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Editorial Notes

About This Issue . . . and Other Matters, by Peter R. Rony and Scott E. Keeler....3
New CAST Division Officers Elected....4
Joe Pekny, Area 10c Programming Chair....5
CAST Division Awards, by Bjorn Tyreus, CAST Awards Chairman....5
CAST Email List Changes Hands, by Jeffrey Kantor....6
CAST Email is Back in Operation, by James Rawlings....6

Articles and Communications

"Modeling and Control--Back to the Future, Part I" by Thomas F. Edgar, 1995 CAST Division Computing in Chemical Engineering Awardee....7
"Proposal: Eight-Dot-Three Filenames for AIChE Meeting Extended Abstracts" by Peter R. Rony....12
"Volume 2 CACHE CD-ROM" by Peter R. Rony and Michael Cutlip....15
"We Have Found Big Brother, and He is the Internet" by Peter R. Rony....16

Meetings, Conferences, Congresses, Short Courses, and Workshops

1996 AIChE Spring National Meeting, New Orleans, Louisiana, February 25-29, 1996....19
International Conference on Identification in Engineering Systems, University of Wales, Swansea, UK, March 27-29, 1996....20
Sixth European Symposium on Computer Aided Process Engineering (ESCAPE-6), Rhodes, Greece, May 26-29, 1996....20
International Conference on Computer Integrated Manufacturing in Process Industries (I-CIMPRO '96), Eindhoven, Netherlands, June 3-4, 1996....20
Ninth International Conference on Industrial & Engineering Applications of Artificial Intelligence & Expert Systems, Japan, June 4-7, 1996....21
13th IFAC World Congress, San Francisco, June 30 - July 5, 1996....21
Fifth World Congress of Chemical Engineering, San Diego, July 14-18, 1996....21
Third Workshop on Discrete Event Systems (WODES '96), Edinburgh, Scotland, August 19-21, 1996....21
1996 Portuguese Control Conference, Porto, Portugal, September 11-13, 1996....22
1996 AIChE Annual Meeting, Chicago, November 10-15, 1996....22
1997 AIChE Spring National Meeting, Houston, March 9-13, 1997....23
International Symposium on Advanced Control of Chemical Processes (ADCHEM '97), Banff, Canada, June 9-11, 1997....24
1997 AIChE Annual Meeting, Los Angeles, November 16-21, 1997....24

Calls for Papers

Final Call, 1996 AIChE Annual Meeting, Chicago, November 10-15, 1996....25
First Call, 1997 AIChE Spring National Meeting, Houston, March 9-13, 1997....35
First Call, 1997 American Control Conference (ACC), Albuquerque, June 4-6, 1997....37

Advertisements

Intelligen, Inc.: EnviroPro Designer....14
Academic Press: "Neural Networks in Bioprocessing and Chemical Engineering"....18
CAST Communications Advertising Policy....3
Join the CAST Division of AIChE....40
1996 Award Nomination Form....41

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EDITORIAL NOTES

About This Issue . . . and Other Matters

Peter R. Rony & Scott E. Keeler

This issue will not make it to the mailboxes of CAST Division members prior to the spring AIChE meeting in New Orleans. The deadline for this meeting, February 25-29, 1996, is too early for our Winter issue publication schedule.

The feature article by our 1995 CAST Division Computing in Chemical Engineering awardee, Thomas F. Edgar, exceeded our page expectations. It will be serialized into Parts I and II during the 1996 publication year for CAST Communications. We thank Tom for the energy and effort that he put into this paper. Naturally, he retains copyright ownership to the manuscript and can publish it, or parts thereof, elsewhere since this is not a referred publication. This subject of copyright ownership leads naturally to the following news item.

Ellen Rony, sister of the editor and an individual who lists one of her occupations as "cyberscribe," mailed her brother an article, "Who will control written works?," which appeared in the August 27, 1995 issue (Section E) of the Marin Independent Journal. The article starts as follows:

"SAN FRANCISCO -- The next book, newspaper or magazine article you read may have its own story, a bitter one over who controls the story's future rights particularly electronic. Many publishers, who previously held only one-time rights, are now unilaterally declaring ownership of the work of free-lance writers. This includes works for which there may not yet be a market such as in on-line publishing or CD-ROM. 'To me, it's like being mugged at your computer,' says Chris Barnett, San Francisco free-lance writer, who works as Chief Financial Officer for San Francisco Focus and Graphics. Barnett has ghost-written several books. He deplores the possibility of being deprived of payment for his own work."

So what is new? For decades, technical authors -- engineers and scientists -- have experienced the existential pleasures of having technical journals unilaterally declare ownership of their write-ups of research work. "Being mugged at your computer" is only a modern view of this process.

Should authors and writers need to yield to the whims of publishers? It should not be necessary to do so. After all, creative artists in the music field -- all composers, arrangers, and performers -- have developed a highly effective and sophisticated system for receiving royalties for creative works. Independent painters, sculptors, and other artists sometimes sell their works, but many times they retain creative ownership and the rights to make prints and duplicates. Why should literary "artists" be any different? A writer is as much a creator as a musician or an artist.

The anger stirred up in independent authors may have its silver lining. The National Writers Union, or some other organization that represents large numbers of independent writers and authors, may ultimately succeed in mobilizing enough individuals to force publishers to develop reasonable policies of intellectual property and royalty sharing in this electronic age. Engineers and scientists should support the protest; we will not, but we should.

There exist exceptions to the rule of copyright ownership by publishers of technical articles. The editor served on the college-level promotion and tenure committee during January 1996. During his studies

of the dossiers of some very fine candidates for promotion, he observed one who had copyrighted most of his publications in an aeronautics -- AIAA -- journal.

Meanwhile, CAST Communications will continue its long-held policy that authors of its feature articles -- and for that matter, communications -- retain all intellectual property rights to their manuscripts. This is our way of saying "thank you" for sharing your thoughts and work with the members of the CAST Division of the AIChE.

A colleague had an epiphany during January 1996. "It is clear that Internet is BIG . . . HUGE . . . MAMMOTH. Internet will change the social order of the world." The editor shares this opinion. Sure, we will first need to overcome one or more incidents of worldwide Internet gridlock -- duly noted by cover art on Time and Newsweek (picture in your mind a roughly conical pile of computers, modems, monitors, smoke, dust, hard drives, CD-ROM discs, and cybergeeks arranged as a huge traffic accident). On the Internet, control of intellectual property will be important. And this is why we have paid attention to the conflict between free-lance writers and publishers. It is a conflict over the control of intellectual property. As engineers, we generate intellectual property. On occasion, it would be nice to maintain ownership of it.

On another subject, the January 1996 issue of AIChExtra had an important announcement. "Entrepreneurial Forum Offers Practical Advice to Those Starting or Running Businesses." "Will Debut at Spring National Meeting." This is an excellent idea, a fine service to AIChE members in a business environment that is placing increasing emphasis upon entrepreneurism. Since this newsletter will arrive at your mailbox after the spring meeting, note that for further information you should contact either Harold A. Huckins, Princeton Advanced Technology, Inc., 4 Bertram Place, Hilton Head Island, SC 29938, Phone: (803) 789-9211, FAX: (803) 689-9212; or Henry Greeb, Hg Consulting, Inc., 6580 Dry Ridge Road, Cincinnati, OH 45252, Phone: (513) 385-8363, FAX: (513) 385-8888, Email: 722277.706@compuserve.com. The editor compliments the Management Division's Executive Committee for promoting such an activity, and making it available to the AIChE membership.

Two announcements that arrived too late to be included in other sections of this newsletter. "AspenTech has acquired Dynamic Matrix Control Corporation (DMCC) and has signed a definitive agreement to acquire Setpoint, Inc., both leading suppliers of online automation and information management software and services to the process manufacturing industries," according to a January 29, 1996 press release. Hyprotech will have workshops during May 15-17 and June 27-28, 1996; for further details, call (715) 870-1900.

New CAST Division Officers Elected

Bjorn Tyreus,
2nd Vice Chair

Bjorn Tyreus, who is a Sr. Research Associate in DuPont's Advanced Process Control and Modeling group, received his BS Degree in Chemical Engineering from the Royal Institute of Technology (RIT), Sweden, in 1971. Bjorn received his MS and Ph.D. degrees in Chemical Engineering from Lehigh University in 1973 and 1975, respectively. He also holds a post-doctoral, teaching degree (docent) with the Chemical Engineering Department at RIT.

Bjorn started his industrial career as a project engineer at a Union Carbide subsidiary in Sweden in 1975. Unfortunately, due to the energy crisis, the project Bjorn was hired to work on got canceled. Instead, Bjorn found fertile ground for his training in process control in helping major energy consumers save energy. He therefore accepted a position with British Petroleum at their Gothenburg refinery in 1976. Bjorn participated in many control related improvement projects and had a chance to really understand what distillation is all about. In 1978 Bjorn decided to try his luck in research and development and joined Bofors Chemicals in Sweden. Here he had an opportunity to work on high value added chemicals and issues related to batch processing. However, after six years in the Swedish chemical industry it was clear to Bjorn that the "major league action" was elsewhere. He rekindled contacts from his Lehigh years, in particular with the late Page S. Buckley. Page was instrumental in helping Bjorn land a position with DuPont. In 1981 Bjorn thus accepted an offer from DuPont and moved with his family from Sweden to Delaware. Here, he first worked as a control system design consultant in DuPont's Engineering Department. He then served as an area superintendent for a computer control group at DuPont's Parkersburg Plant in West Virginia where he stayed for two years before re-

turning to the central engineering section as a senior consultant. In 1993 Bjorn left DuPont to form his own consulting company specializing in dynamic simulation and control software. Bjorn returned a year later to his current position in DuPont's Central Research Division.

Bjorn's main area of interest is dynamic process simulation as applied to the design and control of entire plants. Together with a colleague, Bjorn has invented a software concept which allows DuPont engineers to quickly and efficiently put together dynamic simulations of their process units. The simulations help in designing control systems, trouble shoot process operations and in operator training. In DuPont, Bjorn has participated in numerous projects and has helped design the controls for several plants. His current interests involve extending the use of dynamic simulations to units which are considered difficult to simulate. Bjorn is also studying methods to improve the way traditional unit operations are simulated with respect to the numerical methods used as well as the use of proper thermodynamic sub-models.

Charles F. Moore,
Director

Charlie Moore is a Distinguished Service Professor and Head of the Department of Chemical Engineering at the University of Tennessee. He also serves as Co-Technical Director of the Measurement and Control Engineering Center which is a research consortium supported by the National Science Foundation, Oak Ridge National Research Labs and about 15 industrial companies. Dr. Moore has been on the faculty for the University of Tennessee for over 25 years. During that time he has written numerous papers and contributed to six books in the area of process modeling and control . He has also served as a consultant to over 35 companies and has taught over 150 industrial short courses in both the US and in Europe. Dr. Moore received his B.S., M.S, and Ph.D.. in Chemical Engineering from Louisiana State University.

Area 10c Programming Chair

Joseph F Pekny

Joseph F. Pekny is an Associate Professor of Chemical Engineering and has been on the faculty at Purdue University since January 1990. He received a Ph.D. from Carnegie Mellon University and a B.S.E. from Princeton University, both in Chemical Engineering. In 1990, he was named a Presidential Young Investigator by the National Science Foundation. His teaching responsibilities at Purdue have included courses in process design, optimization methods, parallel and distributed computing, and applied mathematics. The underlying theme of Dr. Pekny's research is combinatorial optimization, the science and engineering of algorithms for solving problems involving discrete decisions. Principal industrial applications include process scheduling, planning, and design as well as the design and operation of integrated supply chains. Dr. Pekny has served as the chair of Area 10c of the AIChE CAST division since November 1994 and his term will expire in November 1996.

CAST Division Awards

Bjorn Tyreus,
CAST Awards Chairman

February is an excellent month to start the process of nominating a candidate for one of the CAST Awards. While the Awards cermony during the fall meeting seems a long time off, the deadline for nominations is in the Spring (April 16), which we all hope is around the corner.

For those of you who have sponsored a candidate in the past, please consider renewing a nomination (a nomination can be made active for three years) or submitting a new one for another deserving individual.

For those who have never been an Awards sponsor, I will make a few assumptions which form the basis of some information I provide below. First, I assume that everyone can think of a fellow engineer who deserves to be recognized. Second, I assume that you might not be completely familiar with the different CAST Awards. Third, you may not know the process involved, and finally, you may think it is too time consuming to get in-

volved. Let me deal with these issues one at a time.

There are three different CAST Awards, The Computing in Chemical Engineering Award, The Computing Practice Award, and the Ted Peterson Student Paper Award.

The Computing in Chemical Engineering Award "is given to recognize outstanding contributions in the application of computing and systems technology to chemical engineering". Traditionally, this award has been given to deserving contributors from academia specializing in any of the four CAST areas, Systems and Process Design, Process Control, Computers in Operation, and Applied Mathematics.

The Computing Practice Award "is given to recognize outstanding contributions in the practice or application of chemical engineering to computing and systems technology." This award usually goes to someone from industry, again in any of the four CAST areas.

The Ted Peterson Student Paper Award" is given to an individual for published work in the application of computing and systems technology to chemical engineering. The work must have been done by the individual while pursuing graduate or undergraduate studies in chemical engineering."

So, these are the awards. What about the process for winning? First, there needs to be a nomination. A nomination package is put together by a sponsor. The package is centered around the 1996 Award Nomination Form which can be found at the end of the CAST Newsletter. Winners for the Computing and the Computing Practice Awards are chosen by a group of electors consisting primarily of current CAST executive members and past award winners. Electors for the Student Paper Award are drawn from a large pool of qualified researchers from all CAST areas.

Finally, how much effort is involved in being a sponsor? Clearly, a strong package has the best chance of winning and quality comes with effort. However, if you look at the Nomination Form you will find that the role of the sponsor is mostly in coordination of information, not necessarily generating it in the first place. In addition, I will be more than happy to guide you in preparing a nomination for the first time. You can call me at DuPont (302) 695-8287 or write me an E-mail (tyreusbd@esvax.dnet.dupont.com).

I hope this helps you decide to be a CAST Award sponsor in 1996!

CAST Email List Changes Hands

Jeffrey Kantor

After five years of operation, the CAST email list is changing hands. Jim Rawlings has generously agreed to take care of it from this point on.

The email list presently consists of 784 working addresses, which is well beyond the original 54 email addresses that Ali Cinar and I gathered at CPC IV. My rather homespun set of software tools for managing this list are not really up to the task any longer, and I trust that Jim will bring up to date list management software to bear on the problem.

For what it's worth, the reason for the change is that, effective July 1, I am taking on a new job at Notre Dame as Vice President and Associate Provost. My current duties as department chair have already put a crimp in my ability to keep this service at the level it needs to be, and my new job certainly would not help matters. Besides, the service will benefit from fresh ideas.

I want to thank the many people who, over the last five years, have cooperated, offered suggestions, and helped develop this vehicle for professional communications. Ali Cinar, Jim Rawlings, Frank Doyle, and Mike Malone are people whose assistance has been particularly helpful at one time or another. Clearly, the time is again right for new initiatives aimed at conferencing, preprint distribution, or even a CAST Division electronic journal. Perhaps one of you reading this will be in a position to contribute to your profession by taking such an initiative.

CAST Email is Back in Operation

James Rawlings

As announced by Jeff Kantor, I am the new moderator for the CAST10 mailing list.

In addition to changing moderators, we have made changes in the operation of the list. The motivation for most of these changes is to reduce the burden on the list moderator. Most of the administrative details are now handled by a program, and the moderator's primary responsibility is to ensure suitability of the messages for distribution to the list. Thanks to John Eaton

for putting these changes in place.

Posting a message to the list

To post a message to the list, send it to cast10@bevo.che.wisc.edu. Once the message is approved for posting, it will be forwarded to all the members of the list. Messages sent to the list should have an appropriate subject line and should be formatted exactly as you want them to appear.

Subscribing and Unsubscribing

The mailing list is now managed by a utility called Majordomo. To subscribe to the list, send a message like this:

subscribe cast10

to majordomo@bevo.che.wisc.edu.

Likewise, if you want to remove yourself from the list, send the message:

unsubscribe cast10

to the same address.

For a complete list of Majordomo commands, use the command:

help

Please do not send requests to be added or removed from the the mailing list, or other administrative details to the list itself.

WWW Archive

The CAST10 WWW page has also moved. The new URL is http://www.che.wisc.edu/cast10. Postings to the e-mail list are automatically archived and available via this URL. In addition to the archive of past messages, the WWW site also has links to a meeting calendar, an address book, and lists of job postings, software postings, and other internet resources.

ARTICLES AND COMMUNICATIONS

"Modeling and Control--Back to the Future, Part I"

Thomas F. Edgar

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Perhaps the most significant technological change during the last 40 years has been the development of digital computers. Staggering improvements have occurred in computer speed and efficiency since computers were first commercialized in this century. Computers have evolved from large mainframe machines consulted only by scientific or engineering specialists to desktop microcomputers employed by a wide cross-section of the population. In fact computing is imbedded in many new household devices and automobiles; today's video camera contains more computing power than the IBM 360 computer did forty years ago. The computer has also evolved from a passive role of giving answers only when prompted to an active role in management and operation, performing without human intervention, also called "automatic control." It is estimated that there are 10 billion microprocessors and microcontrollers in the world currently, and that number is rapidly growing. Indeed the industrial society has now become an information society, where computers influence every facet of life and are the basis for economic well-being, as envisioned by John Naisbitt in Megatrends [1].

In this paper I examine the past, present, and future use of computers in control and automation. Most of the important developments in automatic control transcend a specific branch of engineering. In fact, automatic control, or more generally, systems analysis and control, is an area that covers all scientific and engineering disciplines, even business. The first section of this paper is a brief review of key historical developments in control engineering. The roles of academia, government, and industry in the evolution of control technology are described. A revival of process control occurred in the mid-1970s, with new-found optimism on how R&D results in industry and academia could be translated to commercial success. While much progress in this area has been made in the past 20 years, future improvements are limited by a lack of understanding of the behavior of industrial plants. Hence the ability to perform mathematical modeling in the context of process control (model-based control) will determine the ultimate success of automation. Several examples are presented of how certain control ideas from the past have resurfaced in new surroundings ("back to the future"), in many cases because of hardware/software limitations or an inadequate knowledge base. Finally I make some observations about industrial/academic cooperation in

process control and give some advice to the process control community.

Origins of Automatic Control

Automatic control deals with dynamic systems, namely those that vary with time. While most machines and processes are designed to operate at "steady-state," in actual practice changes occur that prevent the equipment from achieving constant operating conditions. Experience and intuition served as the basis for many primitive automatic control systems, in that they simply emulated what humans would do. In ancient times, mechanical controls were used to regulate oil lamp flow, water clocks, and the water level in a reservoir, by adjusting the inflow until the desired liquid level was reached [3]. The same concept was employed in the water tank of the modern flush toilet, purportedly invented by Thomas Crapper during the Victorian era in England. In the late 1700's about the time of the Industrial Revolution, there was a great deal of interest in controlling the speed of a rotating shaft in a machine. James Watt adapted some early ideas for controlling the speed of a grinding stone in a flour mill to develop the fly-ball governor for the Watt steam engine. The vertical position of balls in a cone measured the speed of rotation. Mechanical levers adjusted the steam supply to the engine to increase or decrease the speed, using a version of proportional-integral control. As an historical note, as a protest against the mechanization of factories in England in the early 1800's, the Luddites (perhaps the precursor of today's "green" radicals) actually destroyed many of the factories because of the belief that automation would eliminate many jobs [2].

While analysis of feedback controllers and the occurrence of instability arising from an improperly designed system aroused some academic interest in the late 1800's, the main event shaping modern control systems was the work at Bell Laboratories on developing electronic amplifiers for long-distance telephoning in the 1920's [3]. The invention of the electronic feedback amplifier in 1927 solved the noise and distortion problems arising from successive re-amplification of the voice signal. A single stage amplification was unsatisfactory, as anyone who has turned up the gain of a public address system discovers. The proportional-integral-derivative (PID) controller given in Eq. (1) was found to be one solution to give a high-fidelity amplified signal.

$$u(t) = K_c\left[e(t) + \frac{1}{\tau_I}\int_o^t e(t')dt' + \tau_D\frac{de}{dt}\right]$$

Equation 1.

During the past 50 years the PID controller has been the foundation for industrial control practice. An important design question is how to "tune" the controller, i.e., to select the values of K_c, τ_I, and τ_D that give satisfactory performance. This question has received considerable attention by both theoreticians and practitioners for the past 70 years.

Black and Bode of Bell Laboratories were the principal developers of the frequency response method for PID controller design during the 1920's and 30's [3]. Pneumatic rather than electronic controllers based on Equation (1) were introduced in the 1940's in chemical plants, since most of the instruments and control valves utilized air signals for their operation. Both types of analog controllers have been adequate for industrial applications but are in limited use today in most modern chemical plants.

Improved guidance and control of aircraft provided the next major transition in the evolution of control theory and practice. The control of airplanes and guided missiles at the end of World War II led to a new age in the late 1950's and 1960's, where a digital computer was used to provide automatic control rather than by an analog or pneumatic device. The launchings of artificial earth satellites beginning with Sputnik in 1957 were controlled by detailed analysis of differential equations that were used to model the space flight and landing of such vehicles. Optimization and stability analysis received new emphasis. The competition between the U.S. and U.S.S.R. for leadership in space brought control scientists and engineers to the forefront, involving such luminaries as Pontryagin and Lyapunov from the U.S.S.R., who helped developed the "maximum" principle. The U.S. scientists, not to be outdone, formulated the "minimum" principle, which merely involved a change in sign. This viewpoint was a departure from the earlier frequency response approach because of its emphasis on the use of differential equations. Hence it was called "modern" control theory as opposed to the "classical" control theory, which is the name ascribed to the earlier PID approach. One of the key results from modern (or optimal) control theory was the Linear-Quadratic-Gaussian (LQG) control problem, which gave a multivariable feedback control, similar in structure to a PID controller. During the 1960's and 1970's these two camps continued to argue about the superiority of each approach. Since 1970 most new developments in control theory have occurred in the western world, with contributions from many branches of engineering. Hence automatic control is an interdisciplinary field. Clear evidence is the American Control Conference, which is sponsored by seven societies and held annually with over 700 papers presented. Its proponents suggest that a generic, or "systems," approach can be used to solve any engineering problem. To

paraphrase Gertrude Stein, "a system is a system is a system."

Chemical Process Control--The First 30 Years

While the leading control scientists felt that their new theories could be applied to any process, the chemical process industries and the field of chemical process control have maintained a separate identity. Part of the reason for this was that chemical reactors and distillation columns were difficult to model using chemical engineering fundamentals. This is in contrast to the fairly accurate models for communications networks and aerospace systems. Another factor was the economic pressure felt by the process industries. Any move to use modern control theory in chemical plants required implementation by digital computers; improvements in product quality or throughput, and the resulting increased profitability needed to be large enough to justify a large capital expenditure, typically over one million dollars in the 1960s. The first process control computer was constructed by Ramo-Wooldridge in 1957 and early tests using Direct Digital Control (DDC) were carried out in the Gulf Coast by Texaco and Monsanto. Their results did not achieve the benefits imputed from the aerospace success [4]. The chemical industry resisted changing from the reliable PID controllers, which worked well enough, were not terribly expensive, and were easy to understand. Why trade them for extremely expensive systems that were unreliable and required extensive research and development and highly-trained personnel for implementation?

The aerospace experience was not portable to the process industries for two reasons. First, in the case of satellites, large sums of government funds could be used to achieve a success, regardless of the economics. Therefore very complicated control strategies could be implemented. Second, the aircraft industry had the advantage of being able to replicate successfully-developed control systems on 1,000 helicopters, for example. On the other hand, equipment in the chemical industry tends to have rather unique features. While units are generically similar, they process different chemicals and have other idiosyncrasies. In addition, due to proprietary reasons different companies do not often share information on control systems or operating strategies. Hence accurate mathematical models for these processes could require extensive research. Because modern control theory generated controllers whose performance was quite sensitive to model error, it was not a practical approach.

While there were a few plant installations that used advanced strategies such as feedforward control during the 1960's, it was clear that a significant gap between theory (mostly led by academicians) and industrial practice developed during the 1960's and in the 1970's, with very little in common between the two groups. Industry maxims such as "you can get 80% of the profit with 20% of the effort" and "what can go wrong will go wrong" were watchwords. Once a plant was making satisfactory product, any efforts to change the plant or optimize the operating conditions were opposed. There were also a lack of funds and pilot facilities to test new ideas, so no hard evidence was developed to demonstrate the value of these new ideas (i.e., which theories would be useful). One paper written by an industrial practitioner sums up a popular view around 1975: "The author has been reading the chemical process control literature for over 25 years, and in his opinion, the vast majority of papers contained little or no material useful in the daily practice of control engineering".

In defense of industry's viewpoint, successful implementation of control concepts was very difficult and required different skills from those required for theoretical developments. Due to the explosion of control literature, it appears that very few practitioners in the control field were interested in or capable of working over a wide spectrum of theory and applications. One of the main criticisms of modern control theoreticians was that they made incorrect assumptions that did not reflect process realities. The lack of communication between theoreticians and applications engineers was largely responsible for the so-called "gap" between theory and practice. Applications engineers did not usually have the background, orientation, or interest to make the necessary mathematical extensions and customize the theory for the problem to be solved. In a sense, process control researchers failed in the task to communicate important results that could be used in applications because they did not pose problems in an industrial context. Instead they focused on problems such as the "linear absorber" and the famous industrial reaction $A \rightarrow B$.

Process Modeling and Control: The Renaissance

Since the mid 1970's major forces have changed the attitudes of industry about the importance of advanced modeling and control, namely

(1) Increased profitability via control
(2) Increased energy costs and plantwide energy integration
(3) Environmental constraints and safety
(4) Improved and less expensive hardware and software
(5) International competition and quality control

This recent era has seen the rebirth of approaches to real process control problems and a new spirit of cooperation between academia and industry.

Increased profitability in a plant via process control can be achieved by increased product throughput, increased yield of higher-valued products, decreased raw material costs, decreased energy consumption, extended equipment life, reduced plant shutdowns, and decreased production labor. A 1988 study at E. I. duPont de Nemours estimated that increased profits of 200 to 500 million dollars/year could be realized in their facilities through implementation of advanced control and optimizing operating conditions.

One key event in the 1970's was the quantum jump in oil and gas prices. While energy prices have been fairly stable since 1982, the era of cheap energy ended in the mid 1970's. Chemical companies are now heavily involved in energy conservation and energy management. Energy integration, where hot streams leaving one unit are used to provide energy to another unit, has caused operational coupling of multiple units. This may make advanced control mandatory in order to keep the facility operating.

Hazardous waste disposal practices of the past have created a number of pressing environmental problems, leading to tighter environmental regulations today. Chemical companies are changing design and operating strategies (via process control) to minimize waste production because of the prohibition against discharge and/or disposal of toxic substances. Some new plants are in fact "zero-discharge" plants. Protecting the safety of operating personnel has taken on heightened emphasis since the Three-Mile Island and Bhopal incidents. As plants have become more complex, the use of computers to assist human operators has become mandatory. Computer-based expert systems, developed using artificial intelligence techniques, are now employed for rapid decision-making.

The hardware revolution due to improvements in process control computers has been a significant incentive for implementing computer control and advanced control techniques. Computers available in the 1960's typically cost over $1 million, had storage capacity of 32k, and were fairly unreliable in terms of component failure. Each decade since 1950 has seen an 100-fold increase in processing speed for digital computers due to improvements in both hardware and software, while the cost per floating point operation has declined. Component reliability has similarly increased so that breakdowns are not a weekly concern. Similarly the emergence of standard software packages and architecture has facilitated applications in process control.

Early digital installations used for process control were not failure-proof and required a totally redundant system in case of component failure. In most cases, the backup system was the analog (pneumatic) system used before the introduction of computer control, which involved extra costs. Reliability improvements during the 1980's now permit the use of digital redundancy. While there are still analog control systems in use today in chemical plants, there are no longer any vendors selling analog systems.

An important hardware development during the 1970's pioneered by Honeywell was distributed computer process control. The distributed control system (DCS) is dominant in the process industries today and employs a hierarchy of computers, with a single microcomputer controlling 8 to 16 individual control loops [5]. More detailed calculations are performed using workstations, which receive information from the lower-level devices. Set points are sent from the higher level to the lower level. The advantages of this configuration are as follows:

(a) Software can be located where calculations need to be made (computer limitations are usually not a problem).
(b) The system can be modularly designed, and failure at any one point in the network is not disastrous.
(c) The hierarchical design is compatible with different supervisory and regulatory functions and the need for database accessibility.

Finally the effect of global competition in the chemical process industries has caused a heightened awareness of the importance of product quality. The importance of process control to ensure satisfactory product quality is unquestioned, and the subject of statistical process control (SPC) is mandatory schooling for all process engineers today [6]. This has caused industry to carry out detailed analyses of process performance characteristics, a departure from the attitude of "optimum sloppiness" that was the prevalent philosophy of the 1970's. An interesting dichotomy that has developed in many corporations is whether SPC should take precedence over automatic process control (APC). The point of view taken depends on whether statisticians or engineers are in charge.

Recent Advances in Model-based Control

The capability of using more sophisticated mathematical models in automation and control has grown during the past 20 years. Given the current state of the art in control and optimization theory, the major uncertainty in controller design is the selection of the model and its level of detail and complexity. Once the model is actually chosen and verified, there are usually several methods available to compute a control strategy.

However, the potential cost and time savings offered by using complex model must be weighed against the fact that the model only imitates reality and does not incorporate all features of the real system being modeled.

Hence, the process of interest contains information not readily available or perhaps not even valid in the model. In the development of a model, the user must decide what factors are relevant and how complex the model should be. For example, typical modeling questions that should be posed include:

(1) Should the process be modeled on a macroscopic or microscopic level and what level of effort will be required for either approach? How many variables should be employed?
(2) Can the process be described adequately using principles of chemistry and physics? Or should it be an empirical model? or a semi-empirical model?
(3) What is the desired accuracy of the model and how does its accuracy influence its ultimate use? How many unknown parameters are included in the model?
(4) What measurements and what data are available for model verification?

Table 1 gives some great thoughts about modeling. The disparity between data and models is illuminated by the famous Anscombe's quartet, which consists of four data sets (all quite different). These four data sets lead to the same first order model (y=3+0.5x), when least squares curve fitting is applied.

Table 1

Great Thoughts about Modeling

"Although this may seem a paradox, all exact science is dominated by the idea of approximation"
- Bertrand Russell

"Everything should be as simple as possible, but no simpler" - Albert Einstein

"All models are wrong but some are useful"
- anonymous

"It is much easier to prove a model wrong than prove it is right" - anonymous

The "Frontiers in Chemical Engineering" report [7] identified computer modeling as a high priority research area for the future. Computer modeling provides a means to take information from small-scale experiments and scale-up these results to even commercial-scale equipment, without additional, more expensive pilot-scale testing. Many oil and chemical companies now entirely use simulation and believe that the results, or at least the trends, are sufficient for decision-making. Models are also used to identify which experiments ought to be run. Computers are beginning to use qualitative insights, fuzzy logic, and other artificial intelligence techniques, much as a human uses judgment and intuition to solve problems.

A new generation of model-based control theory is emerging that is tailored to the successful operation of modern plants, addressing the process characteristics shown in Table 2.

Table 2

Process Characteristics That Must Be Treated by Control

- Time Delays
- Nonminimum Phase
- Disturbances
- Unmeasured Variables
- Noise
- Time-Varying Parameters
- Nonlinearities
- Constraints
- Multivariable Interactions

Included here are such ideas as model predictive control, robust control, and adaptive control [8, 9], where a mathematical model is explicit in developing a control strategy. These techniques can handle the nonlinear, multivariable processes that are characteristic of chemical plants. Model predictive control uses the notion that one can intelligently select the current and future control actions if a model is available to predict the process dynamic behavior. A robust controller recognizes that the process characteristics can change over time and is designed so that it always gives satisfactory performance. Adaptive control implies that the controller parameters should be adapted in real-time to yield optimal performance at all times, often by updating the process model parameters. As a historical note, the idea of self-optimizing or adaptive control systems dates back over 40 years, with such authors as Kalman [10] (a former DuPont employee) and Aris [11].

It is notable that industry has taken a leadership role in developing and implementing model predictive control methods with the involvement of companies such as Shell Oil, Texaco, Adersa, Set Point, Honeywell, Dot Products, Treiber Controls and DMC [12] as well as a proliferation of acronyms (see Table 3).

Table 3

Acronyms Used in Model Predictive Control

DMC	LDMC
DMI	LQG
GMC	MPC
IDCOM	NMPC
IMC	QDMC

Various model predictive controllers are now the most widely used type of multivariable control algorithm in chemical process industries. In MPC control actions are obtained from on-line optimization (usually by

solving a quadratic program or QP), which handles process variable constraints. MPC also unifies treatment of load and set-point changes via the use of disturbance models and the Kalman filter. There is some confusion on this latter point, as illustrated by the following quote [13] regarding a specific algorithm (DMC): "The DMC is capable of outperforming the PID controller on setpoint changes but not on load changes introduced upstream of a dominant lag." However, with an appropriate load model and a Kalman filter, MPC and DMC should clearly perform better than PID for most processes.

There are still many questions to be answered regarding the connection between modeling and control. For example:

(1) What explicit modeling information is required to achieve a particular level of control performance?

(2) Even in the case of perfect models, what are the fundamental limitations on control performance?

(3) What are the tradeoffs between modeling accuracy, control performance, and stability?

In order to answer these questions, control-relevant identification has become a popular research topic.

What is coming next in MPC?

[Part II of Prof. Edgar's article will be published in the Summer 1996 Issue]

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Proposal: Eight-Dot-Three Filenames for AIChE Meeting Extended Abstracts

Peter R. Rony

According to a message from Jeff Siirola that the editor received in mid-December:

"AIChE is entering the electronic age. Electronic submission of proposal-to-present (PTP) forms and abstracts has been possible for the last several meetings. Starting with the Chicago 1996 Annual Meeting, AIChE has asked the CAST Division to require that all programming transactions be done electronically. This includes (a) receipt of proposals-to-present and extended abstracts, (b) conduct of the centralized review and acceptance process, (c) notification of authors, and so forth. As these procedures will be used starting immediately, appropriate announcements should be placed in several locations in the newsletter (e.g., editorial, in the paper calls section, and possibly in several 'ad boxes').

"Additional details are to be worked out in December 1995 by a committee headed by Tim Andersen and including Sangtae Kim and Jeff Kantor. Hopefully, all details will be ready by the AIChE retreat, and will be sent to you possibly after your regular deadline, but perhaps in time for you to include in the Winter 1996 issue."

It is the understanding of the editor of CAST Communications that the primary medium for the delivery of extended abstracts at the Chicago 1996 Annual Meeting in November 1996 will be a CD-ROM disc. As of January 12, 1996, this decision has not been made final to the editor, but it is likely to occur. In the following paragraphs, the editor would like to repeat Q&A information that was first shown at the Miami Beach 1995 Annual Meeting and is currently present on the Vol-

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ume 2 CACHE CD-ROM under the HTML menu category.

How much memory would be required?

Assume a typical extended abstract containing 30 lines of 10 words each, with each word containing 10 characters. This is a conservative estimate. The total is 3000 characters/abstract. The Miami Beach 1995 Extended Abstracts Book contains 580 pages, 4 abstracts per page. Multiplying these figures, we obtain 580 x 4 x 3000 = 6,960,000 bytes. This is approximately one-hundredth (0.01) the capacity of a 74-minute CD-ROM, which contains a maximum of 680,000,000 bytes.

What "style" should be used for each abstract?

The editor of the Volume 2 CACHE CD-ROM recommends a double-duty style such as the World Wide Web HTML style, which can accommodate images, various type fonts, imagemaps, forms, Java applets, and so forth. The "double duty" aspect of this recommendation is the fact that the individual extended abstracts could simultaneously be placed on the AIChE World Wide Web, preferably before the AIChE Chicago meeting.

What should be the subdirectory structure?

The editor recommends very few subdirectories for the 1996 Chicago AIChE Annual Meeting Extended Abstracts. With few subdirectories, there would be distinctive, 8-dot-3 character filenames, *.HTM and *.GIF. The editor feels that with a distributed contribution situation -- where Chicago meeting participants submit their files individually -- it is absolutely necessary that each participant have a unique filename for his/her extended abstract.

What should be the extended abstract filename structure?

For the present, we should avoid UNIX, Macintosh, and Windows 95 long filenames, and stick to the lowest common denominator, namely the 8-dot-3 character format typical of DOS filenames. This restriction is limiting, but we can live with it. Since every character position is precious, each of the AIChE programming groups should be restricted to a three-character acronym.

SCI	Engineering Sciences and Fundamentals (Group 1)
SEP	General Topics & Other Methods of Separation (Group 2)
PAR	Particle Technology Forum (Group 3)
EDU	Education (Group 4)
MAN	Management Division (Group 5)
MIX	North American Mixing Forum (Group 6)
HTE	Heat Transfer & Energy Conversion Division (Group 7)
MAT	Materials Engineering and Sciences Division (Group 8)
ENV	Environmental Division (Group 9)
CAS	Computer and Systems Technology Division (Group 10)
ENG	Engineering (Group 12)
PRO	Process and Products (Group 13)
FPB	Food, Pharmaceutical, & Bioengineering Division (Group 15)
F_P	Fuels and Petrochemicals Division (Group 16)
FOR	Forest Products Division (Group 17)
LIA	Liaison Functions (Group 18)

Similarly, the three-letter acronyms for the AIChE divisions could be:

CAS	Computer and Systems Technology Division
CAT	Catalysis and Reactor Engineering Division
ENV	Environmental Division
FPB	Food, Pharmaceutical, and Bioengineering Division
FOR	Forest Products Division
F_P	Fuels and Petrochemicals Division
HTE	Heat Transfer and Energy Conversion Division
MAN	Management Division
MAT	Materials Engineering and Sciences Division
NUC	Nuclear Engineering Division
SAF	Safety and Health Division
SEP	General Topics and Other Methods of Separation

What would be the format for an 8-character filename?

The 8-character filename would be used in an *.HTM World Wide Web filename that would (a) be included in the "Extended Abstracts" Chicago 1996 Annual Meeting CD-ROM, (b) made available on the World Wide Web in advance of the Chicago 1996 meeting. A simpler filename containing fewer characters would be uploaded to an anonymous FTP site. The filename itself would consist of the following:

Programming Group + Group Session Number + Group Paper Number =

3 characters + 2 characters + 2 characters = 7 characters

Thus, filename CASB05b.htm means that this file contains the extended abstract for CAST Division Area 10B, Session 5, Paper b. This paper could be uploaded by FTP as CASB05.HTM, CASB5.HTM, or something as simple as these filenames. The idea is to always use the KISS principle in developing the CD-ROM version of the extended abstracts, but at the same time shifting most of the burden to the contributing speakers.

An extra character position remains. It could be used to differentiate different meetings, or to differentiate different types of email files.

In conclusion, what is the vision for the extended abstract CD-ROM?

In the opinion of the editor, this project first is an exercise in bookkeeping. The bookkeeping involved is the naming of filenames to be incorporated on the Extended Abstract CD-ROM for the 1996 Chicago Annual AIChE Meeting. The editor strongly recommends that some type of filename convention be built into the extended abstract SUBMISSION process by FTP. Standard (a) programming group and (b) session number naming conventions would be of substantial assistance at the beginning of the meeting process as a method to keep the 2000+ files organized.

The vision proposed here is for the extended abstracts to appear both online via the World Wide Web and also as an Extended Abstract CD-ROM to be delivered to attendees at the 1996 Chicago AIChE Annual Meeting. The ability to provide the Extended Abstracts early would help individuals plan their session attendance. It would also reduce some complaints about the lack of paper copies at the meeting.

The entire meeting program file would be made available as a single, compressed file that could be downloaded via FTP to an AIChE member's computer. If necessary, updated files would be provided as the remaining extended abstracts trickle in. The objective is to transmit meeting program information to prospective attendees in a timely manner.

Copiers would be available in Chicago for attendees to print their selected groups of extended abstracts. It may be possible for AIChE to allow each attendee the option of printing **X** number of pages for free. Overall, there would be less paper, and the paper generated would be more specific to an attendee's interests.

Members of the CAST Division who wish to comment on this proposal--or who wish to make alternative proposals--are encouraged to send them by email to the CAST Division Programming Chairman, Jeff Siirola.

The Volume 2 CACHE CD-ROM

Peter R. Rony, Virginia Tech
Michael B. Cutlip, University of Connecticut

If everything goes according to plan, the Volume 2 CACHE CD-ROM will be distributed to chemical engineering undergraduate students, to faculty, and to CACHE-supporting ChE departments sometime during March or early April 1966. The distribution of Volume 2 was delayed from its initial target date of Sunday, November 12, 1995 at the AIChE Annual Meeting in Miami Beach, Florida. Version VOL2_19 was demonstrated at the AIChE Student Chapter Brunch, Monday, November 12, 1995; during the Educational Software Session 264 all day Tuesday and Wednesday; and the CACHE Reception on Wednesday, November 15, 1995 in Miami Beach. License agreements for free copies of Volume 2 were signed by approximately 500 students, as well as by 200 faculty members and guests at the reception. CD-ROM discs will be sent in one mailing to a ChE department -- one copy for the department head/chairman, one copy for the AIChE student chapter, copies for those students who signed up at the AIChE student brunch, and several copies of the Microsoft Development Network Development Library (April 1995 version), a most generous gift to the chemical engineering community courtesy of Dr. Joel P. Kantor, Academic Programs Manager at Microsoft Corporation in Redmond, WA.

The entire December-January holiday period of one month was required both to finish the Authorware 3.01 for Windows graphical user interface (GUI) and to make final decisions on the file content of the 650.8 maximum-capacity CD-ROM disc. Beta testing of the the VOL2_29 write-once CD-R disc was performed during the end of January and all of February, 1996. The master CD-R disc was completed and sent, for replication of 2500 CD-ROM discs, to 3M Corporation in Menomonie, Wisconsin by the beginning of March, 1996. A normal production cycle requires 15 days.

Mike Cutlip was the main beta tester for the series of test CD-Rs that the editor, Peter Rony, produced starting in October 1995. Mike Cheung tested VOL2_29 for use with the Windows 95 platform; he observed that DOS files (examples: XCOPY.EXE and PKUNXIP.EXE) associated with Windows 3.1 gave problems when an attempt was made to execute them on Win95. A critical decision was made to provide only a Windows-based CD-ROM disc. The dual platform approach, with the Macintosh as the second platform, was dropped because HFS filename overhead for the Macintosh-formatted dual platform CD-ROM was about 45 Mb. Little useful material for the CD-ROM was lost by excluding the Mac.

3M Corporation provided the first 1500 CD-ROM discs and disc mastering/artwork charges as a corporate contribution to both CACHE and to the academic chemical engineering community. Several companies, including Laboratory Technologies, Inc. (Fred Putnam, a ChE, is president) have also provided financial support for CD-ROM disc replication and distribution.

What is new on the CD-ROM? Critical installation software is being developed to easily allow installation and operation from any designated CD-ROM drive letter. The Authorware GUI will be based upon Authorware 3.01 rather than 2.01, making navigation easier for the entire graphical user interface. The Authorware 3.01 GUI contains eleven (11) main menu categories,

File	Demos	3M
Install	HTML	WWW
Readme	PDF	Depts
CACHE	SciViz	

that provide "perpetual menu" access to most of the contents of the CD-ROM.

There are approximately 678+ million bytes of files on the Volume 2 CACHE CD-ROM. Licenses for a local HTML viewer, called IVIEW version 1.15, and for a Windows-based installation program, Freeman Constructor, have been obtained for all 2500 discs. The use of Freeman Constructor has led to the creation of a CDSETUP.EXE file to install the CD-ROM Authorware graphical user interface for the first time.

What else is new on the CD-ROM? A student version of the DIPPR student database, including instructions. AIChE materials from the New York office regarding student chapters and membership information. Courtesy of Professor Dale Kirmse of the University of Florida and the AIChE Web site at that University, AIChE information on the World Wide Web, including full details of the recent Miami Beach AIChE meeting; these WWW files are viewable using IVIEW or local capabilities of Netscape or Mosaic. WWW publisher information from Prentice-Hall (other publishers were contacted, but did not contribute). Updated demos from Aspen and Sim Sci (other design companies were interested, but were not able to contribute materials this year). Tutorial information on Spyglass' scientific visualization software, including both Slicer (3-dimensional plots) and Transform (2-dimensional plots). Bruce Finlayson's materials on his Chemical Reactor Design Toolbox. The entire CACHE 25th-Anniversary Monograph, except perhaps one chapter, in Acrobat PDF format.

Many additional new demo software items. Extensive coverage of shareware and freeware WWW software.

Finally, as an extra feature -- call it a bonus -- an extensive **SETUP.EXE** file is provided that allows a CD-ROM user to create several hundred Program Manager icons located within about 10-15 different Program Manager groups.

Pricing for the CD-ROM disc is as follows: $15 each for student chapters and supporting ChE departments. $20 each for non-supporting departments, individual students and faculty. $50 each for ChE professionals who have no academic connection as faculty members. Departments and students who submitted orders based upon incorrect prices contained on page 24 of the Fall 1995 CACHE News will have those prices honored by the CACHE Corporation as a matter of corporate integrity.

We Have Found Big Brother, and He is the Internet

Peter R. Rony

'BIG BROTHER IS WATCHING YOU" . . . 1984, by George Orwell

A funny thing happened on the way to completing the Winter 1996 issue of CAST communications: I discovered Digital Equipment Corporation's **http://www.altavista.digital.com/** World Wide Web site, which I have been informed accesses the content of sixteen million Web documents.

The search engine -- located at **http://www.altavista.digital.com/** -- to somebody who has used neither Yahoo nor Web Crawler, was irresistible. After testing AAUP, Intelligen, and several other words, I tried a search for "rony." It turned up a demoralizing word count of 1335 hits. I learned that my sister, Ellen Rony, had a home page and is a "cyberscribe" in Marin County, California. I also learned that Rony is a common first name, as in Rony Hack, Rony W. R. Castro, Rony Hitron, Rony Muliana, and Rony Seikaly (an NBA basketball player who weighs 252 pounds and was born on May 10, 1965). Also depicted were four small images of paintings -- called OBRA Rony-1 through Rony-4 -- associated with Mtro. Roman Castelltort, an Italian. Of course, all this information was transmitted in the first 10 items.

The secret to using Alta Vista is to use logical functions such as logical AND. Therefore, a search of Peter&Rony did the desired filtering job, yielding only 14 items, all of them containing the two-word phrase, Peter&Rony. Closer scrutiny of these 14 items surprised me, and was responsible for the title of this essay. What did I -- and presumably the rest of the world -- learn about Peter&Rony?

(1) He was a presenter at the Instructional Technology Expo on March 24, 1995 at Virginia Tech.

(2) His query on the Aware-L list (Macromedia Authorware software) was used "to give you an idea of the kinds of topics that are discussed on the Aware-L list, here is an (edited) discussion thread on the issue of working with different CD-ROM drive letters on Windows PCs. Note that at the end, Paul Hamilton from Macromedia steps in with a definitive answer."

(3) An old CACHE01.HTML file that I created at Virginia Tech.

(4) An old INDEX.HTML file that I created at Virginia Tech.

(5) A WEBSERV abstract. Reference to me by Harry M. Kriz, in his Web document, "Teaching and Publishing in the World Wide Web," which I commissioned for the 25th-Anniversary CACHE CD-ROM.

(6) Virginia Tech's College of Engineering Faculty Expertise Listing, which listed Peter Rony among many others.

(7) A second, revised copy of the INDEX.HTML file that I created at Virginia Tech.

(8) Excerpts from Virginia Tech Magazine column called, "Around the Drill Field." Among other more newsworthy topics, such as the selection of a new Provost, was a story about "Engineer's electronic documents spare trees," which briefly described my use of Adobe Acrobat in my chemical engineering courses.

(9) Virginia Tech Engineering Expertise "C" , which listed Peter Rony under the heading, "Chemical Batch Process Controls."

(10) Department Chemical Engineering "Chemical Instrumentation Lab," file CHEMILAB.HTML, part of the Virginia Tech's ChE department's WWW presentation that was completed by a student colleague, Jason Lockhart, during summer 1995.

(11) CAST10 Email List, from Jeffrey Kantor @ nd.edu

(12) A WEBSERV abstract of "Teaching and Publishing in the World Wide Web," by Harry M. Kriz, University Libraries, Virginia Tech.

When I searched Yahoo for the words "rony peter" I produced 28 hits, including a number of irrelevant references (e.g., Criminal Encryption & Long Term; readers who had been accessing The Scientist free of charge on the Internet; Rolling Stones Web Server Guest Book; Remington Steele Episode Guide). Apparently if the word Peter and the word Rony where present anywhere in the indexed HTML document, then a hit occurred. However, included in the listing were additional items not identified by Alta Vista.

(13) Welcome to the Department of Chemical Engineering, the current WWW presentation of Virginia Tech's ChE department, INDEX.HTML

Search for the word "rony" on Yahoo produced one more item,

(14) Virginia Tech Graduate Catalog/Chemical Engineering, which presumably listed Peter Rony as a faculty member.

WebCrawler found nothing relevant and I lost patience with it. The best search service was Alta Vista, which for the words "Peter&R&Rony" turned up 19 hits, including:

(15) "Opposition to Library Funding Cutback," by Peter R. Rony, Virginia Tech Spectrum, May 11, 1995.

(16) Department of Chemical Engineering Faculty, Virginia Tech. RONY.HTML

(17) Department of Chemical Engineering (ChE): Computer Design and Controls Area. COMPDC.HTML

(18) Authorware Hypermail Archive by thread. Messages sorted by date, subject, author on the AWARE list.

(19) CACHE Trustees. WWW.CACHE.ORG/CACHE/TRUSTEES.HTML

(20) AIChE Miami Beach Annual Meeting: Session 264b.

(21) CAST Organization. If you are not already a member of the Computing and Systems Technology (CAST) Division of AIChE, then you may wish to join. CAST-1995.HTML

I was surprised to see items (1), (2), (6), (8), (9), (11), (15), (18), (20), and (21).

The points I wish to make are that, increasingly, meeting programs, meeting abstracts, Usenet threads, departmental WWW presentations, expertise listings, professional organization officer lists, and 'gosh knows what else' seem to make it to the World Wide Web, with or without your knowledge. Your name can turn up on unexpected Web pages. If you are active as a professional, there seems to be no hiding from the World Wide Web and its search engines. DEC's Alta Vista search capability appears to be the most powerful search mechanism available today. How they access and organize 16 million documents I will never know.

George Orwell's "big brother" may turn out to be all of us, cumulatively disseminating electronic information about each other. He will be distributed. He will be the Internet. He will use Alta Vista to keep tab on each of us. 1984 has arrived . . . in 1996.

AIChE is entering the electronic age. Starting with the Chicago 1996 Annual Meeting, AIChE has asked the CAST Division to require that all programming transactions be done electronically. This includes (a) receipt of proposals-to-present and extended abstracts, (b) conduct of the centralized review and acceptance process, (c) notification of authors, and so forth.

MEETINGS, CONFERENCES, CONGRESSES, SHORT COURSES, AND WORKSHOPS

To submit a paper for consideration at any event listed below, please contact the symposium coordinator or session chair directly. For further information or details about each of the four CAST Division programming areas, contact the appropriate Area Chair as noted in the masthead. For general information concerning CAST Division sessions and scheduling, or to correct errors in this listing, please contact Jeffrey J. Siirola (CAST Division Programming Chair), Eastman Chemical Company, PO Box 1972, Kingsport, TN 37662-5150, 423-229-3069, 423-229-4558 (FAX), siirola@emn.com. Many of these postings are archived on the World Wide Web (WWW) with URL http://www.che.wisc.edu/cast10.

1996 AIChE Spring National Meeting New Orleans, Louisiana February 25-29, 1996

Meeting Program Chair: David A. Rosenthal, Rohm and Haas Company, PO Box 219, Bristol, PA 19007, 215-781-4024, 215-785-8976 (FAX).

CAST is sponsoring the following sessions at the New Orleans National Meeting which are also being cosponsored by the Society for Computer Simulation:

Area 10a: Systems and Process Design

1. Process Synthesis for Industrial Applications. Oliver M. Wahnschafft, Aspen Technology, Inc. (Chair), and Lionel O'Young, Mitsubishi Chemical Corporation (Co-Chair).
2. Design and Analysis. Antonis C. Kokossis, University of Manchester Institute of Science and Technology (Chair) and Claudia Schmid, Simulation Sciences Inc. (Co-Chair).
3. Process Design for Waste Minimization. Paul I. Barton, Massachusetts Institute of Technology (Chair) and Srinivas K. Bagepalli, General Electric Company (Co-Chair).
4. Potential Applications of Power Plant Simulation Technologies in the Chemical Industry. (Developed by the Society for Computer Simulation.) Ariel Sharon, Computer Simulation Technologies, Inc. (Chair) and Reza Fakory, S3 Technologies (Co-Chair).

Joint Area 10a and Area 10b Session

1. Design and Control. Karen A. High, Oklahoma State University (Chair) and Richard D. Braatz, University of Illinois (Co-Chair).

Joint Area 10a and Area 10c Sessions

1. Design for Operability. Joseph F. Pekny, Purdue University (Chair) and Ryan C. Schad, Eastman Chemical Company (Co-Chair).
2. Engineering Databases and Data Management for Process Design. Carl F. King, E. I. du Pont de Nemours & Company (Chair) and H. L. Tomlinson, Chevron Research (Co-Chair).

Area 10b: Systems and Process Control

1. Applications of Control and Model Predictive Control. Jonathan E. Whitlow, Florida Institute of Technology (Chair) and Michael A. Henson, Louisiana State University (Co-Chair).
2. Control of Batch Processes. Srinivas Palanki, FAMU/FSU College of Engineering (Chair) and Surya N. Kavuri, Amoco Corporation (Co-Chair).

Area 10c: Computers in Operations and Information Processing

1. Modeling and Optimization. Claudia Schmid, Simulation Sciences, Inc. (Chair) and Robert L. Clay, Sandia National Laboratories (Co-Chair).
2. Environmental Considerations for Process Simulation and Operations. Urmila M. Diwekar, Carnegie Mellon University (Chair) and Ajay K. Modi, Massachusetts Institute of Technology (Co-Chair).

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International Conference on Identification in Engineering Systems Swansea, United Kingdom March 27-29, 1996

Parameter estimation and system identification are used extensively to obtain dynamic models of engineering systems. A large number of methods have been developed and a huge amount of experience gained in their application, particularly in control engineering and structural dynamics. Although aspects of the methods are different there is a substantial overlap in the methodology and practice used in the identification. This conference, to be held at the University of Wales, Swansea, will provide a forum for researchers and practitioners in the art and science of identification from a range of disciplines and provide further impetus for the cross fertilization of ideas in this area. The conference scope will include system identification, parameter estimation, inverse problems, parameter estimation in non-linear models, validation of estimated models, adaptive controllers, recursive estimation, self-tuning controllers, excitation signals, modal analysis, finite element model updating, error localization and damage location, and actuator/sensor location. For further information, contact M. I. Friswell, Department of Mechanical Engineering, University of Wales Swansea, Swansea SA2 8PP, UNITED KINGDOM, 44-1792-295217, 44-1792-295674 (FAX), M.I.Friswell@swansea.ac.uk.

Sixth European Symposium on Computer Aided Process Engineering (ESCAPE-6) Rhodes, Greece May 27-29, 1996

ESCAPE-6 is the latest in the series of events initiated by the Computer Aided Process Engineering Working Party of the European Federation of Chemical Engineering. It follows previously successful conferences in Elsinore, Toulouse, Graz, Dublin, and Bled. The major aim of ESCAPE-6 is to review the latest developments in the use of computers as well as systems and information technology tools in the design and operation of processing plants. ESCAPE-6 will be held in Rhodes, Greece. The conference will focus on recent theoretical and practical developments in computer-aided process engineering in process design (process synthesis, optimization, static and dynamic simulation, control synthesis, energy integration, flexibility, etc.), process operations (modeling, identification, dynamics, controllability, operability, safety, reliability, fault tree analysis, process fault detection diagnosis and prevention, hazard and operability analysis, etc.), process and plant control (advanced control, on-line optimization, plant data analysis, large-scale control, integrated design operations and control, etc.), computer-integrated flexible manufacturing systems (scheduling and planning batch and semibatch operations, applications of computer aided engineering in small industries, specialty chemicals manufacture, management information systems, computer integrated manufacturing, etc.), use of computers in education, inclusion of environmental aspects and considerations, and industrial applications and case studies. For additional information, contact George Stephanopoulos, Massachusetts Institute of Technology 66-440, Cambridge, MA 02139, 617-252-1651 (FAX), geosteph@mit.edu or the Organizational Secretariat of ESCAPE-6, Hellenic Institution of Chemical Engineers, 36 3rd Septemvriou Street, 104 33 Athens, GREECE, 30-1-823-5877, 30-1-821-6242 (FAX).

International Conference on Computer Integrated Manufacturing in Process Industries (I-CIMPRO '96) Eindhoven, The Netherlands June 3-4, 1996

The International Conference on Computer Integrated Manufacturing in Process Industries (I-CIMPRO '96) is being organized by the Industrial Engineering Department of Rutgers University and the Eindhoven University of Technology. AIChE, AIME, and AIIE are co-sponsors. The conference is a forum for bringing together academic researchers and industrial practitioners to discuss current advances in operations management, automation, and computer integrated manufacturing in batch and continuous process industries. Topics include process design (engineering, project management, process re-engineering, etc.), production control (hierarchical distributed and inventory control, planning and scheduling, etc.), quality control (sensors, data acquisition, SPC, TQM, etc.), factory automation (real time control, AI, neural nets, robotics, machine vision, etc.), regulatory and environmental issues (software and process validation, regulatory changes, energy management and control, etc.), and information systems (CIM architecture, database design, decision support systems, etc.). The organizers are looking to AIChE and to CAST to provide industrial applications and other industry oriented papers. The CAST coordinator for this event is Michael T. Tayyabkhan, Tayyabkhan Consultants, 62 Erdman Avenue, Princeton, NJ 08540, 609-924-9174, miket@ins.infonet.net. For additional information, contact Mohsen A. Jafari, Department of Indistrial Engineering, Rutgers University, Piscataway, NJ 08855-0909, 908-932-3654, 908-445-5467 (FAX), jafari@princess.rutgers.edu.

The Ninth International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems (IEA.AIE-96)
ACROS Fukuoaka, Tenjin, Chuo-ku Fukuoaka, Japan
June 4-7, 1996

This conference has been held in Tennessee; South Carolina; Hawaii; Paderborn, Germany; Edinburgh, Scotland; Texas; Melbourne, Australia; and now visits the Orient for the first time. IEA/AIE-96 continues the tradition of emphasizing the application of Artificial Intelligence and Expert/Knowledge-based systems to engineering and industrial problems. Topics of interest include, but are not limited to:

Automated Problem Solving, CAD/CAM, Case-based Reasoning, Computer Vision, Connectionist Models, Dependability of AI/ES, Distributed AI Architectures, Expert Systems, Fuzzy Logic & Soft Computing, Genetic Algorithms, Heuristic Searching, Intelligent Computer Network, Intelligent Databases, Intelligent Interface, Intelligent Tutoring, KBS Methodologies, Knowledge Acquisition, Knowledge Representation, Machine Learning, Model-Based Reasoning, Natural Language Processing, Neural Networks, Planning & Scheduling, Practical Applications, Reasoning Under Uncertainty, Robotics, Sensor Fusion, Spatial & Temporal Reasoning, Speech Recognition, System Integration, Tools, Verification & Validation of KBSs.

The general chair is Moonis Ali, Southwest Texas State University; the program chair Setsuo Ohsuga, Waseda University; and the program co-chair is Takushi Tanaka, Fukuoka Institute of Technology. Inquiries should be addressed to Professor Moonis Ali, IEA/AIE-96 General Chair, Dept. of Computer Science, Southwest Texas State University, San Marcos TX 78666-4616, Phone: (512) 245-3409; FAX, (512) 245-8750; and E-mail: ma04@swt.edu

INTERNET: http://www.fit.ac.jp/ieaaie.html

LaTek AND POSTSCRIPT VERSIONS AVAILABLE AT: http://www.che.wisc.edu/cast10.

The proceedings will be published and will be available at the conference. Copies of the proceedings of earlier conferences are available from: Gordon and Breach Science Publishers, Customer Service, P.O.Box 786, Cooper Station, New York, NY 10276; Fax:(+1)212-645-2459. A color brochure of IEA/AIE-96 is available.

13th IFAC World Congress
San Francisco, California
June 30-July 5, 1996

The 13th World Congress of the International Federation of Automatic Control will feature a Symposium on Industrial Applications of Chemical Process Control. Prospective areas to be addressed include dynamic modeling, identification, model based control, nonlinear control, statistical methods, fault detection and safety, process monitoring, and unit process control. For more information, contact Michael Peshkin, IFAC '96, Department of Mechanical Engineering, Northwestern University, Evanston, IL 60208-3111, 708-467-2666, 708-491-3915 (FAX), ifac96@ nwu.edu.

Fifth World Congress of Chemical Engineering
San Diego, California
July 14-18, 1996

The World Congress of Chemical Engineering is held every five years in countries around the globe. 1996 will be the first time it has ever been held in the United States. The theme of this congress is "Technologies Critical to a Changing World". Technical areas of emphasis include Energy, Safety, and the Environment; Agriculture, Food, and Biotechnology; Products and Materials Process Technology; Technology Management and Transfer; and Advanced Fundamentals. Of particular interest may be the session on the implications of information technology, artificial intelligence and simulation on the future of the process industries which is being facilitated by the CAST Division. The CAST Division coordinator is Scott E. Keeler, Dow-Elanco, 9330 Zionsville Road, Indianapolis, IN 46268-1053, 317-337-3138, 317-337-3215 (FAX), skeeler@dowelanco.com. For general information about the Fifth World Congress, contact AIChE at 212-705-7373, 212-752-3297 (FAX).

Third Workshop on Discrete Event Systems (WODES '96)
Edinburgh, Scotland
August 19-21, 1996

Discrete event systems has developed to be an interdisciplinary field of shared interest, methodologies, and applications between control and computer science. This workshop, sponsored by the Institution of Electrical Engineers (U.K.), aims to bring together control theoreticians, software engineers, and computer scientists with a view to integrate methodology, techniques, and tools. The workshop will focus on the control of discrete event systems (with emphasis on real time control), computer science (with emphasis on hybrid systems, timed systems, Petri nets, process algebras, software verification, and design), and applications

(with emphasis on manufacturing systems and software design). For more information, contact Rein Smedinga, WODES '96, Department of Computer Science, University of Groningen, NL-9700 AV Groningen, THE NETHERLANDS, 31-50- 633800 (FAX), wodes96@cs.rug.nl.

1996 Portuguese Control Conference
Porto, Portugal
September 11-13, 1996

The Portuguese Society of Automatic Control will hold the 2nd Portuguese Conference on Automatic Control in Porto, Portugal. Held in cooperation with Instituto de Sistemas e Robotica, Instituto Superior Tecnico, and Faculdade de Engenharia da Universidade do Porto, this conference will bring together people working in the fields of control, automation, and related areas. Topics of interest include linear and nonlinear systems, adaptive control, robust control, modelling and simulation, systems identification, optimal control and optimization, stochastic control filtering and estimation, automation systems and control, algorithms and architectures for real-time control, robotics, manufacturing systems, process control, electrical and fluid power actuators, signal processing, artificial vision, fuzzy systems, and neural networks. For further information contact Maria Margarida A. Ferreira, Faculdade de Engenharia da Universidade do Porto, DEEC-ISR, Rua dos Bragas, 4099 Porto, PORTUGAL, 351- 2-2041847, 351-2-2000808 (FAX), control@fe.up.pt.

1996 AIChE Annual Meeting
Chicago, Illinois
November 10-15, 1996

Meeting Program Chair: Sangtae Kim, Department of Chemical Engineering, University of Wisconsin, Madison, WI 53706-1691, 608-262-5921, 608-262-0832 (FAX), kim@engr.wisc.edu.

The CAST Division is planning the following sessions at the Chicago Annual Meeting which have been approved by the Meeting Program Chair. A final call for papers for this meeting appears later in this issue. Deadline for submission of presentation proposals to Area Chairs is March 1, 1996. The entire CAST program in Chicago is being cosponsored by the Society for Computer Simulation.

Area 10a: Systems and Process Design

1. Design and Analysis - General Papers. Costas D. Maranas, Princeton University (Chair) and Srinivas K. Bagepalli, General Electric Company (Co-Chair).
2. Synthesis and Analysis of Separation Systems. Sophie Ung, E. I. du Pont de Nemours & Company (Chair) and Oliver M. Wahnschafft, Aspen Technology, Inc. (Co-Chair).
3. Process Synthesis - General Papers. Vivek Julka, Union Carbide Corporation (Chair) and Matthew J. Realff, Georgia Institute of Technology (Co-Chair).
4. Special Topics in Design and Analysis. Stratos Pistikopoulos, Imperial College (Chair) and Michael L. Luyben, E. I. du Pont de Nemours & Company (Co-Chair).
5. Synthesis and Analysis for Safety and Environmental Concerns. Karen A. High, Oklahoma State University (Chair) and Lionel O'Young, Mitsubishi Chemical Corporation (Co-Chair).

Joint Area 10a and Area 1a Session

1. Educational Initiatives in Molecular Simulation and Computational Chemistry. Peter T. Cummings, University of Tennessee (Chair) and Michael L. Mavrovouniotis, Northwestern University (Co-Chair)

Joint Area 10a and Area 15b Session

1. Design of Food and Pharmaceutical Processes. Matthew J. Realff, Georgia Institute of Technology (Chair) and Stephen P. Lombardo, The Coca-Cola Company (Co-Chair)

Area 10b: Systems and Process Control

1. Nonlinear Control. Francis J. Doyle, Purdue University (Chair) and Yaman Arkun, Georgia Institute of Technology (Co-Chair).
2. Advances in Process Control. Oscar D. Crisalle, University of Florida (Chair) and M. Nazmul Karim, Colorado State University (Co-Chair).
3. Applications of Process Control. Jorge A. Mandler, Air Products and Chemicals, Inc. (Chair) and Thomas A. Badgwell, Rice University (Co-Chair).
4. Integrated Estimation and Control. Fred Ramirez, University of Colorado (Chair) and Michael A. Henson, Louisiana State University (Co-Chair).
5. Plantwide and Decentralized Control. Richard D. Braatz, University of Illinois (Chair) and S. Joe Qin, Fisher-Rosemont Systems, Inc. (Co-Chair).
6. Process Performance Monitoring. George N. Charos, Amoco Research Center (Chair) and Masoud Soroush, Drexel University (Co-Chair).

Joint Area 10b and Area 10c Session

1. On-Line Optimization for Control. Karlene A. Kosanovich, University of South Carolina (Chair) and Iauw-Bhieng Tjoa, Mitsubishi Chemical (Co-Chair).

Joint Area 10b and Area 8f Session

1. Modeling, Monitoring, and Control of Materials/Polymers Manufacturing. Sheyla L. Rivera, Stevens Institute of Technology (Chair) and Richard S. Parnas, National Institute of Standards and Technology (Co-Chair).

Area 10c: Computers in Operations and Information Processing

1. Optimization Methodology and Fundamentals. Christodoulos A. Floudas, Princeton University (Chair) and Mark A. Stadtherr, University of Illinois (Co-Chair).
2. Computer Integrated Manufacturing in the Chemical Process Industries. (Cosponsored by the International Cooperation Committee of the Society of Chemical Engineers, Japan). Bhavik R. Bakshi, Ohio State University (Chair) and Shinji Hasebe, Kyoto University (Co-Chair).
3. Process Monitoring and Data Interpretation. Lyle H. Ungar, University of Pennsylvania (Chair) and Miguel J. Bagajewicz, Simulation Sciences, Inc. (Co-Chair).
4. Large Scale Dynamic Modeling. Paul I. Barton, Massachusetts Institute of Technology (Chair) and Thanos Tsirukis, Air Products and Chemicals, Inc. (Co-Chair).
5. Intelligent Systems for Process Operations. Ajay K. Modi, Massachusetts Institute of Technology (Chair) and James F. Davis, Ohio State University (Co-Chair).

Area 10d: Applied Mathematics and Numerical Analysis

1. Nonlinear Dynamics and Pattern Formation. Hsueh-Chia Chang, University of Notre Dame (Chair) and Vemuri Balakotaiah, University of Houston (Co-Chair).
2. General Papers in Applied Mathematics. Doraiswami Ramkrishna, Purdue University (Chair) and Fernando J. Muzzio, Rutgers University (Co-Chair).
3. Novel Numerical Methods. Marios Avgousti, Stevens Institute of Technology (Chair) and Pedro Arce, FAMU/FSU College of Engineering (Co-Chair).
4. Inverse Problems and Methods in Chemical Engineering. Andrew N. Hrymak, McMaster University (Chair) and B. Erik Ydstie, Carnegie Mellon University (Co-Chair).

Joint Area 10d and Area 15d/e Session

1. Applied Mathematics in Bioengineering. Francis J. Doyle, Purdue University (Chair) and Paul D. Frymier, University of Tennessee (Co-Chair).

CAST Division Poster Session

Section A. Recent News in Systems and Process Design. Michael F. Malone, University of Massachusetts (Chair) and Michael L. Mavrovouniotis, Northwestern University (Co-Chair).

Section B. Topics in Systems and Process Control. James B. Rawlings, University of Wisconsin (Chair) and Babatunde A. Ogunnaike, E. I. du Pont de Nemours & Company (Co-Chair).

Section C. Optimization Methodology and Fundamentals. Christodoulos A. Floudas, Princeton University (Chair) and Mark A. Stadtherr, University of Notre Dame (Co-Chair).

Section D. Advances in Applied Mathematics. Hsueh-Chia Chang, University of Notre Dame (Chair) and Kyriacos Zygourakis, Rice University (Co-Chair).

Educational Computer Software Demonstrations (Joint Effort with Group 4)

Douglas J. Cooper, University of Connecticut (Coordinator) and Susan M. Montgomery, University of Michigan (Coordinator).

1997 AIChE Spring National Meeting Houston, Texas March 9-13, 1997

Meeting Chair: E. Dennis Griffith, Brown and Root, Inc., PO Box 4574, Houston, TX 77210-4574, 713-575-4582, 713-575-4321 (FAX), dgriffith@b-r.com.

The CAST Division is planning the following program for the Houston National Meeting. AIChE and the Meeting Programming Chair will finalize the sessions at the 1996 Programming Retreat in February, and any corrections will appear in the next issue of CAST Communications. A first call for papers for this meeting appears later in this issue. Deadline for submission of presentation proposals is August 1, 1996. The entire CAST program in Houston is being cosponsored by the Society for Computer Simulation.

Area 10a: Systems and Process Design

1. Challenge Problems in Systems and Process Design. Miguel J. Bagajewicz, University of Oklahoma (Chair) and Gavin Towler, University of Manchester Institute of Science and Technology (Co-Chair).

2. Reactive and Catalytic Distillation. Amy R. Ciric, University of Cincinnati (Chair) and Michael F. Malone, University of Massachusetts (Co-Chair).

3. New Technology, Needs, and Opportunities in Process Engineering Software. George Stephanopoulos, Massachusetts Institute of Technology (Chair) and Lionel O'Young, Mitsubishi Chemical Corporation (Co-Chair).

4. Technology Reviews in Process Design and Analysis. Antonis C. Kokossis, University of Manchester Institute of Science and Technology (Chair) and Luke Achenie, University of Connecticut (Co-Chair).

Area 10b: Systems and Process Control

1. Process Control Theory and Applications: Opportunities and Challenges. Charles F. Moore, University of Tennessee (Chair) and Thomas A. Badgwell, Rice University (Co-Chair).

Area 10c: Computers in Operations and Information Processing

1. Industrial Applications of Information and Decision Making Systems. Alan B. Coon, Aspen Technology, Inc. (Chair) and Nikolaos V. Sahinidis, University of Illinois (Co-Chair).

International Symposium on Advanced Control of Chemical Processes, ADCHEM '97
Banff, CANADA
June 9-11, 1997

The ADCHEM '97 meeting will bring together engineers and scientists from universities, R&D laboratories, and the process industries to focus attention on recent advances in the analysis and control of chemical process systems. The main topics of the meeting include system identification using open and closed loop data, robustness issues, linear and nonlinear model-based control, performance assessment of control loops, process monitoring and fault detection, software sensors, industrial applications in petrochemical, pulp and paper, and metallurgical or other continuous/batch processes, batch process control, real time optimization, adaptive control, multivariate statistical based techniques, neural networks and fuzzy logic systems, and control of discrete event dynamic systems. Drafts of contributed papers in any technical area relevant to the symposium should be submitted before September 2, 1996 to Sirish Shah, Department of Chemical Engineering, University of Alberta, Edmonton, Alberta T6G 2G6 CANADA, adchem.97@ualberta.c

a. Conference related information is available at http://www.ualberta.ca/dept/chemeng/adchem.

1997 AIChE Annual Meeting
Los Angeles, California
November 16-21, 1997

The CAST Division is considering the following programming topics for the Los Angeles Annual Meeting. AIChE and the Meeting Programming Chair will finalize the sessions at the 1996 Programming Retreat in January, and the approved program will appear in the next issue of CAST Communications. Deadline for submission of presentation proposals is expected to be March 1, 1997.

The State of Computing and Systems Technology
Design and Analysis
Process Synthesis
Advances in Process Integration
Batch Process Design
Reactor System Synthesis and Analysis
Interaction of Design and Control
Advances in Process Control
Nonlinear Control
Applications of Process Control
Controller and Process Monitoring
On-line Dynamic Optimization
Robust Control
Control of Particulate Systems
Computer Integrated Manufacturing in the Chemical Process Industries
Industrial Applications of Plant and Enterprise Wide Optimization
High Performance Computing
Computer-Aided Strategic Decision Making in the Supply Chain
Environmental Issues in Process Operations
Operations in Food and Pharmaceuticals
Nonlinear Dynamics and Pattern Formation
Chemical Engineering Applications of Stochastic Processes
Parallel Computing Applications in Chemical Engineering
Discretization Methods in Computational Strategies for Chemical Engineering Applications
Polymer Flow
Mathematical Modeling in Cellular Biology

In addition, CAST is planning a four-section Poster Session and is also cosponsoring Educational Software Demonstrations throughout the Los Angeles meeting.

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CALLS FOR PAPERS

Final Call for CAST Sessions
1996 AIChE Annual Meeting
Chicago, Illinois
November 10-15, 1996

The names, addresses, and telephone numbers of the session chairs are given on the next several pages, as are brief statements of the topics to receive special emphasis in selecting manuscripts for these sessions. Prospective session participants are encouraged to observe the following deadlines which have been established, but may be changed, by the Meeting Program Chair, Sangtae Kim.

SPECIAL NOTE TO AUTHORS SUBMITTING ABSTRACTS FOR ANNUAL MEETING SESSIONS SPONSORED BY CAST AREAS 10A, 10B, and 10C:

Because of the large number of anticipated presentation proposals for annual meetings and the limited symposia space available, and also to maximize the number of good proposals that can be accepted, and to generally improve programming quality, all proposals for Fall 1996 programming in Areas 10a, 10b, and 10c must be accompanied by an extended abstract and submitted directly to the corresponding Area Chair for review by panels of session chairs for selection and allocation to specific sessions. Because of this centralized review and selection process, the deadline for receipt of proposals for 10a, 10b, and 10c sponsored sessions at the Annual Meeting is ONE MONTH EARLIER than the generally published AIChE deadline. Please note that CAST Area 10d and CAST sessions cosponsored with other AIChE divisions DO NOT participate in this centralized review process.

Submission Procedure for Areas 10a, 10b, and 10c:

Please send the following to the AREA CHAIR, with copies to the Chair and Co-chair of the session you think is most appropriate for your work. **E-MAIL SUBMISSIONS ARE STRONGLY PREFERRED.**

1. An Extended Abstract of approximately 550 words, and up to 3 pages, which will be reviewed as described below. AIChE has discontinued the printed abstract booklet. In its place, the area chairs will attempt to post the extended abstracts of accepted papers on the World Wide Web for browsing before the meeting.

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2. Professional affiliations and full contact information including postal address, phone, fax and e-mail for all authors.

3. Indicate the speaker.

4. Indicate if this paper is submitted for presentation at another session in this meeting or elsewhere.

5. This extended abstract should be submitted to Area Chair as follows:

   (a) Using the electronic PTP form and LaTeX, available by anonymous ftp from ftp.che.wisc.edu in the pub/tex/aiche directory. This method is preferred because it will allow automatic preparation of the abstracts for the WWW. All of the information required above is supported with this electronic form.

   (b) A flat ASCII file containing the information required above. Email is preferred, but this file can also be submitted via postal mail on a floppy. We will have to process this information by hand to put it on the WWW.

   (c) A postal mailing of the information required on paper. We will accept your abstract for review, but we cannot guarantee that we will be able to post your abstract on the WWW.

Centralized Review Procedure for Areas 10a, 10b, and 10c:

1. Extended abstracts will receive anonymous reviews by three or four session chairs and/or co-chairs and/or the Area Chair and Vice-Chair, for technical content, novelty and style. Submissions may be shifted between sessions or other CAST areas as appropriate.

2. Each area will sponsor one section of the Division Poster Session. Some areas may develop a topical theme for their section while others may have a more general scope to accommodate late news. Authors may not know if their submissions will be accepted in the poster session or in an oral session until after the review and selection process.

Chicago Meeting Deadlines:

March 1, 1996 (10a, 10b, and 10c): Submit a proposal to present including extended abstract to the corresponding CAST AREA CHAIR.

April 10, 1996 (10d, and sessions cosponsored with other divisions): Submit a proposal to present including abstract to the appropriate SESSION CHAIR.

May 1, 1996: Session content is finalized authors are informed of selection.

September 10, 1996: Authors submit final manuscript to AIChE.

November 10, 1996: Speakers bring 60 hardcopies of visual aids to be distributed to the audience at the presentation. (This is a CAST Division policy, intended to improve the quality of the presentations and the benefit to the audience.)

Please note that there is an AIChE limitation that no person may author or co-author more than four contributions at any one meeting nor more than one contribution in any one session.

Authors submitting by the above deadlines will be notified of decisions on acceptance on or about May 1, or as close to this date as the schedules of the reviewers, the Meeting Program Chair, and the AIChE permit.

Updates and revisions of this and other CAST information can be found on the WWW server (http://www.che.wisc.edu/cast10)

Special Note: AIChE is preparing guidelines for submission of final CAST abstracts in electronic form, since that seemed to work well at the Miami meeting. This might mean some extra work for the authors of accepted papers. The instructions will be posted on the WWW server listed above, through the CAST e-mail list and in the sci.engr.chem newsgroup as soon as they are available.

Area 10a: Systems and Process Design

NOTE: PLEASE SUBMIT EXTENDED ABSTRACTS FOR ALL AREA 10A SESSIONS TO THE 1996 AREA 10A CHAIR:

Michael F. Malone
Department of Chemical Eng.
University of Massachusetts
Amherst, MA 01003-3110
413-545-0838
413-545-1133 (FAX)
mmalone@ecs.umass.edu

1. Design and Analysis -- General Papers.

Papers are sought in the general area of design and analysis of continuous and batch processes. The session will focus on fundamental as well as application-oriented issues. Topics may include, but are not limited to, conceptual design methodologies, novel techniques for the design and analysis of process alternatives, retrofitting of process plants, thermodynamic issues in chemical process/product design, molecular design. The applicability of the design and analysis techniques in generating cost-effective solutions should be demonstrated by case studies of industrial significance.

Submit extended abstract to Michael F. Malone, 1996 Area 10A Chair at address above.

Session Chair (For Information Only)
Costas D. Maranas
Department of Chemical Engineering
Pennsylvania State University
University Park, PA 16802
814-865-2574
814-865-7846 (FAX)

Co-Chair: Srinivas K. Bagepalli
General Electric Company
PO Box 8
Schenectady, NY 12301-0008
518-387-7676
518-387-7611 (FAX)
bagepask@crd.ge.com

2. Synthesis and Analysis of Separation Systems.

Process synthesis, a key step in chemical process design, is concerned with determining the best configura-

tion of processing steps that can transform given raw materials into the desired products. Typically, the process synthesis step will elucidate a limited number of candidate schemes from among a typically quite large number of alternatives which will require more detailed analysis. The analysis step, complementary to process synthesis, involves calculating the outputs for a specified process and given feeds. This session will focus on the synthesis and analysis of separation systems. The process economics and a number of other quality measures, such as controllability, safety, compliance with environmental and other regulations, largely depends on the results of this conceptual design phase. Papers are sought on new developments and applications of process synthesis methodologies for separation systems, such as mathematical programming approaches, heuristic strategies, thermodynamic methods, etc.

Submit extended abstract to Michael F. Malone, 1996 Area 10A Chair at address above.

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3. Process Synthesis - General Papers.

Papers are solicited for a general session on process synthesis (systematic methodologies/procedures for developing the basic flowsheet structure for chemical processes). Areas of interest include, but are not restricted to, overall process flowsheet synthesis, reaction path and reactor network synthesis, sequencing and scheduling of batch processes, advances in mathematical programming, heuristic, thermodynamic, and artificial intelligence based methodologies for process synthesis, integration of synthesis, operability and control, process synthesis under uncertainty, synthesis of multipurpose plants, heat exchanger networks, and future trends and challenges in process synthesis research. Industrial applications of process synthesis are particularly encouraged.

Submit extended abstract to Michael F. Malone, 1996 Area 10A Chair at address above.

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4. Special Topics in Design and Analysis.

Papers are sought in process design and analysis. Topics may include such areas as the design of integrated plants, interaction between process design and process control, consideration of uncertainty and operability at the design stage, and strategies for the synthesis and optimization of entire flowsheets/plantwide systems.

Submit extended abstract to Michael F. Malone, 1996 Area 10A Chair at address above.

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5. Synthesis and Analysis for Safety and Environmental Concerns.

This session invites paper submissions in the area of process synthesis and analysis for safety and environmental concerns. Papers describing the latest synthesis and analysis techniques, methodologies, procedures, novel equipment related to safety and the environment are sought. Applications and industrial case studies relating to process safety concerns and/or environmental issues are encouraged.

Submit extended abstract to Michael F. Malone, 1996 Area 10A Chair at address above.

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Joint Area 10a and Area 1a Session

1. Educational Initiatives in Molecular Simulation and Computational Chemistry.

Molecular-based tools, such as molecular simulation and computational chemistry, are increasingly being used for product design and for predicting the thermophysical properties needed for process synthesis. As a consequence, there is a growing realization that these methods should be taught on a routine basis in both the graduate and undergraduate chemical engineering curricula. The coming year should see the establishment of a molecular simulation and computational chemistry task force within CACHE to accelerate the development of educational tools in these areas. Several of the papers in this mini-session will be invited. However, there will be opportunity for contributed papers. Prospective authors are invited to submit proposal to present forms and abstracts for this jointly-sponsored session to the chair and/or co-chair directly.

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Joint Area 10a and Area 15b Session

1. Design of Food and Pharmaceutical Processes.

The food and pharmaceutical industries are an important segment of the overall US process industry market. In the food, beverage and pharmaceutical industries, process variability is frequently inherent to the process due to the use of natural raw materials and they often utilize complex recipes. These recipes are typically batch or semi-continuous in nature often involving long and complex sequences of processing tasks interspersed with material handling operations. This session will address recent advances in the methods available for the design of these processes -- both at a detailed unit operations and at a system-wide performance level. Submissions are thus welcomed from both industry and academia. Prospective authors are invited to submit proposal to present forms and abstracts for this jointly-sponsored session to the chair and/or co-chair directly.

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Area 10b: Systems and Process Control

NOTE: PLEASE SUBMIT CAMERA-READY ABSTRACT AND AN ADDITIONAL EXTENDED ABSTRACT FOR ALL AREA 10B SESSIONS TO THE 1996 AREA 10B CHAIR:

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1. Nonlinear Control.

Papers are solicited which describe new theoretical approaches and/or applications in the area of nonlinear process control. The main issues addressed by the paper should be clearly described in the abstract. Priority will be given to papers which describe new work, and work that is not covered in other sessions. Relevant topics include, but are not limited to: model predictive control, differential geometric control, robust control, nonlinear model identification for control, scheduled control, and nonlinear analysis tools.

Submit extended abstract to James B. Rawlings, 1996 Area 10B Chair at address above.

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2. Advances in Process Control.

This session emphasizes papers that address recent advances in the control of chemical process systems. Priority will be given to papers that discuss novel theories, new and innovative strategies, novel applications or the definition of new problem areas. Papers which demonstrate the application of existing theory to new problem areas are also welcome. The contribution of the paper to the advancement of the state-of-the-art should be clearly stated in the abstract. The topic and research area are open; however, authors are strongly discouraged from submitting to this session papers that would be better suited for presentation in the following sessions sponsored by the Area 10b of CAST: Nonlinear Control, Applications of Process Control, Integration of Estimation and Control, Plantwide and Decentralized Control, Process Performance Monitoring, and On-line Optimization for Control.

Submit extended abstract to James B. Rawlings, 1996 Area 10B Chair at address above.

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3. Applications of Process Control.

Submit extended abstract to James B. Rawlings, 1996 Area 10B Chair at address above.

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4. Integrated Estimation and Control.

Submit extended abstract to James B. Rawlings, 1996 Area 10B Chair at address above.

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5. Plantwide and Decentralized Control.

This session will focus on recent advances in the areas of plantwide and decentralized control. Papers highlighting industrial experience or comparisons between theoretical predictions and experimental observations are welcome. Some areas of interest include, but are not limited to, alternative formulations of the plantwide control problem, pairing of manipulating and measured variables, decentralized controller design, performance comparisons between decentralized and interacting control, computational difficulties associated with plantwide control, implementation issues: supervisory computer vs. DCS platform, and real time applications.

Submit extended abstract to James B. Rawlings, 1996 Area 10B Chair at address above.

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6. Process Performance Monitoring.

Process Performance Monitoring is an extremely important function in the process industry. It provides the means to achieve process safety, product quality, process operability, process performance optimization, the economic viability and ultimately the profitability of a process. Various strategies and techniques have been devised for automatic process performance monitoring. Multivariate statistical methods have been shown to provide a mechanism for process monitoring and diagnosis. Neural networks have been utilized in fault detection. Artificial intelligence and fuzzy logic are some other alternative approaches. We solicit papers which address the theoretical and application problems associated with process performance monitoring and diagnosis. Industrial implementations and/or case studies are particularly welcome. Topics may include, but are not limited to: Multivariate Statistical Methods, Neural Networks, Process Chemometrics, Fuzzy Logic, Artificial Intelligence for Monitoring and Diagnosis, and Statistical Process Control.

Submit extended abstract to James B. Rawlings, 1996 Area 10B Chair at address above.

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Joint Area 10b and Area 10c Session

1. On-Line Optimization for Control.

This session will focus on issues in the general area of real-time optimization for control. Areas of interest include, but are not limited to, large-scale modeling strategies, sparsity issues, gross error detection, data reconciliation, and optimization strategies. New developments in real-time MPC for challenging industrial problems (e.g. plant-wide control) are sought. Papers dealing with actual applications (industrial or experimental) are strongly encouraged.

Submit extended abstract to James B. Rawlings, 1996 Area 10B Chair or Joseph F. Pekny, 1996 Area 10C Chair.

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Joint Area 10b and Area 8f Session.

1. Modeling, Monitoring, and Control of Materials/Polymers Manufacturing.

Papers are solicited which describe recent advances in the areas of measurement technology and modeling and control methodologies for materials processing. Submissions may deal with manufacturing processes for polymers, composites and microelectronics. Topics of particular interest include, but are not limited to, the development of novel approaches for on-line monitoring, fault- detection and diagnosis, model-based and knowledge-based techniques for control and optimization and intelligent processing (IP) in composites/materials manufacturing. Papers that include industrial or practical implementation issues and experimental results are especially encouraged, although simulation studies that validate a methodology will also be considered. Prospective authors are invited to submit proposal to present forms and abstracts for this jointly-sponsored session to the chair and/or co-chair directly.

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Area 10c: Computers in Operations and Information Processing

NOTE: PLEASE SUBMIT CAMERA-READY ABSTRACT AND AN ADDITIONAL EXTENDED ABSTRACT FOR ALL AREA 10C SESSIONS TO THE 1996 AREA 10C CHAIR:

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1. Computer Integrated Manufacturing in the Chemical Process Industries. (Cosponsored by the International Cooperation Committee of the Society of Chemical Engineers, Japan.)

Contributions are sought describing methodological developments, implementations, and experiences with all aspects of CIM in the process industries. Subjects of particular interest include integration of application areas such as plant information systems, monitoring, diagnosis, control, scheduling, planning, optimization, and design, as well as developments within application areas themselves that focus on integration issues. Presentations of industrial experiences with CIM technology and critical discussions of limitations/advantages of current approaches are also welcomed.

Submit extended abstract to Joseph F. Pekny, 1996 Area 10C Chair at address above.

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2. Process Monitoring and Data Interpretation.

This session addresses recent advances in process monitoring and data interpretation. Topics of interest include fault detection and diagnosis; root-cause identification; fault compensation; statistical methods for data analysis; data-, model-, knowledge- based approaches; integration of process monitoring within high level decision systems; and industrial applications.

Submit extended abstract to Joseph F. Pekny, 1996 Area 10C Chair at address above.

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3. Large Scale Dynamic Modeling and Optimization.

In recent years dynamic simulation of entire chemical manufacturing systems has become widely demonstrated and practiced in the chemical processing industries. Modeling, simulation, and optimization of large-scale dynamic systems continue to pose many challenging problems, particularly as new and larger applications push and exceed the limits of existing technology. Papers are sought that address the modeling, simulation, and optimization of large-scale dynamic systems. Topics of interest include algorithms, modeling approaches, analysis tools, computational performance, computer and software architecture, integration of simulation and optimization, hybrid (combined discrete/continuous) systems, and on-line technology. Industrially relevant applications and examples are encouraged, in particular applications to non-traditional sectors of the chemical industry such as industrial gases, pharmaceuticals, semiconductors, forest products, or polymers.

Submit extended abstract to Joseph F. Pekny, 1996 Area 10C Chair at address above.

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4. Intelligent Systems for Process Operations.

Contributions are sought concerning all aspects of the construction and use of intelligent systems in process operations including automated problem solving, knowledge acquisition, knowledge representation, machine learning, model-based reasoning, connectionist models, neural networks, distributed AI architectures, practical applications, expert systems, fuzzy logic and soft computing, reasoning under uncertainty, genetic algorithms, heuristic searching, intelligent databases, intelligent interfaces, tools, knowledge based system (KBS) methodologies, and verification & validation of KBSs.

Submit extended abstract to Joseph F. Pekny, 1996 Area 10C Chair at address above.

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Area 10d: Applied Mathematics and Numerical Analysis

NOTE: PLEASE SUBMIT CAMERA-READY ABSTRACT AND AN ADDITIONAL EXTENDED ABSTRACT FOR ALL AREA 10D SESSIONS TO THE 1996 AREA 10D CHAIR:

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1. Nonlinear Dynamics and Pattern Formation.

Papers are sought on nonlinear spatio-temporal patterns in chemical systems. Of specific interests are reaction-diffusion systems, wave dynamics, mixing kinematics and fluid dynamics and dynamics of systems under control. Experimental, computational and theoretical papers are all welcomed.

Submit extended abstract to Hsueh-Chia Chang, 1996 Area 10D Chair at address above.

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2. General Papers in Applied Mathematics.

Papers are solicited in the innovative application of mathematics to chemical engineering with an analytical or computational flavor. Preference will be given to those that deal with more current developments of applied mathematics.

Submit extended abstract to Hsueh-Chia Chang, 1996 Area 10D Chair at address above.

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3. Novel Numerical Methods.

The increasingly widespread use of non-traditional computational methods in the modeling of physicochemical processes is becoming an attractive and powerful alternative to more traditional numerical techniques. Contributions related to applications of novel numerical techniques in Engineering and Science are welcomed. Some specific examples include but are not limited to: Cellular Automata, Random and Stochastic Methods (Monte Carlo), Brownian Dynamics, Multigrid Methods, Domain Decomposition, Global Optimization Techniques, Wavelet and Neural Network Applications and Sinc Methods. Selected applications may include, for example, Fluid Mechanics of one or more phases, complex and supermolecular fluids, Non-Newtonian fluids, porous media, advanced materials and their processing (ceramic and composites), and environmental and bioengineering problems. Authors are invited to present the advantages of their chosen methods over more traditional techniques. Discussions on the applicability and extensions of specific methods to various classes of problems are also welcomed.

Submit extended abstract to Hsueh-Chia Chang, 1996 Area 10D Chair at address above.

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4. Inverse Problems and Methods in Chemical Engineering.

Many chemical engineering applications can be posed as inverse problems. They may be ill-posed if the outputs do not depend continuously on the input data. Applications of inverse methods include parameter estimation and domain identification from overspecified boundary data. Sources of models and data include partial differential equations, multivariate statistical models, process data, physical property measurements and imaging data. Common difficulties in solving the inverse formulation include non-existent or non-unique solutions, sensitivity of the output to the input conditions, and insufficient or inaccurate data. This session seeks contributions which pose novel inverse problem formulations, provide new developments into the numerical solution or provide an analysis to explain difficulties in the solution of inverse problem formulations.

Submit extended abstract to Hsueh-Chia Chang, 1996 Area 10D Chair at address above.

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Joint Area 10d and Area 15d/e Session

1. Applied Mathematics in Bioengineering

The field of bioengineering has witnessed the increased application of advanced mathematical methods to data analysis and model building. These advances include robust correlation methods in data analysis, cybernetic model development, reflex circuitry modeling using control principles, parameter estimation in biophysical models, fluid-mechanical models of drug delivery devices, combinatorial methods in genetic engineering, and pharmacokinetic modeling applications. Proposals are solicited which address the general theme of applied mathematics in bioengineering, with special emphasis on experimental results and computational simulation results. Prospective authors are invited to submit proposal to present forms and abstracts for this jointly-sponsored session to the chair and/or co-chair directly.

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CAST DIVISION POSTER SESSION

Section A. Recent News in Systems and Process Design.

Posters describing recent original results of interest in the area of process design are solicited. In order to accommodate late-breaking news, submissions will be accepted up until September 1, 1996, although earlier submissions are helpful and welcome. Submit a proposal and extended abstract electronically to the section chair.

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Section B. Topics in Systems and Process Control.

Posters describing recent original results of interest in the area of process control are solicited. In order to accommodate late-breaking news, submissions will be accepted up until September 1, 1996, although earlier submissions are helpful and welcome. Submit a proposal and extended abstract electronically to the section chair.

Section Chair: James B Rawlings
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Section C. Optimization Methodology and Fundamentals.

NOTE: PLEASE SUBMIT CAMERA-READY ABSTRACT AND AN ADDITIONAL EXTENDED ABSTRACT FOR ALL AREA 10C SESSIONS TO THE 1996 AREA 10C CHAIR:

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Contributions are sought describing new optimization methods and theory, for example new algorithms for mathematical programming problems, parallel and dis-

tributed computing based approaches, tailored methods for specialized large scale problems, methods for solving optimization problems in real-time (e.g. for control applications), and new software engineering techniques for optimization systems.

Submit extended abstracts, **by March 1, 1996**, to Joseph F. Pekny, 1996 Area 10C Chair at address above.

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Section D. Advances in Applied Mathematics.

Posters describing recent original results of interest in the areas of applied mathematics and numerical analysis are solicited. In order to accommodate late-breaking news, submissions will be accepted up until September 1, 1996, although earlier submissions are helpful and welcome. Submit a proposal and extended abstract electronically to the section chair.

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AIChE is entering the electronic age. Starting with the Chicago 1996 Annual Meeting, AIChE has asked the CAST Division to require that all programming transactions be done electronically. This includes (a) receipt of proposals-to-present and extended abstracts, (b) conduct of the centralized review and acceptance process, (c) notification of authors, and so forth.

First Call for CAST Sessions
1997 AIChE Spring National Meeting
Houston, Texas
March 9-13, 1997

The names, addresses, and telephone numbers of the session chairs are given on the next several pages, as are brief statements of the topics to receive special emphasis in selecting manuscripts for these sessions. Prospective session participants are encouraged to observe the following deadlines which have been established, but may be changed, by the Meeting Program Chair, Dennis Griffith:

September 1, 1996: Submit a proposal to present including an abstract to the SESSION CHAIR and a copy also to the co-chair.

October 1, 1996: Session content is finalized authors are informed of selection.

February 1, 1997: Authors submit final manuscript to AIChE.

March 9, 1997: Speakers bring 60 hardcopies of visual aids to be distributed to the audience at the presentation. (This is a CAST Division policy, intended to improve the quality of the presentations and the benefit to the audience.)

Please note that there is an AIChE limitation that no person may author or co-author more than four contributions at any one meeting nor more than one contribution in any one session.

The proposal to present a paper at a CAST-sponsored session should include the professional affiliations and full contact information including postal address, phone, FAX, and e-mail address for all authors, and indicate the speaker. Also, indicate if the paper has been submitted for presentation at another session in this meeting or elsewhere.

Proposals to present may be submitted using the electronic PTP form and LaTeX, available by anonymous ftp from ftp.che.wisc.edu in the pub/tex/aiche directory, or by e-mail as a flat ASCII file, or on a Proposal to Present Form available from AIChE and submitted by FAX or postal mail. Electronic submissions are preferred.

Area 10a: Systems and Process Design

1. Challenge Problems in Systems and Process Design.

In this session, speakers from industry will pose challenge problems that they would like to see addressed

by the design research community. These problems will be open-ended in nature and might include new design methods or tools that are needed, specific process design problems, environmental design problems, etc. Each presentation will be followed by extensive discussion to facilitate exchange of ideas and to help the audience appreciate the subtleties of the problem. We hope that this will then provide researchers from industry and academia with a "wish list" of challenging problems that address real commercial and industrial concerns, and hence set the stage for promising technology development and transfer programs. We seek suggestions of challenging industrial problems of an open-ended nature that can be posed in such a way as to involve no proprietary information. We would also consider overviews of specific areas or topics indicating what is perceived in industry as the area where research is most needed. Participation of industrial speakers is preferred; however, all contributions will be given consideration. Any difficult design problem or aspect of the design process will be considered suitable.

Chair: Miguel J. Bagajewicz
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Co-Chair: Gavin Towler
Department of Process Integration
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2. Reactive and Catalytic Distillation.

Papers are sought for a session on reactive and catalytic distillation. Potential topics include industrial applications of reactive distillation processes, novel design and analysis techniques, advances in steady state or dynamic simulation, the results of experiments in reactive distillation, and recent developments in process control for reactive distillation. Critical reviews of the area are also welcome.

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Co-Chair: Michael F. Malone
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3. New Technology, Needs, and Opportunities in Process Engineering Software.

Papers are invited to address the software engineering and process engineering view points, within the scope of designing, developing and deploying computer-aided tools to the processing industries. New software technologies, novel software tools, integration with existing tools, open software development environments, new software needs in process development and design, technology transfer from the research labs to the market place, are typical examples of the areas of interest for this session. This session is envisioned as a semi-open forum with active involvement of the participants. The presentation of papers will be accompanied by an extensive discussion period.

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4. Technology Reviews in Process Design and Analysis.

This session will invite technology reviews in the area of process design and analysis. Over the last decade a large number of contributions have been proposed and applied in reaction processes, separation systems, heat integrated processes, time integrated processes and systems in which steady state and dynamic features are addressed simultaneously. Though some contributions maintain a targeting or shortcut perspective others represent computationally intensive techniques which exploit the potential of algorithmic and modeling developments. The invited papers will review the various

technologies in terms of their technical content, range of applications and industrial impact. Important future directions will also be highlighted in terms of recent and promising developments.

Chair: Antonis C. Kokossis
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Co-Chair: Luke Achenie
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Area 10b: Systems and Process Control

1. Process Control Theory and Applications: Opportunities and Challenges.

This session will be the only control session at the Spring 1997 AIChE meeting. Its purpose is to highlight the progress being made in applying modern control technology to improve process operations in the chemical process industries. We are soliciting papers that demonstrate how industry has benefited from applying modern control technology and/or present current industrial challenges that are not addressed adequately by existing control methods. The session will include a small number of overview papers from invited speakers from industry and academia and a larger number of submitted papers. We intend for this session to present a broad view of the state of industrial process control in the chemical industry. We are especially hopeful that it will provide a unique opportunity for industrial control engineers and young academic control researchers to establish contacts that lead to useful collaborations.

Chair: Charles F. Moore
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Co-Chair: Thomas A. Badgwell
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Area 10c: Computers in Operations and Information Processing

1. Industrial Applications of Information and Decision Making Systems.

Papers are solicited which address the different roles of information and decision systems in various phases of process engineering (including planning and scheduling, supply chain operations, etc.). Of additional interest are papers which address the integration of the various tools used in these phases, and methodologies for the automated use of such integrated systems. The objective of the session is to share information on current and proposed industrial practices for using process engineering tools and information and decision making systems throughout the process life cycle. A broad range of applications is desired, and examples and/or case studies are particularly welcome.

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Co-Chair: Nikolaos V. Sahinidis
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First Call for Papers for the
1997 American Control Conference
June 4-6, 1997
Albuquerque Convention Center
The Albuquerque Hyatt Regency and Doubletree Hotels,
New Mexico

The American Automatic Control Council (AACC) will hold the sixteenth American Control Conference (ACC) Wednesday through Friday, June 4-6, 1997 at the Albuquerque Convention Center, Albuquerque, New Mexico. Held in cooperation with the International Federation of Automatic Control (IFAC), this conference will bring together people working in the fields of control, automation, and related areas from the American Institute of Aeronautics and Astronautics (AIAA), American Institute of Chemical Engineers

(AIChE), Association of Iron and Steel Engineers (AISE), American Society of Civil Engineers (ASCE), Institute of Electrical and Electronics Engineers (IEEE), American Society of Mechanical Engineers (ASME), International Society for Measurement and Control (ISA), and the Society for Computer Simulation (SCS). Approximately 1000 presentations are expected.

The '97 ACC will cover a range of topics relevant to theory and practical implementation of control and automation. Topics of interest include but are not limited to: robotics, manufacturing, guidance and flight control, power systems, process control, measurement and sensing, identification and estimation, signal processing, modeling and advanced simulation, fault detection, model validation, multivariable control, adaptive and optimal control, robustness, intelligent control, expert systems, neural nets, industrial applications, control engineering education, and computer aided design.

Papers will be classified as either "contributed" or "invited" and as either "regular" or "short." When an individual paper is submitted for consideration, it is "contributed." "Invited" papers are specifically solicited by an organizer of a specific session. "Regular" papers are allotted 5 pages in the Proceedings and are to be a complete description of finished work. "Short" papers are allotted 2 pages in the proceedings and are to be an exposition of a novel idea or preliminary results. Based on reviewers' direction, the Program Committee may move regular papers into the short paper category. For all papers, review criteria include: significance of the problem, novelty, clarity, completeness, and accuracy.
Albuquerque, on the Rio Grande River and near to the Sandia Mountains, offers historic missions, art galleries, southwest charm, a diverse heritage, and tasty New Mexico cuisine. Trips to neighboring Santa Fe will be uniquely remembered by participants and their families.

Call for Contributed Papers

Prospective authors of regular papers should submit 5 copies of the complete manuscript and a manuscript form to a Society Review Chair. Submit 5 copies of short papers and a manuscript form to the Program Vice-Chair for Contributed Sessions. Manuscript forms can be obtained from the ACC home page on http://www.eece.unm.edu/controls/ACC97/welcome.html

Call for Invited Sessions

Papers in each invited session should present a cohesive and comprehensive focus on a relevant topic. Before August 15, organizers should contact the Vice Chair, Invited Sessions for instructions and forms. Submit 5 copies of the proposal (per instructions, with a clear motivation for the session, and not less than a 1000 word summary of the results for each paper) to the Vice Chair.

Industry and Applications

The AACC is particularly interested in enhancing the applications and industrial perspective of the ACC. Prospective authors from industry are encouraged. For more information contact the Vice Chair, Industry and Applications.

Student Best Paper Award

To be eligible primary, first-listed author and presenter of regular contributed papers must be students at the time of submission. Up to five finalists based on their written papers will be awarded limited travel grants to the Conference. To apply, send a copy of the paper, with a cover letter on University letterhead from your professor (certifying eligibility), to the Program Chair by September 15, 1996.

1997 ACC Workshops

The Operating Committee intends to arrange tutorial workshops to be held in conjunction with the 1997 ACC. Suggestions are solicited for appropriate subjects. Potential organizers should contact the Workshop Chair by September 1, 1996.

Proceedings

Registered attendees will obtain the Proceedings as both a CD-ROM and paper volumes. Registered student/retiree attendees will get the CD-ROM only.

Schedule Summary

August 15, 1996: Deadline for contacting the Program Vice-Chair, Invited Sessions, regarding invited sessions.

September 15, 1996: Deadline for submission of contributed papers and invited session proposals.
January 20, 1996: Authors notified and author's kits distributed.

March 15, 1997: Deadline for camera ready mats or electronic format for Proceedings.

For further information view the AACC homepage on http://web.eecs.nwu.edu/~ahaddad/aacc.html or contact:

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