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RESEARCH

Volume 3, Number 2

June 1993



From the Dean

by Paul Marto
Dean of Research

Does NPS have a QUALITY research program? Most faculty would reply in return: "How do you define QUALITY and how can you measure it?" The number of publications is a well-used indicator of QUALITY and, by this measure, NPS should be proud of its accomplishments. For example, in 1992, we published 361 journal articles, 272 conference papers, 145 technical reports and 61 books and book chapters. In addition, 613 conference presentations were made and 8 patents issued. These publication numbers are very impressive for the 124 faculty research workyears executed last year, especially since our institution is based almost entirely on a masters level education. Furthermore, these numbers are continuing to increase each year, indicating that faculty are striving to document their scholarly activities and disseminate their results among their peers.

But publications don't tell the whole story. They are one indicator of research QUALITY but do not guarantee that our research is making an IMPACT on people, systems or institutions.

We must dig deeper to discover if an IMPACT is being made by asking, for example: will this research add value to a student's education; will this research improve/update a graduate course or be useful in establishing a case study; will it increase the combat effectiveness of DoN/DoD; will it yield new knowledge in basic science or new understanding of people and their cultural or political thinking?

Is this institution recognized nationally and internationally as having unique expertise in particular disciplines and military application areas? To my knowledge, there are various examples of high-quality, military-related research being conducted at NPS that do not get "counted" if we focus only on publication statistics. For example, during Desert Storm, Professor Gerry Brown's research on optimization assisted the Air Force in scheduling aircraft sorties and weapon loads and Professor Don Walters provided the Army with expertise to predict the influence of atmospheric turbulence on laser-guided

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Four Faculty Honored

Four NPS faculty members were recently honored by professional associations. Professor Alan Fox was elected a Fellow of the Institute of Materials, United Kingdom, in recognition of his high quality of research and professional reputation in the area of material science engineering. Distinguished Professor Emeritus Allen Fuhs was elected a Fellow of the Society of Automotive Engineers in honor of his contributions to technological advancement in the field of



Prof. Brian Wilson



Prof. Tri Ha



Prof. Alan Fox



Prof. Allen Fuhs

self-propelled vehicles and machinery. Professor Tri Ha was elected a Fellow of the Institute of Electrical and Electronics Engineers in recognition of his contributions to satellite communications systems. Professor Brian Wilson Jr. was presented with the "medaille d'argent (Etrangere)" by the French Acoustical Society in recognition of his international stature as an acoustical scientist.

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missiles. Or what about the classified thesis of Lt. Charles Swicker, USN, who was supervised by Professor Tom Grasse in the NSA Department. This thesis dealt with neutralizing the nuclear capability of IRAQ using the Tomahawk Cruise Missile and was of vital importance during the early part of Desert Storm. A subsequent letter from the Vice Director, Joint Strategic Planning Staff, praised the thesis "as being fully equal to the best contractor products... at a mere fraction of the price."

So NPS research yields many different products for different customers and we must

accept the challenge to measure research QUALITY across this broad spectrum of activity. We encourage a range of faculty scholarly activity at NPS, including non-traditional interdisciplinary work, so we must find acceptable measures of quality and reward these unique efforts. What indicators might be useful in making administrative decisions? How can the synergism between our officer students and our military-oriented faculty be fully developed? What must we do to become a leading institution for both basic and applied military-oriented research? I would appreciate your thoughts.

1994-95

Fulbright Scholar Competition Opens

Application materials for the 1994-95 Fulbright Scholar competition became available on Mar. 1 and will be accepted until Aug. 1, 1993. The awards are open to scholars of all academic ranks and in a variety of disciplines. The basic eligibility requirements are a Ph.D. and U.S. citizenship. For more information and application materials, call or write: Council for International Exchange of Scholars, 3007 Tilden Street, N.W., Suite 5M, Box CAMP, Washington, D.C. 20008-3009, telephone: (202) 686-7877.

ONR Young Investigator Program 1994

The ONR wants to identify and support research for university scientists and engineers who received their Ph.D.'s on or after 1 Dec. 1988. Awards of 75K per year for three years will be made to sixteen researchers who show exceptional promise in their areas of expertise. Proposals should fall within the general scope of the Navy's areas of research interest as described in the ONR 1992 "Guide to Programs" (on file in the Research Office). To qualify, individuals must hold tenure-track positions at U.S. universities and colleges. For more information on this program, contact Danielle in the Research Office at X2099/98.

Report Published on DOD Live Fire Test and Evaluation Program

The NRC's Committee on Weapons Effects on Airborne Systems, chaired by Professor Robert Ball, Department of Aeronautics and Astronautics, has published its report, "Vulnerability Assessment of Aircraft: A Review of the Department of Defense Live Fire Test and Evaluation Program." The report presents the committee's evaluation of the DoD LFT&E Program, the military services' current methodologies for conducting live fire tests, and the military's conformance to the Live Fire Test Law passed by Congress in 1987. The report concludes with six pages of findings and recommendations. Professor Ball is an internationally recognized expert on aircraft vulnerability.

Professor Eitelberg Forms Local Chapter of IUS

Administrative Science Professor Mark Eitelberg has formed a Pacific Coast chapter of the Inter-University Seminar on Armed Forces and Society (IUS). The IUS was founded in 1960 as a forum for the interchange and assessment of research and scholarship in the social and behavioral sciences dealing with the military establishment and civilian-military relations. The IUS publishes a leading journal, *Armed Forces and Society*, a monograph series and newsletter. Local chapter meetings will be held to coincide with visits by VIP speakers. For more information or an application for a fellowship, please contact Professor Mark Eitelberg, Code AS/Eb, in the Administrative Sciences Department at extension 3160 or fax number 3407.

Professor Zyda Appointed to NAS Committee

Professor Michael Zyda has been appointed to the National Academy of Science, National Research Council's Committee on Virtual Reality Research and Development. The committee was formed in response to requests by several government agencies for a committee to develop a national agenda for virtual reality research and to recommend an appropriate infrastructure to support the formulated agenda. Professor Zyda is group leader for the Computer Generation Technology Group.



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NAVAL POSTGRADUATE SCHOOL

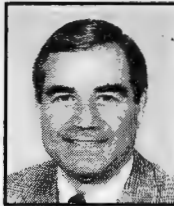
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Provost	Dr. Harrison Shull
Dean of Research	Dr. Paul Marto
Associate Dean of Research	Dr. Jeffrey Knorr
Associate Dean of Research	Dr. Gilbert Howard
RESEARCH Editor	Ramona M. Fortanbary

THE RESEARCH OFFICE STAFF

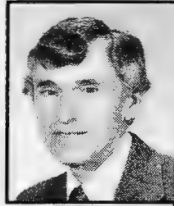
The Research office staff has undergone some changes over the last several months. Hopefully the names and faces below will help to direct you to the appropriate staff member for assistance.



Assoc. Dean
Howard



Dean Marto



Assoc. Dean
Knorr



Danielle Kuska
* Proposal Processing,
Chairs, Postdoctoral
Programs, IPA's



Nita Manlego

- * Admin Support
- * SPIN
- * FEDIX
- * Sponsor Liason



Ramona
Fortanbary

- * Research News
- * Research Summary Book
- * Tech Rpts



Nikki
Thomas

- * Direct-funded Rsrch
- * Page Charges



Laura Ann
Small

- * Reimbursable Research

Academic Services



Sandra Day
* Thesis Processing



Maryann Clarey
* Academic Svcs. Mgr.



Millie Fidel
* Conferences
* Short Courses



Alice
Roberson
* Thesis Processing

Research Project Spotlight

Professor Neil Rowe's ARPA funded research project, "Caption-based Access to Multi-media Databases," is in the Process of solving a major problem for the NAWC Weapons Division, China Lake. The Research Project's focus is on putting the division's library of 40,000 photographs onto a computer to be stored according to the photo's caption. Caption filing systems are a traditional organizational tool for non-textual multi-media data, such as photos, slides, graphs etc. Professor Rowe's research is looking at ways to effectively catalog, store and access the photos by utilizing a software program he developed known as the MARIE system. The MARIE system interprets English language queries and reads English language captions in the database to match the query with all related photos. The Marie software is based on a linguistics and artificial intelligence, unlike most software which operates according to specific words and commands. The MARIE system retrieves data based on word *meaning*, an important distinction, which allows any user of the system to access needed information by simple language relation, e.g. querying for "aircraft" would produce file photos of all aircraft-related photos in the database. Professor Neil Rowe's MARIE system is making the NAWC Weapons Division library more user-friendly and efficient, and is also a major step forward in the field of natural-language understanding.

NPS Short Courses

NPS short courses can be an important element in faculty research and teaching goals. Professors interested in conducting short courses, both on and off campus, should contact Mrs. Millie Fidel in Rm. 272 of Root Hall or at extension 2426. Millie can supply you with the information needed to develop and present short courses. She can also provide you with the publication "Guidelines and Procedures for Short Course Development and Delivery," which clearly outlines the steps involved in putting together and gaining approval of your short course proposal.

**ACADEMIC SERVICES OFFICE
RELOCATES**

The Academic Services Group has relocated to Root Hall, room numbers 270-272. Faculty advisors should direct their students to the new location for thesis processing.

Interest in CRADAS Grows

NPS Faculty are continuing to take advantage of the new opportunities for partnerships with the private sector made possible by the Technology Transfer Act. Last December, a Cooperative Research and Development Agreement (CRADA) was signed with Pacific Bell. Under the terms of this agreement, Professor Tarek Abdel-Hamid, Administrative Sciences, has received support to work with Pac Bell on software development problems. Authorization to sign another CRADA has been received from the Chief of Naval Research (CNR). It will provide support for Professor Terry McNelley, Mechanical Engineering, to work with Duralcan-USA. Prof. McNelley's expertise in thermomechanical processing will be tapped in an attempt to improve the ductility of Duralcan's aluminum metal matrix composite products. Three more CRADAs are in various stages of review and negotiation.

CRADAs are generally conceived by faculty, who through their professional contacts identify opportunities to work with their counterparts in private industry. Once an opportunity has been identified, a CRADA is prepared by the Research Office based on information provided by the faculty member. Standard CRADA format provided by the Office of Naval Research (ONR) is modified to suit the circumstances of each partnership arrangement.

Following negotiations between NPS and the private

"CRADA's are generally conceived by faculty, who through their professional contacts, identify opportunities to work with their counterparts in private industry."

partner, the Agreement is submitted to ONR for review. Once approved, CNR authorizes the Superintendent to sign for NPS. When all partners have signed, work can commence.

CRADAs cover a wide spectrum of possible activities. Technical and legal personnel in partner companies have differing views of the issues covered in the Agreements, particularly the intellectual property issues. Consequently, it is difficult to predict the time which might be required to successfully negotiate an Agreement and have it approved by ONR. Experience to date suggests the time may vary anywhere from a minimum of several months to as long as nine months. Faculty interested in implementing CRADAs should contact Dean Knorr at X2098.

Research Advisory Panel

The membership of the Research Advisory Panel (RAP) changed recently as some members completed their appointments and were replaced by new members. Currently, the membership includes Professors Atchley (PH), Batteen (OC), Gaver (OR), Loomis (EC), Cdr. Petho (OR), Roberts (AS), Wirtz (NS), and Wu (CS). Professor Thomas (AS) represents the Faculty Council. The RAP is chaired by Dean Marto and serves as a link between the Research Office and the faculty. At RAP meetings, various issues and policies relating to the NPS research program are aired. Through the RAP, the Research Office attempts to remain sensitive to faculty viewpoints and concerns with the objective of maintaining a climate conducive to the unencumbered pursuit of research. Faculty are encouraged to communicate research concerns through any member of the RAP.

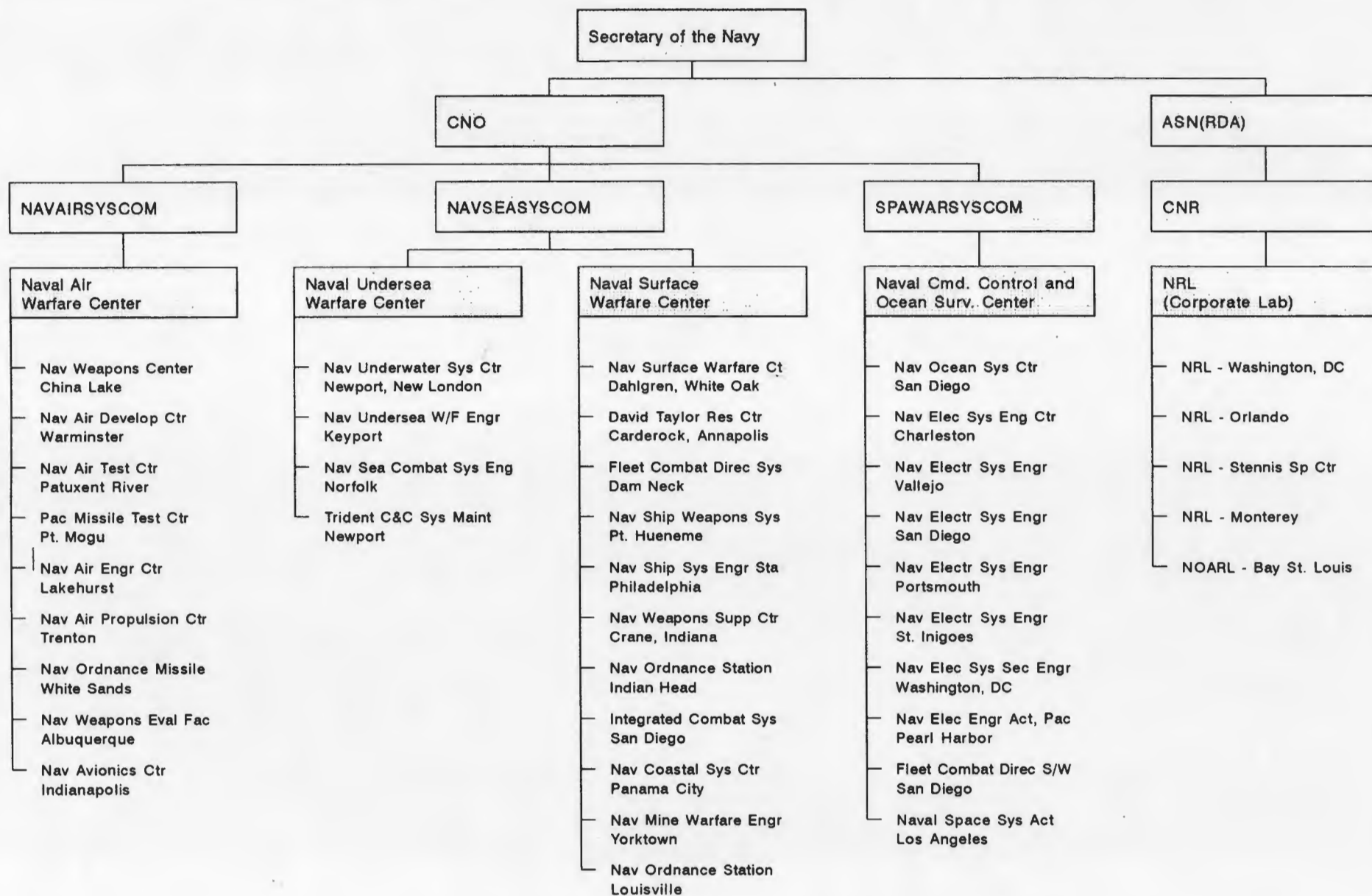
Unauthorized Commitments Still A Problem

The issue of unauthorized commitments is a recurring problem at NPS and one that needs to be addressed by all faculty and staff. The only authorized official for entering into a contract, verbal or written, for goods and services on behalf of the Naval Postgraduate School is the duly appointed contracting officer and his/her staff. Any other commitment is unauthorized and results in a tremendous amount of paperwork and time lost for faculty members or staff who inadvertently find themselves in this difficult position.

Proper training of personnel in procurement procedures is the responsibility of department chairmen and department heads. When proper procedures for obtaining goods and services are not followed and an unauthorized commitment results, the party responsible may be held monetarily liable for the amount committed. The Supply Department conducts classes to train faculty and staff on proper requisition procedures.

Of particular concern to researchers and the Research Office is the proper handling of publication page charges. Publication page charge requests must be processed using an official requisition form. Faculty cannot make page charge commitments on behalf of NPS; rather, a purchase order must be prepared by the Research Office. Faculty who need assistance in this regard should contact Nikki Thomas at X2272.

NAVY LAB CONSOLIDATION



* Facilities listed under the new Centers are identified by their old names.

Research Recognition Evening

The Research Recognition Evening held on 6 April 1993 was a big success. Eighteen faculty members were recognized for excellence in research. Faculty recognized at this years event are listed below:

Assoc. Prof. Ching-Sang Chiu
Research Assoc. Professor M.S. Chandrasekhara
Research Assoc. Professor John A. Ekaterinaris
Professor Norman Schneidewind
Assoc. Professor Luqi
Assoc. Professor James H. Miller
Professor Guillermo Owen
Assoc. Professor Alan Fox
Professor R.T. Williams

Research Assoc. Prof. Melinda S. Peng
Assistant Professor Scott D. Tollefson
Professor Albert J. Semtner, Jr.
Assoc. Professor R. Kevin Wood
Assoc. Professor Anthony A. Atchley
Senior Lecturer Wayne Hughes
Professor Michael A. Morgan
Professor Brij Agrawal
Assoc. Professor Francois Melese



Reimbursable News

Principal Investigator

Project Title

Sponsor

AA		
Ball	NPS Survivability/Lethality	NAVAIR
Howard/Kaminer	Dev. of UAV for Transitional Flt	NAVAIR
Kaminer	Advanced Avionics Technology	NAVAIR
Platzer	Dynamic Lift Studies	NAWC
Platzer	Studies of Compressible Flow	NAWC
AS		
Abdel Hamid	Software Development	Pacific Bell
Bui	Design of MILSATCOM	US Space Command
Bui	Seas Prototype	TRAC-Monterey
Ciavarelli/Sengupta	Night Vision Technology Study	NAVAIR
Euske/Haga	Re-engineering Metrics	Ofc. of Dir. Defense Info.
Euske/Haga	RAMP Program	NAVSUP
Lamm	USMC Student Theses	USMC RD&A
McMasters	Engine Improvement Study	NAVAIR
Ramesh	Model of Requirements Traceability	NSWC
Schneidewind	Reliability Model Enhancements	NAWC
Whipple/Harris	Initial Implementation of MTF EME	HSETC
CS		
Pratt/Zyda	NPSNET	USA STRICOM
Rowe	Caption Based Access	ONR
Stemp	INFOSEC Ctr. of Excellence	NSA
Zyda/Pratt	Virtual World Exploration	ARPA
EC		
Cristi	High Frequency Antennae	NCCOSC
Hippenstiel	Bi-spectral Techniques	NCCOSC
Janaswamy	Widebanding VHF Antennas	USA CECOM
Lee	Parallel Systems Design	NSWC
Levien	Jamming Simulation Algorithm	AFEWC
Moose	UHF Satellite Sys. Models	COMOPTEVFOR
Titus	GEO Location Systems	NRL
Ziomek	Recursive Ray Acoustics	NAVSEA
MA		
Mansager	Javelin / TUGV M-T-M	TRAC-Monterey
ME		
Joshi/Kelleher	Computer Model of Liquid Flow	NSWC
Kwon	Unbalanced Sandwich Composites	NSWC
McNelly	Measurement of Aging Using Sensors	NAWC
Shin	Combat Systems Responses	NAVSEA
Shin/Kwon	Underwater Shock Load Responses	DNA
MR		
Chang/Murphree/Chen	Global and Tropical Circulations	NRL
Davidson	Wind/Meteorological Analyses	NRL-SSC
Davidson	Marine Aerosol Models	NCCOSC
Davidson	Coastal region Refraction Measuring	NCCOSC
Davidson/Wash	Shared and Single Point Analysis	NRL
Davidson/Guest	Analysis of Regional Lead Forcing	NRL-West
Durkee	Cloud Climate Feedback	NCSU
Pauley	Mesoscale Phenomena	NRL
Williams/Peng	Frontal Modeling	NSF
NS		
Abenheim	German Military	DOD

Reimbursable News and Navy Lab Reorganization

Principal Investigator

Project Title

Sponsor

OC

Batteen	Modelling of LEEUWIN Current	NSF
Bourke	Marine Arctic Chair	ONR
Carter	Data Assimilation Model	ONR
Clynch	Analysis of Receivers For For DMA	DMA
Clynch	Sea-based TACAN and GPS	NCCOSC
Collins/Carter/Garfield	California Undercurrent Study	ONR
Garwood/Chu	Convection In Mediterranean Sea	ONR
Paduan	Langrangian Measurement	ONR
Thornton	Wave Transformation	USA Corp of Engineers
Thronton/Stanton	Acoustic Sediment Probe	USA Corp of Engineers

OR

Bailey	QA Major Caliber Ammunition	NSWC
Bailey/Dell	Coast Guard Law Enforcement	Coast Guard
Bradley/Brown/Wood	Large-scale USAF Optimization	AFOSR
Brown/Bradley/Washburn	Optimization Munitions Model	AFDTC
Gaver	Quantitative Bioassay Methodology	USA MEDDAC
Gaver	Quantitative Toxicology	NAVY MRI
Gaver	Analytic Support For Navy T&E	COMOPTEVFOR
Gaver/Jacobs	Management Indicator	NAVAIR
Halwachs	MAPP Research	Washington HQ Services
Hughes	Military Worth of Staying Power	NSWC
Kemple	Stratigraphic Correlation	NSF
Larson	Analysis of Recruiting Payments	USAREC
Lind	Army Nursing Careers, Perceptions	USAREC
Lind/Driels	Improved Target Acquisitions	TRAC-Monterey
Milch	Delayed Entry program	USAREC
Read	Attrition Rate for Manpower Models	USMA (MI)
Sohn/Lowe/Webb	Optimal USA Recruiting Budget	USAREC

PH

Colson	Phalanx Gun Dispersion Study	NSWC
Cooper	FLIR Performance Prediction	NCCOSC
Davis/Maruyama	Inductive Coupling	NAWC
Hofler	Thermoacoustic Refrigerator	NRL
Maruyama	Electromagnetic Pulse Field	NSSC
Maruyama/Woehler/Neighbour	Combat Systems Sciences	DNA
Olsen	Spear III Analysis Support	DNA
Sternberg/Jones	New Methodology for C3I	DNA
Walters	Atmospheric Characterization	Phillips Laboratory

SP

Panholzer	Managing Ed., Ferroelectric Bulletin	ONR
Panholzer	Small Satellite Design	USA ETL
Panholzer/Duym	Space Engineering Exp. Tours	NAVSPACE/SPAWAR

NAVY LABS REORGANIZE

The reorganization and consolidation of Navy Labs has resulted in all labs being realigned under one of four "megacenters." To insure that proposals and sponsor reports are directed to the appropriate agency, please verify addresses and codes for future mailings.

An organization chart showing the new relationships among labs and warfare centers is included as an insert of this issue of Research News. Please retain a copy for your records.

Faculty News

AA

• **Adj. Prof. M.S. Chandrasekhara** chaired a session on Mathematical Modeling and Scientific Computing at the IMACS International Conference in Bagalore, India.

Five AA Department faculty participated in the 31st AIAA Aerospace Sciences Meeting in Reno, Nevada. Listed below are highlights of their contributions:

Prof. Platzer chaired a session on "Unconventional Concepts and Fundamental Research." **Prof. Newberry** chaired a session on "Aerospace Engineering Education."

Adj. Prof. Chandrasekhara presented a paper entitled, "Interferometric Investigations of Compressible Dynamic Stall Over a Transiently Pitching Airfoil."

Prof. Hebbar presented a paper entitled, "Vortex Wake Investigation of a Twin-tail Fighter Aircraft Model at High Angles of Attack With and Without LEX Fences."

Prof. Hobson co-authored a paper entitled, "Flowfield Computations Over the Space Shuttle Orbiter With a Proposed Mach Number of 5.8 and 50 Degrees Angle of Attack."

AS

• **Prof. Norman Schneidewind** received the IEEE Computer Society's Meritorious Service Certificate in recognition of his dedicated work in advancing the goal of software engineering standards.

Adj. Prof. Keebom Kang was invited to the Proposal Review Panel at the National Science Foundation (Operations Research and Production Systems Program). Professor Kang also has been appointed Associate Editor for the *Journal of Industrial Engineers Transactions*.

Prof. Nancy Roberts published "Public Entrepreneurship and Innovation," in *Policy Review Studies*. Prof. Roberts also served as Guest Editor for the *Journal of Public Productivity and Management Review*.

Prof. Hemant Bhargava co-authored "Computer-aided Model Construction," in *Decision Support Systems*. Prof. Bhargava also contributed a book chapter, "Fleet Mix Planning in the U.S. Coast Guard: Issues and Challenges for DSS," to *Decision Support Systems*, Clyde W. Holsapple and Andrew B. Whinston, Eds.

Prof. Daniel Dolk co-authored "Model Integration and a Theory of Models," in *Decision Support Systems*.

Prof. Tung Bui co-authored "A Stochastic Model of Organizational Choice," in the *Belgian Journal of Operations Research, Statistics and Computer Science*.

Prof. King and **Prof. Roberts** co-authored "A Psychological Profile of Policy Entrepreneurs," in *Public Productivity and Management Review*.

Prof. Abdel Hamid published "Investigating the Impacts of Managerial Turnover/Succession on Software Project Performance," in the *Journal of Management Information Systems*.

Prof. Steve Mehay has been selected to serve on the editorial board of the *Defence Economics Journal*.

Prof. Gregory Hildebrandt contributed a book chapter entitled, "The Effect of Modernizing Soviet Machine Building on Defense and The Macroeconomy: 1995-2010, in

Prof. Mark Eitelberg contributed a book chapter, "Military Manpower and the Future Force," to *The American Defense Annual*, 1993, Joseph Kruzal, Ed.

Prof. Larry Jones has received a Fulbright award to study corporate environmental policy and government regulation in Canada and Western Europe.

CS

LCDR John Daley served as Tutorial Chair for the 1994 convention of the Association of Computing Machinery's Special

Interest Group on Computer and Human Interaction.

Professor Neil Rowe gave a talk on his newly-funded research project, "Caption-based Access to Multimedia Databases," at the U.S. Navy R&D Conference in San Diego.

EC

Prof. Herschel Loomis co-authored a paper entitled, "Digital Implementation of Special Correlation Analyzers," published in the *IEEE Transactions on Signal Processing*.

Assoc. Professor Lawrence Zlomek co-authored "The RRA Algorithm: Recursive Ray Acoustics for Three-Dimensional Speeds of Sound," and was sole author of "Three Necessary Conditions for the Validity of the Fresnel Phase Approximation for the Near-field Beam Pattern of an Aperture." Both articles were published in the January 1993 Issue of the *IEEE Journal of Oceanic Engineering*.

Assoc. Prof. James Miller was appointed Associate Editor (Underwater Sound) for the *Journal of the Acoustical Society of America (JASA)*.

Prof. Jon Butler was invited to participate in Texas A&M University's Distinguished Lecturer Series. Prof. Butler's lecture was entitled, "Design of Multiple-Valued Programmable Logic Arrays."

MA

Professors Danielson and Criswell, with **Assoc. Professors Frenzen and Vasudevan**, published "Buckling of Stiffened Plates Under Axial Compression and Lateral Pressure," in the *International Journal of Solids*.

Professors Neta and Danielson, with **CPT Warren Phipps, USA**, will publish "Parallelization of the Naval Space Surveillance Satellite Motion Model," in the *Journal of Astronautical Sciences*.

Prof. Gragg and co-author **J.W.**

Demmel will publish "On Computing Accurate Singular Values and Eigenvalues of Matrices with Acyclic Graphs," in the journal of *Linear Algebra Graphs*.

Professors Frenzen and Fischer have published, "On a Conjecture of Pierce for Permanents and Singular Correlation Matrices," in the *SIAM Journal of Matrix Analysis and Applications*.

Prof. Weir has been elected Vice Chair of the Northern California Section of the Mathematics Association of America for a three year term.

ME

Prof. Sarpkaya has been appointed Associate Editor of the *Applied Mechanics Reviews* of ASME. **Professor Sarpkaya** also chaired the first session of the International Meeting on Turbulent Surface Signatures, and published two journal articles: "Offshore Hydrodynamics," in the *Journal of Offshore Mechanics and Arctic Engineering*, and "On the Instability of the Stokes Boundary Layer," in *Near Wall Turbulent Flows*.

MR

Prof. R.L. Elsberry was invited to sit on a panel discussing future developments in tropical cyclone prediction at the American Meteorological Society's Annual Meeting in Anaheim, Ca.

PH

Prof. Schwirzke has been elected to senior membership in the IEEE, an honor held by only 8% of the organization's 320,000 members. **Professor Schwirzke's** invited Paper, "The Physics of Vacuum Breakdown," will be presented at the 1993 IEEE International Conference on Plasma Science.