



RESEARCH AT NPS



U.S. Navy Commander Mike Bilzor's research investigates methods for hardware security, specifically the formal expression of security requirements in processor designs, so that they can be dynamically enforced.

Bilzor's dissertation, "Defining and Enforcing

Hardware Security Requirements," addresses the threat of subversions—known as hardware Trojans, or malicious inclusions—in general-purpose processors. Most current strategies for detecting malicious inclusions focus on equivalence checking between two physical samples or two functional designs. Bilzor asserts that, as with software, the security of a hardware design should be judged relative to well-defined policies, properties, and requirements, rather than by equivalence alone. Bilzor presents a novel method for expressing and enforcing security requirements at runtime in a processor using dynamic checkers, based on a form of temporal logic. While the

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BROWN-BAG SEMINAR SERIES

WA-302, 1200-1300

- Wednesday, September 7th, Research Initiation Program
- Tuesday, October 11th, NSF, Responsible Conduct of Research
- Tuesday, November 8th, NRC Postdoctoral Program

RSPO UPDATES

New Deputy Director, RSPO: Terry Rea has joined the Research and Sponsored Programs Office as deputy director. Terry served 28 years in the U.S. Navy, retiring as a captain (O6). Her final military assignment was as an instructor at the Navy Command Leadership School, Newport, RI. She was military associate dean in the Graduate School of Business and Public Policy from 2007–2010 and holds a master's in management science (NPS, 1997) and bachelor's in journalism (University of Oregon).

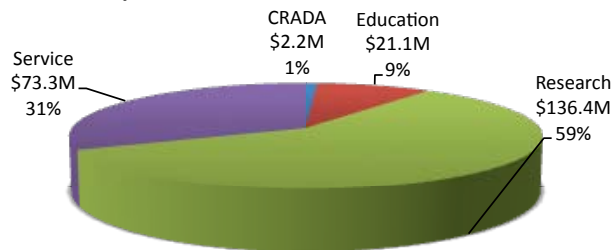
Electronic Proposal Submissions: Please note, proposals submitted electronically must be in the RSPO no later than three days prior to submission. Electronic submission does not obviate department/institute/dean review. If the signed NPS proposal page is not included with the documentation, RSPO will staff the proposal via email to the PI's chair/dean or director/dean before submitting the proposal electronically to the sponsor. **TIMELY** receipt of documentation is needed to meet NPS and sponsor requirements. Questions: research@nps.edu.

FY12 Indirect Cost Rates: While NPS is reviewing its indirect cost rate structure, current rates remain in affect. Information about current and applications can be found at <http://intranet.nps.edu/ResAdmin/FY11IndCostRates.pdf>. All proposals approved by a sponsor for funding that were submitted under the current rate structure will be grandfathered for the life of the project period of performance outlined in the proposal. For questions, email research@nps.edu.

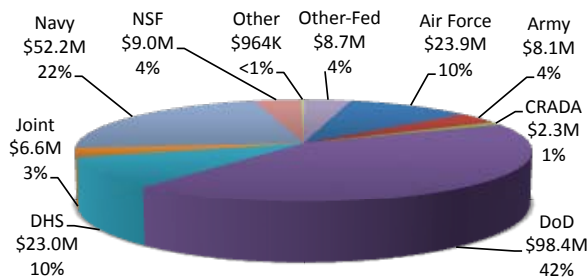
SPONSORED PROGRAMS STATUS, JULY 2011

FUNDS AVAILABLE: \$207.1M

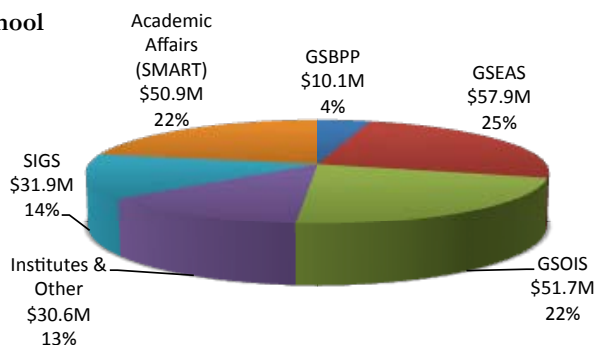
By Type of Activity



By Sponsor



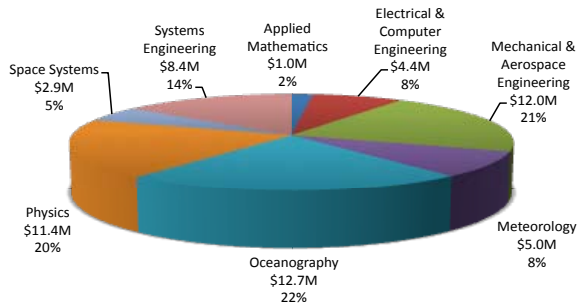
By School



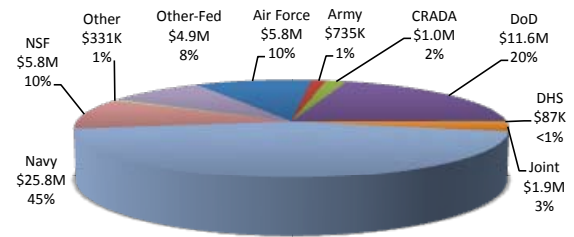
Graduate School of Engineering and Applied Sciences

Funds available to date: \$57.9M

By Department



By Sponsor



Projects funded in July

- Classified Advanced Technology Update Short Course, *Hersch Loomis, EC* (various)
- Observability in Data Assimilation and Optimal Sensor Configuration, *Wei Kang, MA* (NRL)
- Spacecraft Systems, *Brij Agrawal, MAE* (NRO)
- Adaptive Optics Center of Excellence for National Security, *Brij Agrawal, MAE* (AFRL, NRO)
- Constant Volume Combustion Technology Development, *Chris Brophy, MAE* (AFRL)
- Pulse And Rotating Detonation Combustion, *Chris Brophy, MAE* (ONR)
- Biofuel Characterization, *Chris Brophy, MAE* (NAWC-China Lake)
- Joint Optimization of UUV Sensing and Sampling for Mine Warfare, *Peter Chu, OC* (NAVOCEANO)
- Characterization and Classification of Marine Mammal Vocalizations, *Curt Collins, OC* (CNO)
- Support of Structural and Servo Response Test with Mass Mockup for Phalanx Laser CIWS, FY2011, *Steve Baker, PH* (NAVSEA)
- Sonar Equations Short Course, *Daphne Kapolka, PH* (NAVAIR)
- SSP Missile Branch Initiative #1, *Jim Kays, SE* (Strategic Systems Program)
- SEM-PD21, *Wally Owen, SE* (various)
- Real-Time Optimal Guidance for PGS, *Mike Ross, SP* (DARPA)

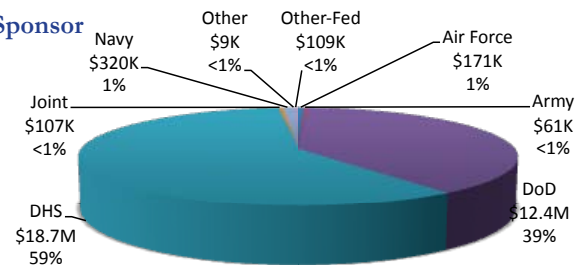
School of International Graduate Studies

Funds available to date: \$31.9M

Projects funded in July

- Nuclear Forensics, *Anne Clunan, NS* (DHS)
- Social Media Technologies, *Anne Clunan, NS* (OSD)
- Translating Logistics and Pre-Curriculum Course Materials Under Development of Iraqi Security Forces, *Abbas Kadhim, NS* (USF-I)
- PRC Leadership Signaling, *Lyman Miller, NS* (PACOM)
- Extended Deterrence in 21st Century, *David Yost, NS* (OSD)

By Sponsor



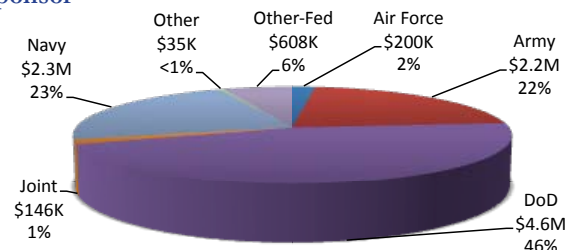
Graduate School of Business and Public Policy

Funds available to date: \$10.1M

Projects funded in July

- Advanced Acquisition Program, *John Dillard, GSBPP* (USMC - MARCORSSCOM)
- Performance Measurement and Risk Management in Supply Chains, *Keebom Kang, GSBPP* (USTRANSCOM)
- Chair of Acquisition and Acquisition Research Program, *Keith Snider, GSBPP* (DSCA)

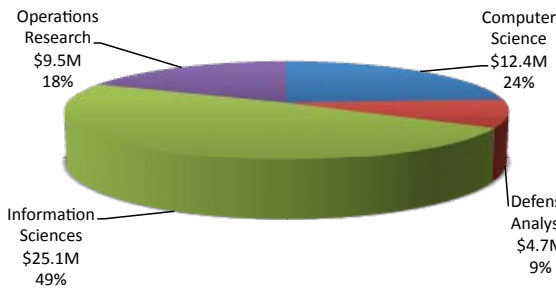
By Sponsor



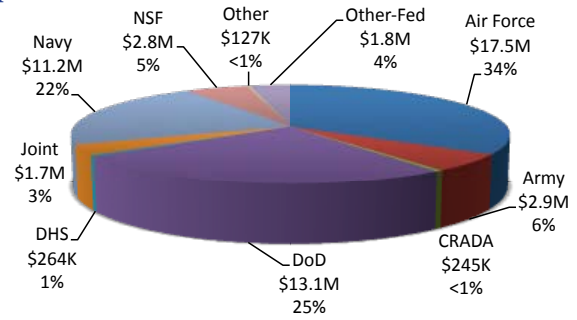
Graduate School of Operational and Information Sciences

Funds available to date: \$51.7M

By Department



By Sponsor



Projects funded in July

- Navy Certifier Program Special Offering, *Karen Burke, CS* (Strategic Systems Program)
- Navy Certifier Program Special Offering, *Karen Burke, CS* (NAWC-Weapons Division)
- IC Computer Network Operations Support, *George Dinolt, CS* (SSC-Atlantic)
- Adversarial Reasoning, *Neil Rowe, CS* (AFRL)
- CTFP ECCO CT Operator Archive Project (CTOAP), *Doug*

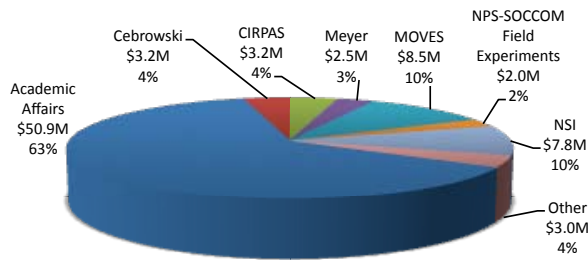
Borer, DA (OSD)

- Canadian Forces Aerospace Warfare Center Wargaming Course, *Jeff Appleget, OR* (Canadian Forces Aero Warfare Ctr)
- Explosive Ordnance Disposal Training Allocation, *Emily Craparo, OR* (EODTEU2)
- Statistical Tasks in Support of the Board of Inspection and Survey, *Ron Fricker, OR* (USN Board of Inspection & Survey)

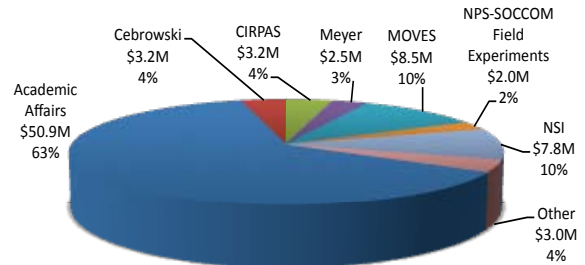
Research and Education Institutes, Centers, and Other

Funds available to date: \$81.5M

By Department



By Sponsor



Projects funded in July

- The Cross-Cultural Implications of Trust, *Alan Howard, USPTC* (AFRL)
- DoD Strategic Communications Workshop, *Ron Franklin, CEE* (AFRICOM)
- Research Support to Hybrid Knowledge-Management System for Complex Operations, *Karen Guttieri, GPPAG* (ONR)
- Stochastic Analysis and Control of Multiple Moving and Rotating Aerodynamic Bodies, *Sri Sritharan* (ARO)
- LMC Disaster-Management Workshop, *Alan Jaeger, NSP* (USPACOM)
- Disaster-Management Humanitarian Assistance, *Sue Higgins,*

Cebrowski (COE)

- IAMD Assessment, *Scott Miller, Cebrowski* (OASN)
- NPS Chair of Undersea Warfare Program, *Jerry Ellis, Meyer* (NAVSEA)
- Marine Corps Small Arms/Marksmanship Training, *Bill Becker, MOVES* (ONR)
- TRAC Information Technology, *CDR Joe Sullivan, USN, MOVES* (TRAC - MONTEREY)
- Deployment Equipment for a Mobile Weather Radar, *Haflidi Jonsson, CIRPAS* (ONR)

“The cure for boredom is curiosity. There is no cure for curiosity.” –Dorothy Parker, 1893–1967

CLUSTER HIRES IN MATERIALS SCIENCES

“Cluster hires” are becoming common in universities in the U.S. and abroad. The concept is to build capability in a given general area beyond the minimum faculty strength needed for teaching. Due to the small size of NPS, many areas have one faculty member. It can be difficult to build diverse groups with skills to cover large technical problems. Cluster hiring can build both depth and synergy in closely related disciplines.

The materials cluster hire was a joint venture between the Departments of Physics and Department of Mechanical and Aerospace Engineering. It was necessary to expand beyond a single department for several reasons, and this type of interde-

partmental collaboration is an example of how NPS can function. By breaking down some of the more rigid barriers, our students can have the benefit of working with faculty in different departments, having access to better facilities and technical support, and creating a better academic program with advanced courses that better support their research and theses. The two departments are committed to maintaining and improving the capabilities of this interdepartmental group, providing improved thesis opportunities for our students, and delivering cutting-edge research capabilities to sponsors. The four initial material

...continued on p. 5



Assistant Professor Drago Grbovic

Assistant Professor Drago Grbovic, PH, researches microelectromechanical systems (MEMS) for sensing and energy-harvesting applications. His recent research focuses on creating focal plane arrays of bi-material MEMS devices for infrared and terahertz imaging. Grbovic has a wide experience in MEMS device design and simulation as well as photolithography and microfabrication processes. He was a research fellow of National Academy of Sciences. His

work has been published in *Applied Physics Letters*, *Journal of Applied Physics*, *Optics Express* and other journals and proceedings, and he is an author of a chapter in the *Encyclopedia of Nanoscience and Nanotechnology*. Grbovic is a member of American Physical Society.

Microbeam Analysis Society, 2002; Presidential Student Award, Microscopy Society of America, 2000; W.A. Sanderson Teaching Assistant of the Year Award, Materials Science and Engineering Department, Northwestern University, 1997 and 1998.



Associate Professor Claudia Luhrs

Associate Professor Claudia C. Luhrs, MAE, focuses on nanostructured and multifunctional materials; novel synthetic pathways for their preparation (i.e. plasma/aerosol methodologies), characterization of their crystal structures, determination of properties and reactivity studies. Her research activities were initially centered on ceramics but extended in recent years to the production

of nanosized metal particles, carbon nanostructures and nanoscale ceramic/metal and metal/carbon composites. Application projects include the generation of thermally stable materials for catalysts, gas sensors, batteries, electrical double layer capacitors, structural and high energy density nanoscale materials. Besides many publications, Luhrs holds two patents.



Assistant Professor Sebastian Osswald

Assistant Professor Sebastian Osswald, PH and MAE, teaches energy conversion and storage, solid-state physics thermodynamics, and materials science. His research interests are energy storage and conversion, nanomaterials materials, carbon and carbon composites, optical and acoustical sensors, micro- and nanoelectrochemical systems (MEMS/NEMS), and Raman spectroscopy.



Assistant Professor Joe Hooper

Assistant Professor Joe Hooper, PH, researches new explosive materials and the response of solids to intense loading conditions. His recent computational research focuses on quantum-level simulations of new nanostructured propellants and nanomaterial-reinforced armors. Recent theoretical work includes a new theory for the first 100 picoseconds behind a detonation

wave and a theoretical framework for fragmentation of combustible warhead casings.

Hooper was previously a research physicist at Naval Surface Warfare Center, Indian Head, where his research team won the 2010 Navy Scientists of the Year Award for their work on reactive warhead casings.



Associate Professor Luke Brewer

Associate Professor Luke N. Brewer, MAE, is interested in characterization of materials structure and chemistry; mechanical behavior of materials; materials for nuclear energy; welding and joining of materials; and high throughput screening methods for materials design. He has been awarded the Macres Award from the

Cluster hires, continued from p. 4

clusters were planned for two positions in mechanical and aerospace engineering (MAE), one in physics (PH) and a joint MAE/PH appointment. An independent physics hire at the same time in the area of energetic materials and shock physics proved to have many areas of overlapping interest that have quickly integrated in the Center for Materials Research.

THE CENTER FOR MATERIALS RESEARCH

The Center for Materials Research has been very successful due to all the critical elements coming together. First there is a great group of talented and motivated new faculty. Second there has been very strong support from NPS leadership, particularly **Provost Leonard Ferrari**, and **Dean of Research Karl van Bibber**. The leadership by the center's director, **Distinguished Professor Nancy Haegel**, has been crucial in building the teams, and the teamwork of faculty, staff, and students has truly been remarkable. Without this leadership and high-level support, the center would not have come together so nicely.

CMR was established in 2010 as a multidisciplinary initiative of the Graduate School of Engineering and Applied Science to integrate graduate-level education and basic and applied research in materials science.

CMR contains eleven faculty members and over fifty students from mechanical and aerospace engineering, electrical and computer engineering, and physics. Joe Farmer of Lawrence Livermore National Labs also contributes to teaching and research. The mission is to foster collaborative and interdisciplinary research in the science and engineering of materials and to support the education and professional development of military and civilian students.

The Center provides a focus for research and education in materials science and engineering at NPS. Projects range from basic research sponsored by the NSF to applied work on microelectronics reliability sponsored by Intel through the Semiconductor Research Corporation and the Army Research Office. Projects also include advanced processing of naval materials, sponsored by Defense Advanced Research Projects Agency, and a project funded through the Office of the Secretary of Defense, Corrosion Office, on research and education on corrosion mitigation.

CMR hosted an open house on July 20th, featuring tours of the Raman Laboratory, Transport Imaging Lab, Nanoindenter Lab, Scanning Electron Microscopy Lab, and Functional-Materials Lab. Other laboratory facilities available to CMR include:

- Microsystems Fabrication Laboratory
- Advanced Materials and Devices Laboratory
- Sensor Research Laboratory
- Nanomaterials and Integrated Nanosystems Lab
- Light-Gas Gun Facility

Current research topics are:

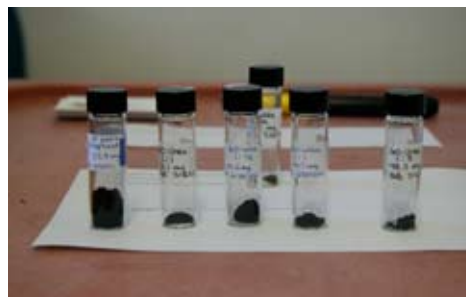
- New materials and nanostructures (Haegel, Osswald)
- Military sensors and triggered emitters (Haegel, Crooker)
- Microsystems and devices (Grbovic, Larraza)
- Novel sensors and imaging arrays (Karunasiri, Grbovic)
- Energy storage and energy-harvesting technologies

(Osswald, Grbovic)

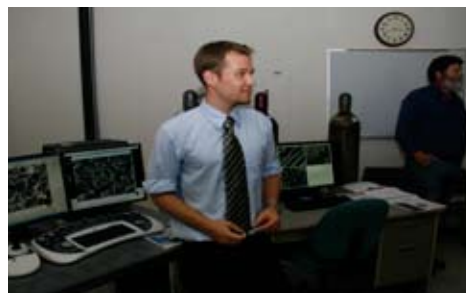
- Novel energetic materials (Hooper)
- Advanced materials processing (Brewer, McNelley, Farmer)
- Nanometer-micrometer carbon fibers composites (Luhrs)
- Friction-stirred processing (McNelley, Brewer, Menon)
- Advanced surface treatment via laser peening (Farmer, Brewer, Oswald)
- Amorphous metal properties (Brewer, Farmer, Luhrs)
- WS2 based structures spheres, tubes and sheets for armor (Luhrs)
 - Advanced corrosion studies (Brewer, Farmer)
 - Multifunctional, high-temperature/low-density materials (Osswald, Luhrs)
 - Nano-particle joining of bulk materials (Osswald, Brewer)
 - Mitigation of stress corrosion cracking in aluminum alloys (Brewer, Farmer)



Professor Osswald displays the new Raman systems in the Microscopy Lab to Dean Karl van Bibber.



Nitrogen-doped graphene samples in the Functional-Materials Lab are used in studying graphene as an energy-storage material.



Graduate student Will Young (MAE) explains advanced scanning electron microscope for investigation of marine alloys during CMR open house.

DEFENSE ANALYSIS

Rothstein, H. and Freeman, M., ed., *Gangs & Guerrillas*, NPS, NPS-DA-11-001. Compilation of essays on gangs and social problems, developed to assist Salinas and other cities. The books are requested by and distributed to a number of federal, state and local agencies.

INFORMATION SCIENCES

Chaturvedi, A., **Dolk, D.,** Drnevich, P., “Design Principles for Virtual Worlds.” *MIS Quarterly* 35, 3 (Sept 2011), 673-684.

Nissen, M.E., Burton, R.M., “Designing Organizations for Dynamic Fit: System Stability, Maneuverability and Opportunity Loss,” *IEEE Transactions on Systems, Man and Cybernetics* (May 2011), pp. 418-433.

Hayes-Roth, R., Truthiness Fever: How Lies and Propaganda are Poisoning Us and a Ten-Step Program for Recovery: Booklocker.com, 2011.

Huynh, Thomas V., and **Osmundson, John S.** “Systems Integration Assessment,” *Systems Engineering, Test & Evaluation (SETE) Conference Proceedings*, Canberra, Australia, 2-4 May, 2011.

Levitt, T. S., Leister, K. G., Woodaman, R. F., Askvig, J. K., Laskey, K. B., and **Hayes-Roth, R.,** “Valuing Persistent ISR Resources,” *AFCEA-GMU C4I Center Symposium, Critical Issues in C4I*, George Mason University, Fairfax, Virginia, 2011.

Hudson, K. and **Nissen, M.E.,** “Understanding the Potential of Virtual Environments for Improving C2 Performance,” *Proceedings of the International Command and Control Research and Technology Symposium*, Quebec City, Quebec (June 2011).

Osmundson, John, Thomas Huynh, and **Gary Langford,** “Systems Engineering of a Regional Economy,” *Systems Engineering, Test & Evaluation (SETE) Conference Proceedings*, Canberra, Australia, 2-4 May, 2011.

Osmundson, John and Holgerson, Jason, “Systems Analysis of On-Line Collaborative Systems,” *Conference on Systems Engineering Research (CSER) Proceedings*, Redondo Beach, CA, 15-16 April, 2011.

Osmundson, John, Rendon, Rene, and **Huynh, Thomas,** “System-of-Systems Acquisition: Alignment and Collaboration,” *Proceedings of the 8th Acquisition Research Symposium*, Monterey, CA, 10-12 May, 2011.

Zhao, Y., MacKinnon, D.J., and **Gallup, S.P.,** “Lexical Analysis of the Haiti Earthquake Relief Operation Using Open Data Sources,” *16th International Command and Control Research and Technology Symposium (ICCRTS)*, Quebec City, Canada, June 21-23, 2011.

Housel, Thomas J. and Lorentz, Rebecca, “Modeling The Risks Of Intangibles,” Presentation to the 7th World Conference on Intellectual Capital for Communities, Paris, France, May 26, 2011.

Hutchins, S. G., Zhao, Y., & Kendall, A. (2011). “Use of a Model of Team Collaboration to Investigate Inter-Organizational Collabora-

tion during the Haiti Relief Effort.” In *Proceedings of the 16th International Command and Control Research & Technology Symposium*. Quebec City, Canada, 21-23 June.

Hutchins, S. G., & Kendall, A. (2011). “Collaboration during the Haiti Relief Effort from a Macrocognition Perspective.” Paper to be presented at the 55th Annual Meeting of the Human Factors and Ergonomics Society, Las Vegas, NV. September 19-23, Santa Monica, CA.

Hutchins, S. G., Miller, S., & Deleot, C. (2011). “Ensuring Effective Information Flow through the JTB Enterprise in Support of Combat Operations.” In *Proceedings of the 16th International Command and Control Research & Technology Symposium*. Quebec City, Canada, 21-23 June. www.dodccrp.org

Nissen, M.E., “Key Principles of Dynamic Knowledge,” invited presentation, Army Operational Knowledge Management Qualification Course Pilot, Ft. Leavenworth, KS (May 2011).

Nissen, M.E., “KM404: Advanced Knowledge Management Principles & Techniques for Viral Organizational Transformation,” Knowledge Management Conference & Exposition, McLean, VA (May 2011).

Pfeiffer, K. D., Hutchins, S. G., Kleinman, D. L., Miller, S. A., & Kemple, W. G. (2011). “Operational planning with uncertain and ambiguous information: Command and control and the natural environment.” *Proceedings of the 16th International Command and Control Research and Technology Symposium*. Quebec City: DODCCRP.

Zhao, Y., Gallup, S. P., MacKinnon, D. J., “A Web Service Implementation for Large-Scale Automation, Visualization, and Real-time Program-Awareness,” 8th Annual Acquisition Research Symposium, Monterey, CA, May 11-12, 2011.

John Osmundson was awarded the Wayne E. Meyer Award for Excellence in Systems Engineering, by the Wayne E. Meyer Institute of Systems Engineering, NPS, June 2011.

Tom Housel was a visiting professor at the University of Paris (Sud 11) from May 23–June 23, 2011.

MECHANICAL AND AEROSPACE ENGINEERING

Boyarko, G. A., Romano, M., & Yakimenko, O. A. (2011). Time-optimal reorientation of a spacecraft using an inverse dynamics optimization method. *Journal of Guidance Control and Dynamics*, 34(4), 1197-1208.

Boyarko, G., Yakimenko, O., & Romano, M. (2011). Optimal rendezvous trajectories of a controlled spacecraft and a tumbling object. *Journal of Guidance Control and Dynamics*, 34(4), 1239-1252.

Yan, H., Gong, Q., Park, C. D., **Ross, I. M., & D’Souza, C. N.** (2011). High-accuracy trajectory optimization for a trans-earth lunar mission. *Journal of Guidance Control and Dynamics*, 34(4), 1219-1227.

METEOROLOGY

Graf, M. A., Sprenger, M., & **Moore, R. W.** (2011). Central euro-

pean tornado environments as viewed from a potential vorticity and lagrangian perspective. *Atmospheric Research*, 101(1-2), 31-45.
National Security Affairs

Keller, J. H., Jones, S. C., **Evans, J. L., & Harr, P. A.** (2011). Characteristics of the TIGGE multimodel ensemble prediction system in representing forecast variability associated with extratropical transition. *Geophysical Research Letters*, 38, L12802.

OCEANOGRAPHY

Traxler, A., Stellmach, S., Garaud, P., **Radko, T., & Brummell, N.** (2011). Dynamics of fingering convection. part 1 small-scale fluxes and large-scale instabilities. *Journal of Fluid Mechanics*, 677, 530-553.

Stellmach, S., Traxler, A., Garaud, P., Brummell, N., & **Radko, T.** (2011). Dynamics of fingering convection. part 2 the formation of thermohaline staircases. *Journal of Fluid Mechanics*, 677, 554-571.

OPERATIONS RESEARCH

Belmont, P. J., Jr., Thomas, D., Goodman, G. P., Schoenfeld, A. J., Zacchilli, M., **Burks, R.,** (2011). Combat musculoskeletal wounds in a US army brigade combat team during operation iraqi freedom. *Journal of Trauma-Injury Infection and Critical Care*, 71(1), E1-E7.

Cullenbine, C., **Wood, R. K., & Newman, A.** (2011). A sliding time window heuristic for open pit mine block sequencing. *Optimization Letters*, 5(3), 365-377.

McClernon, C. K., **McCauley, M. E., O'Connor, P. E., & Warm, J. S.** (2011). Stress training improves performance during a stressful flight. *Human Factors*, 53(3), 207-218.

Salmeron, J., Kline, J., & Densham, G. S. (2011). Optimizing schedules for maritime humanitarian cooperative engagements from a united states navy sea base. *Interfaces*, 41(3), 238-253.

PHYSICS

K.L. Jensen, E.J. Montgomery, D.W. Feldman, P.G. O'Shea, **J.R. Harris, J.W. Lewellen,** and N. Moody "Multiple scattering effects on quantum efficiency and response time for cesiated metal photocathodes," *Journal of Applied Physics* 110, 034504 (2011).

J. R. Harris, "Free-Electron Lasers for Shipboard Missile Defense," presentation to Naval Directed Energy Center, Naval Surface Warfare Center-Dahlgren, 3 August 2011

NATIONAL SECURITY AFFAIRS

Rasmussen, M. How terrorism ends: Understanding the decline and demise of terrorist campaigns. *Political Science Quarterly*, 126(2), 332-333, 2011

SYSTEMS ENGINEERING

Professor David H. Olwell was named among 50 faculty members and administrators in the newest cohort of American Council on Education (ACE) Fellows, a program that produces future provosts and presidents. The fellows work on an "away" campus, receiving guidance and assignments from presidents and senior leaders.

Ph.D Candidates, *continued from p. 1*

method outlined doesn't guarantee the detection of all possible malicious inclusions in a processor, it addresses a large class of inclusions—those detectable as violations of behavioral restrictions in the processor's architectural specification—which provides significant progress against the general case, given a suitably complete set of checkers. **Assistant Professor Ted Huffmire** of the Department of Computer Science has served as advisor. CDR Bilzor's next duty will be teaching computer science at the U.S. Naval Academy in Annapolis, Maryland.

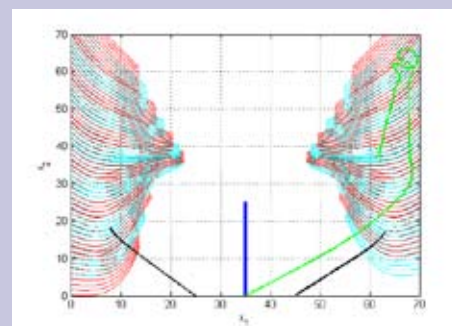


CDR Joseph Foraker, USN

CDR **Joseph Foraker's** dissertation, "Optimal Search for Moving Targets in Continuous Time and Space Using Consistent Approximations," develops a framework that allows for the formulation of many continuous time-and-space search problems as generalized optimal control problems, where multiple searchers look for multiple targets. Foraker's formulations include examples of problems whose solutions minimize the probability that all of the searchers fail to detect any of the targets during the planning horizon, and maximize the expected number of targets detected during the planning horizon.

Discretization schemes are constructed to solve these continuous time-and-space problems, which prove to be consistent approximations. Consistency ensures that global minimizers, local minimizers, and stationary points of the discretized problems converge to global minimizers, local minimizers, and stationary points, respectively, of the original problems.

The rate of convergence of algorithms is also investigated, and numerical results show that discretization schemes are computationally tractable, including examples with three searchers and ten targets. **Assistant Professor Johannes Royset**, Department of Operations Research, is advisor.



Optimized search trajectories for one helicopter searcher (green) and two surface searchers (black) looking for targets (cyan and red) attacking a high-value unit (HVU, depicted in blue). The search area is a 70-nautical-mile square.

LIMITED-PURPOSE COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS (LPCRADAS)

Handheld Computers for Use Aboard Ship

Partner: DRS Tactical Systems, Inc.

PI: Mathias Kolsch, Department of Computer Science

Summary: NPS will evaluate the feasibility of various handheld tablet computer systems for use aboard ships in the NMCI environment.

Solar Generators in Disaster Response

Partner: Solar Stik, Inc.

PI: Brian Steckler, Department of Information Sciences

Summary: NPS will evaluate portable solar generators in disaster response scenarios to gauge the effectiveness and the ease of use of the systems.

Breadcrumb Radio Tests

Partner: Rajant Corporation

PI: Brian Steckler, Department of Information Sciences

Summary: Breadcrumb radios will be used by NPS solely for the testing of mobile and portable hastily formed, wireless networks (HFN) to gauge the effectiveness and the ease of use of the systems.

MEMORANDA OF UNDERSTANDING/ AGREEMENT (MOUs/MOAs)

NPS–Center for Hemispheric Defense Studies Mutual-Support Program

Partner: Center for Hemispheric Defense Studies

NPS POC: Administrative Associate Thomas Ellzey

Summary: The purpose of this agreement is to maintain a program of mutual support between the Center for Hemispheric Defense Studies (CHDS) and the Naval Postgraduate School (NPS). This agreement will augment the organic capabilities of two institutions as they conduct programs in support of the U.S. National Security Strategy and the DoD Security cooperation Guidance in the Western Hemisphere.

Support of the Chair of Undersea Warfare and Director, Undersea Research Warfare Center

Partner: Submarine Forces and Submarine Warfare Division (N87)

NPS POC: Jerry Ellis, Underseas Warfare Chair

Summary: The purpose of this agreement is to establish the commitment between the Submarine Forces, the Submarine Warfare Division and the Naval Postgraduate School and the Chair of Undersea Warfare at NPS in order to enhance the value of NPS to the Submarine Community.

Joint Education and Research Programs

Partner: Naval Air Systems Command

NPS POC: Walter Owen, Department of Systems Engineering

Summary: This MOA is intended to promote the spirit of collaborations between the Naval Air Systems Command (NAVAIR) and the Naval Postgraduate School (NPS). Specifically, this MOA is established to promote joint educational programs, research and professional projects for each participant’s mutual advantage and to forge a cooperative relationship to further the educational, research, and service missions of each party.

TECHNICAL REPORTS PUBLISHED

NPS-GSBPP-11-006	Dimensions of Small Unit Resilience in Organizations Facing Threat, Disruptions, and Stress	E. Powley, J. Lopes
NPS-SE-11-005	Submarine Combat Systems Engineering Project	J. Backer, <i>et al.</i>
NPS-SE-11-007	Unmanned Surface Combatant. Consideration for Concept Exploration	P. Cox, <i>et al.</i>

Technical reports may be obtained at <http://www.nps.edu/Research/TechReports.html>

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