



(<http://renew.informs.org>)

2013 Membership Renewal ►►

US Coast Guard, USC Win INFORMS Wagner Prize for Protecting America's Ports, Waters from Terror Attack

HANOVER, MD, November 21, 2012 – The Institute for Operations Research and the Management Sciences (INFORMS®) today announced the award of the Daniel H. Wagner Prize by CPMS, the association's Practice Section, to the U.S. Coast Guard and its research partner, the University of Southern California's Viterbi School of Engineering. The winners used analytics and operations research to ramp up protection of America's ports and waterways from unpredictable terrorist attack.

"A Deployed Quantal Response Based Patrol Planning System for the US Coast Guard" is by Bo An, Fernando Ordonez, Milind Tambe, Eric Shieh, Rong Yang of the University of Southern California; and Craig Baldwin, Joseph DiRenzo, Ben Maule, Garrett Meyer, and Kathryn Moretti of the United States Coast Guard.

Watch video of the Wagner Prize-winning presentation, as well as all the 2012 Wagner Prize finalists, at http://livewebcast.net/INFORMS_AM_Wagner_Prize (http://livewebcast.net/INFORMS_AM_Wagner_Prize_2012)

"This research addresses a nationally important problem, the modeling of which is quite complex," said Allen Butler, the competition's committee chair. "The team has provided a superior solution using innovative mathematical approaches, including a response model to allow for potentially irrational behavior on the part of the adversaries. They deserve praise for the impact of this work and the originality of their methodology."

Every day the U.S Coast Guard faces challenges of evolving asymmetric threats in the Maritime Global Commons and also within the ports and waterways that make up the United States Maritime Transportation System.

The objective of this work was to develop and deploy a decision support system, known as PROTECT (Port Resilience Operational/Tactical Enforcement to Combat Terrorism), to aid the Coast Guard in its mission. The system is based on an attacker-defender game model of

the interaction between Coast Guard patrols and attackers.

Given the finite patrolling resources, an optimal use of limited resources takes into account the relative importance of the different targets protected and the presence of adversaries that can observe security measures before deciding to attack.

Recent research and applications have used what are known as Stackelberg Security Games to model the interaction between a security provider and attackers. The optimal defensive strategies to these games are mixed strategies over the different patrolling actions, making the optimal decisions unpredictable to the attacker while taking into account the relative importance of the different targets and the strategic behavior of the attackers.

Previous work on security games assumes the human attackers are perfectly rational. PROTECT addresses this limitation by drawing from what is known as quantal response (QR) theory to represent the adversary's behavior.

PROTECT has been successfully deployed in the port of Boston and is currently undergoing testing at the port of New York, with the potential for nationwide deployment.

Results show that the model better handles real-world uncertainties than a perfectly rational model and is able to perform better than human generated patrolling strategies.

Prior to implementing PROTECT, there were no documented reports of illicit activity. After implementation, Coast Guard crews reported more illicit activities within the port of Boston and provided a noticeable presence, with industry port partners commenting, "The Coast Guard seems to be everywhere, all the time."

The Daniel H. Wagner Prize competition is held each fall at the INFORMS Annual Meeting. The prize is presented for superior analytical work that has produced real benefits in practical application.

The late Dr. Wagner, for whom the prize is named, strove for strong mathematics supported by excellent writing, applied to practical problems. This prize recognizes those principles: The judges make their selection based on quality and originality of mathematical models and analytic content, clarity of written and oral exposition, and verifiable success in implementation.

This year's other finalists are:

Improving Patient Access to Chemotherapy
Treatment at Duke Cancer Institute; Jonathan C.
Woodall, Duke University Health System; Tracy

Gosselin, Amy Boswell, Duke Cancer Institute;
Michael Murr, Brian Denton, Edward P. Fitts
Department of Industrial & Systems Engineering,
North Carolina State University

The Philadelphia Districting Contest: Designing
Territories for City Council Based upon the 2010
Census: Ram Gopalan, School of Business, Rutgers
University; Steven O. Kimbrough, Operations and
Information Management, Wharton School of
Business; Frederic H. Murphy, Marketing and Supply
Chain Management, Fox School of Business, Temple
University; Nicholas Quintus, Office of Watersheds,
Philadelphia Water Department

Automated Bed Assignments in a Complex and
Dynamic Hospital Environment: Bex George
Thomas, Srinivas Bollapragada, Kunter Akbay, David
Toledano, Peter Katlic, Onur Dulgeroglu, Dan Yang,
General Electric Global Research, Software Sciences
and Analytics

Incorporating Stochastic Lead Times into the
Guaranteed Service Model of Safety Stock
Optimization: Salal Humair, Harvard School of Public
Health; John Ruark, Logility, Inc.; Brian Tomlin, Tuck
School of Business at Dartmouth; Sean P. Willems,
School of Management, Boston University

Biological Planning for High-Dose Rate
Brachytherapy: Application to Cervical Cancer
Treatment: Eva K Lee, Fan Yuan, Center for
Operations Research in Medicine and HealthCare,
Georgia Institute of Technology; Alistair Templeton,
Rui Yao, Krystyna Liel, Jame CH Chu, Rush
University Medical Center, Chicago, IL

The Wagner Prize competition was held last month at
the INFORMS annual meeting in Phoenix, Arizona. The
papers of all finalists will appear next year in a special
issue of the INFORMS journal **Interfaces**
(<http://interfaces.journal.informs.org/>).

About INFORMS

The Institute for Operations Research and the
Management Sciences (INFORMS®) is the leading
professional association for professionals in advanced
analytics. INFORMS is an international scientific society
with 10,000 members, including Nobel Prize laureates,
dedicated to applying scientific methods to help improve
decision-making, management, and operations. Members
of INFORMS work in business, government, and
academia. They are represented in fields as diverse as
airlines, health care, law enforcement, the military,
financial engineering, and telecommunications.
INFORMS serves the scientific and professional needs
of operations research analysts, experts in analytics,
consultants, scientists, students, educators, and
managers, as well as their institutions, by publishing a
variety of journals that describe the latest research in

operations research. Further information about
INFORMS, analytics, and operations research is at
[www.informs.org \(http://www.informs.org\)](http://www.informs.org).

###

INFORMS • 7240 Parkway Drive, Suite 300, Hanover, MD 21076 USA • 443-757-3500 • 800-4INFORMS (800-446-3676) •
informs@informs.org