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CAST Communications - Winter 2007

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Editorial Notes

by Peter Rony and Karl Schnelle

Welcome to the tenth online issue of *CAST Communications*, which includes one of the most interesting contributions ever to appear in this newsletter. We refer to the CAST [Award Address](#) given by Chris Floudas at the CAST Division banquet in San Francisco during the November 2006 AIChE annual meeting.

Chris expended an enormous amount of imagination and effort to create his multimedia award presentation, which included five, Google-Earth, Windows-Media-Audio/Video-file visits to Greece, Ionnina, Thessaloniki, CMU, and Princeton. Chris did one of the finest jobs that the editors have ever seen in *CAST Communications*, with his tasteful acknowledgements of both colleagues and graduate students.

The WMV files are very large. In addition to these files, the PowerPoint presentation was 60,202 KB in size – and had many color images. To make downloading times reasonable for this newsletter, we have subdivided the total presentation into (a) a simplified Acrobat PDF file for the PowerPoint presentation (size 6,140 KB) plus (b) the five Windows Media files.

Chris kindly provided the editors with [instructions](#) about how to play the embedded Google Earth files contained in his PowerPoint presentation.

Also published in this issue is "[Data Compression for Process Historians](#)", by Peter A. James, which was originally published in the printed *CAST Communications*, volume 19, number 2, Summer 1996. At that time, Peter was employed at Chevron Research and Technology Company.

Peter Rony (a UC-Berkeley alumnus) notes, with sadness, the passing of Professor Emeritus Alan Foss, who died on February 22, 2006, at age 76 after a long illness. Alan attended CAST Division banquets for many years after the beginning of his illness. (See the [obituary](#), which was published in the U. of California at Berkeley College of Chemistry [News and Publications](#).)

Also, don't miss the [Centennial Corner](#) in the latest issue of *CEP* (Feb 2007, p18) by Richard Snow. He reminisces that one of his papers was "the first published chemical reactor design using a digital computer." Can you guess what year?

Finally, the Associated Press reported from Stockholm that, on February 5, 2007, the "World's oldest newspaper goes digital". It is about time. Here are further details: "For centuries, readers thumbed through the crackling pages of Sweden's Post-och Inrikes Tidningar newspaper. No longer. The world's oldest paper still in circulation has dropped its paper edition and now exists only in cyberspace. The newspaper, founded in 1645 by Sweden's Queen Kristina, became a Web-only publication on Jan. 1. It's a fate, many ink-stained writers and readers fear, that may await many of the world's most venerable journals." [[Guardian Unlimited](#)]


The [Quote of the Day](#) for this issue is by Claude Monet.

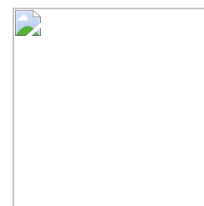
Communications

Award Introduction

by B. Wayne Bequette, Past CAST Chair

Computing in Chemical Engineering Award - *Recognizes outstanding contributions in the application of computing and systems technology to chemical engineering*


The [introduction](#) [428 KB 

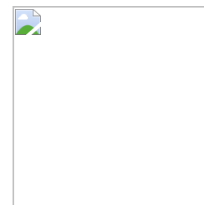


[www.eng.rpi.edu]

2006 Computing in Chemical Engineering Award Lecture

by Chris Floudas

The [award presentation](#) [6 MB 



[titan.princeton.edu]

Editors' Note: These files are very, very large. Please right-click and select "Save Target As..." to download them to your own computer. If you have an internet connection that is slower than DSL (a modem for instance), the files will take more than 1 hour to download EACH!!! An online speed test is at tech.msn.com.

[Chris Floudas simplified 02.pdf](#)

6,140 KB

[Greece.wmv](#)

8,624 KB

[Ioannina.wmv](#)

12,508 KB

[Thessaloniki.wmv](#)

17,219 KB

[CMU.wmv](#)

10,024 KB

[Princeton.wmv](#)

12,401 KB

News from the 2006 CAST Awards Dinner

by Gavin Towler, CAST First Vice-Chair

We would like to congratulate again all the award winners announced at the 2006 awards dinner:

- CAST Outstanding Young Researcher Award: **Costas D. Maranas**, Pennsylvania State University
- W. David Smith, Jr. Graduate Publication Award: **Krishna Mahadevan**, University of Toronto
- Computing Practice Award: **Basil Joffe**, Aspen Technology
- Computing in Chemical Engineering: **Christodoulos Floudas**, Princeton University
- 2005 CAST Directors' Award: **Fadwa T. Eljack**, Auburn University

And a special thank you to **Wayne Bequette** for serving as the 2006 CAST Chair.



Costas Maranas



Krishna Mahadevan



Basil Joffe



Chris Floudas



Fadwa Eljack



Wayne Bequette and Gavin Towler

Sahinidis Receives Beale-Orchard-Hays Prize

by the Editors

A member of the CAST Division, Nick Sahinidis, Professor of Chemical and Biomolecular Engineering at U of I, has won the 2006 [Beale-Orchard-Hays Prize](#), given by [The Mathematical Programming Society](#). The [Citation](#) states:

Nick Sahinidis and Mohit Tawarmalani, "A polyhedral branch-and-cut approach to global optimization", Mathematical Programming, Series B 103 (2005), pp. 225-249.

The approaches described in this paper are implemented in the BARON system. It represents a powerful approach for the global optimization of nonlinear optimization problems, including problems with integer variables. ...

CAST Election Results

by Dan Rozinski and Robert Earl Young, 2006-2008 CAST Directors

Please welcome these new members of the executive committee. Thanks to everyone involved in selecting, organizing and executing the election, as well as to all the candidates. The commitment to CAST by all these individuals is noteworthy.



2006 SECOND VICE-CHAIR: Francis Doyle III

Francis J. Doyle III was appointed to the *Suzanne and Duncan Mellichamp Endowed Chair in Process Control* at the University of California, Santa Barbara, and as a Full Professor in the Department of Chemical Engineering, in 2002. He received his B.S.E. from Princeton (1985), C.P.G.S. from Cambridge (1986), and Ph.D. from Caltech (1991), all in Chemical Engineering. After graduate school, he was a Visiting Scientist at DuPont in the Strategic Process Technology Group (1991-1992), and held appointments at Purdue University (1992-1997); the University of Delaware (1997-2002); and the Universität Stuttgart (2001-2002).

His research interests are in the areas of systems biology and nonlinear process control, with applications ranging from gene regulatory networks to complex particulate process systems. He is the recipient of several research awards including: National Science Foundation National Young Investigator (1992); Office of Naval Research Young Investigator (1996); Alexander von Humboldt Research Fellowship (2001-2002); and AIChE CAST Division Computing in Chemical Engineering Award (2005). His contributions to engineering education have been recognized as well, including: Potter Engineering Teaching Award (1995); ASEE Section Outstanding Teacher Award (1996); Tau Beta Pi Teaching Award (1996); CACHE Academic Trustee (1998-present); and ASEE Ray Fahien Award (2000). He is the author of 2 books, and over 120 journal articles.

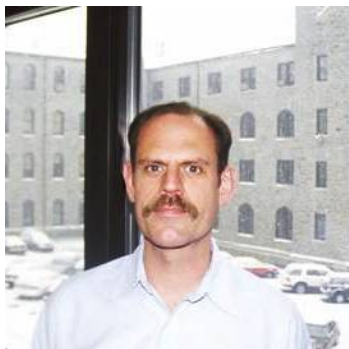
2007-2009 DIRECTOR: Donald Bartusiak

Don Bartusiak is Lead Specialist for Process Control Applications at ExxonMobil Chemical Company. He has 18 years of experience with ExxonMobil in technical and supervisory positions in the U.S. and Europe covering regulatory control, linear and nonlinear MPC, real-time optimization, and online artificial intelligence technologies for businesses ranging from



olefins to polymers. He was Lecturer and Adjunct Professor of Chemical Engineering at Rice University from 2000 to 2003. From 1977 to 1984, he worked for Bethlehem Steel Corporation doing process development research.

He has a B.S. degree from the University of Pennsylvania and M.S. and Ph.D. degrees from Lehigh University. He is co-author of 16 technical articles, and co-inventor on 3 U.S. patents and multiple international patents. He has served on the Process Control programming committee of the Ethylene Producers Conference (an AIChE topical) for 10 years, and has been the chairman for the last 3 years. He has served on the industrial advisory boards of several industry/university process control consortia, on PhD committees, and as reviewer for three refereed journals. He held multiple offices in the AIChE Lehigh Valley Section, culminating in Section Chairman in 1982.



2007-2009 DIRECTOR: Kenneth Muske

Kenneth Muske is the Robert F. Moritz Sr. Chair of Systems Engineering, director of the Systems Engineering Computational Laboratory, and Professor of Chemical Engineering at Villanova University. He received his B.S.ChE and M.S. in chemical engineering from Northwestern University in 1981. He then worked as a staff engineer in process automation at the Phillips Petroleum Company Research Center and as a senior engineer in process control for Setpoint, Inc. He began his doctoral studies at The University of Texas at Austin in 1990 and, after receiving his PhD in chemical engineering in 1994, joined Los Alamos National Laboratory as a technical staff member where he was involved in the design of advanced control and automation projects for laboratory and DOE facilities. He joined the chemical engineering faculty at Villanova University in 1997 where his research interests are in the areas of system modeling, control, and optimization. He is currently responsible for the interdisciplinary systems engineering programs in the College of Engineering at Villanova University. He is also a registered Professional Engineer.

Ken has been active in the CAST Division serving as the 2006 CAST Area 10b Programming Coordinator, AIChE Society Review Chair for the 2006 American Control Conference, two terms as the AIChE Alternate Director on the American Automatic Control Council Board of Directors and will be the next AIChE Director on this board, and as an Operating Committee Member for the 2000, 2003, and 2007 American Control Conferences. He has also served on over twenty AIChE, IEEE, and IFAC conference organizing, programming, and technical committees in addition to acting as a session organizer and/or co-chair for over thirty sessions at AIChE, IEEE, and IFAC conferences.

New WebCAST CHAIR: Richard D. Braatz by the Editors



Richard Braatz is Millennium Chair of Chemical and Biomolecular Engineering at the University of Illinois at Urbana-Champaign where he is an affiliate Professor in the Departments of Electrical and Computer Engineering, Mechanical Science and Engineering, and Bioengineering. Before starting at U of Illinois he received M.S. & Ph.D. degrees from Caltech and spent a year at DuPont. He has been highly active in CAST Division activities, having served as an AIChE CAST Director and a programming coordinator as well as organizing and/or co-chairing over 25 sessions at AIChE and related conferences.

Dr. Braatz has consulted and/or collaborated with more than 10 companies including Merck, IBM, and UTC Fuel Cells, and is a co-author of 100+ journal papers and 3 books, including the textbook *Fault Detection and Diagnosis in Industrial Systems*. His interests span computing and systems technology including applied mathematics and process design, control, and operations. As WebCAST chair he will form a committee representing the various subareas of the CAST Division to select speakers that bridge the interests of academia and industry.

Letter to the Editor

Article Request
from Paul Gusciora

10 Jan 2007

Dear Prof. Rony:

I am writing to request that CAST republish an article that appeared in an earlier CAST newsletter. The article by my colleague at Chevron:

Peter A. James: "Data Compression for Process Historians." *CAST Communications*, v19, n2, Summer 1996. p15-21

is only available in paper. It is not available in PDF or HTML form. Since the article is not available in electronic form, and the CAST newsletter is not retained by many libraries, the article is not available to researchers who might want to read or cite it. This is unfortunate, because the article contains analysis that has not been repeated elsewhere.

I recently read on the CAST website that some people were complaining about the lack of literature citations in articles published in the CAST newsletter. This article cites 14 prior works, including some IEEE papers from 1967 that have been overlooked by later work published in refereed journals.

Peter James has the article with his marked-up corrections as a scanned PDF document. I believe that he has an electronic version of the text document, so publishing this should be fairly straightforward with minor editing. For example, his e-mail address has changed.

Please republish this article for the benefit of the engineering community that is working on time-series data compression.

Best regards,

Paul H. Gusciora, Ph.D., P.E.
Senior Software Developer
OSIsoft, Inc.
[via email]

Article

Data Compression for Process Historians

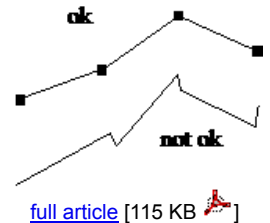
by Peter A. James

Originally published from *CAST Communications*, v19, n2, Summer 1996

Copyright © 1995 by Peter A. James

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pajames at chevron.com



Historization

This paper deals with storing and retrieving the time history of plant sensor data. Historization is an important part of modern plant monitoring and information systems. Operators look at real-time multivariable trends for clues to "what's going on", post-mortem committees need to reconstruct the circumstances leading up to plant "incidents", and engineering studies benefit from a way-back look at a not-so-recent mode of operation.

Compression

Why compress, why not just store all data? The reasons are pretty obvious:

- to conserve storage space
- to live within limited channel bandwidth - this could be the input-output channel to disk or the message channel from a data collecting/filtering process to a history storage process.

Efficient utilization of storage space is important even with today's huge storage volumes. Operations and Engineering want months of data online in addition to last shift's. Compression is not the only means to fulfill this need: storage of "averaged" data (e.g. hourly, shift, daily, weekly averages) may fulfill the really long term data storage requirement. Nonetheless, for some "short" time scale most clients want "raw" data or some really close approximation thereto. And "short" may mean months or longer to some clients.


Data compression is not effective at dealing with limited I/O bandwidth at all times. This is because there will be intervals during which little or no compression will take place, e.g. computer or instrumentation subsystem startup, plant upsets, neurotic sensors. Compression can only help insofar as memory buffers are able to provide a temporary repository when the I/O channels are "maxed out".

Compression is not the only means to deal with limited I/O bandwidth. Multiple channels can be provided. This especially convenient along the lines of datatype (e.g. analogs versus discreties) since the different data types are usually dealt with separately anyway.

Who's the Client?

The client is an operator, an engineer, a plant supervisor, an accountant, a government agency -- in short, anybody or any body that may want a peek at the historical record. Choosing a compression method is as much a matter of clientele proclivity as mathematical proof.

...

The entire [article](#) [115 KB 

Announcements

Free CAST Membership Offered!

by Karen High, CAST Chair

CAST membership is now free to Undergraduate AIChE members! This is a great mechanism for students to find out about what goes on in the CAST Division. One of the best perks is their ability to participate in live [webCASTS](#)!

How to Contact AIChE

Publication sales, meeting registration, applications for membership, technical training, and other AIChE products and services may be obtained by using the contact information below or visiting [AIChE Contacts](#).

American Institute of Chemical Engineers (AIChE)

3 Park Avenue

New York, NY 10016-5991

General Inquiries: 800-242-4363

International calls: 212-591-8100

Fax: 212-591-8888

[On-line contact form](#)

For answers to questions, try one of the following [AIChE Staff](#):

Felicia Guglielmi Director of Volunteer & Membership Activities (212) 591-7329	Bette Lawler Director of Operations (212) 591-7207
Joe Cramer Director of Technical Programming (212) 591-7950	Anette Ngijol Volunteer & Membership Activities (212) 591-7478
	Steve Smith Director of Technical Activities & Journals (212) 591-7335


CAST10 E-Mail List

The following websites are used to participate in the list:

1. listserv.umd.edu/archives/cast10.html is the link that subscribers can use to read and post emails.
2. www.ench.umd.edu/cast10/ has lots of archived emails.

The address to post messages to the list is CAST10 at LISTSERV.UMD.EDU .

2007 Award Nomination Form

 Until updated, please use the [2006 Award Nomination Form](#) [52KB, MS Word], which should be completed by April 15, 2007. See [CAST Division Awards](#) for more information.

Quote of the Day

To see we must forget the name of the thing we are looking at.

-- Claude Monet [1840-1926]

Advertisements

CAST Communications Advertising Policy

Advertising Rates:	1/4 page = \$60; 1/3 page = \$70; 1/2 page = \$90; 2/3 page = \$120; 1 page (8.5" x 11") = \$150
Production Details:	Retain your original art, please. Submit an e-mail containing a WORD or PDF version (contact editor for preferred formats) of your advertisement, to the CAST newsletter editor: Peter R. Rony .
Deadlines:	December 1 for the Winter issue; July 1 for the Summer issue.
Payment Details:	Prior to publication of advertisement, please submit check payable to CAST Division, AIChE to the CAST Division Secretary/Treasurer
Questions:	Peter R. Rony , Telephone (540) 951-2805

Join the CAST Division of AIChE

Already a member? Please ask a colleague to join.

The Computing and Systems Technology (CAST) Division of AIChE is responsible for the wide range of activities within AIChE that involve the application of computers and mathematics to chemical engineering problems including process design, process control, operations, and applied mathematics. We arrange technical sessions at AIChE Meetings, organize special conferences, and publish this newsletter - *CAST Communications* - twice a year. These activities enable our members to keep abreast of the rapidly changing fields of computing and system technology. The cost is \$10 per year, and includes a subscription to this newsletter. Shouldn't you join the CAST Division now?

To join the CAST Division, please contact [AIChE](#).

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Associate Editor: Karl D. Schnelle, Dow AgroSciences LLC