



CECDNEWS

CENTER FOR ENERGETIC CONCEPTS DEVELOPMENT



A newsletter for
alumni and friends of
the Center for Energetic
Concepts Development

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Message from the Director

We are pleased to bring to you the inaugural issue of CECDNews. With this new publication we will keep you abreast on our latest research, faculty updates, and other topics of interest. We hope that you find this to be a useful tool.

THE CENTER FOR ENERGETIC Concepts Development was founded as a partnership between the University of Maryland and the Naval Surface Warfare Center, Indian Head Division (NSWC IH). Through our alliance, we have established a resource for the continuing advancement in energetics manufacturing, science, and research, all while educating the next generation of energetics experts.

Since then we have been busy working toward the goals we outlined for ourselves in that cooperative agreement.

They include the development of an internationally recognized energetics capability; the development of the next generation of Department of Navy energetics experts; supporting DOD and non-military research priorities; accessing world-class experts in energetics and related disciplines; and the sharing of experts and facilities between the two organizations. I am delighted to tell you that we are well on our way to realizing these goals, as we have secured \$4 million for research activities, capital equipment & special awards, developed specialized curricula in energetics at

the University of Maryland and the College of Southern Maryland, offered \$100,000 in free courses for NSWC IH at UM and CSM, and developed business relationships with TEDCO, the Navy Mentor-Protégé Program, and several Southern Maryland manufacturing concerns.

We are also working in partnership with the College of Southern Maryland and the Charles County Economic Development Commission

in bringing economic opportunity to Southern Maryland — an article highlighting our efforts can be found in this issue.

Finally, I would like to acknowledge our key representatives from NSWC IH — CECD

Deputy Director **James Short** and CECD Government Program Director **Robert Kavetsky**. Together, the three of us will be working towards making CECD the best in energetics research and development — and education.



Dave Anand, Jim Short, and Bob Kavetsky

Davinder K. Anand
CECD Director

CECD Hosts ONR Workshop

ON OCTOBER 31, 2001, THE CENTER hosted an Undersea National Naval Responsibility Workshop at Marriott's Inn & Conference Center on the University of Maryland campus. The workshop was attended by 18 people, representing the three organizations most closely involved with undersea weapons technology — Naval Undersea Warfare Center (NUWC), NAVSEA Indian Head Division (IHD), and the Applied Research Laboratory (ARL) at Penn State University — as well as the University of Maryland. The purpose of the workshop was to identify ten projects to be done in American universities in consultation with these organizations.

Edward Johnson, Undersea Weapons Program Manager at the Office of Naval Research, shared a history of the events leading up to the creation of the Undersea National Naval Responsibility (NNR) by Admiral Cohen, Chief of Naval Research. Mr. Johnson summarized the benefits of the educational component of the NNR and the benefits that he hopes will accrue to ARL, NUWC and IHD-NSWC. The primary purpose of the Undersea NNR

university consortium is to fund graduate students and postdoctoral students.

Dick Philips and **Tom Gieske** summarized recent college recruiting experience by NUWC, stating they are having more success hiring experienced people than



recent college graduates. **Frank Symons** said that while ARL is successful hiring Penn State graduates who worked at ARL as part-time student employees, hiring people from elsewhere has been difficult. **Steve Mitchell** and **Greg Harris** of Indian Head said that Indian Head has been successful recruiting college students in the recent past; however, none had arrived with skills specific to undersea weapons technology. Success of the NNR univer-

sity consortium program might bring new employees to Indian Head with specific skills related to undersea weapons technology.

From about 20 technology concepts discussed at the workshop, 10 were selected as NNR university consortium topics. ONR will issue a broad agency announcement inviting universities to submit proposals, in collaboration with at least one of the three laboratories, to conduct research in one of the ten topics. ONR expects to issue 10 grants under the BAA. A typical grant might be of the order of \$75,000.

Dr. Spiro Lekoudis, Head of the Engineering, Materials & Physical Sciences Department was the after-lunch speaker. His remarks touched upon the obligation and ability of the Office of Naval Research to fund research in areas germane to naval operations.

Dr. Richard Carlin of ONR has funded a project with CECD focusing on the educational component of the NNR activities. This work is being performed by **Dr. Dave Anand** and **Dr. George Dieter**.

CECD Partnerships

THE CECD STARTED OUT AS A research group at the University of Maryland, focused on research in detonation physics and detonation chemistry. Not coincidentally, at the time Professor Dave Anand became Director, our focus moved towards energetics manufacturing science.

Professor Anand has long-standing interests in manufacturing science. Indian Head, a manufacturer of energetic materials for over 100 years, has a mission that includes energetics manufacturing technology. The Office of Naval Research has also placed its Energetic Materials Manufacturing Technology Center at Indian Head. The combination of the

two made a perfect match.

Independently, the Office of Naval Research recently placed a CAVE (Computer Automated Virtual Environment) at the University of Maryland. This led to the Center envisioning a virtual research, development, manufacturing, and training center at Indian Head, Maryland in partnership with the College of Southern Maryland and the town of Indian Head. The training would be concerned with the design, analysis, prototyping, manufacturing & process management of products in virtual environments.

In July 2001, Bob Kavetsky, Jim Short, Dave Anand, and Elaine Ryan met

with Indian Head town leaders and Charles County Economic Development Commission members. Mr. Kavetsky shared our vision of a virtual research, development, manufacturing, and training center. Subsequent meetings were held to present the idea to the full Economic Development Commission in the presence of several of Charles County Commissioners. In January 2002 we made the same presentation to the Maryland Department of Business and Economic Development. Currently, we are pursuing these ideas and related matters necessary to start establishing a Technology Park in Indian Head.

CECD Faculty Receive Research Awards

FOUR CECD/DEPARTMENT OF Mechanical Engineering faculty have received awards for their research.

Assistant Professor **Satyandra K. Gupta** was named on behalf of President Bush by the Executive Office of Science and Technology as a recipient of the 2001 Presidential Early Career Award for Scientists and Engineers (PECASE). Twenty researchers funded by the National Science Foundation were selected for the award this year. The White House will honor Gupta and the other awardees later this winter in an invitation-only ceremony in Washington, DC.

The PECASE award, established by President Clinton in 1996, bestows the highest honor by the U.S. government to outstanding scientists and engineers who are in the early stages of establishing their independent research careers. Award winners receive a grant for a five-year period to further their research and educational efforts.

Gupta received this award for innovative use of information technology for improving decision making in manufacturing. Dr. Gupta's research is focused on utilizing information technology principles to develop new manufacturing processes and decision support tools. These new processes and tools are aimed to make it possible to design and manufacture products that were not possible before.

Assistant Professor **Steven Buckley** has received an Office of Naval Research (ONR) Young Investigator Award for his proposal entitled "Particle and Toxic Release Inventory Diagnostics for Navy Vehicles and Operations." In his research Dr. Buckley will design, validate and test a unique, compact, integrated

sensor for particulate matter, toxic metals, and volatile organic species in vehicle emissions. Such measurements, made during vehicle operation, can be used to make informed decisions regarding engine choices based on performance/emission tradeoffs.

Assistant Professor **Hugh Bruck** has also received a Young Investigator Award for his research entitled "Fabrication and Design of Functionally Graded Energetic Materials." In his research Dr. Bruck will investigate computational design methods and continuous manu-

not only energetic materials, but to structural composite materials, as well.

The Young Investigator Program supports basic research by exceptional faculty at U.S. universities who received a Ph.D. or equivalent degree within the preceding five years. Grants to their institutions provide up to \$100,000 per year for three years; additional funds may be made available to purchase equipment related to the investigator's research. The funds may be applied to a variety of research costs,

including salary, graduate student support, laboratory supplies, and operating costs.

In addition, Assistant Professor **Don DeVoe** received a Department of Defense University Research Instrumentation Program (DURIP) Award to purchase a Deep Reactive Ion Etcher. The DURIP supports the purchase of state-of-the-art equipment that augments current or develops new university capabilities to perform cutting-edge defense research. The

DURIP meets a critical need by enabling DoD-supported university researchers to purchase scientific equipment costing \$50,000 or more. The researchers generally have difficulty purchasing instruments costing that much under their research contracts and grants.



Examples of CECD research: MEMS, Virtual Reality, and Combustion

facturing technologies for the development of functionally graded materials that simultaneously optimize energetic material performance and physical properties. His research will lead to greener and more efficient energetic materials that are functionally adaptive, and will be applied to

The Center for Energetic Concepts Development is an alliance between The University of Maryland, Naval Sea Systems Command, Indian Head, Surface Warfare Center Division (NAVSEA IH), and The College of Southern Maryland. It was established to address R&D in energetics manufacturing and a full spectrum education program, from graduate education to technician training. Further, it is involved in establishing partnerships with industry and other organizations to further the goals of their enterprise.

CECDNEWS is published several times a year for alumni and friends of the Center for Energetic Concepts Development at the A. James Clark School of Engineering.

Your alumni news and comments are welcome. Please send them to: CECDNEWS Editor, 2181 Glenn L. Martin Hall, College Park, MD, 20742-2115.

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Visit our Web site at www.enme.umd.edu/CECD

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currentRESEARCH

Below are the some of titles of several recent research projects underway at CECD. For more information about these projects, click on www.enme.umd.edu/CECD.

- Multiple Criteria Optimization and Selection Using Warhead Design as a Platform
- Initiation of Chemistry in Solid Explosives
- Confined Burn Facility — Environmental Measures
- A Framework For Optimization-Based Design of Undersea Warheads With Multiple Targets and/or Scenarios
- Improving Sensitivity Of Metastable Intermolecular Composite (MIC) Percussion Primers
- MEMS Package Architecture and Fiber Optic Plumbing
- Parachute Performance Investigation for IH Continuous Rod Warhead Delivery System



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