



Interfaces

Publication details, including instructions for authors and subscription information:
<http://pubsonline.informs.org>

Introduction: 2015 Daniel H. Wagner Prize for Excellence in Operations Research Practice

C. Allen Butler Wagner Competition Chair , Randall S. Robinson Special Issue Editor

To cite this article:

C. Allen Butler Wagner Competition Chair , Randall S. Robinson Special Issue Editor (2016) Introduction: 2015 Daniel H. Wagner Prize for Excellence in Operations Research Practice. Interfaces 46(5):365-367. <https://doi.org/10.1287/inte.2016.0866>

Full terms and conditions of use: <https://pubsonline.informs.org/Publications/Librarians-Portal/PubsOnLine-Terms-and-Conditions>

This article may be used only for the purposes of research, teaching, and/or private study. Commercial use or systematic downloading (by robots or other automatic processes) is prohibited without explicit Publisher approval, unless otherwise noted. For more information, contact permissions@informs.org.

The Publisher does not warrant or guarantee the article's accuracy, completeness, merchantability, fitness for a particular purpose, or non-infringement. Descriptions of, or references to, products or publications, or inclusion of an advertisement in this article, neither constitutes nor implies a guarantee, endorsement, or support of claims made of that product, publication, or service.

Copyright © 2016, INFORMS

Please scroll down for article—it is on subsequent pages



With 12,500 members from nearly 90 countries, INFORMS is the largest international association of operations research (O.R.) and analytics professionals and students. INFORMS provides unique networking and learning opportunities for individual professionals, and organizations of all types and sizes, to better understand and use O.R. and analytics tools and methods to transform strategic visions and achieve better outcomes. For more information on INFORMS, its publications, membership, or meetings visit <http://www.informs.org>

Introduction: 2015 Daniel H. Wagner Prize for Excellence in Operations Research Practice

C. Allen Butler

Wagner Competition Chair

Daniel H. Wagner Associates, Hampton, Virginia 23669, allen.butler@va.wagner.com

Randall S. Robinson

Special Issue Editor

Sparks, Maryland 21152, randy.robinson@mac.com

Competition for the 2015 Daniel H. Wagner Prize for Excellence in Operations Research Practice provided the five finalist papers featured in this special issue of *Interfaces*. The prestigious Wagner Prize—awarded for achievement in implemented operations research, management science, and advanced analytics—emphasizes quality and originality of mathematical models and clarity of written and oral exposition. Researchers from Georgia Institute of Technology, Emory University, the University of São Paulo, and a major client organization—Centers for Disease Control and Prevention—won the competition for their invention and successful laboratory testing of original methods that will guide the rapid development of better vaccines to protect against pandemic-causing viruses. The remaining finalist papers describe work to improve repair and maintenance of railroad locomotives, testing of new-model automotive vehicles, location of products on shelves in supermarket stores, and organization of a national postal service.

Keywords: professional: comments on.

One way CPMS, the Practice Section of INFORMS, strives to help the umbrella field of operations research, management science, and advanced analytics is by making practice success stories available to the profession. We are therefore pleased to present the results from the 2015 competition for the Daniel H. Wagner Prize for Excellence in Operations Research Practice, an INFORMS prize administered by CPMS and established in memory of the late Dr. Daniel H. Wagner.

Dan Wagner earned his PhD in mathematics in 1951 from Brown University. His dissertation, “On Free Products of Groups,” was published in 1957 in *Transactions of the American Mathematical Society* (Wagner 1957). He began his career in the U.S. Navy’s Operations Evaluation Group at the Pentagon, where he worked on operations research for naval warfare. He worked there until 1956, with a one-year leave of absence for postdoctoral research on free algebras at MIT. Dan then joined Burroughs Research Center, where he directed a group of mathematicians

performing analysis for the development of digital computers.

In 1957, Dan’s entrepreneurial spirit took over and, together with John D. Kettelle, he formed the partnership of Kettelle and Wagner, which was dissolved in 1963. That same year, he formed a new company, Daniel H. Wagner Associates, Inc. This company did leading-edge work in the mathematics of naval tactics, especially antisubmarine warfare, detection theory, and search planning.

During his years as president and principal owner of Wagner Associates, Dr. Wagner brought many high-quality mathematicians into the operations research community. This led to significant advances in the firm’s fields of endeavor and delivery of significant applications to Navy, Coast Guard, and other clients; many of these applications are still in service today.

After retirement from his eponymous company, Dan continued his commitment to the field of operations research, serving in various teaching and research positions with the U.S. Naval Postgraduate

School and the U.S. Naval Academy. He was an active member of ORSA, and then INFORMS, for more than 40 years.

The idea for this prize began at Dan's memorial service in April 1997, where many of his former colleagues gathered. Following the agreements made on that day and subsequent pledges, the firms Metron, Inc., Daniel H. Wagner Associates, Inc., and Applied Mathematics, Inc. generously donated a total of \$51,000 as an endowment to ensure the availability of a cash award in perpetuity. Each of these companies is an outgrowth in large part of Dan's early efforts.

Metron, Inc. (President and CEO Tom Corwin, <http://www.metsci.com>) is a scientific consulting company dedicated to solving challenging problems in national defense through the development and application of advanced mathematical methods. Problem solutions are realized using computer software with graphical interfaces that allow a user to understand and act on the results without having to comprehend the models' intricacies.

Daniel H. Wagner Associates, Inc. (President and CEO C. Allen Butler, <http://www.wagner.com>) specializes in innovative mathematical solutions to problems in government and business. The firm provides consulting services in operations research, mathematics, and related software development. It also offers a variety of ready-made products for financial analysis.

Applied Mathematics, Inc. (President Bill Browning, <http://www.applmath.com>) develops and implements mathematical models that its clients use to help them better understand their systems and processes to improve performance. Current application areas include submarine warfare, search and tracking, sensor-data fusion, search and rescue, clinical informatics, uncertainty quantification, and vineyard analytics.

We are grateful to the judges who donated their time to evaluate the entries and select the winners of this year's competition: C. Allen Butler, Daniel H. Wagner Associates, Inc. (Committee Chair); Susan L. Albin, Rutgers University; Ann Bixby, Aspen Technology, Inc; William J. Browning, Applied Mathematics, Inc; Joseph H. Discenza, SmartCrane LLC; Russ Labe, former INFORMS Vice President for Practice; Patricia Neri, SAS Institute, Inc; Uday Rao, University of Cincinnati; Randall S. Robinson, Special Issue Editor; and Lawrence Stone, Metron, Inc.

The judging committee selected semifinalists on the basis of their abstracts and verification of success in practice. The semifinalists were then invited to submit drafts of their full papers. Based on the draft papers, the judging committee selected the finalists, who presented their work at the 2015 INFORMS Annual Meeting and whose papers constitute this special issue. Judging of the final papers and selection of the winning entry were based on the following criteria: quality and coherence of analysis and originality of mathematical solutions, quality and clarity of writing, utility or success of the work in one or more real-world practice applications, and quality and clarity of the oral presentation.

The five finalists this year represent the diversity of successful worldwide implementations of operations research. The finalists' innovative analytical methods are varied, the benefiting organizations are from both private and public sectors in Europe and the United States, and the home countries of authors include Portugal, France, Germany, Brazil, and America.

The winning team—composed of members from the Centers for Disease Control and Prevention, Georgia Institute of Technology, Emory University, and the University of São Paulo—developed methods to better predict human reactions to vaccines that protect against pandemic-causing viruses. Laboratory tested with both yellow fever and influenza, these new methods applied an original machine-learning framework to discover previously unrecognized gene signatures that can help predict vaccine immunity and efficacy. Participants anticipate that revelations from the applications of these analytical methods will guide the rapid development of better vaccines to fight emerging infections, and will also improve monitoring for poor responses to particular vaccines in the elderly, infants, or others with weakened immune systems. In addition, they expect the project's work to help with the future design of more effective universal flu vaccines.

A team from CSX Transportation and the University of Illinois at Urbana-Champaign created new methods of finding efficient ways to manage the facilities for repair and maintenance of railroad locomotives. They apply optimization models to assist with decisions about: locations, capabilities, and capacities of fixed facilities; home locations and routing plans

of moveable facilities; and assignments of actual locomotive work to specific facilities. Successful application of the team's methods within CSX demonstrated significant cost savings.

Ford Motor Company chartered an effort to develop improved analytical methods to assist with determining the number of test vehicles to produce and then with assigning crash tests among them. While this general topic has become a classic optimization-model application, growing costs motivated an initiative to find better ways to handle the modeling. A team from Ford and the University of Michigan succeeded in developing an innovative approach that combines optimization and expert knowledge within a Web-based system that automates time-consuming computations. Furnishing notable cost reductions and other benefits, the methods have so far been successfully applied to a number of Ford's new-vehicle programs, with more programs expected to join soon.

The conglomerate Sonae, one of the largest companies in Portugal, within its subsidiary Sonae MC, operates the major food retailing chain Continente. A team from Sonae MC and the University of Porto developed a novel method for Continente stores to decide how to locate store products on their shelves to enhance profit. The team created a decision support system that suitably blends optimization models and experience-based merchandising rules. Implementation led to significant profitability increases.

Executives of La Poste, the French national postal service, wondered whether they should retain their

system of separate delivery networks for mail and parcels, as in the Netherlands and Belgium, or instead combine them into a single network, as in Germany. They commissioned a team from their own staff, the WHU-Otto Beisheim School of Management, and the Massachusetts Institute of Technology, to investigate. Their team created new models based largely on optimization to explore the consequences of both approaches. Drawing on data from the French city of Nantes, the team found that merging networks yielded reliable cost reductions under various detailed scenarios. As a result, La Poste converted from two delivery networks to a single network that handles both mail and parcels.

We congratulate all the authors for their outstanding work. And we again thank our esteemed judges for their volunteer efforts, which made this competition possible. We look forward to another strong competition during the 2016 INFORMS Annual Meeting in Nashville, Tennessee, and to recognizing the winner at the Edelman Gala during next year's INFORMS Conference on Business Analytics and Operations Research in Las Vegas, Nevada.

References

Wagner DH (1957) On free products of groups. *Trans. Amer. Math. Soc.* 84(2):352–378.

Full presentation videos with slides are available in the INFORMS Video Learning Center and as electronic companions to the *Interfaces* articles at <https://www.pathlms.com/informs/events/455>.