2011-09-01

Research Naval Postgraduate School, v.3, no. 10, September 2011

Monterey, California, Research and Sponsored Programs, Office of the Vice President and Dean of Research, Naval Postgraduate School (U.S.)

VOLUME 3, NO. 10 SEPTEMBER 2011

RESEARCH AT NPS

In his dissertation entitled, "Extracting Value from Ensembles for Cloud-Free Forecasting," **Major Cedrick L. Stubblefield, USAF,** (left) combines the Air Force Weather Agency's global cloud analysis and cloud advection model with the National Centers for Environmental Prediction's global weather ensemble to study the potential for ensemble cloud-free forecasts to improve support for space-based image collection operations. Currently, AFWA produces cloud free forecasts for several agencies, but operational forecasts do not incorporate forecast uncertainty. An ensemble created with perturbed initial conditions can be used to forecast the uncertainty in cloud cover conditions.

A year of ensemble forecasts forms the evaluation dataset. The operationally relevant cloud-free forecast threshold (cloud cover less than 30%) is evaluated over sets of 24-km grid boxes in three climatologically different regions. Because costs of satellite image collection

...continued on page 7

BROWN-BAG SEMINAR SERIES

WA-302, 1200-1300

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

NPS PARTNERS STUDY HYDROCARBON TRANSPORT FROM GULF OIL SPILL

Associate Professor Jamie MacMahan

As part of the Gulf of Mexico Research Initiative (GRI), **Associate Professor Jamie MacMahan** will work with colleagues at the University of Miami and seven other institutions in a three-year investigation of the fate of petroleum spilled from the Deepwater Horizon oil rig. The impact of the accident, the development of new tools and technologies for responding, and improving mitigation and restoration are the focus.

NPS co-PI MacMahan will study the exchange between the surf zone and inner shelf of the Florida panhandle, using NPS instruments such as drifters, current meters, dye sensors, and unmanned vehicles. Work is expected to begin within a few months.

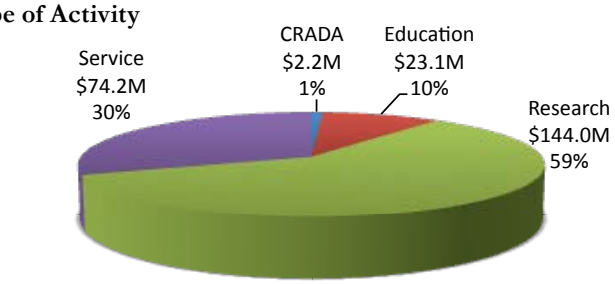
The University of Miami serves as lead institution on the Consortium for Advanced Research on the Transport of Hydrocarbons in the Environment (CARTHE), which comprises 26 PIs from twelve universities and research institutions. The goal is to predict the fate of hydrocarbons found in crude oil that is released into the environment, helping to guide risk management and response efforts to mini-

...continued on page 5

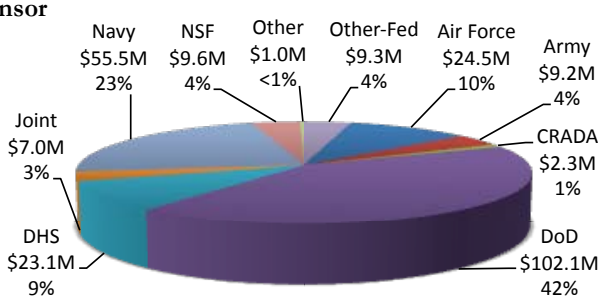
SPONSORED PROGRAMS STATUS, AUGUST 2011

FUNDS AVAILABLE: $243.5M

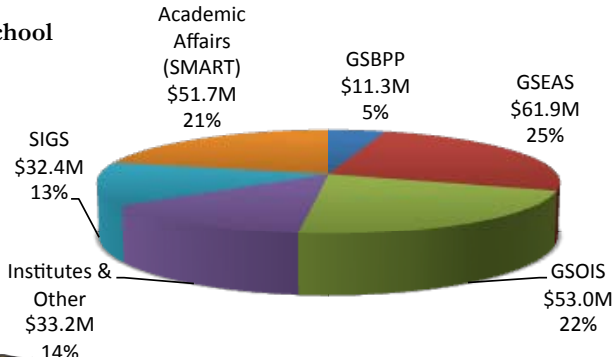
By Type of Activity



By Sponsor



By School



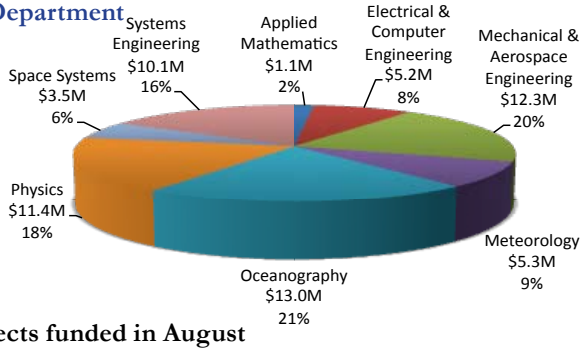
Research and Sponsored Programs Office (RSPO)
Office of the Vice President and Dean of Research
Naval Postgraduate School

Danielle Kuska, Director
Research and Sponsored Programs Office
research@nps.edu

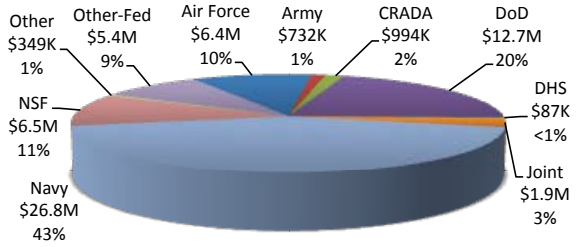
Graduate School of Engineering and Applied Sciences

Funds available to date: $61.9M

By Department



By Sponsor



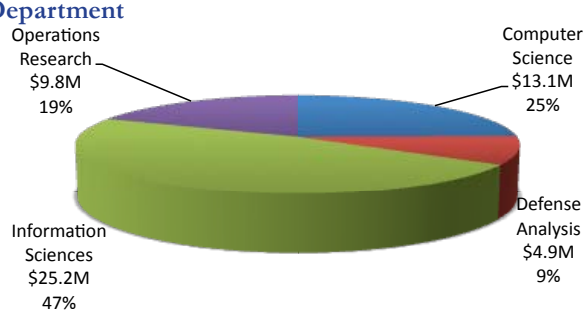
Projects funded in August

- Surveillance and Reconnaissance (ISR), *Rachel Goshorn, EC* (ONR)
- Mobile Wimax Security Vulnerabilities, *Frank Kragh, EC* (Laboratory for Telecommunications Sciences)
- Extending Capabilities of Raven UAV Using Advanced Flexible Solar Cells, *Sherif Michael, EC* (NAWC-Weapons Division)
- LSPO Special Research Project, *Clark Robertson, EC* (SAF)
- ECE Distance Learning, *Clark Robertson, EC* (Various)
- Numerical Solution of First-Order Partial Differential Equations of Nonlinear Control, *Art Krener, MA* (AFOSR)
- Field-Based Residual Stress Measurements for Predicting Stress Corrosion Cracking, *Luke Brewer, ME* (OSD)
- VSW Mine Neutralization, *Doug Horner, ME* (ONR)
- Modeling and GNC of Spacecraft Attitude Using Analytic Solutions of Rigid Body Mechanics, *Marcello Romano, ME* (AFRL)
- Climatology of Electromagnetic Propagation Conditions in the U.S. West-Coast Region, *Paul Frederickson, MR* (NRL)
- Evaluation of JSAF EM Propagation Prediction for NCTE/ Fleet Synthetic Training, *Paul Frederickson, MR* (NWDC)
- Long-Range Forecasting Support, Tom *Murphree, MR* (HQ, AFWA)
- Dropsonde Measurements for Moisture Variability and Air-Sea Interaction over Tropical Indian Ocean, *Qing Wang, MR* (NSF)
- Hifast: Fish-School Models for High Fidelity Simulations of Biologic Clutter, *LCDR Ben Jones, USN, OC* (ONR)
- Atomistic Simulations of Organometallic Clusters, *Joseph Hooper, PH* (NSWC-Indian Head)
- Strategic Weapons Systems - 1, *Jim Kays, SE* (SSP)
- Software-Cost-Estimation Metrics, *Ray Madachy, SE* (AFCAA)
- Advanced Sensor Systems for Naval Aviation Systems T&E and Health Management, *Dick Millar, SE* (NAVAIR)
- Body of Knowledge and Curriculum to Advance Systems Engineering, *Dave Olwell, SE* (OSD)
- Mobile CubeSat C2 Support, *Jim Newman, SP* (NRO)
- NPSCUL and Sequencer Support, *Jim Newman, SP* (NRO)
- Integration and Testing of a Miniature High-Frequency Receiver (MINIHFR), *Jim Newman, SP* (AFTENCAP)

Graduate School of Operational and Information Sciences

Funds available to date: $53M

By Department



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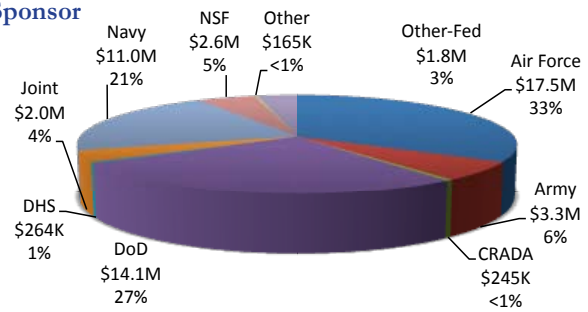


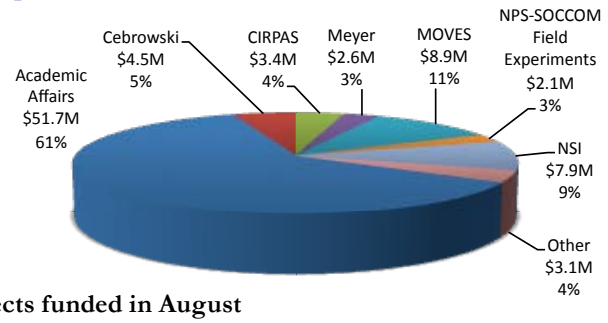
Projects funded in August

- Automated Media Exploitation Research 3, *Simson Garfinkel, CS* (DIA)
- Celex, Carving and Contracts, *Simson Garfinkel, CS* (DIA)
- Cyber Operations, *Bret Michael, CS* (NELO)
- Software Engineering DL Program, *Loren Peitso, CS* (Various)
- FARC Network Analysis Workshop, *Gregory Wilson, DA* (USSOUTHCOM)
- Socio-Cultural Knowledge and Technology Support, *Gregory Wilson, DA* (1st Special Forces Group)
- Kva+Ro+Sd To Create Flexibility: Use of 3D VIS and Collaborative PLM Tools to Support Shipman, *Tom Housel, IS* (OSD)
- Agent-Based Modeling, *Jeff Appleget, OR* (JWAC)
- Validation of Data Supporting Irregular Warfare: Methods, Models, Tools (MMT), *Jeff Appleget, OR* (TRAC - Monterey)
- Research with Math Sciences Program, *Robert Burks, OR* (NSA)
- NWDC Chair of Warfare Innovation, *Jeff Kline, OR* (NWDC)
- Training and Research Support to JITC, *Robert Koyak, OR* (JITC)
- Assessing Accuracy of Real-Time Scoring and Classification of Munitions, *Robert Koyak, OR* (Yuma Proving Ground)
- Master of Systems Analysis/SA Distance Learning Program, *Steve Pilnick, OR (Various)*
- Optimization of Complex Systems, *Johannes Royset, OR* (AFOSR)

Research and Education Institutes, Centers, and Other

Funds available to date: $84.9M

By Department



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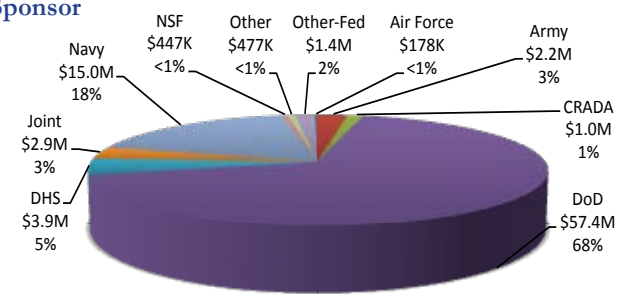


Projects funded in August

- Transformative Education Forum, *Alan Howard, USPTC* (OSD)
- Theater Analysis Through Systems Engineering Methodology, *Alan Howard, Provost* (U.S. EUROPEAN COMMAND)
- Transformative Education Forum, *Alan Howard, USPTC* (ONRG)
- GPOI Peacekeeping Operations Training Central Asia, *Alan Howard, USPTC* (NETSAFA)
- NPS/IDS Operations Research and Systems Analysis Workshop, *Alan Howard, USPTC* (USPACOM)
- INSURV Strategic Planning and Project Management Planning Support, *Ron Franklin, CEE* (INSURV)
- Port of Hueneme Emergency Planning and Preparedness, *Alan Jaeger, CAW* (Oxnard Harbor District)
- LMC Disaster Management Workshop, *Alan Jaeger, CAW* (USPACOM)
- NPS Military Wireless Communications Research and Experimentation, *Geoff Xie, Cebrowski* (USMC- ARCORSYSCOM)
- GI&S Program and Technical Oversight Support, *Warren Yu, Cebrowski* (FNMOC)
- Chair of Undersea Warfare Program, *Jerry Ellis, Meyer* (NAVSEA)
- NSWCDD/NPS Collaboration on Modeling and Simulation, *Curt Blais, MOVES* (NSWC-Dahlgren Division)
- Puckster Partial Automation, *Rudy Darken, MOVES* (NWDC)
- Collaborative NWDC/NPS Modeling and Simulation Research, *CDR Joe Sullivan, USN, MOVES* (NWDC)
- Field Experimentation Program for Special Operations (Futures), *Ray Buettner, NPS-SOCCOM* (USSOCOM)
- Dante Test on Pelican, *Bob Bluth, CIRPAS* (SPAWAR)
- NPS SBIR Program Support, *Bob Bluth, CIRPAS* (ONR)
- China Sea Experiment Support, *Haflidi Jonsson, CIRPAS* (NRL)
- Coast Experiment Support, *Haflidi Jonsson, CIRPAS* (NASA)
- Support of ONR Airborne Research Objectives, *Haflidi Jonsson, CIRPAS* (ONR)

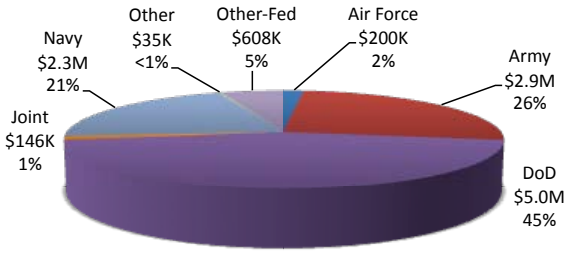
Graduate School of Business and Public Policy

Funds available to date: $11.3M

Projects funded in August

- Cases Relating to Army Forces Generation for Cost Management Certificate, *Alice Crawford,* (OASA (FM&C))
- Cost-Management Certification Course, *Alice Crawford,* (OASA [FM&C])
- Cost Attrition Part II, John Enns (OSD)
- Research through the Acquisition Research Program, *Keith Snider* (Army Contracting Command, Navy Office of Small Business Program)

By Sponsor



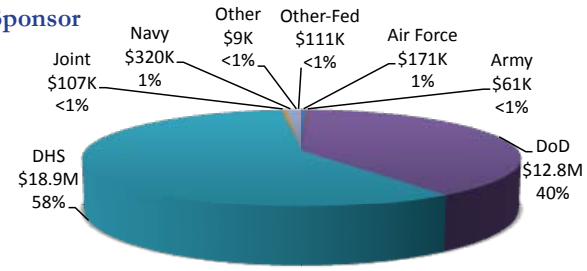
School of International Graduate Studies

Funds available to date: $32.4M

Projects funded in August

- Social Network Analysis for Open Source, *Tom Johnson, NS* (Open Source Center)
- CHDS National Fusion Liaison-Officer Program Workshop, *Ted Lewis, NS* (DHS)
- CHDS National Fusion Liaison Program (FLOP) Workshop, *Ted Lewis, NS* (DHS)
- Public Perspectives on Security and Defense in Latin America**,** *Harold Trinkunas, NS* (US Southern Command)

By Sponsor



CENTER FOR NEW SECURITY ECONOMICS AND NET ASSESSMENT

On August 25, 2011, the Research Board of the Naval Postgraduate School approved the establishment of a new Center for New Security Economics and Net Assessment (CNSE) to promote research in economics, security, strategy, and the dynamics that globalization adds to these topics.

CNSE intends to develop research, events ,and outputs that link recent events and traditions in economics and economies, and changes in the global security environment and implications for security and strategy of matters economics.

The focus of CNSE is to understand some longer-term issues and implications for the security environment of the economic crisis and trends. Of particular interest are topics such as the strategic implications of the changes in the US–Chinese economic issues and the interactions among the forces of climate change, economic change, energy, and national security. Interdisciplinary and empirically relevant in nature, CNSE's research will build on ideas and perspectives from a variety of perspectives, including evolutionary economics, behavioral organization theory, net assessment, strategic thinking, biosocial anthropology as well as other areas.

Associate Professor Mie Augier of the Global Public Policy Academic Group (GPPAG) and **Associate Professor Robert McNab** of GPPAG and the Defense Resources Management Institute (DRMI) are the codirectors of CNSE.

The CNSE faculty's activities and publications include seminars on climate and economic change, an edited handbook of security and economics, and a manuscript on the influence of technology on military organizations. These activities employ theories and ideas from the fields of economics, strategy, and organizational studies. As prelude of the founding of CNSE, the organizers have hosted several related events on and off the NPS campus, with academicians such as Giovanni Dosi, Professor of Economics at the Scuola Superiore Sant' Anna in Pisa; Professor James March, Stanford University; and Professor Sidney Winter of the Wharton School, University of Pennsylvania.

CNSE is working also to link faculty members interested in spanning the fields of climate change, energy, hydrology, and the economics of water scarcity with outside sponsors. Initially, the focus area of CNSE is diagnostic strategic research using the framework of diagnostic net assessment. Over time, faculty may choose to offer policy-framing analysis using the findings of peer-reviewed, reimbursable research. The Center promotes the belief that a good analysis and diagnosis of the strategic situation and understanding of the complex issues of security and economics must come before any attempts at prescription.

Intellectually, CNSE aims to build on and integrate several research traditions, including business strategy, organization theory, behavioral and evolutionary economics, public-sector economics and net assessment. Several of these traditions have intellectual and institutional roots at the RAND Corporation in the 1950s and 1960s, which was successful in fostering interdisciplinary research on strategic issues in the Cold War years.

By interdisciplinary, CNSE does not mean that everybody works on the same projects or papers, or that everything is between disciplines, but rather, that one uses different theories to understand an interdisciplinary problem—in a disciplined way. The challenge of CNSE is to foster the conversation among disciplines that, according to Jim March and Sidney Winter (both formerly of RAND with Andrew Marshall), have grown apart over time. CNSE's role is not only to instigate research but also to facilitate connections: to start small but think big.

The center is housed within GPPAG and DRMI. CNSE participants hope to engage a wider range of faculty from other parts of campus interested in the relationships between economics and security. The focus is broad; that is, not just the relationship between economics and security, but also the issues that arise from their complex interaction.

Thus, CNSE seeks to understand the economic foundations for security as well as the security implications of the changes in economies (and economics). Today's world brings challenges to most areas, including economics and security, and the global financial crisis has emphasized aspects in which these areas intertwine and have implications beyond their own focus. For example, the financial crisis has changed the global security balance.

As the effects of financial crises tend to play out over a decade (if not longer), thinking today about how the global environment will change in the next ten years is important. CNSE argues that research needs to reach beyond different investments in defense and also examine changes in the economic balance of powers and long-run changes in the migration of businesses and people. In research, seminars, and publications, participants hope to shed new light on some of these key issues.

A recent brainstorming seminar with Sid Winter and **Director Chuck Kimzey** of the National Security Institute, focused on climate change, economic change, and security. With participants from many departments, the discussion touched upon energy; the implications of social and economic costs of climate change, security implications of climate, and the promises and limitations of climate models.

Participants are working on future events on the topics of energy security and the long-term implications of the globalization of Chinese investments. The Center will continue to hold open events for interested faculty and staff.

To join the mailing list, please contact Mie Augier or Bob McNab.

DRMI EDUCATION INITIATIVE

The OSD Comptroller has a new education/training initiative for DoD financial managers to develop competency at the entry, intermediate, and advanced levels. The comptroller's decision was to leverage and map desired core competencies into existing short courses like DRMI's four-week Defense Resources Management Course (DRMC) and Budget Preparation Execution and Accountability (BPEA) Course.

Courses are available on a secure website run by the Comptroller's Office, "FM Online," which also publishes short articles on related topics. The latest article currently posted and available for viewing is **Professor Francois Melese's** article, "Transaction Cost Economics."

Assistant Professor Erik Dahl

NEW ANGLE ON TERRORIST ATTACKS

A recent article by **Assistant Professor Erik Dahl** (NSA) in the journal *Studies in Conflict and Terrorism* argues we can learn more about how to prevent terrorist attacks from studying unsuccessful attacks than we can from focusing on the better-known cases in which terrorists actually succeed in carrying out their attacks.

In his article, Dahl examines a database he compiled of 176 unsuccessful plots against American targets during the past 25 years. Although a few other scholars and think tanks have published shorter lists of foiled plots, Dahl believes this is the most comprehensive open source data set available of these "plots that failed."

The most significant finding, Dahl says, is that most plots—especially domestic terrorist plots—are not foiled by exotic intelligence systems or by imaginative analysts who carefully "connect the dots." Instead, most plots are thwarted through conventional law-enforcement efforts and ground-level domestic intelligence and security activities.

"This suggests that much of the debate since 9/11 over how to prevent terrorist attacks has been misguided," says Dahl. Many of the intelligence reforms put in place in recent years have been focused on improving intelligence analysis, based on the belief that attacks such as 9/11 happen when information is not properly shared or understood, and clues are missed. But Dahl's research suggests that what actually works to prevent terrorist attacks is the collection of specific, tactical-level intelligence.

Most plots, according to Dahl's study, are disrupted as a result of tips from the public, police, and FBI informants inside homegrown cells and undercover agents operating within American communities. The good news, Dahl says, is that this indicates that domestic law enforcement and counterterrorism efforts have been very effective in preventing attacks. But the bad news is that these types of domestic intelligence and surveillance efforts often raise difficult questions about civil liberties and the role of intelligence in a democracy.

Dahl's article is his first published work based on the study of unsuccessful plots, and he is updating this research for inclusion in a book.

HYDROCARBON STUDY, *continued from page 1*

mize damage to human health, the economy and the ecosystem. Partners include City University of New York, Florida International University, Florida State, NPS, Naval Research Laboratory, Nova Southeastern University, Texas A&M, Tulane University, University of Arizona, University of Delaware and University of Texas, Austin.

Grants were awarded for investigation of five problems: physical distribution, dispersion, and dilution of petroleum under physical oceanographic processes, air–sea interactions, and tropical storms; chemical evolution and biological degradation of petroleum/dispersant systems and interaction with marine ecosystems; environmental effects of the petroleum/dispersant system on the sea floor, water column, coastal waters, beach sediments, wetlands, marshes, and organisms, and the science of ecosystem recovery; technologies for improved responses, mitigation, detection, characterization, and remediation of oil spills and gas releases; and integration of results from the other four topics with public health research.

The GRI Research Board was established by British Petroleum as an independent research program into the effects of the Deepwater accident, to understand the dynamics of such events, their environmental effects, and public-health implications.

MacMahan releases dye in surf zone to measure dispersion, material transport.

PRINCIPAL INVESTIGATOR/PROGRAM MANAGER REVIEW OF ROLES, RESPONSIBILITIES

The responsibilities of principal investigators (PIs) and program managers (PM) at the Naval Postgraduate School (NPS) include the direction of research and scholarly activities and the education and training of students. There is responsibility and trust placed upon PI/PMs with respect to their conduct of research and scholarly activities. Policy and guidance memos have been developed by NPS to assist the PI/PM to understand their roles. This is in addition to the federal and DoD/DoN directives and regulations, guidelines, and, when applicable, sponsor requirements.

Each year, NPS PI/PMs are required to review their responsibilities prior to the release of sponsored funding. In FY12, the training will focus on the responsible conduct of research and responsible stewardship of the PI/PM. This annual review is mandatory prior to accepting the role and responsibilities of the PI/PM. Regardless of your level of expertise and experience, it is intended that the information is useful and helpful. All NPS PI/PMs should seek out additional information and material when confronted with situations requiring more in depth analysis.

WRITING RESOURCES CENTER ONLINE

Students are encouraged to peruse the Dudley Knox Library's online Writing Resources Center, a collection of resources supporting academic writing for NPS students. The Writing Resources Center lists helpful books, e-books, online guides, videos, slide presentations, handouts, and other resources to answer a variety of questions. Tabs include "conducting research," "writing," "common assignments," "plagiarism," "citations," and "classes and help." Visit http://libguides.nps.edu.

APPLIED MATHEMATICS

Scandrett, C. L., Boisvert, J. E., & Howarth, T. R. (2011). Broadband optimization of a pentamode-layered spherical acoustic waveguide. *Wave Motion,* 48(6), 505-514.

CIRPAS

Morales, R., Nenes, A., **Jonsson, H.,** Flagan, R. C., & Seinfeld, J. H. (2011). Evaluation of an entraining droplet activation parameterization using in situ cloud data. *Journal of Geophysical Research-Atmospheres,* 116, D15205.

COMPUTER SCIENCE

Das, A., & **Kendall, A.** (2011). "Building a Small KM Collaboration Portal." *CHIPS, Department of Navy's Information Technology Magazine,* July–September 2011.

Drusinsky, Doron, *Practical UML-based Specification, Validation, and Verification of Mission-Critical Software: Space Exploration and Defense Software Examples in Practice.* Dog Ear Publishing, ISBN 978-145750-494-5, 2011.

Robert Beverly, Simson Garfinkel, and **Greg Cardwell,** "Forensic Carving of Network Packets and Associated Data Structures," *Proceedings of the 11th Digital Forensics Conference* (DFRWS), August, 2011. Greg Cardwell is a student, and his master's thesis is based on the paper.

Thompson, M.F., Irvine, C.E., "Active Learning with the Cyber-CIEGE Video Game," 4th Workshop on Cyber Security Test and Evaluation, San Francisco, CA, August 8, 2011.

Beverly, R., Garfinkel, S., & **Cardwell, G.** (2011). Forensic carving of network packets and associated data structures. *Digital Investigation,* 8, S78-S89.

DEFENSE RESOURCES MANAGEMENT INSTITUTE

Berck, P., & **Lipow, J.** (2011). Military conscription and the (socially) optimal number of boots on the ground. *Southern Economic Journal,* 78(1), 95-106.

ELECTRICAL AND COMPUTER ENGINEERING

Oriti, G., & Julian, A. L. (2011). Three-phase VSI with FPGA-based multisampled space vector modulation. *IEEE Transactions on Industry Applications,* 47(4), 1813-1820.

P. Thulasiraman, "Mobility Aware Routing for Multihomed Wireless Networks Under Interference Constraints," *Proceedings of International Conference on Emerging Networks and Intelligence.*

P. Thulasiraman, "Multipath Routing for Survivability of Complex Networks Under Cascading Failures," *Proceedings of International Conference on Emerging Networks and Intelligence.*

MOVES

Liu, S., Schulze, J. P., Herr, L., **Weekley, J. D.**, Zhu, B., Osdol, N. V., et al. (2011). CineGrid exchange: A workflow-based peta-scale distributed storage platform on a high-speed network. *Future Generation Computer Systems-the International Journal of Grid Computing and Escience*, 27(7), 966-976.

OCEANOGRAPHY

Chu, P. C. (2011). Global upper ocean heat content and climate variability. *Ocean Dynamics,* 61(8), 1189-1204.

Timmermans, M., Proshutinsky, A., Krishfield, R. A., Perovich, D. K., Richter-Menge, J. A., **Stanton, T. P.**, et al. (2011). Surface freshening in the arctic ocean's eurasian basin: An apparent consequence of recent change in the wind-driven circulation. *Journal of Geophysical Research-Oceans,* 116, C00D03.

MacMahan, J., Reniers, A., Brown, J., Brander, R., **Thornton, E., Stanton, T.,** et al. (2011). *An introduction to rip currents based on field observations. Journal of Coastal Research,* 27(4), III-VI.

OPERATIONS RESEARCH

Knox, J., Orchowski, J., Scher, D. L., Owens, B. D., **Burks, R.,** & Belmont, P. J., Jr. (2011). The incidence of low back pain in active duty united states military service members. *Spine*, 36(18), 1492-1500.

Schoenfeld, A. J., McCriskin, B., Hsiao, M., & **Burks, R.** (2011). Incidence and epidemiology of spinal cord injury within a closed american population: The united states military (2000-2009). *Spinal Cord,* 49(8), 874-879.

PHYSICS

Kim, A. M., & **Olsen, R. C.** (2011). Simulated LIDAR waveforms for understanding factors affecting waveform shape. **Laser Radar Technology and Applications XVI**, 8037, 80371K.

Kruse, F. A., & Elvidge, C. D. (2011). Identification and mapping of night lights signatures using hyperspectral data. *Algorithms* **and** *Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XVII,* 8048, 80480T.

Olsen, R. C., Kim, A. M., & McConnon, C. (2011). High spatial resolution bidirectional reflectance retrieval using satellite data. *Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery* XVII, 8048, 80480W.

NATIONAL SECURITY AFFAIRS

Erik J. Dahl, "The Plots That Failed: Intelligence Lessons Learned from Unsuccessful Terrorist Attacks against the United States." *Studies in Conflict and Terrorism,* Vol. 34 No. 8 (August 2011), pp. 621-648.

Please submit your faculty and research news (published articles, conference proceedings, conference presentations, books, honors received, accomplishments, milestones achieved, etc.) to research@nps.edu.

SEA-17B–TEMASEK COOPERATIVE

In the fall of 2010, US Navy leadership tasked the students of Systems Engineering Analysis Cohort 17, Team B (SEA-17B) to develop concepts for advanced undersea warfare systems. Over the ensuing year, SEA-17B's team members immersed themselves in the research and analysis of the problems affecting the evolving undersea battlespace and potential solutions for continued US Navy dominance.

SEA-17B is an international, multidisciplinary capstone project team formed in cooperation with Singapore's Temasek Defense Systems Institute. SEA-17B's 10 US naval officers and fifteen Singaporean officers and defense scientists represent the air, land, surface, and subsurface warfare communities and the fields of military science and engineering. With this expertise, SEA-17B has developed and recommended potential concepts and identified underlying principles that can benefit research and systems development.

Since project completion in June 2011, the results of the SEA-17B study have been briefed to Commander, Naval Mine and Anti-Submarine Warfare Command (NMAWC), Naval Surface Warfare Center, Panama City Division (NSWC PCD), Chief of Naval Operations Staff (OPNAV N81 and N85), Office of Naval Research (ONR), Commander, US Pacific Fleet staff (COMPACFLT N00WAR), and other stakeholders.

SEA-17B has been accepted to present at the Association for Unmanned Vehicle Systems International (AUVSI), North America conference; the Institute for Defense and Government Advancement (IDGA) Mine Warfare Symposium; and the National Defense Industrial Association (NDIA) Undersea Warfare Conference.

Front row: RADM (Ret.) Richard Williams, Lu Zheng Liang, Tan Yick Fung, LT Jonathan Saburn, LT William Walker, LT Jim Drennan, LT Philip Castaneda, Research Assistant Professor John Osmundson, ME5 Chan Chung Wei, CPT Kelvin Zhu. Middle row: Koh Wee Yung, LT Matt Malinowski, CPT Teo Yong Kiong, LCDR Alwin Wessner, LCDR Tracy Emmersen, LT Christian Silvestrini, Wee Hong Chuan, Pek Wee Kok, Lim Choon Wee, CPT Sor Wei Lun. Back Row: MAJ Ong Zi Zuan, LT Tommy Mills, MAJ Wong Chee Heng, CPT Daniel Perh, CPT Ng Kiang Chuan, David Chiam. Not Pictured: LT Scott Harvey, USN

DOCTORAL STUDENTS, *continued from page 1*

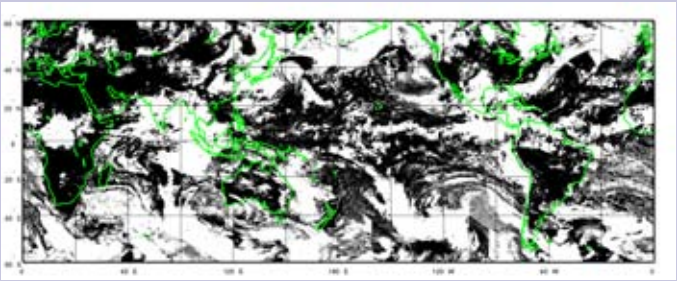
are largely unknown or classified, and typical cost/loss models may not apply. We invoke utility theory to quantify operator benefits obtainable from the ensemble. Ensemble skill is apparent, and utility for risk-averse users in persistently clear, cloudy, and variable regions/seasons yields up to a 20 percent increase in operational efficiency. **Professor Joshua Hacker,** Department of Meteorology, is advisor.

The research of **U.S. Air Force Major Robert Harder** investigates quantitative models for assessing visual simulation architectures to aid acquisition professionals in choosing appropriate software for building simulations.

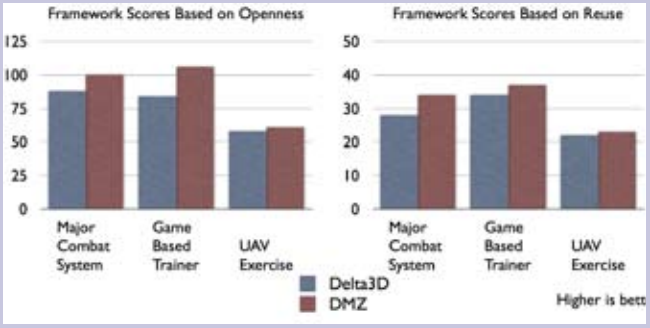
Harder's dissertation, "A Quantitative Model for Assessing Visual Simulation Architecture," addresses three objectives that are important to the DoD for software: openness, reuse, and agility. Program managers have plenty of guidance suggesting that they pursue these objectives, but until now there have not been quantitative tools to help them assess competing software frameworks.

Maj Robert Harder, USAF

Harder asserts that visual simulation architectures can be distinguished based on these objectives. He develops new metrics and uses old metrics in new ways. After applying his work to two visual simulation frameworks, he shows that his model does indeed provide differentiation that can be used to improve military acquisition decisions. **Professor Rudy Darken** served as advisor.



Weather patterns as charted in Stubblefield's research



Metrics for framework scores from Harder's research.

TECHNICAL SERVICES AGREEMENTS (TSAs)

Spatially Resolved Optical Imaging of Solar Cell Structure
Partner: Spectrolab
PI: Nancy Haegel, Department of Physics
Summary: NPS will utilize its unique transport imaging laboratory capability to test up to six (6) samples provided by Spectrolab to image the luminescence using both biasing of the device and electron beam excitation.

MEMORANDA OF UNDERSTANDING/ AGREEMENT (MOUs/MOAs)

NPS/CIRPAS Project Support to the Operations and Technology Office
Partner: Department of the Army Deputy Chief of Staff G-3/5/7, Operations and Technology Office
NPS POC: Robert Bluth, CIRPAS
Summary: The agreement established a collaborative relationship between the parties and outlines the procedures for executing NPS/CIRPAS support of the Army-led, USSOCOM sponsored SENTRY UAS project.

Naval Space Systems Engineering and Acquisition Chair at the Naval Postgraduate School
Partner: Program Executive Office for Space Systems
NPS POC: Rudy Panholzer, Space Systems Academic Group
Summary: The purpose of this agreement is to continue support of the Naval Space Systems Engineering and Acquisition Chair at NPS and to define the instructional, research, and advisory activities to be undertaken by the Chair

TECHNICAL REPORTS PUBLISHED

NPS-OC-11-004CR	Marine Mammal Demographics of the Outer Washington Coast During 2008-2009	Ana Sirovich, Erin M. Oleson, *et al.*

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

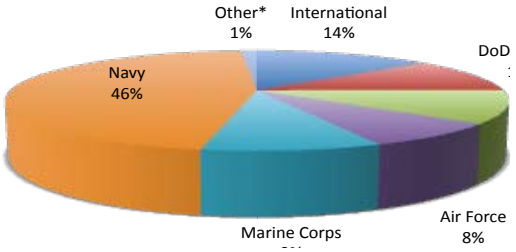
NPS HOSTS STEM PROGRAM

NPS welcomed 22 students this summer who participated in the 5th year of the Community College Catalyst (3C) program run by the Cebrowski Institute. The science, technology, engineering, and mathematics (STEM) internship program matches Hartnell Community College students with NPS researchers across campus. The eight-week internships provide opportunities for these students to conduct mission relevant research alongside their mentors and NPS students. A 3C alum, Genaro Sanchez, recently presented on his experiences at the ONR STEM Forum in Arlington, VA.

This year's program concluded with a symposium and celebration at Hartnell in Salinas. NPS attendees included President **Daniel Oliver,** Provost **Leonard Ferrari**, Vice President **Christine Haska,** Dean of Research **Karl van Bibber.** 3C Program mentors Professor **Jim Newman,** Visiting Research Scientist **Mark Karpenko**, Lecturer **Joe Welch,** Research Associate Professor **Amela Sadagic**, and 3C Program Manager **Alison Kerr** also attended.

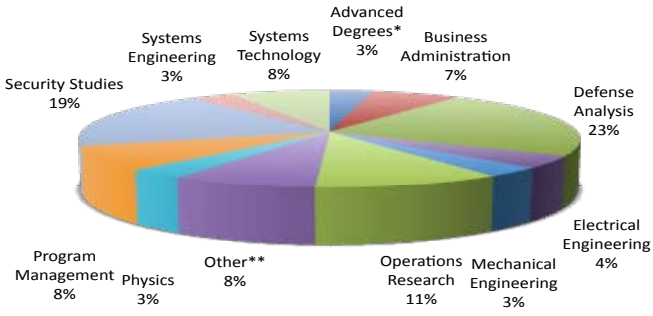
STEM symposium at Hartnell College, summer 2011

THESIS STATS FOR JUNE 2011



**Army Reserve, Army Reserve National Guard, Coast Guard, NOAA*

Resident Degrees/Subspecialty Student Population for June 2011 (1,545 total)



** Advanced degrees: Ph.D in applied physics (1), engineering acoustics (1), information sciences (1), physical oceanography (1); mechanical engineer (1)*
***Other master's degrees: applied math (3), applied physics (3), applied science (1), computer science (3), engineering acoustics (1), human–systems integration (1), information technology management (2), management (1), meteorology and physical oceanography (1), physical oceanography (1), software engineering (2), systems-engineering management (1)*

Degrees Conferred in June 2011
(160 Degrees Conferred)