Maj. Gen. Ellen M. Pawlikowski, commander of the Air Force Research Laboratory, visited NPS on May 13 to sign an agreement between the Office of Naval Research (ONR), National Reconnaissance Office (NRO), Air Force Research Laboratory (AFRL), and NPS, establishing NPS as the Adaptive Optics Center of Excellence for national-security education and research. ONR, NRL and AFRL will commit $1 million yearly for five years to research and education in adaptive optics.

Lt. Col. Neil Sanger, USAF, LTC Paul Robards, Australian Army, and LCDR Mike Touse, USN, will be awarded doctoral degrees at the Spring 2011 graduation ceremony.

Lt. Col. Sanger’s work in the Department of Meteorology examined observational data from an intensifying typhoon collected during the NPS-ONR field experiment, Tropical Cyclone Structure 2008 (TCS08), conducted out of Guam, USA, in the summer of 2008. Neil also researched data from an intensifying hurricane in the Atlantic region. An observational study of tropical-cyclone spin-up was performed using dropsondes and satellite imagery from Supertyphoon Jangmi and Hurricane Georges and a gradient wind analysis was conducted for both storms. ELDORA data was analyzed during the tropical storm stage. Together, Sanger’s study of these storms is providing a unique observational test of a new paradigm of tropical-cyclone intensification developed by his advisor, Professor Mike Montgomery (Meteorology) while at NPS, in collaboration with Roger Smith at the University of Munich.

The observational results support, for the first time, a fundamental theory of the intensification mechanism. These findings may spur basic improvements of tropical-cyclone intensity forecasting models. If the continued on p. 4

By Sponsor

- Service $41.3M 26%
- Education $16.3M 10%
- CRADA $1.8M 1%
- Research $99.0M 63%
- Fed $6.6M 4%
- Arm $6.7M 4%
- DoD $71.4M 45%

By School

- Navy $43.6M 28%
- NSF $728K ≤1%
- Other $6.6M 4%
- Air Force $5.9M 4%
- Army $6.7M 4%
- SIGS $14.7M 9%
- GSBPP $8.6M 5%
- GSEAS $44.2M 28%
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- CRADA $1.8M 1%
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- CRADA $1.8M 1%
- SIGS $14.7M 9%
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- GSEAS $44.2M 28%
Graduate School of Engineering and Applied Sciences

Funds available to date: $44.2M

By Department

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Projects funded in April

- Wireless Networking and Communications Research, John McEachen, ECE (NSA)
- Efficient High-order Time-Integrators for Local High-order Discretization Methods, Francis Giraldo, MA (AFOSR)
- Maritime Beam Control, Brij Agrawal, MAE (ONR)
- Autonomous Surface Vehicles, Doug Horner, MAE (NSWC-Panama City)
- Pseudospectral Feedback Control for Space Applications, Mike Ross, MAE (AFOSR)
- South-China-Sea Signal Propagation and Ambient Noise Data Analyses, CV Chin, OC (ONR)
- Nanocarbon-Reinforced Metal Armors, Sebastian Osswald, PH (ONR)
- Seaweb ASW Sensor Network, Joe Rice, PH (ONR)
- Quantitative Capabilities-based Assessment for Naval Combatant Ship Design Through M&$S, Eugene Paulo, SE (ONR)

School of International Graduate Studies

Funds available to date: $14.7M

By Department

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Projects funded in April

- Establishing and Operating an Advanced Systems and Concepts WMD Center, Anne Clunan (DTRA)
- CCC-ASCO Partnership, Anne Clunan (DTRA)
- Emerging Infectious Diseases Surveillance: Evidence from Egypt, Kenya, Peru, and the US-Mexican Border, Sophal Ear (DTRA)
- Resource Conflicts: Strategic Commodities in Latin America, Maihab Jaikiazi (DTRA)
- Operational Culture for Deploying Personnel Guidebook for CAOCL, Tom Johnson (CAOCL)
- Insurgent Strategic Communication Analysis for Open Source Center, Tom Johnson (OSC)
- Pakistan Strategic Dialogue VI, Feroz Khan (DTRA)
- Multilateral Cooperation on Nonproliferation, Jeff Knopf (DTRA)
- Projects on Nuclear Issues, Sandra Leavitt (DTRA)
- Homeland Security Master’s Degree Program, Ted Lewis (DHS)
- DHS/FEMA Protection and National Preparedness, Ted Lewis (DHS/FEMA)
- Homeland Security Leadership Development Seminars, Ted Lewis (DHS)
- Challenges to U.S. Space-based Early Warning and Strategic Reconnaissance, Clay Moltz (DTRA)
- Submarine Proliferation and Future Strategic Stability, Clay Moltz (DTRA)
- African Security Challenges, Jessica Piombo (DTRA)
- Regional Educational Program in Support of the African Partnership Center, Jessica Piombo (USN)
- WMD Innovation and Terrorism: Causes, Processes, and Predictive Indicators, Phase II, Maria Rasmussen DTRA
- Global Futures Forum, James Russell (DNI)
- WMD Proliferation Networks Post Aq Khan, James Russell (DTRA)
- U.S.-Latin America Nuclear Relations: from Commitment to Defiance, Arturo Sotomayor (DTRA)
- Controlling Border Spaces in the Americas, Harold Trinkunas (DTRA)
Graduate School of Operational and Information Sciences
Funds available to date: $31.7M

By Department

- Information Sciences $9.2M (29%)
- Operations Research $7.3M (23%)
- Computer Science $10.8M (34%)
- Defense Analysis $4.4M (14%)

By Sponsor

- Computer Science $10.8M (34%)
- Defense Analysis $4.4M (14%)
- Information Sciences $9.2M (29%)
- Perceptions Research $7.3M (23%)
- Air Force $1.5M (5%)
- Army $2.4M (8%)
- CRADA $245K (1%)
- DoD $10.9M (34%)
- DHS $264K (1%)
- Joint $1.7M (5%)

Projects funded in April

- Navy Certifier Program Special Offering, Karen Burke, CS (USMC - Network Op & Security Center, NAVCENT)
- Federal Cybersecurity Research, Cynthia Irvine, CS (DHS)
- Xplane, Dennis Volpano, CS (ONR)
- Defense Counterterrorism Technology, Nancy Ann Budden (OSD)
- Afghan Lessons from Soviet Era, Nancy Roberts, DA (ONR)
- Trident Warrior 10: Sea Trials, Shelley Gallup, IS (ONR)
- Net-T Integration and Management onto the L3 Communications Mini-C and Rover 6 Transceivers, Shelley Gallup, IS (Army Unmanned Aircraft Systems)
- Purple Rain, Bill Roeting, IS (USAF Adv Capabilities Office)
- Large-scale Optimization, Gerald Brown, OR (AFOSR)

Research and Education Institutes, Centers, and Other
Funds available to date: $25.3M

By Department

- Academic Affairs (SMART) $33.9M (57%)
- Cebrowski $2.7M (5%)
- CIRPAS $2.6M (4%)
- Meyer Institute $1.8M (3%)
- MOVES $6.0M (10%)
- NSP-SOCCOM Field Experiments $1.8M (3%)
- Other $2.8M (5%)

By Sponsor

- NSF $2.8M (10%)
- Other $103K (1%)
- Fed $1.8M (6%)
- Air Force $1.5M (5%)
- Army $2.4M (8%)
- CRADA $245K (1%)
- DoD $10.9M (34%)
- DHS $264K (1%)
- Joint $1.7M (5%)

Projects funded in April

- Global Wargame: Warfighting Assessment, Scott Miller, Cebrowski (SPAWAR)
- DMEA Development, Cliff Whitcomb, Meyer Institute, (OSD)
- Anti-Submarine Warfare Support for C4I System Interoperability and Track Visualization, Don Brutzman, MOVES (NAVSEA)
- Discrete-Event Simulation Approach to Cultural Geography, Arnold Buss, MOVES (TRAC–Monterey)
- Field-Experiments for Special Operations, Ray Buettner, NPS–USOCCOM (OSD)
- Multi-Intuitional Semi-Structured Learning Environment, Ray Buettner, NPS–USOCCOM (ARL)
- UAV Operations at Camp Roberts, Bob Bluth, CIRPAS (NAWC–Weapons)

Graduate School of Business and Public Policy
Funds available to date: $8.6M

By Sponsor

- NSF $2.8M (10%)
- Other $102K (1%)
- Fed $1.8M (6%)
- Air Force $1.1M (4%)
- Army $1.5M (5%)
- CRADA $65K (1%)
- DoD $10.4M (37%)
- Joint $6.1M (6%)
- Navy $8.9M (32%)

Projects funded in April

- Seminar in Defense Budget Analysis, Doug Brook (CIA)
- Business-Case Analysis for SPA, Chip Franck (AFRL)
- DASN (A&LM)–Chair of Acquisition and Research Program, Keith Snider (DASN)
tropical-cyclone intensification process is correctly represented in both theory and models, forecasters at the National Hurricane Center and Joint Typhoon Warning Center will have improved tools for making reliable intensity forecasts.

Improved forecasts are essential for protecting the lives of military and civilian personnel and their family members living in tropical-cyclone prone areas along the U.S. Gulf Coast and Atlantic Coast and in the western North Pacific Ocean. Better forecasts are also key to maximizing the safety of multi-million dollar military aircraft based in other tropical cyclone-prone areas such as Andersen Air Base, Guam and U.S. Navy ships transiting the western Pacific, Gulf of Mexico, and Atlantic Ocean basins.

Lt. Col. Sanger is squadron Commander of the 16th Weather Squadron in the Air Force Weather Agency at Offutt Air Force Base, Nebraska.

The doctoral work of LTC Paul Robards, Australian Amy, examines the practice of many large organizations that rely on manual assignment processes, despite the theory of bounded rationality indicating that time and cognitive constraints would limit the quality of assignments. Robards’s work was supervised by Professor Bill Gates, Dean of the Graduate School of Business and Public Policy.

Robards’s research used participant experiments to explore the effect of information load on assignment quality: participants, motivated by induced value theory, performed the role of decision makers; and information load was identified by the number of personnel requiring assignment and the number of attributes to be considered. Results varied considerably between participants, despite a relatively homogenous group of participants and low information loads compared to what would be experienced in actual military assignment processes. Having analyzed the shortcomings of manual assignment processes, this research examined two-sided matching as the basis for a decision support system. It was demonstrated that two-sided matching could be used to assign personnel to positions in hierarchies. Multi-attribute utility functions were used to generate position preferences based on a variety of attributes, some relevant to the organization and others to its subordinate units.

Computational experiments showed that assignments are responsive to the utility function weights, allowing decision makers to quickly examine various assignment sets under different conditions. The effects of preference list indifference on two-sided matching were also examined.

Robards was a NPS Distinguished Graduate and NPS Outstanding International Student upon receiving a master’s degree in manpower-systems analysis from NPS in 2001 and returned for further research in 2004–2006. He is currently a Staff Officer Grade 1, Workforce Analysis, in the Australian Army and has been appointed a Member of the Order of Australia for his contributions to the Australian Army and Defense Force in the field of workforce modeling, forecasting, and analysis.

The doctoral dissertation of LCDR Tou se, USN, “Design, Fabrication, and Characterization of a Micro-electromechanical, Directional Microphone,” involves the design, fabrication, and testing of a millimeter-sized microphone that is able to determine the origin of a sound source using a structure based on the ear of the Ormia ochracea. LCDR Touse’s research was supervised by Professor Gamani Karunasiri, Department of Physics.

While humans generally determine sound direction by sensing how long it takes for the sound to travel between their ears, insects are so small that sound reaches both ears at the same time. The Ormia ochracea fly is able to overcome this problem with a
NPS faculty and staff participated in the biannual Weapons and Tactics Instructors course conducted this April by the Marine Aviation Weapons and Tactics Squadron One (MAWTS-1). MAWTS-1 provides standardized training in all aspects of the employment of Marine aviation units toward the accomplishment of their assigned mission, assists in the development of aviation weapons and tactics and provides for the evaluation of other aviation units. The Marine students take what they learn back to their units, where they, in turn, become the teachers. Each exercise is designed to simulate realistic urban combat situations. MAWTS-1 also conducts two Desert Talon exercises per year.

As participants in MAWTS-1, Distinguished Professor Nancy Haegel and LT Marty Blomberg, USN, a master’s student in the combat systems curriculum (physics department), traveled to the Marine Corps Air Station, Yuma, to support a demonstration and evaluation of the NPS vehicle-mounted identification, friend or foe (VMIFF) device. VMIFF is a near-infrared and midwave-infrared beacon that can be remotely or locally triggered to provide fratricide mitigation and situational awareness during close air support. Working with MAWTS instructors and the Marine Corps Experimentation Center of MARFORPAC, LT Blomberg coordinated the demonstration and use of VMIFF during live fire and daytime and nighttime tracking exercises. VMIFF was developed at NPS in collaboration with industrial partners at Syvax Design Inc. The next test will be at the Bold Quest combat identification exercise in September of this year.

Bob Bluth and CIRPAS staff also participated in the course, supporting the MAWTS-1 class 2-11(WTI 2-11) at Camp Roberts. CIRPAS provides the Pelican Surrogate (SUAV) to simulate the Predator unmanned, aerial vehicle (UAV) and provide quality video from a sensor aboard the aircraft to a ground-control station. The purpose is to train the Marine MAWTS-1 students in the use of UAV video to call in air strikes with live F-18 and Harri-
COMPUTER SCIENCE


ELECTRICAL AND COMPUTER ENGINEERING


Distinguished Professor Jon T. Butler was a recipient of the outstanding paper award” from the Transactions on System LSI Design Methodology for the paper, S. Nagayama, T. Sasao, and J. T. Butler, “Programmable architectures and design methods for two-variable numeric functions generators,” IPSJ Transactions on System LSI Design Methodology, Vol. 3, No. 2, pp. 118-129, Feb. 2010.’

GRADUATE SCHOOL OF BUSINESS AND PUBLIC POLICY


Snider, K. F. (2011). On the problem of adopting pragmatism in public administra-

tion. Administration & Society, 43(1), 133-141.


MECHANICAL AND AEROSPACE ENGINEERING
Back, S-C., Hobson, G. V., Song, S-J, Millsaps, K. T., “Effect of Reynolds Number and Surface Roughness Magnitude & Location on Compressor Cascade Performance,” Accepted for publication in the ASME Journal of Turbomachinery, December 2010


METEOROLOGY


NATIONAL SECURITY AFFAIRS

Assistant Professor Sophal Ear was honored by the World Economic Forum in Geneva, Switzerland, as a Young Global Leaders for 2011. The annual award recognizes up to 200 outstanding young leaders worldwide for professional accomplishments, commitment to society, and potential to contribute to shaping the future of the world.

OCEANOGRAPHY


OPERATIONS RESEARCH


Assistant Professor LTC Scott Nestler, USA, was an invited speaker at the INFORMS Conference on Business Analytics and Operations Research in Chicago. His presentation, “Analytics in the Fog of War,” was based on experience as the Chief of Strategic Assessments for Multi-National Force - Iraq in 2009.

PHYSICS


B.R. Poole and J.R. Harris. Cerenkov Radiator Driven by a Superconducting RF Electron Gun, 2011 Particle Accelerator Conference, New York City, 28 March 2011

Bradley L. McCarthy, Professor Chris Olsen, and Research Associate Angela Kim presented “Creation of bathymetric maps using satellite imagery” at the SPIE Conference on Defense, Security, and Sensing, Orlando, FL, April 2011.


SYSTEMS ENGINEERING


Please submit faculty research news items to research@nps.edu.
TECHNICAL SERVICES AGREEMENT (TSA)

Title: Improving Regional VOC Emission Estimate
Partner: University of California, Berkeley
PI: Hafldi Jonsson, CIRPAS
Summary: NPS/CIRPAS will provide pre-flight coordination, flight coordination, range management, flight safety and facility management of Berkeley for the Regional VOC Emission Estimate at CIRPAS facility and will ensure compliance with all CIRPAS policies and procedures.

MEMORANDUM OF UNDERSTANDING (MOU)

Partner: National Science Foundation
NPS POC: Bob Bluth, CIRPAS
Summary: NPS/CIRPAS Twin Otter and A-10 will be made available to NSF as part of the Deployment Pool to support National Research Facilities. These aircraft will function as airborne science platforms for various research projects when schedule and cost considerations are appropriate.

Partner: Naval Medical Administrative Unit
NPS POC: Ryan Greve, Radiation Safety Officer
Summary: Naval Medical Administrative Unit will act as the custodian of the radiation health records that are required to be maintained as part of the NPS radiation protection program.

PATENT APPLICATIONS

“Automatic Parafoil Turn Calculation Method and Apparatus,” Navy Case No. 20110006.
Inventors: Oleg Yakimenko, Department of Mechanical and Aerospace Engineering

“Method and Apparatus for Parafoil Guidance That Accounts for Ground Winds,” Navy Case No. 20110007.
Inventors: Oleg Yakimenko, Department of Mechanical and Aerospace Engineering, and Eugene Bourakov, Department of Information Sciences

Inventors: Alex Bordetsky, Department of Information Sciences, Oleg Yakimenko, Department of Mechanical and Aerospace Engineering, and Eugene Bourakov, Department of Information Sciences

Inventors: Oleg Yakimenko, Department of Mechanical and Aerospace Engineering, and Eugene Bourakov, Department of Information Sciences

TECHNICAL REPORTS PUBLISHED

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<tr>
<td>NPS-DA-11-001</td>
<td>Gangs and Guerrillas: Ideas from Counterinsurgency and Counterterrorism</td>
<td>M. Freeman, H. Rothstein</td>
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Technical reports may be obtained at http://www.nps.edu/Research/TechReports.html

ELECTRONIC PROPOSAL SUBMISSIONS: PROCESS

The use of electronic means to submit proposals to competitive solicitations has increased dramatically within the last year. The NSF site, FastLane, has been used for many years, but more and more agencies are either utilizing Grants.Gov or their own sites to assure timely submission of proposals in formats specified. Staff in the RSPO are well-versed in utilizing these portals and do complete the submission on behalf of NPS. Staff will also assist with formatting and budget development.

Due to the increase in electronic submissions and the fact that all submissions are time/date stamped to assure arrival by the date set by the sponsor, it is necessary that the RSPO be alerted if a PI is planning a submission and that all necessary documents be received in the RSPO with sufficient time to review and submit. We request that the PI notify the RSPO as soon as they have decided on submission and work out a timeline with the staff to complete all documentation. All documentation must be completed at least twenty-four hours prior to submission, which means that the RSPO should receive input from the PI no later than three working days prior to submission. The RSPO will assure that submission requirements are met.

An electronic submission of a proposal does not preclude the necessity for Department/Institute/Dean review. If the signed Standard NPS Proposal Page is not received with the proposal documentation, the RSPO will staff the proposal via email to the PI’s Chair/Dean or Director/Dean as applicable prior to submitting the proposal electronically to the sponsor.

Again, TIMELINESS in receipt of documentation is a necessity to assure both NPS and sponsor submission requirements can be met. Questions, please email research@nps.edu.