



RESEARCH AT NPS



Congratulations to **Anjum Gupta** on his being awarded a Ph.D. in computer science in March 2011. Gupta pursued his degree under a SMART scholarship, sponsored by SPAWAR Systems Center–Pacific in 2009.

Gupta’s research area is in machine learning and pattern recognition. His dissertation proposes new algorithms for cross-genre topic detection. His work will allow searchers to find documents on a particular topic

in different genres such as twitter posts, emails, and blogs without requiring previously labeled samples from that genre. His proposed algorithms greatly reduce the number of documents that an analyst would need to manually search and categorize to train the classifier algorithm. Gupta’s dissertation was guided by Associate Professor **Craig Martell** of the Department of Computer Science. Gupta has been working as a scientist at SPAWAR Systems Center–Pacific in San Diego since 2005. He received his B.S and M.S. in computer science from the University of California, San Diego.

BROWN-BAG SEMINAR SERIES

WA-302, 1200-1300

- Wednesday, 13 April: Research Initiation Program
- Wednesday, 11 May: Research Safety

NPS ISSUES PARTIALLY EXCLUSIVE LICENSE TO PNI SENSOR CORPORATION

PNI Sensor Corporation of Santa Rosa, CA, known for its magneto-inductive magnetometer, has licensed two NPS patents, “Method and Apparatus for Motion Tracking of an Articulated, Rigid Body,” U.S. patent numbers 6,820,025 and 7,089,148. This use will complement PNI’s sensor-fusion algorithm for multi-axis modules. The NPS inventors (**Eric Bachmann, Robert McGhee, Douglas McKinney, Xiaoping Yun** and **Michael Zyda**) will share in the royalties: DoD inventors can receive up to \$150,000 per year in royalties and other invention-related payments.

PNI sensors have made a broad impact in the automotive and consumer products industry. PNI also sells electronic-compass modules and accelerometer and gyroscopic sensors and licenses its core sensor fusion algorithms which form the basis for many of its orientation module products.

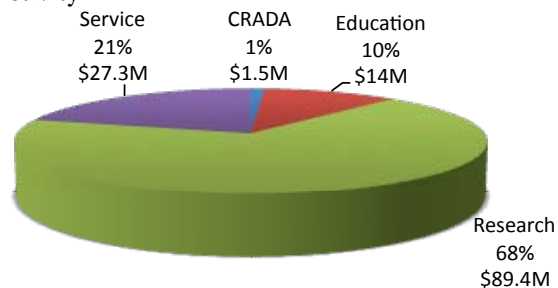
The first product platform where the NPS invention is slated for use is in SpacePoint 3D, a revolutionary motion-control sensor system consisting of a 9-axis sensor suite powered by algorithm engines for point and motion tracking, making it possible to combine the precision and accuracy of a click-by-click ‘D-pad-and-grid’ interface with the ease of a mouse. The system has multiple applications for both gaming and television and set-top-box controller industries.

For information on filing a patent, contact NPS patent attorney **Lisa Norris** at 656-7892 or lanorris@nps.edu. Also, look for the next RSPO Brown Bag on this topic.

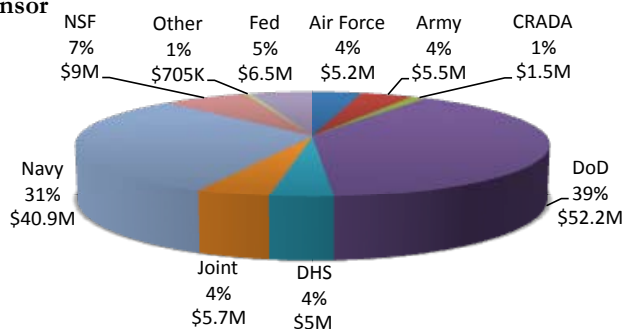
SPONSORED PROGRAMS STATUS, MARCH 2011

FUNDS AVAILABLE: \$132.3M

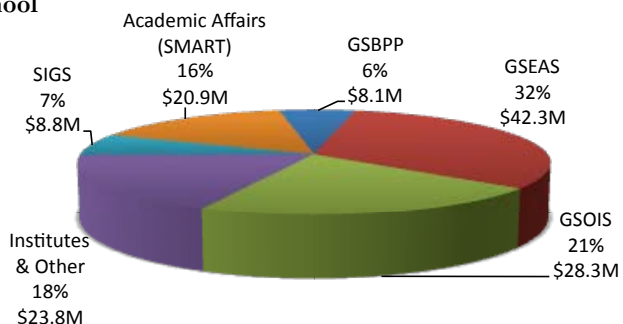
By Type of Activity



By Sponsor



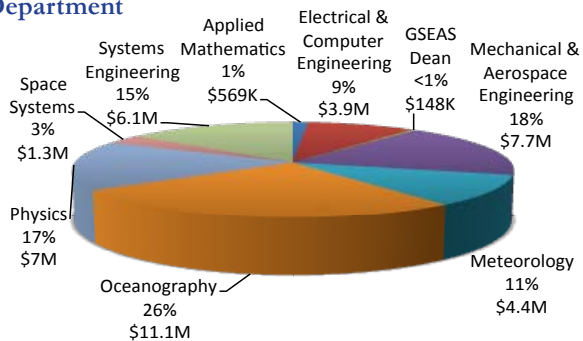
By School



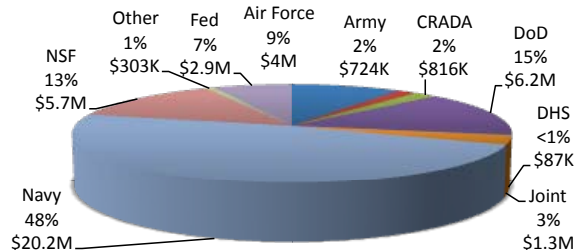
Graduate School of Engineering and Applied Sciences

Funds available to date: \$42.3M

By Department



By Sponsor



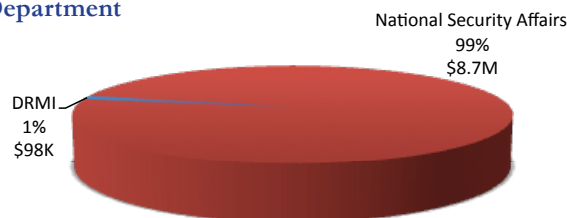
Projects funded in March

- Advanced Power Systems Model and Design Methods for Electrical Distribution, *Bob Ashton, EC* (NSWC-Carderock Division)
- WPAC Support and Rapid Acquisition Enabling for MARCORSYCOM, *Rachel Goshorn, EC* (USMC-MARCORSYCOM)
- Classified Advanced Technology Update Short Course (CATU), *Hersch Loomis, EC* (Various)
- HEL Weapon Alignment System Architecture Efficiencies, *Brij Agrawal, MAE* (AFRL)
- Portable X-ray Diffraction for Residual Stress Measurements Aboard Naval Vessels, *Luke Brewer, MAE* (ONR)
- Evaluation of an Oxygen-alcohol Thruster, *Chris Brophy, MAE* (Ventions, LLC)
- Constant Volume Combustion Technology Development, *Chris Brophy, MAE* (AFRL)
- LCS-Class Ship-shock Modeling and Simulation Using DYMSAS Code, *Jake Didoszak, MAE* (NAVSEA)
- Autonomous Guidance and Control of a Spacecraft Approaching a Tumbling Object, and Agile Attitude Control for Nanosatellites, *Marcello Romano, MAE* (AFRL)
- Dark Skies: Spacecraft Maneuvering Flight Demonstration-Phase 1A, *Michael Ross, MAE* (SAF)
- Regional Numerical Weather Prediction for Aerosol Modeling, *Chih-Pei Chang, MR* (NRL)
- Extending the NSLOT Model Wavelength Range, *Paul Frederickson, MR* (SSC-PACIFIC)
- Characterization and Classification of Marine Mammal Vocalizations, *Curt Collins, OC* (CNO, NAVSEA)
- AAWIM Technology Integrated Demonstration and Transition, *Ron Brown, PH* (NAWC-Weapons Division)
- Ocean Observatory, *Daphne Kapolka, PH* (ONR)
- NPS Combat Systems Science and Technology (CSS&T) Curriculum, *Andres Larraza, PH* (PEO IWS)
- Master of Science in Systems Engineering, *Wally Owen, SE* (NSWC-Port Hueneme)
- Launch CubeSats on AFT Bulkhead Carrier, *Jim Newman, SP* (SAF)
- Technology Review and Update for Technical Personnel-(TRAU) 2011, *Rudy Panbolzer, SP* (Various)
- Space Systems Operations Student Thesis Research/Experience Tour, *Rudy Panbolzer, SP* (Navy Cyber Forces)

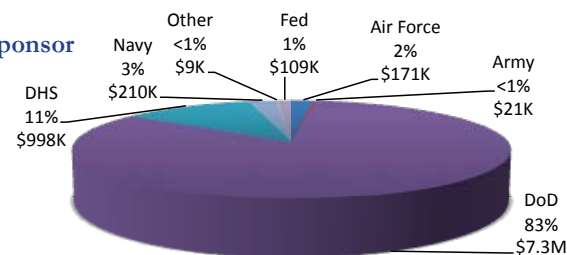
School of International Graduate Studies

Funds available to date: \$8.8M

By Department



By Sponsor



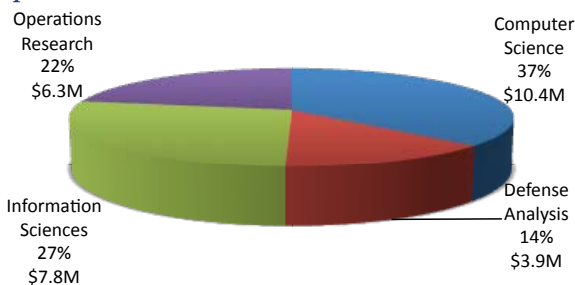
Projects funded in March:

- Trilateral Nuclear Dialogues, *Anne Clunan, NS* (DTRA)
- Operational Culture for Deploying Personnel Product for CAOCL, *Tom Johnson, NS* (USMC - CAOCL)
- U.S.–Indian Strategic Dialogue, Phase VI, *Paul Kapur, NS* (DTRA)
- 5th Annual Foreign Area Officer (FAO) Conference, *Sandra Leavitt, NS* (SAF/IA)
- U.S.–Southeast Asian Dialogue, Phase III: Sources of Strategic Instability in Southeast Asia, *Michael Malley, NS* (DTRA)
- Global Trends and the Future of Warfare 2025, *Dan Moran, NS* (DNI)
- Global Futures Forum, *James Russell, NS* (DNI)
- U.S.–Chinese Strategic Lexicon and Concepts, *Chris Twomey, NS* (DTRA)
- U.S.–ROK Extended Deterrence Policy Committee Meeting, *Chris Twomey, NS* (OSD)

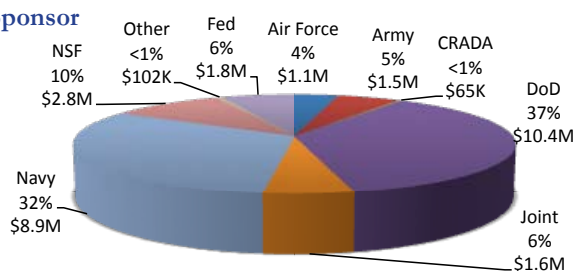
Graduate School of Operational and Information Sciences

Funds available to date: \$28.3M

By Department



By Sponsor



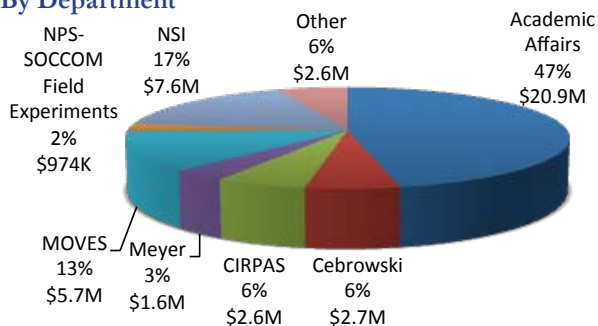
Projects funded in March

- Navy Certifier Program Special Offering, *Karen Burke, CS* (NAWC–Training Systems Division, Norfolk Naval Shipyard)
- Mobile Communication Infrastructure, *Cynthia Irvine, CS* (NSA)
- Cyber Masters Program, *Cynthia Irvine, CS* (NSA)
- Winning in Afghanistan-Separating Illusion from Reality, *John Arquilla, DA* (OSD)
- MANET, *Alex Bordetsky, IS* (ONR)
- Laser Detection Sensor, *Shelley Gallup, IS* (AFMSA)
- Trident Warrior (FY11): Sea-Trial Support for Experimentation, *Shelley Gallup, IS* (U.S. Fleet Forces Command)
- Large-Scale Optimization, *Gerald Brown, OR* (ONR)
- Efficient High-dimensional Design of Experiments in System-of-Systems Survivability Simulation, *Tom Lucas, OR* (ARL)

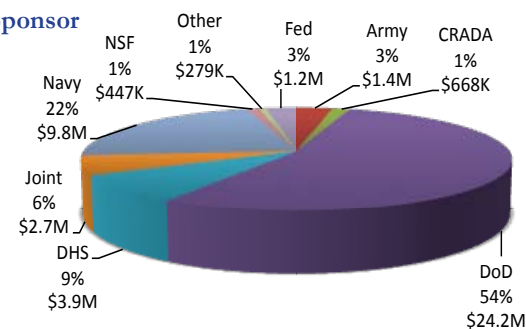
Research and Education Institutes, Centers, and Other

Funds available to date: \$44.7M

By Department



By Sponsor



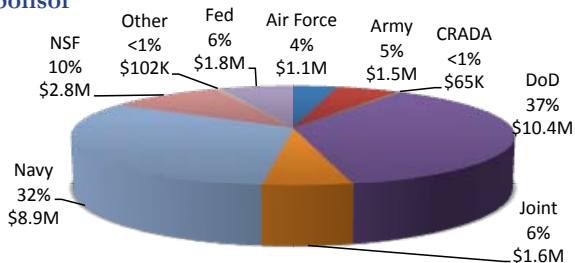
Projects funded in March

- Port of Hueneme Emergency Planning and Preparedness Studies, *Alan Jaeger, NSI* (Oxnard Harbor District)
- Massive Multiplayer Online War Game Leveraging the Internet (MMOWGLI) Project Execution, *Don Brutzman, MOVES* (NSWC–Carderock)
- Back to Basics: an Interactive Simulation to Train SWO
- Decision Making, *CDR Joe Sullivan, USN, MOVES* (ONR)
- JIEDDO Technical Exploitation-Red/Blue Modeling/Simulation, *Ray Buettner, NPS-SOCOM* (JIEDDO)
- Masters of Systems Analysis and Systems Analysis Certificate Program, *Tom Mastre, CHDS* (Various)
- SMART/NSSEFF Support, *Knox Millsaps, SMART* (OSD)

Graduate School of Business and Public Policy

Funds available to date: \$8.1M

By Sponsor



Projects funded in March

- Advanced Acquisition Program 47-31, *John Dillard, GSBPP* (USMC - MARCORSSYCOM)
- Support to the Naval Supply Systems Command, *Ken Euske, GSBPP* (NAVSUP)
- DCAA Strategic Communication Assessment: Phase 3 2011, *Cynthia King, GSBPP* (Defense Contract Audit Agency)
- FY11-OSD Sponsored Acquisition Research Program, *Keith Snider, GSBPP* (OUSD (AT&L))

DTRA FUNDS MAJOR EFFORT IN DEPARTMENT OF NATIONAL SECURITY AFFAIRS

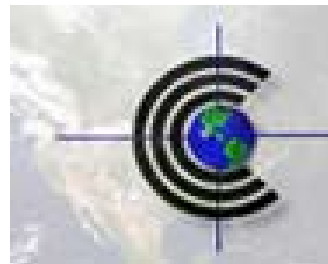
The Defense Threat Reduction Agency (DTRA) has funded a major program involving over fourteen projects supporting their Advanced Systems and Concepts Office (ASCO).

The mission of DTRA is to safeguard America and its allies from the threats posed by chemical, biological, radiological, nuclear and high-explosive (CBRNE) weapons of mass destruction (WMD) by providing capabilities to reduce, eliminate, counter those threats and to mitigate their effects.

As a component of the DTRA Strategy and Plans Enterprise, ASCO supports DTRA's Combating Weapons of Mass Destruction (CWMD) mission by providing long-term (5–20 year) analytical perspectives to help DTRA leadership identify, plan, and persuasively communicate what is needed to achieve strategic threat anticipation goals inherent in the agency's mission.

Funding of over \$4.2M will fund the following efforts:

- **Establishing and Operating an Advanced Systems and Concepts CWMD Center:** The Center for Contemporary Conflict, under the direction of **Associate Professor Anne Clunan**, will establish a center to serve as a program planning and intellectual clearinghouse, providing access to pre-eminent subject-matter expertise for the execution of the ASCO mission.
- **Center for Contemporary Conflict—ASCO Partnership:** Under the direction of **Associate Professor Anne Clunan**, work will focus on providing coordination, creating efficiencies, facilitating smooth communication, and widely disseminating project information.
- **Effective Emerging Infectious Diseases Surveillance:** **Professor Sopal Ear** will identify political, economic, and cultural factors for a given country, extract lessons learned, and suggest strategies to promote international collaboration and effective dealing with future outbreaks (deliberate or otherwise).
- **Resource Conflicts—Emerging Struggles Over Strategic Commodities in Latin America:** **Assistant Professor Maiah Jaskoski** will seek to explain social conflict over extractive resources in Latin America, with an over-the-horizon look at the implications for uranium extraction.
- **US—Pakistani Strategic Dialogue:** **Lecturer Feroz H. Khan** and **Associate Professor James Russell** will engage experts and former officials at a track-II level in a strategic dialogue to build upon US—Pakistani strategic cooperation in the decade ahead. This dialogue will build upon the previous discussions to examine in candid discussion issues of global security trends, Asian power balances, and the future of regional security and stability.
- **Multilateral Cooperation on Nonproliferation—Lessons Learned:** This project, under the direction of **Associate Professor Jeffrey Knopf**, will identify factors conducive to successful multilateral cooperation to combat WMD proliferation.
- **Project on Nuclear Issues** Building a network of nuclear professionals through the hosting of conferences, an active online forum, engaging young experts and scientists, and the production of a relevant journal is the goal of the work lead by **Research Assistant Professor Sandra Leavitt**.



- **Challenges to US Space-based Early Warning and Strategic Reconnaissance:** **Associate Professor Clay Moltz** will conduct research on the threats posed to US space-based early warning satellites and strategic reconnaissance assets posed by China and other emerging space powers.

- **Submarine Proliferation and Future Strategic Stability:** **Professor Moltz** will also conduct research on the emerging risks to U.S. naval and nuclear stability caused by the international proliferation of nuclear-powered and advanced diesel submarines.

- **Capstone Synthesis and Policy Implications—African Security Challenges Now and Over the Horizon:** This project will provide a capstone publication that brings together the insights from a series of workshops and reports that DTRA-ASCO has commissioned over the past two years under the “African Security Challenges: Now and Over the Horizon” project. **Associate Professor Jessica Piombo** will lead the effort.

- **WMD Proliferation Networks, Post—A.Q. Khan:** **Associate Professor James Russell** will organize a perspectives workshop between prominent US and Indonesian experts to exchange views on the changing security environment in Asia as affects nuclear security and non-proliferation.

- **US—Latin America Nuclear Relations—From Commitment to Defiance Assistant—Professor Arturo Sotomayer's** work will provide an understanding about why some Latin American countries are committed to work with the US on nonproliferation while other states in the region are defiant of US efforts. Analysis of Latin American states' nuclear motivations and ambitions, vis-à-vis US non-proliferation initiatives, will secure vulnerable nuclear materials and prevent acts of nuclear terrorism.

- **Controlling Border Spaces in the Americas:** **Assistant Professors Maiah Jaskoski and Arturo Sotomayer and Associate Professor Harold Trinkunas** will provide an understanding about changing border policies and trafficking networks in an international context where globalization has accelerated the flows of goods, persons, and information, both licit and illicit.

- **Weapons of Mass Effect (WME) Innovation and Terrorism— Causes, Processes and Predictive Indicators:** **Associate Professors Maria Rasmussen and Mohammed Hafez** will continue the ongoing WME workshop through examination of causes and innovation in terrorism in order to generate predictive indicators that could help counterterrorism specialists in law enforcement and intelligence respond to potential and emerging WME forms of terrorism.

For additional information on the Center for Contemporary Conflict, visit www.nps.edu/Academics/Centers/CCC/.

APPLIED MATHEMATICS

C. Chun, **B. Neta**, **P. Stanica**, Recurrence relations for a third-order family of methods in Banach spaces, *Computers and Mathematics with Applications*, 61, (2011), 1665-1675.

Jangveladze, T., Kiguradze, Z., and **Neta, B.** (2011). Galerkin finite element method for one nonlinear integro-differential mode. *Applied Mathematics and Computation*, 217(16), 6883-6892.

Kilic, E., and **Stanica, P.** (2011). A matrix approach for general higher order linear recurrences. *Bulletin of the Malaysian Mathematical Sciences Society*, 34(1), 51-67.

Stanica, P., Gangopadhyay, S., Chaturvedi, A., Gangopadhyay, A. K., and Maitra, S. (2010). Nega-hadamard transform, bent and negabent functions. Sequences and their Applications-Seta 2010, 6338, 359-372.

COMPUTER SCIENCE

Cynthia Irvine and **Mike Thompson** from the Center for Information Systems Security and Research were invited by the National Science Foundation to present the CyberCIEGE videogame at the NSF Showcase within the 2011 ACM Special Interest Group on Computer Science Education in Dallas on March 11.

Esher, L., Hall, S., Regnier, E., Sanchez, P. J., Hansen, J. A., and Singham, D. (2010). Simulating pirate behavior to exploit environmental information. *Proceedings of the 2010 Winter Simulation Conference*, 1330-1335.

Irvine, C. E., and Thompson, M. F. (2010). Simulation of PKI-enabled communication for identity management using CyberCIEGE. *Military Communications Conference, 2010 (Milcom 2010)*, 906-911.

Irvine, C. E., and Rao, J. R. (2011). Engineering secure systems introduction. *IEEE Security and Privacy*, 9(1), 18-21.

Rowe, N. (2010). In Demergis J. (Ed.), Towards reversible cyberattacks

Rowe, N. C. (2010). Efficient deployment of fiber-optic cable seismic sensors. Unattended Ground, Sea, and Air Sensor Technologies and Applications Xii, 7693, 76930T.

Singh, G., Young, C. P. J., Rowe, N. C., and Anderson, T. S. (2010). Inexpensive seismic sensors for early warning of military sentries. *Wireless Sensing, Localization, and Processing V*, 7706, 77060J.

Weissman, C., and **Levin, T. E.** (2011). Lessons learned from building a high-assurance crypto gateway. *IEEE Security and Privacy*, 9(1), 31-39.

Xiao, Y., Zhang, Y., **Gibson, J. H., Xie, G. G., and Chen, H.** (2011). Performance analysis of ALOHA and p-persistent ALOHA for multi-hop underwater acoustic sensor networks. *Cluster Computing—the Journal of Networks Software Tools and Applications*, 14(1), 65-80.

DEFENSE ANALYSIS

Dennis, J. A., Martinez, O. V., Landy, D. C., Malinin, T. I., Morris, P. R., **Fox, W. P., et**

al. (2011). A comparison of two microbial detection methods used in aseptic processing of musculoskeletal allograft tissues. *Cell and Tissue Banking*, 12(1), 45-50.

Roberts, N. C. (2011). Tracking and disrupting dark networks: Challenges of data collection and analysis. *Information Systems Frontiers*, 13(1), 5-19.

ELECTRICAL AND COMPUTER ENGINEERING

Calusdian, J., Yun, X., and Drakopoulos, L. (2010). Testing and evaluation of an Inertial/Magnetic sensor-based pen input device. *IEEE/RSJ 2010 International Conference on Intelligent Robots and Systems (IROS 2010)*, , 5232-5237.

Eng, C. H., **Jenn, D. C., and Broadston, R.** (2010). Automated calibration station for quadrature demodulators used in digital phased arrays. *IEEE Antennas and Propagation Magazine*, 52(5), 174-178.

Kao, C., **Robertson, C., Kragh, F., and Lin, K.** (2011). Performance analysis and simulations of 32-ary cyclic code-shift keying. *International Journal of Communication Systems*, 24(2), 258-268.

Koromilas, I., **Robertson, C., and Kragh, F.** (2010). Performance analysis of the LINK-16/JTIDS waveform with concatenated coding in both AWGN and pulsed-noise interference. *Military Communications Conference, 2010 (Milcom 2010)*, , 2074-2081.

Spyridis, K., and **Robertson, C.** (2010). Per-

TENURE AND PROMOTION

Electrical & Computer Engineering

Geraldo Ferrer, Tenure

Alexander Julian, tenure and promotion to associate professor

Graduate School of Business & Public Policy

Cynthia King, tenure and promotion to associate professor

George Lucas, tenure and promotion to professor

Elda Pema, tenure and promotion to associate professor

Mechanical & Aerospace Engineering

Vladimir Dobrokhodov, promotion to research associate professor

National Security Affairs

Mohammed Hafez, tenure

Paul Kapur, tenure and promotion to professor

Christopher Twomey, tenure and promotion to associate professor

Oceanography

Jamie MacMahan, tenure and promotion to associate professor

Timothy Stanton, promotion to research professor

Operations Research

Johannes Royset, tenure and promotion to associate professor

Congratulations on the following career advancements.

Applied Mathematics

Raluca Gera, tenure and promotion to associate professor

Craig Rasmussen, promotion to professor

CIRPAS

Hafidi Jonsson, promotion to research professor

Computer Science

Mathias Kolsch, tenure and promotion to associate professor

formance simulation and analysis of M-ary frequency-shift keying with reed solomon encoding, coherent demodulation, and hybrid soft decision-hard decision decoding. Military Communications Conference, 2010 (Milcom 2010), 2357-2362.

GRADUATE SCHOOL OF BUSINESS AND PUBLIC POLICY

DiRenzo, M. S., Greenhaus, J. H., and Weer, C. H. (2011). "Job Level, Demands, and Resources as Antecedents of Work-Family Conflict." *Journal of Vocational Behavior*, 78: 305-314.

Doyle, Richard, 2011. The Rise and (Relative) Fall of Earmarks: Congress and Reform, 2006-2010. *Public Budgeting and Finance*, Spring: 1-22.

Eggleston, K., and **Shen, Y.** (2011). Soft budget constraints and ownership: Empirical evidence from US hospitals. *Economics Letters*, 110(1), 7-11.

Henderson, D. R. (2010). Seeds of destruction. *Policy Review*, (164), 101-106.

Hsia, R., and **Shen, Y.** (2011). Possible geographical barriers to trauma center access for vulnerable patients in the United States: an analysis of urban and rural communities. *Archives of Surgery*, 146(1), 46-52.

INFORMATION SCIENCES

Abdel-Hamid, T. K. (2011). Single-loop project controls: Reigning paradigms or straitjackets? *Project Management Journal*, 42(1), 17-30.

Baer, W. (2010). Multi-eye input experiments for UAV image navigation and control. *Signal Processing, Sensor Fusion, and Target Recognition XIX*, 7697, 769719.

Baer, W. (2010). Theoretical discussion for quantum computation in biological systems. *Quantum Information and Computation VIII*, 7702, 77020W.

Clark, P. C., Cook, G. R., Fisher, E. L., Fulp, J. D., Linhoff, V., and Irvine, C. E. (2010). New pathways in identity management. *IEEE Security and Privacy*, 8(6), 64-67.

MECHANICAL AND AEROSPACE ENGINEERING

Bevilacqua, R., Lehmann, T., and Romano, M. (2011). Development and experimentation of LQR/APF guidance and

control for autonomous proximity maneuvers of multiple spacecraft. *Acta Astronautica*, 68(7-8), 1260-1275.

Burkholder, G. L., **Kwon, Y. W.**, and Pollak, R. D. (2011). Effect of carbon nanotube reinforcement on fracture strength of composite adhesive joints. *Journal of Materials Science*, 46(10), 3370-3377.

Chandrasekhara, M. S. (2010). Optimum gurney flap height determination for "lost-lift" recovery in compressible dynamic stall control. *Aerospace Science and Technology*, 14(8), 551-556.

Faulkner, S. D., and **Kwon, Y. W.** (2011). Fracture toughness of composite joints with carbon nanotube reinforcement. *Journal of Pressure Vessel Technology-Transactions of the ASME*, 133(2), 021002.

Kwon, Y. W., Schultz, W. A., Loup, D. C., and Rasmussen, E. A. (2011). Experimental study of mode II fracture of hybrid composite and metal-wire joints. *Journal of Pressure Vessel Technology-Transactions of the ASME*, 133(2), 021003.

Kwon, Y. W., and Tan, K. S. (2011). Failure of ductile materials subject to varying strain rates. *Journal of Pressure Vessel Technology-Transactions of the ASME*, 133(1), 011402.

Lee, D., and Mark, R. (2010). Decentralized control of unmanned aerial robots for wireless airborne communication networks. *International Journal of Advanced Robotic Systems*, 7(3), 191-200.

Marquis, F. D. S. (2011). Carbon nanotube nanostructured hybrid materials systems for renewable energy applications. *JOM*, 63(1), 48-53.

Marquis, F. D. S. (2011). The role of nanomaterials systems in energy and environment: Renewable energy. *JOM*, 63(1), 43-43.

Toselli, A., **Agrawal, A.**, and Restaino, B. (2010). Gaussian beam propagation in maritime atmospheric turbulence: Long term beam spread and beam wander analysis. *Free-Space Laser Communications X*, 7814, 78140R.

Toselli, I., **Agrawal, B.**, and Restaino, S. (2011). Light propagation through anisotropic turbulence. *Journal of the Optical Society of America A-Optics Image Science and Vision*, 28(3), 483-488.

METEOROLOGY

Harris, R. J., Mecikalski, J. R., MacKenzie, W. M., Jr., **Durkee, P. A.**, and **Nielsen, K. E.** (2010). The definition of GOES infrared lightning initiation interest fields. *Journal of Applied Meteorology and Climatology*, 49(12), 2527-2543.

Rostkier-Edelstein, D., and **Hacker, J. P.** (2010). The roles of surface-observation ensemble assimilation and model complexity for nowcasting of PBL profiles: A factor separation analysis. *Weather and Forecasting*, 25(6), 1670-1690.

Tsai, H., Lu, K., **Elsberry, R. L.**, Lu, M., and Sui, C. (2011). Tropical cyclone-like vortices detection in the NCEP 16-day ensemble system over the western north pacific in 2008: Application and forecast evaluation. *Weather and Forecasting*, 26(1), 77-93.

MOVES INSTITUTE

Members of multi-institutional project BASE-IT, including Research Associate Professor **Amela Sadagic**, MOVES, visited Kilo 2, a physical range for training of urban-warfare operations at Camp Pendleton, CA. Sadagic executed a user study validating behavioral models developed in the BASE-IT project, with active-duty Marines as volunteer subjects.

Buss, A., and Al Rowaei, A. (2010). A comparison of the accuracy of discrete event and discrete time. *Proceedings of the 2010 Winter Simulation Conference*, 1468-1477.

Alt, J. K., and **Lieberman, S.** (2010). Representing dynamic social networks in discrete event social simulation. *Proceedings of the 2010 Winter Simulation Conference*, 1478-1489.

Koelsch, M. (2010). An appearance-based prior for hand tracking. *Advanced Concepts for Intelligent Vision Systems, Pt II*, 6475, 292-303.

Wachs, J. P., Koelsch, M., Stern, H., and Edan, Y. (2011). Vision-based hand-gesture applications. *Communications of the ACM*, 54(2), 60-71.

NATIONAL SECURITY AFFAIRS

Jeffrey W. Knopf has been awarded the Bernard Brodie Prize for the best article in 2010 in the journal *Contemporary Security Policy*, entitled "The Fourth Wave in Deterrence Research" (April 2010 issue).

Thomas H. Johnson and Ahwad Waheed, “Analyzing Taliban Taranas (Chants): An Effective Afghan Propaganda Artifact,” *Small Wars and Insurgencies*, Vol. 22, No. 1, March 2011, pp. 3-31.

Robert Weiner, “Why So Little Strategy? District-level Electoral Entry in Theory and Practice,” *Commonwealth and Comparative Politics* 49:1 (February 2011), 29-47.

Moltz, J. C. (2011). China, the United States, and prospects for Asian space cooperation. *Journal of Contemporary China*, 20(68), 69-87.

Trinkunas, H. A. (2010). The transformation of Venezuela. *Latin American Research Review*, 45(3), 239-247.

OCEANOGRAPHY

Fiorino, S. T., Randall, R. M., Bartell, R. J., Downs, A. D., **Chu, P. C.**, and **Fan, C. W.** (2011). Climate change: Anticipated effects on high-energy laser weapon systems in maritime environments. *Journal of Applied Meteorology and Climatology*, 50(1), 153-166.

Galanis, G., **Chu, P. C.**, and Kallos, G. (2011). Statistical post processes for the improvement of the results of numerical wave prediction models. A combination of Kolmogorov-Zurbenko and Kalman filters. *Journal of Operational Oceanography*, 4(1), 23-31.

Kim, S. Y., Terrill, E. J., Cornuelle, B. D., Jones, B., Washburn, L., Moline, M. A., **Paduan, J.**, et al. (2011). Mapping the U.S. west coast surface circulation: A multiyear analysis of high-frequency radar observations. *Journal of Geophysical Research—Oceans*, 116, C03011.

Radko, T. (2011). On the generation of large-scale structures in a homogeneous eddy field. *Journal of Fluid Mechanics*, 668, 76-99.

Reeder, D. B., Bryan, C. L., Everett, K. R., **Batteen, M. L.**, and **Guest, A. A.** (2011). Quantitative ocean characterisation: Acoustically analogous environments. *Journal of Operational Oceanography*, 4(1), 3-12.

Reeder, D. B., Ma, B. B., and Yang, Y. J. (2011). Very large subaqueous sand dunes on the upper continental slope in the South China Sea generated by episodic, shoaling deep-water internal solitary waves. *Marine Geology*, 279(1-4), 12-18.

Reeder, D. B., Sheffield, E. S., and Mach, S. M. (2011). Wind-generated ambient noise in a topographically isolated basin: A pre-industrial era proxy. *Journal of the Acoustical Society of America*, 129(1), 64-73.

OPERATIONS RESEARCH

Akgun, I., Tansel, B. C., and **Wood, R. K.** (2011). The multi-terminal maximum-flow network-interdiction problem. *European Journal of Operational Research*, 211(2), 241-251.

Brown, G., and Cox, L. A., Jr. (2011). How probabilistic risk assessment can mislead terrorism risk analysts. *Risk Analysis*, 31(2), 196-204.

Brown, G., and Cox, L. A. (., Jr. (2011). Making terrorism risk analysis less harmful and more useful: Another try response. *Risk Analysis*, 31(2), 193-195.

Craparo, E. M., How, J. P., and Modiano, E. (2011). Throughput optimization in mobile backbone networks. *IEEE Transac-*

tions on Mobile Computing, 10(4), 560-572.

Fricker, R. D., Jr. (2011). Rejoinder: Some methodological issues in biosurveillance. *Statistics in Medicine*, 30(5), 434-441.

Fricker, R. D., Jr. (2011). Some methodological issues in biosurveillance. *Statistics in Medicine*, 30(5), 403-415

Miller, N. L., **Shattuck, L. G.**, and **Mat-sangas, P.** (2011). Sleep and fatigue issues in continuous operations: A survey of U.S. army officers. *Behavioral Sleep Medicine*, 9(1), 53-65.

O'Connor, P., **O'Dea, A.**, **Kennedy, Q.**, and **Buttrey, S. E.** (2011). Measuring safety climate in aviation: A review and recommendations for the future. *Safety Science*, 49(2), 128-138.

PHYSICS

Kim, A. M., **Olsen, R. C.**, Lee, K., and Jablonski, D. (2010). Using panchromatic imagery in place of multispectral imagery for kelp detection in water. *Ocean Sensing and Monitoring II*, 7678, 767807.

Kim, A. M., **Olsen, R. C.**, and **Borges, C. F.** (2010). Simulating full-waveform LIDAR. *Laser Radar Technology and Applications XV*, 7684, 768411.

Kruse, F. A., and **Olsen, R. C.** (2010). Variability analysis and change characterization of HSI data for urban mapping. *Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XVI*, 7695, 76951K

Please submit faculty research news items to research@nps.edu.

CALL FOR PROPOSALS: ACQUISITION-RESEARCH PROGRAM

The Graduate School of Business and Public Policy announces the availability of a grant in acquisition research, open until 5:00 p.m. PDST 13 June 2011.

The objective is to attract researchers and scholars to investigate topics in defense acquisition. The program solicits innovative proposals for defense acquisition management and policy research to be conducted during fiscal year FY 2011 (1 Oct 2010 - 30 Sep 2011) and FY 2012 (1 Oct 2011 - 30 Sept 2012). This pro-

gram is targeted in particular to U.S. universities.

Multiple awards of up to \$120,000 each for a basic research period of twelve months, in the form of grants or cooperative agreements will be awarded. NPS will complete proposal evaluations and notify awardees in September 2011.

All responsible sources from academia and industry may submit proposals under this BAA using Grants.gov. U.S. Government agencies are not eligible to receive

awards through Grants.gov submissions.

Interested parties from U.S. government schools of higher learning (i.e. NPS, AFIT, DAU, etc.), naval laboratories and warfare centers, and DoD agency laboratories should submit requested information in a single PDF attachment to Ms. Karey Shaffer, klshaffe@nps.edu, no later than 13 June 2011. See here for full announcement. For questions about the acquisition-research program, contact Keith Snider at ksnider@nps.edu.

COUNTERING PIRACY WITH THE NEXT GENERATION PIRACY PERFORMANCE SURFACE MODEL**Leslie A. Sloomaker—Lieutenant, United States Navy****Master of Science in Operations Research—March 2011****Advisor: Eva Regnier, Department of Operations Research****Co-Advisor: James Hansen, Naval Research Laboratory—Monterey****Second Reader: Thomas Lucas, Department of Operations Research**

In 2009, the Naval Oceanographic Office was tasked with developing a product that uses forecasted meteorological conditions and historical pirate incidents to predict locations conducive to pirate activity in the Somali Basin Region and the Gulf of Aden. This resulted in the development of the Piracy Performance Surface (PPS) model, whose outputs are briefed daily to the Commander of the United States Naval Forces Central Command and Combined Maritime Forces in Bahrain. The next-generation PPS (PPSN) model uses simulation to provide as output, a forecast of relative pirate presence probability over time. Effective March 1, 2011, the name of PPSN has been changed to the Pirate Attack Risk Surface (PARS) model. This research includes interviews with counter-piracy forces that led to recommended changes in the PPSN model. In addition, using robust and realistic experimental designs, this research identifies the significant intelligence factors of the PPSN model. This gathered information is being used to refine these input variables to achieve maximum performance of the PPSN model. This research also unveiled input variables that are influential in computing memory requirements and program runtime. This information is being used to focus efforts on setting these variables to realistic levels without sacrificing the model's efficiency and effectiveness. Finally, the results of this thesis allow for quick turnaround of updates to the PPSN model in response to gathered intelligence. *LT Sloomaker received the Surface Navy Association's Award for Excellence in Surface Warfare Research and the Military Operations Research Society Stephen A. Tisdale Graduate Research Award.*

EFFECT OF BEING AN AVIATOR ON PROMOTION PROBABILITY TO O-5 IN THE USMC**Jacob L. Reynolds, Major, USMC****Master of Science in Manpower Systems Analysis****Advisor: Yu-Chu Shen, Graduate School of Business and Public Policy****Second Reader: Stephen L. Mehay, Graduate School of Business and Public Policy**

Marine Corps aviation is an imperative component of the storied Marine Air-Ground team. Marine aviation is a perishable skill, however, not only in tactical employment, but also in operational and strategic planning. The senior leadership of the Marine Corps needs the technical and tactical experience of Marine aviators. In July of 2009, the Marine Corps Deputy Commandant for Aviation (DCA) proposed a quantitative study of the decreased promotion rates of aviator majors (O-4) to lieutenant colonel (O-5). If true, decreasing promotion opportunity of Marine aviators presents risk to the Marine Corps warfighting institution, through the loss of valuable aviation technical and tactical experience in senior leadership.

The study is organized to answer the DCA's research question and to provide recommendation in how officers of the aviation component can be more competitive for promotion to O-5.

The study draws upon nine years of Total Force Data Warehouse (TFDW) and Marine Manpower Support Branch (MMSB) data of Marine O-4s eligible for promotion, resulting in a dataset of 8,271 observations. The study's sample closely replicates the above and in-zone population of O-5 promotion cohorts from fiscal years 2004 through 2012. Analysis of the sample demonstrates that Marine aviators had a decreased selection opportunity to O-5 compared to all other MOSs, 62.3% versus 67.3%.

Additionally, multivariate analysis was accomplished on the sample, which revealed a statistically significant and negative "aviator" effect of approximately 7.6 percentage points on promotion probability through various econometric model specifications. Traditional promotion selection notions are also affirmed in statistically significant and positive effects in individual performance (FITREP Relative Value), combat experience, professional military education (PME), and above bachelor's degree education. Finally, a restricted model was designed to analyze the factors that differentiated those aviators selected for promotion and those non-selected. Statistically significant factors for aviator promotion selection to O-5 included being part of the fixed-wing community, holding an additional MOS as a Weapon and Tactics Instructor (WTI), completion of Intermediate Level School, and the special education/advanced degree programs. *Maj Reynolds won the Navy League Award for Highest Academic Achievement.*

EXPERIMENTAL TESTING AND CFD MODELING OF AN ADVANCED TRANSONIC COMPRESSOR FOR MILITARY APPLICATIONS**Daniel L. McNab—Lieutenant, United States Navy****Master of Science in Mechanical Engineering—March 2011****Co-Advisor: Anthony Gannon, Department of Mechanical and Aerospace Engineering****Co-Advisor: Garth Hobson, Department of Mechanical and Aerospace Engineering**

This thesis presents the first performance map of the NPS Military Fan (NPSMF). The NPSMF is an advanced design transonic compressor rotor with significant forward sweep in the leading and trailing edges of the blade. The fan was tested up to 90% speed in the Transonic Compressor Rig (TCR) at the NPS Turbopropulsion Laboratory.

The NPSMF was fabricated as a solid titanium alloy blade and disk component. Because of the increased weight of the NPSMF over previous aluminum designs there was significant modal vibration in the TCR well below design speed. To continue with the experimental testing, modal analysis was performed on the rotating components of the TCR using ANSYS Mechanical within Workbench. Modal frequencies and sources of maximum deformation were found to guide a redesign of the TCR drive components. Following redesign, the performance of the fan was limited to 90% speed because of TCR power limits.

These tests enabled the first comparison of experimental data to numerical analysis results for the NPSMF. The numerical analysis was performed with CFX, a computational fluid dynamics (CFD) code also within ANSYS Workbench. Numerical results were found to be a reasonable representation of the experimental performance and direct comparisons are made with numerical results that are representative of experimental data. *LT McNab won the Chief of Naval Operations Undersea Warfare Award.*

WHY THAILAND'S MILITARY STEPPED IN

Andrew C. O'Connor—Lieutenant, United States Navy
 Master of Arts in Security Studies (Far East and Southeast Asia)—March 2011

Advisor: Sandra R. Leavitt, Department of National Security Affairs

Second Reader: Christopher P. Twomey, Department of National Security Affairs

This thesis is a comparison of the military coups d'état that occurred in Thailand in 1991 and 2006. The thesis explores how Thailand's military acts as a political army and determines the combination of factors necessary for the military to step into the political system. A historic narrative from the kingdom's ancient beginnings, through the 1932 coup d'état that overthrew the absolute monarchy to the 1980s, established the founding principles of the military and its historical role in politics, both of which contribute to the values and identity of Thailand's military as an institution.

The comparison of the pre-coup periods to the events that lead directly to the coup reveal a common set of factors necessary for the military to stage a successful coup. Specifically, these factors include political stalemate, affronts to values, and direct threats to interests. Additionally, the two cases demonstrate how Thailand's military is compelled to act as a political army due to the birthright principle, civilian incompetence, and military competence.

The thesis concludes with some recommendations for the United States in its relationship with Thailand with the better understanding of why these coups occur. *LT O'Connor received the Louis D. Liskin Award for Excellence in Regional Security Studies.*

PHYSICS-BASED MODELING OF SEABASING OPERATIONS

Ashley S. Wright—Lieutenant, United States Navy
 Mechanical Engineer—March 2011

Master of Science in Mechanical Engineering—March 2011

Advisor: Fotis Papoulias, Department of Mechanical and Aerospace Engineering

Second Reader: Joshua Gordis, Department of Mechanical and Aerospace Engineering

In this thesis the overall throughput rate and individual throughput rates from a series of nested ships and their connecting platforms to the shore based objective of a Seabasing scenario are analyzed.

An initial study was conducted using a mix of air and surface connectors, and surface transport ships to establish the baseline of the Seabase concept. The second study developed a modeling network to use these ships and connectors in operations. Nodes represent the ships included in this study, and their associated connectors are analyzed by developing a series of analytical equations. The nodes are classified as underactive, equilibrium, and overactive depending on the number of connectors operating from the node and the associated number of load spots available for operations.

The nodes are also classified as internal and external depending on their relative location within the Seabase network. From these definitions, this study develops five different scenarios and creates a methodology for simulating the transportation of cargo to the shore using Landing Craft Air Cushion (LCAC) platforms. *LT Wright was awarded the Naval Sea Systems Command Award in Naval/Mechanical Engineering.*

A CAPABILITY-BASED, META-MODEL APPROACH TO COMBATANT SHIP DESIGN

Jason P. Fox—Lieutenant Commander, United States Navy
 Master of Science in Systems Engineering—March 2011

Advisor: Clifford A. Whitcomb, Department of Systems Engineering

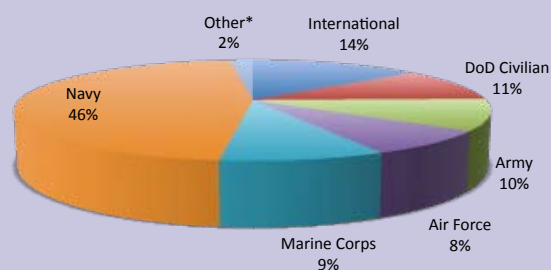
Second Reader: Eugene P. Paulo, Department of Systems Engineering

This thesis continues to develop a conceptual methodology for the design of a warship that is capable of showing how naval architecture related decisions interact with operational measures of effectiveness through the use of modeling and simulation. Beginning with a brief overview of recent developments in total ship design approaches, it supports an overarching method that directly supports capability-based decisions.

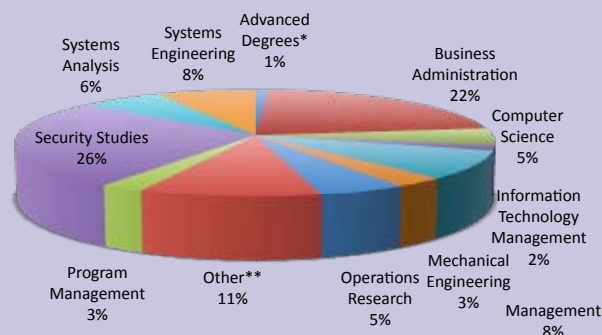
Using a simple medium-tonnage patrol vessel and a Maritime Intercept Operation (MIO) mission in a fictional setting, operational and ship design synthesis models are developed. Critical design criteria (responses) in each model are measured using relevant design variables (factors) based on mission measures of performance used in creating experimental designs. The resulting models are then linked, both mathematically and using graphs, to show how decisions made by the naval architect can directly influence a single operational measure of effectiveness. Decision makers can then assess various system outcomes by trading off performance parameters to make capability-based decisions. *LCDR Fox received the Naval Sea Systems Command Award for Excellence in Systems Engineering.*

STUDENT/DEGREE STATISTICS FOR MARCH 2011 GRADUATION

(Degrees awarded: 168)



Student population: March 2011



Degrees awarded: March 2011

LIMITED-PURPOSE, COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT (LP-CRADA)

Title: Evaluation of TireBall Air Inflation System

Partner: TireBall Development Company, LLC

PI: Raymond Buettner, Department of Information Sciences

Summary: NPS will test and evaluate TireBall air-inflation system for use on US special-operations vehicles. The TireBall system consists of multiple individual inflation cells inside a tire rather than a single tube. If a TireBall tire is punctured, a cell is lost, versus the entire tube, allowing for continued functioning of the tire. NPS will evaluate the long-term performance and test the TireBall system for extended durability in field-experimentation exercises.

TECHNICAL SERVICES AGREEMENT (TSA)

Title: Evaluation of an Oxygen-Alcohol Thruster

Partner: Ventions, LLC

PI: Christopher M. Brophy, Department of Mechanical and Aerospace Engineering

Summary: NPS will provide testing facility and technical expertise to perform testing of high-performance, liquid bipropellant rocket

engines for small-scale launch vehicle applications.

EDUCATION PARTNERSHIP AGREEMENT (EPA)

Partner: Monterey Institute of International Studies

NPS POC: Leonard Ferrari, Provost and Academic Dean and Christine Haska, Vice President of Information Resources

Resources

Summary: NPS and MIIS have established an agreement to promote joint educational programs 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.

PATENT APPLICATION

“Aerial Delivery System With High Accuracy Touchdown,” Navy Case No. 20100004.

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

TECHNICAL REPORTS PUBLISHED

NPS-CS-11-003	Applying UML-based Formal Specification, Validation, and Verification to Space Flight Control System and Defense Software	M. Alves, K. Beylin, D. Drusinsky, et al.
NPS-OC-11-001	High Frequency Acoustic Recording Package Data Summary Report PS06, January 30, 2009 – April 30, 2009	T. Margolina
NPS-OC-11-002	High Frequency Acoustic Recording Package Data Summary Report PS07, April 30, 2009 – September 22, 2009	T. Margolina

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

DISTANCE-LEARNING MASTER’S IN COST ESTIMATION AND ANALYSIS

NPS and the Air Force Institute of Technology (AFIT) have jointly developed a distance-learning program leading to the Master’s in Cost Estimation and Analysis (MCEA).

NPS professors **Daniel Nussbaum** and **Greg Mislick** of the Department of Operations Research worked closely with AFIT’s Alfred Thal to head an initiative sponsored by the Naval Sea Systems Command. The MCEA will integrate courses from the Operations Research Department and Graduate School of Business and Public Policy at NPS with courses in Cost Estimating and Systems Engineering currently taught only in residence at AFIT.

The driving force behind the new offering is the Weapons System Acquisition Reform Act of 2009, which created the Directorate of Cost Analysis and Program Evaluation within the DoD. The MCEA addresses a critical need for personnel as the DoD doubles the number of professional estimators in the near future.

The need for this program became apparent to Nussbaum as an outgrowth of his research in support of Cost Estimates and Business Case Analyses for DoD advanced technology projects. As the former Director, Naval Center for Cost Analysis, he was keenly aware of the challenges facing the government in an era of limited resources.

Additionally, Greg Mislick, who holds the NPS Chair of Cost Analysis, supported by OSD, understands the cost estimating

needs at the OSD level. Drawing upon their combined professional knowledge, Nussbaum and Mislick developed a strategy for leveraging a joint interdisciplinary master’s education program provided by the nation’s two premier military graduate schools. This program, MCEA, provides the perfect answer to the need for developing a strong cadre of professional cost estimators now and in the future.

The MCEA is designed to be completed in two years, at two courses per quarter, to accommodate students currently in related career fields.

The program is open to military and civilian students and is now accepting applications. See http://www.nps.edu/DL/Degree_Progs/MCEA.asp for information and application. The deadline for admissions for the next cohort is January 15, 2012.



Professor Daniel Nussbaum