architectures for Autonomous Tactical Missile Swarms", Advanced Simulation Technology Conference, Arlington, VA, April 2004*

***Probability of Line-of-Sight in Urban Terrain***  
**MAJ Fernando Maymi**

**SPONSOR: TRAC Monterey**

Many combat simulations require the determination of whether there is line-of-sight between two urban locations. The process of calculating line-of-sight is time-intensive. This past year we developed a system that calculates the probability of line-of-sight between two urban locations based on distance and sensor placement. The application used existing terrain data files and produced customized probability tables for a given scenario.

*Bergeron, D., Ramos, M., Fierner, D., Bairley, D., Maymi, F., "Calculating Line of Sight in an Urban Warfare Simulation", Proceedings of the National Conference on Undergraduate Research 2004, Indianapolis, Indiana*

***Terrain Visualization Module***  
**MAJ Fernando Maymi**

**SPONSOR: Program Manager PM Intelligence & Effects**

The Fire Support Client for AFATDS is a Java application that provides multiple users with a subset of the capabilities of AFATDS. The graphics support in the FSC is primitive at best. This past year we developed a prototype of a module that provides users a three-dimensional rendering of the terrain in the area of operations. This allows the users to precisely manage fire missions by pointing and clicking on the terrain model.

*Arnett, D. Driscoll, D, Simmons, J., York, K., Alford, K., "Tactical Terrain Visualization System", Proceedings of the 2004 Systems and Software Technology Conference, Salt Lake City, Utah*

***Land Warrior Network Simulation***  
**MAJ Fernando Maymi**

**SPONSOR: Program Manager, Soldier Systems**

Once Land Warrior soldiers are equipped with a variety of subsystems, they will need to be networked together to facilitate situational awareness and command and control. In this project, we are building a network simulation of the proposed system as a baseline. Once this is done, we will conduct experiments to determine the sensitivity of the system to interruption and degradation. In addition, we will be able to use this model to help determine the effects of new technologies, protocols or organizations on the overall system.

*J., James, F. Maymi, "An Environment for Comparing Command and Control Architectures", Command and Control Research Symposium, San Diego, California, June 2004*

*A.E. Henninger, G. Taylor, J.R. Surdu, and C. Jacquet, "Using COTS Software to Capture Deliberate and Reactive Weapons Firing Behavior: Lessons Learned in Knowledge Acquisition", 12th Conference On Behavior Representation In Modeling and Simulation (BRIMS 2003), Scottsdale, Arizona, May 12-15, 2003.*

***Palm Device Application Development***  
**MAJ Fernando Maymi**

**SPONSOR: CECOM RDEC, FT Monmouth, NJ**

Researchers propose to develop a suite of palm device application tools that can be used by a robust group of leaders. This will be a multi-disciplinary effort involving many departments at USMA. It will also include coordination with the CompanyCommander.com and PlatoonLDR.org programs.

***Analysis and Classification of Multi-spectral Imagery***  
**MAJ Kenneth Fritzsche, Ph.D**

**SPONSOR: US Army Topographic Engineering Center**

This work will compare the effectiveness of machine learning methods, geostatistical methods, and traditional human (parametric) methods in the extraction and classification of terrain features from multi-spectral imagery using various sources of data. Research objectives include:

- Select the best combinations of different bands from the hyperspectral image.
- Apply both a backpropagation neural network and competitive network using Learning Vector Quantization (LVQ) to evaluate classification
- Assess the impact of ancillary information, such as a digital elevation model.

***PKI/ Cross Domain XML for Coalition Operations***  
**Dr. Aaron Ferguson**

**SPONSOR: DoD/NII**

As the DoD and Intelligence Community migrate from a "need-to-know" to a "need-to-share" environment, XML and PKI will become the de facto enablers of secure cross-domain information sharing. XML facilitates information sharing while the PKI facilitates identity management. The Allied Coalition Information Exchange System is a web-based PKI XML prototype for secure information exchange across security domains (e.g., Top Secret-to-Secret).

*Eason, J. Hampton, G., Strangio, D., Abu-Yaghi, F., Ferguson, A., "Allied Coalition Information System." Presented at the Systems and Software Technology Conference, Salt Lake City, UT, April 2004*

**Information Assurance**

***Military Academy Attack/Defense Network Simulation***  
**LTC Ronald Dodge, Ph.D, LTC John Hill, Ph.D**

**SPONSORS: National Science Foundation, Defense Information Systems Agency**

This complete application simulates all facets of building and managing an information system; combining them into a seamless application that provides an integrated, engaging, challenging, and competitive information assurance learning environment. The goal is to build an information assurance simulation that integrates all the complexities involved in maintaining an information system infrastructure, including hardware configuration, service requirements, "sizing" the system to the correct capacity, administrative support and security configuration.

*D. Edelstein, D. Edwards, "Representing Secure Knowledge Management with Policies and Procedures in a Network Simulator" Workshop for Secure Knowledge Management, Buffalo, NY Sept 2004*

*D. Edelstein, D. Edwards, "A Component-Based Design for a Simulated Network", 2004 IEEE International Conference on Information Reuse and Integration, Las Vega, NV, Nov 2004*

***Honeynets***  
**LTC Ronald Dodge, Ph.D**

**SPONSOR: 1<sup>st</sup> Information Operations Command**

Honeynets are an ideally suited security tool for detecting new attacks and catching advanced attackers. They reveal the attacker's identity, tools, and means of communication. Data collected from honeynets contribute to the prevention of future attacks. We have worked with

the 1st Information Operations Command to develop policies for honeynet implementation. The system designed at West Point is being used as the model for development of Army and DoD systems. We are collaborating with the USMA CERT and CIO on deployment at USMA.

*Dodge, R. Brown, R, Ragsdale, D, "Deploying Honeynets", Sixth Workshop on Education in Computer Security, Naval Postgraduate School, Monterey, California, 15-16 July 2004*

***Network Enterprise Security Agent Architecture***  
**MAJ Kenneth Fritzsche, Ph.D**

**SPONSOR: National Reconnaissance Office**

The diversity of applications, firewalls, and intrusion detection systems present network administrators with a seemingly unmanageable data correlation and storage problem. The goal is to build a scalable system of distributed agents designed to monitor systems at all levels within an enterprise to develop a current assessment of security posture and provide an aggregate threat condition. The purpose of this research is to investigate and apply intelligent methods and Agent-based approaches to provide adaptive intrusion detection and intrusion response. The objectives of this research are to:

- Investigate data reduction methods to possibly find key variables in the data set;
- Apply and assess the accuracy of several types of neural networks regarding the classification of intrusive behavior;
- Develop appropriate metrics and tolerance levels associated with the operation of a given classification system; and
- Assess the risk associated with malicious intrusive behavior versus the resources and time consumed by given classification systems.

*F. Maymi, "Point/Counterpoint: Are You For or Against Intrusion Prevention Systems (IPS)?", The ISSA Journal, June 2004*

***SpyWare Analysis and Tool Evaluation***  
**LTC Ronald Dodge, Ph.D**

**SPONSOR: IAD, G6/CIO**

Spyware installing applications present a security risk as significant as virus and worms. The ability for applications and scripts to monitor, record, and report activity ranging from keyboard logging to Internet surfing habits without user consent is a significant security risk. The ITOC prepared a report on the actions of the most prolific spyware offenders and conducted a security and effectiveness analysis of several client based spyware mitigation applications. The ITOC is working with the USMA CIO to evaluate enterprise spyware mitigation solutions.

*G. Stewart, R. Dodge, and D. Ragsdale, "Embedded Firewall Defense," Proceedings of the 2nd Annual IEEE International Information Assurance Workshop, Charlotte, NC, April 8-9, 2004*

*R. Dodge, "Spyware analysis – techniques and tools", Technical report to the IAD, G6/CIO, September, 2003*

***WebDAV Security Analysis***  
**MAJ Mike Lanham**

**SPONSOR: National Security Agency**

WebDAV is the IETF standard mechanism for distributed authoring and versioning in collaborative environments. Although widely implemented in DoD, a detailed security analysis of this mechanism has not been performed, leaving many DOD servers vulnerable to attack. This deficiency is highlighted by the 2004 WebDAV exploit. The ITOC is building a prototype network and to provide an analysis of the various WebDAV features and inherent security risks.

**Information Assurance Education**

***Virtual Information Assurance Networks***  
**LTC Ronald Dodge, Ph.D**

**SPONSOR: National Security Agency, Microsoft**

The Virtual Information Assurance Network (VIAN) project at USMA uses new technologies to allow for robust testing on a single platform. The VIAN solution has been demonstrated to several Federal Agencies and is currently in use by the 1st Information Operations Command and the State Department. The agencies use the system for both live exploit experimentation and for education. VIAN provides a "real" network using only one machine. In this machine, virtual networks can be rapidly configured. The project provides the Army with the capability to analyze malicious Virus/Trojan/Worms in mobile isolated environments.

*D. Ragsdale, R. Dodge, and S. Lathrop, "The Educational Virtual Information Assurance Network (EVIAN) ," Proceedings of the 4th Annual IEEE Information Assurance Workshop, West Point, NY, June 17-19, 2003*

*L. J. Hoffman, R. Dodge, T Rosenberg, and D. J. Ragsdale, "Novel Approaches for Information Assurance Laboratories," The Journal of Information Security, May 2003.*

*L. J. Hoffman, R. Dodge, T Rosenberg and D. J. Ragsdale "Information Assurance Laboratory Innovations," 7th Colloquium for Information Systems Security Education Washington, DC, June 2-6, 2003*

***Fifth Annual IEEE Information Assurance Workshop***

**LTC Ronald Dodge, Ph.D, COL Dan Ragsdale, Ph.D, MAJ Ken Fritzsche, Ph.D,  
Dr. Aaron Ferguson, Dr. John James, MAJ Fernando Maymi, COL Clark Ray,  
Ph.D**

**SPONSORS: IEEE Systems, Man and Cybernetics Society, National Security  
Agency**

The Department of Electrical Engineering and Computer Science, with support from the IEEE and the National Security Agency, has initiated a national-level series of workshops to provide a forum for discussion of information-assurance-related issues and publication of information-assurance-related research. The EE&CS Information Technology and Operations Center has hosted highly regarded workshops on Information Assurance Topics for the previous four years. The proceedings have been published on compact disk and in book form. The next workshop will be held –15-17 June 2005 at West Point.

*Proceedings of the Fourth Annual IEEE SMC Information Assurance Workshop, June 10-11 2004, West Point, NY, ISBN: 0-7803-7808.3.*

***Eighth Colloquium for Information Systems Security Education***

**LTC Ronald Dodge, Ph.D, COL Dan Ragsdale, Ph.D, MAJ Ken Fritzsche, Ph.D,  
Dr. Aaron Ferguson, Dr. John James, MAJ Fernando Maymi, COL Clark Ray,  
Ph.D**

**SPONSORS: Colloquium for Information Systems Security Education, National  
Security Agency, Department of Homeland Security**

The Department of Electrical Engineering and Computer Science, hosted the eighth Colloquium for Information Systems Security Education (CISSE). The Colloquium is the premier US conference on Information Assurance Education, attended by approximately 300 representatives from government, industry, and academia.

*Proceedings of the eighth Annual Colloquium for Information Systems Security, June 7-10 2004, West Point, NY, ISBN: 0-7803-7808.3.*

***Cyber Defense Exercise 2004***  
**LTC Ron Dodge, Ph.D**

**SPONSOR: Public Key Infrastructure Program Office, National Security Agency**

The inter-academy Cyber Defense Exercise (CDX) is a hands-on, competitive real-life learning experience initiated and implemented by faculty and cadets of the US Military Academy, with funding and direction provided by the National Security Agency. The concept of "defending the network" was derived to evaluate cadet skills and the effectiveness of the Information Assurance (IA) education at West Point. The CDX served as the final project for senior-level Computer Science majors enrolled in the IA course. All five service academies and the Air Force Institute of Technology competed in 2004.

A combined team of analysts from the National Security Agency and the 92<sup>nd</sup> Aggressor Squadron, US Air Force served as the Red Team. Remote access was provided to each participating school's Cyber Defense Network (CDN) via a Virtual Private Network configured to provide authentication and encryption of all traffic. The team verified the student's efforts to provide security to the CDN while ensuring the predetermined services and applications were available, with a baseline set of network resources and operating systems provided by the DoD Public Key Infrastructure Program Management Office. The Red Team then, based on predetermined assessment criteria, designated the school with the strongest information assurance posture the winner of the exercise.

*R Dodge, D.J. Ragsdale, "Organization and Training of a Cyber Security Team", 2003 IEEE International Conference on Systems, Man & Cybernetics, October 5-8, 2003*

*R Dodge, T. Wilson, "Data trends in malicious activity during a Cyber Defense Exercise", 2003 IEEE International Conference on Systems, Man & Cybernetics, October 5-8, 2003*

*Dodge, R., Ragsdale D., "Organized Cyber Defense Competitions", IEEE International Conference on Advanced Learning Technologies, Jpensuu, Finland 30 Aug - 2 Sept 2004*

***Classroom XXI***  
**MAJ Edward Mattison, MAJ Tracy Mann**

**SPONSOR: TRADOC**

This project provides technical expertise and maintains the test-bed laboratory for the TRADOC multimedia classroom of the 21st Century. In addition, it evaluates and recommends proposed technologies. The researcher performs test and acceptance of Classroom XXI implementations and conducts courseware development training. Objectives include:

- Determine benefits and limitations of student computer management tools;
- Evaluate collaborative tools and other methods to enhance student learning;
- Evaluate and test hardware, software, and audio-visual equipment for possible use in future Classroom XXI implementations; and

- Assess knowledge/learning management systems to enhance school administrator ability to conduct soldier Human Capital Management.

*MAJ Mattison made several presentations to senior TRADOC leadership, including the CG, on the future of Army Distance Learning and the feasibility of combining several technology-driven Army education programs.*

***Information Assurance Education and Curriculum Development***  
**LTC Ronald Dodge, Ph.D, COL Daniel Ragsdale, Ph.D**

Our nation's economy and our military are becoming increasingly dependent on information systems. Assuring the confidentiality, integrity, and availability of these systems is a national security issue. A significant effort is being expended to develop information assurance curriculum for use in undergraduate programs. Objectives include:

- Develop consistent IA curriculum criteria for all undergraduate universities to employ;
- Share advances in IA education with other universities as well as industry by facilitating technology transfer;
- Work with the NSA and other organizations to continue to expand cadet and faculty internships;
- Ensure IA education is conducted employing a multi-disciplinary approach; and
- Identifying means for universities resource bounded to include IA into existing curriculum.

*D. J. Ragsdale, and R. Dodge, "Author's Commentary: The 2004 Interdisciplinary Contest in Modeling (ICM)," The UMAP Journal, Fall 2004.*

*D. Ragsdale, D. Welch, and R Dodge, "Information Assurance the West Point Way," IEEE Security and Privacy, winter 2003*

*R Dodge, D Ragsdale, "State of the Art Information Warfare Training", IA Newsletter, July 2003*

*S. D. Lathrop, G. J. Conti, D. J. Ragsdale, " Information Warfare in the Trenches," Security Education and Critical Infrastructures, C. Irvine and H. Armstrong, Editors. 2003, Kluwer Academic Publishers: Boston. pp. 19-39.*

*R. Dodge, "Do Military Forces Need PhD.s?", 19th IFIP International Information Security Conference, Toulouse, France 23-26 Aug 2004*

*A. Ferguson, "Information Assurance Education OR Training: Blurring the Boundaries", Presentation to the Federal Information Systems Security Education Association, Adelphi, MD, March 2004*

A. Ferguson, "Infrastructure Assurance: The New 'I' in Information Assurance Education", Presentation to the 8th Colloquium for Information systems Security Education, West Point, NY, June 2004

***Efficient Algorithms for Problems Modeled by Graphs***  
**Dr. Jean R. S. Blair and LTC Steven B. Horton**

Dr. Blair and LTC Horton from D/Math worked with two groups of world-class researchers: one in the computer science department at Clemson University (Hedetniemi, Hedetniemi, and Goddard), and one in the Informatics Department at Bergen University (Heggernes and Manne) in Bergen, Norway. AY 03-04 publications from these efforts are listed below.

J.R.S. Blair, W. Goddard, S.M. Hedetniemi, S.T. Hedetniemi and S.B. Horton, "Dominance equivalence in graphs." Submitted in August 2003 to *Nordic Journal of Computing*.

J.R.S. Blair, P. Heggernes, S.B. Horton and F. Manne, "Broadcast domination problems for interval graphs, series-parallel graphs and trees," to appear in *Congressus Numerantium*.

Anne Berry, Jean R. S. Blair, Pinar Heggernes, and Barry W. Peyton, "Maximum Cardinality Search for Computing Minimal Triangulations of Graphs," *Algorithmica* (2004) 39, pp: 287-298, Springer-Verlag New York, LLC.

Jean R. S. Blair and Fredrik Manne, "Efficient Generic Multi-Stage Self-Stabilizing Algorithms for Trees", *17th International Conference on Parallel and Distributed Computing Systems*, San Francisco, CA, September 2004, pp. 333-338.

***Classroom Collaboration in Core Information Technology and Chemistry Courses***

**Ms. Susan Schwartz , Dr. Eileen Kowalski, Department of Chemistry & Life Science**

The intent of this project was to provide cadets with a broader sense of how topics in their courses cross academic disciplines. The link between the plebe core introductory two-semester chemistry course, General Chemistry (CH101/CH102) and the core information technology course, Introduction to Computing and Information Technology (IT105) had not been explored. Due to the structure of both courses – 40 lessons with set topics that must be taught to all plebes – it was decided that this project would be restricted to incorporating chemistry into programming assignments in IT and IT problem solving tools into chemistry.

**Photonics Research Center Projects**

The following Department of Electrical Engineering and Computer Science projects are described in the Photonics Research Center section:

***Photonic Analog-to-Digital Conversion and Image Processing Applications of the Error Diffusion Neural Network***

COL Barry L. Shoop, Ph.D., COL Eugene K. Ressler, Ph.D., LTC Brian Gollsneider, Dr. Thomas D. Wagner, Dr. Jean R. S. Blair, LTC David A. Nash, Ph.D., LTC Robert W. Sadowski, Ph.D., COL Glen P. Dudevoir, Ph.D., COL Andre H. Sayles, Ph.D., Dr. Wenli Huang, LTC George Nowak, Ph.D., Dr. Pankaj K. Das, University of California at San Diego, Dr. Liu Jaing, Dr. Joseph N. Mait, Dr. George Simonis, U.S. Army Research Laboratory, Adelphi, Maryland

Sponsors: U.S. Army Research Office, Defense Advanced Research Projects Agency

***Photonic Analog-to-Digital Conversion Using Spatial Oversampling and Spectral Noise Shaping***

COL Barry L. Shoop, Ph.D., COL Eugene K. Ressler, Ph.D., LTC Robert W. Sadowski, Ph.D., COL Glen P. Dudevoir, Ph.D., COL Andre H. Sayles, Ph.D., LTC George Nowak, Ph.D., Dr. Pankaj K. Das, University of California at San Diego

Sponsor: Defense Advanced Research Projects Agency, U.S. Army Research Office

***Mixed Signal Applications of Smart Pixel Technology***

LTC Robert W. Sadowski, COL Barry L. Shoop, COL Glen P. Dudevoir, COL Andre H. Sayles, LTC Brian Gollsneider and Dr. Wenli Huang, Dr. Pankaj K. Das, University of California at San Diego, Dr. George Simonis, U.S. Army Research Laboratory

Sponsor: Defense Advanced Research Projects Agency, U.S. Army Research Office

***Extensions of the Error Diffusion Neural Network: Partitioning and Multigrid Methods***

Dr. Jean R. S. Blair, LTC David A. Nash, COL Eugene K. Ressler, COL Barry L. Shoop, Dr. Thomas D. Wagner, Dr. Pankaj K. Das, University of California at San Diego

Sponsor: Defense Advanced Research Projects Agency, U.S. Army Research Office

***Biologically Motivated Analog-to-Digital Conversion***

COL Eugene K. Ressler and COL Barry L. Shoop, Dr. Pankaj K. Das and Dr. Brian Watson, University of California at San Diego

Sponsor: Defense Advanced Research Projects Agency, U.S. Army Research Office

**Additional Department Research Papers**

**Book chapters**

Kenneth L. Alford, Gregory Conti, David B. Cushen, Eugene K. Ressler, Jr., William Turmel, and Donald J. Welch, "Computing at West Point: Revolution to Purposeful Evolution", West Point, Two Centuries and Beyond, edited by Lance Betros, McWhitney Foundation Press, Abilene, Texas 2004.

G. Conti, J. M. D. Hill, et al. "A Comprehensive Undergraduate Information Assurance Program in Security Education and Critical Infrastructures," C. Irvine and H. Armstrong, Editors, 2003, Kluwer Academic Publishers: Boston. pp. 243-260. (Book Section - Originally presented at

the 3rd World Conference on Information Security Education (WISE 3), Monterey, California, June 26-28, 2003).

M. Liebrand, H. Ellis, C. Phillips, S. Demurjian, and T.C. Ting., "Role Delegation for a Distributed Security Model," *Data and Applications Security: Developments and Directions II*, E. Guedes, S. Shenoi (eds) Kluwer, 2003. Chapter 4, pp 37-48.

S. Demurjian, K. Bessette, T. Doan, and C. Phillips., "Concepts and Capabilities of Middleware Security" *Middleware for Communications*, Chapter 9, John Wiley&Sons, June 2004, pp 211-235.

C. Phillips, S. Demurjian, and T.C. Ting., "Safety and Liveness for an RBAC/MAC Security Model," in *Research Advances in Data and Applications Security II*, S. di Vimercati and I. Ray (eds.), 2004. pp. 305-318.

Charles Edward Phillips, Jr., "Security Assurance for a Resource-Based RBAC/DAC/MAC Security Model," Ph.D. thesis, University of Connecticut, April 2004.

Liang, Puett, Luqi; Quantifiable Software Architecture for Dependable Systems of Systems, *Architecting Dependable Systems II*; Ed. Lemos, Gacek, Romanovsky; Springer-Verlag; 2004.

### **Journal and Conference Papers**

K. Alford and J. M. D. Hill. "Adding PDAs to Your Teaching Toolkit," *Frontiers in Education (FIE 2003)*, Westminster, Colorado. November 5-8, 2003. pp. S4E 14-19.

K. L. Alford. "Multidisciplinary Computer Science Design Projects." *American Society for Engineering Education (ASEE) Annual Conference*, Salt Lake City, Utah, June 20-23, 2004.

K. L. Alford. "Teaching Resources for Handheld Computers." *American Society for Engineering Education (ASEE) Annual Conference*, Salt Lake City, Utah, June 20-23, 2004.

K. L. Alford and A. Gandolfo. "Helping Teachers to Teach: Ideas from West Point." *American Society for Engineering Education (ASEE) Annual Conference*, Salt Lake City, Utah, June 20-23, 2004.

K. L. Alford, J. Eason, et. al. "Allied Coalition Information Exchange System." *Systems and Software Technology Conference*, Salt Lake City, Utah, April 19-22, 2004.

K. L. Alford, "Video FAQs: Instruction on Demand." *Frontiers in Education (FIE 2003)*, Westminster, Colorado, November 5-8, 2003.

K. L. Alford and A. S. Ruocco, "A Survey of Group Work within Computer Science Programs." *Frontiers in Education (FIE 2003)*, Westminster, Colorado, November 5-8, 2003.

G. Parnell, J. Blair, C. Ray, C. Carver, M. Matthews, "Genesis of the New Information Systems Engineering Program at the United States Military Academy at West Point," *International*

*Conference on Information Systems and Engineering (ISE 2003)*, Montreal, Quebec, Canada, July 20-23, 2003.

Shahtab Wahid, C. F. Allgood, C. M. Chewar, and D. Scott McCrickard. "Entering the Heart of Design: Relationships for Tracing Claim Evolution". In *Proceedings of the Sixteenth International Conference on Software Engineering and Knowledge Engineering (SEKE '04)*, Banff Alberta Canada, June 2004, pp. 167-172.

Gregory Conti, John Hill, Scott Lathrop, Kenneth Alford, and Daniel Ragsdale "A Comprehensive Undergraduate Information Assurance Program," *3rd World Conference on Information Security Education (WISE 3)*, Monterey, California, June 26-28, 2003.

L. J. Hoffman, R. Dodge, T Rosenberg and D. J. Ragsdale "Information Assurance Laboratory Innovations," *7th Colloquium for Information Systems Security Education*, Washington, DC, June 2-6, 2003

R Dodge, D.J. Ragsdale, C. Reynolds, "Organization and Training of a Cyber Security Team", *2003 IEEE International Conference on Systems, Man & Cybernetics*, October 5-8, 2003

R Dodge, T. Wilson, "Data trends in malicious activity during a Cyber Defense Exercise", *2003 IEEE International Conference on Systems, Man & Cybernetics*, October 5-8, 2003

R. C. Dodge, D. J. Ragsdale, and D W. Welch, "State-of-the-Art Information Warfare Training," *IA Newsletter*, Volume 6, Number 2, Fall 2003, pp. 18-21 and p. 28.

T. R. Flowers, T. O. Morel, J. M. D. Hill, and C. A. Carver, Jr., "Building a Web-Based Self-Assessment System within a Web Application Framework (J2EE)" *Educational Multimedia, Hypermedia and Telecommunications (ED-MEDIA 2003)*, Honolulu, Hawaii, June 23-28, 2003.

Carl E. Fossa, Jr. and Thomas G. Macdonald, "Dynamic Resource Allocation for Satellite Communications," *IEEE Wireless Communications and Networking Conference*, March 2004.

Cadets Steve Queen Steve Queen, Dave Castillo, LTC Carl Fossa, "Data Communications Over Geostationary Satellite Systems," *2004 National Conference on Undergraduate Research (NCUR)*, Indiana University-Purdue University, Indianapolis, Indiana, 15-17 April, 2004.

Jong-Ru Guo, Chao You, M. Chu, R. Heikaus, K. Zhou, O. Erdogan, B.S. Goda, R.P. Kraft, J.F. McDonald, "The Gigahertz FPGA: Design consideration and Applications," *ISFPGA 2004*.

K. Zhou, J. R. Guo, C. You, J. Mayega, R. P. Kraft, J. F. McDonald and B.S. Goda, "Multi-GHz SiGe BiCMOS FPGAs with new architecture and novel power management techniques", *Journal of Circuits, System, and Computers*, World Scientific Publishing Company, accepted March 2004.

Cadet Louis Jenkins and LTC Brian Gollsneider, "Characterizing Vertical Cavity Surface Emitting Laser Performance," *2004 National Conference on Undergraduate Research (NCUR)*, Indiana University-Purdue University, Indianapolis, Indiana, 15-17 April, 2004.

Brian Gollsneider, "The West Point BattleBots Project and Competition," *Academic Exchange Quarterly*, June 2004.

Peter D. Hanlon, Bryan S. Goda, and Lisa A. Shay, "Experience with Multidisciplinary Design Projects at the US Military Academy," *Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition* (June 2004).

W. R. Harrison, C. M. Wren, and J. M. D. Hill. "The Intelligent Power Plant Analysis Tool," *Advanced Simulation Technologies Conference, Military-Government-Aerospace Symposium (ASTC-MGA 2004)*, Arlington, Virginia, April 18-22, 2004.

J. M. D. Hill and J. R. Surdu, "Simulation Support for Mission Planning," *The 9th Annual Mission Planning Conference*, London, England, March 17-18, 2004.

J. M. D. Hill and K. Alford. "A Distributed Task Environment for Teaching Artificial Intelligence with Agents," *Technical Symposium on Computer Science Education (SIGCSE 2004)*, Norfolk, Virginia, March 3-7, 2004.

J. M. D. Hill, J. R. Surdu, S. Lathrop, G. Conti, C. A. Carver, Jr., "MAADNET: Toward a Web-Distributed Tool for Teaching Networking and Information Assurance" *Educational Multimedia, Hypermedia and Telecommunications* Honolulu, Hawaii, June 23-28, 2003. pp. 773-776.

W. Huang, F. Jain, "Integrated InGaAs-InP quantum wire laser-modulators for 1.55 um applications," *Optical Engineering Journals*, 43(3) 667-672 (March 2004).

M. Reilly, W. Huang and F. Jain, "Photonic Crystal Beam-Splitting Laser Diode," *Proceedings of SPIE 49th Annual Meeting: Optical Science and Technology*, Denver, CO, 2-6 August 2004.

El- Sayed Hasaneen, E. Heller, W. Huang, A. Rodriguez, J. Lee, F. Papadimitrakopoulos and F. Jain, "Nonvolatile Quantum Dot Memory in Floating Gate Configuration: Device and Circuit Modeling," *2003 3rd IEEE Conference on Nanotechnology*, San Francisco, CA, August, 2003.

John James and Frank Mabry "Building Trustworthy Systems: Guided State Estimation as a Feasible Approach for Interpretation, Decision and Action Based on Sensor Data," *37<sup>th</sup> Hawaii International Conference on System Science*, 5 January, 2004

W.J. Schepens, J. James, "Architecture of a Cyber Defense Competition," *2003 IEEE International Conference on Systems, Man & Cybernetics*, October 5-8, 2003.

Mike Lanham, "Developing An Undergraduate Distributed Development Course," *Proceedings of International Conference on Education & Information Systems: Technologies and Applications*, Orlando FL, July 2004

X. Zhao, J. R. Heath, Paul Maxwell, Andrew Tan, and Chameera Fernando, "Development and First-Phase Experimental Prototype Validation of a Single-Chip Hybrid and reconfigurable Multiprocessor Signal Processor System," *2004 IEEE Southeastern Symposium on System Theory*, March 14-16 2004, Atlanta, GA.

Paul Maxwell, "Innovative Army units, manufacturers create cost-effective simulators," *Training and Simulation Journal*, September 1, 2003.

Timothy G. Nix, "Using Introductory Computer Science as a Tool for Teaching General Problem Solving," *Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition* (June 2004).

Cadets Roberto Castillo, Patrick J. Davis, Louis Jenkins, Stephen Queen, and Jamar Wright, and LTC George A. Nowak, COL Glen P. Dudevoir, LTC Brian Gollsneider, "A Two Channel, Full-Duplex, WDM Free-Space Optical Transmission Link for 100BaseTX Ethernet and Digital Audio," *2004 National Conference on Undergraduate Research (NCUR)*, Indiana University-Purdue University, Indianapolis, Indiana, 15-17 April, 2004.

Chris Okasaki "Flattening Combinators: Surviving Without Parentheses," *Journal of Functional Programming*, 13(4):815-822, July 2003.

Yijun Shi, Shi-Chang Wooh, Mark Orwat, "Laser-ultrasonic generation of Lamb waves in the reaction force range," *Ultrasonics*, Vol. 41, Issue 8, November 2003.

C. Phillips, S. Demurjian, and T.C. Ting., "Security Assurance for an RBAC/MAC Security Model", *Proceedings of the 4<sup>th</sup> Annual IEEE Information Assurance Workshop*, West Point, NY 18-20 June 2003.

C. Phillips, S. Demurjian, T.C. Ting., "Assurance Guarantees for an Role-Based Access Control / Mandatory Access Control Security Model," *Proceedings 17<sup>th</sup> Annual International Federation for Information Processing Working Group (IFIP WG 11.3) on Data and Applications Security*, Estes Park, Colorado, 3-7 August 2003, pp 329-343.

Puett, Shing, Luqi; "The Graduate Education of DoD's Software Engineers", *Proceedings of the Systems and Software Technology Conference 2004*, Salt Lake City, UT, 19-22 April 2004.

D. J. Ragsdale, S. D. Lathrop, and R. C. Dodge" Enhancing Information Warfare Education Through the Use of Virtual and Isolated Networks," *Journal of Information Warfare*, June 2003

D. J. Ragsdale, and R. Dodge, "Author's Commentary: The 2004 Interdisciplinary Contest in Modeling " The Journal of Undergraduate Mathematics and its Applications, Volume 25, Summer 2004 pp. 171-174.

G. Conti, D. J. Ragsdale, and S. Lathrop, "Implementation and Lessons Learned from an Undergraduate Special Interest Group in Information Assurance," *Proceedings of the 8th Colloquium for Information Systems Security Education*, West Point, NY, 7-10 June, 2004.

M. Kwinn, Jr, D. J. Ragsdale, J. R. Brence, T. Morel, E. A. Pohl, S. Goldman, E. Tollefson, M. Gorak, R F. Deckro, C. A. Carver, "Operation Enduring Freedom Assessment System Development," *Proceedings of the Defense Analysis Seminar XII*, Seoul, Korea, 29 March – 1 April 2004.

C. K. Ray, "A Modest proposal: Licensing Personal Computers and Internet Service Providers," *2003 IEEE Workshop on Information Assurance*, West Point, New York, June 18-20, 2003.

Cadet Patrick J. Davis, LTC Robert Sadowski, and COL Glen P. Dudevoir, "VCSEL Driver and Photoreceiver Circuitry in 1.5 mm CMOS for a 50 Mb/s Digital Optical Interconnect," *2004 National Conference on Undergraduate Research (NCUR)*, Indiana University-Purdue University, Indianapolis, Indiana, 15-17 April, 2004.

E. Ressler, B. Shoop, B. Watson and P. Das, "Biologically-Motivated Analog-to-Digital Conversion," *Proceedings of SPIE annual meeting*, San Diego, CA, Aug 4-8, 2003.

Charles W. Reynolds "An Undergraduate Information Assurance Curriculum," 2003 IEEE Workshop on Information Assurance, USMA, June 2003

Lisa A. Shay, Bryan S. Goda, Peter Hanlon, and John M.D. Hill, "Outcome Assessment at the US Military Academy," *Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition* (June 2004).

Edward Sobiesk, Maria Gini, and John A. Marin, "Using Group Knowledge for Multitarget Terrain-Based State Estimation," in *Proceedings of the 7th International Symposium on Distributed Autonomous Robotic Systems*, June 2004.

Douglas Wolfe and Curtis A. Carver Jr. "Teaching a Second Core Course in Information Technology: A West Point Experience". *International Conference on Education and Information Systems: Technologies and Applications (EISTA '03)*, Orlando, FL. July 31-August 2, 2003.

Douglas Wolfe , Karl Gossett , Peter D. Hanlon , and Curtis A. Carver Jr. "Active Learning in a Freshman Information Technology Course" *IEEE Frontiers in Education*, Boulder, CO. November 5-8, 2003.

