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VOL. 23 NO. 1 Spring 2000

CAST (Computers and Systems Technology) is a division of the AIChE (American Institute of Chemical Engineers)

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EDITORIAL NOTES

About this Issue

By Peter R. Rony (rony@vt.edu) and Karl D. Schnelle (kschnelle@dowagro.com)

In this issue, it is our honor and pleasure to pay tribute to the accomplishments of our 1999 CAST award winners: Jim Rawlings received the Computing in Chemical Engineering Award, Ferhan Kayahan and John Baldwin shared the Computing Practice Award, and Pangiotis Chrisofides received the Ted Petersen Award. The Computing in Chemical Engineering Award was given to Jim for three major areas of accomplishment: significant research, technology transfer to industry, and valuable service to the CAST community. John and Ferhan were recognized for their outstanding contributions in the practice or application of chemical engineering to computing and systems technology. Also, CAST recognized Pangiotis for his published graduate research on the application of computing and systems technology to chemical engineering.

We also introduce our new *CAST Communications* production team -- Karl Schnelle and Karla Simpson of Dow AgroSciences LLC. Karl replaces our colleague, Scott Keeler, who remains as our CAST Secretary/Treasurer. Karla is responsible for assembly and layout of the newsletter. However, she is not entirely new because she has had a hand, partially or fully, in the last four newsletters. Between the two Editors and Karla, we will be working on the "look and feel" of both the hardcopy and upcoming online versions.

The Editor, who worked on both the first and third drafts of these Editorial Notes (Karl Schnelle, the Associate Editor, created the second draft), would like to convey his thanks and gratitude to both Karl and Karla for their significant contributions to the CAST Division publications activity. For example, Karla created the first draft of the CAST Division web site at http://www.castdiv.org, which is already operational as of late March 2000; she is now working on the inclusion of the Meetings and Conferences section that we have created for this printed newsletter. Karl has done a magnificent job of improving the quality and utility of the Editor's first draft of the Meetings and Conferences section. As stated in previous issues of *CAST Communications*, we have a "virtual publishing" activity (I guess the new buzzword is "virtual publishing company") that depends upon the skills, talents, and attention to detail of all of us. We are all very keen on making the *CAST Communications* publications activity the pre-eminent newsletter activity in the AIChE.

In the Editorial Notes for the Summer 1999, Vol. 22, No. 2, issue, we quoted Mike Malone's multiple recommendations. Later in November in Dallas, the members of the CAST Executive Committee voted on the following items:

(a) Delete duplication between Meetings, etc. and Calls for Papers; **13 YES / 2 NO**
(b) List only titles, deadlines, and URL for CAST papers; **8 YES / 6 NO**
(c) Do not carry full text of Calls for Papers since most sessions are well explained by the title; **7 YES / 7 NO**
(d) Reduce page count and cost of printing/mailing the newsletter; **11 YES / 1 NO**
(e) Make CAST Communications exclusively a web-based newsletter; **10 YES / 5 NO**
(f) CAST should purchase its own domain name, CASTDIV.ORG (registration fee: $35 per year); **9 YES / 4 NO**.

The editorial content of this Winter 2000 issue reflects several of these decisions. Items (b) and (c) received mixed votes, but we decided to err on the side of change in order to learn if and how members of the division react.

Concerning item (e), we have not yet decided to convert the newsletter exclusively to a web-based publication. However, we have taken steps to test the webwaters.com. We have registered the domain name, castdiv.org, on behalf of the CAST Division organization. We have selected a web server in North Carolina that will allow us to test web-based newsletter delivery. We have also prepared some initial web pages, and are in the process of beta testing them from sites as far away as Indianapolis and Blacksburg. Other two beta testers located in Australia and Siberia pooped out on us.

What is your reaction to a web-based replacement to the printed *CAST Communications*? Please take a look at http://www.castdiv.org and communicate any comments to rony@vt.edu. Some ideas that we have received are as follows:

> *"We need to find the effective mix of archival information on the web (low interruption) and short email notices (high interruption) to serve as reminders of when people need to consult the archive."*

"… we need to decide what would work well for the entire CAST membership. Please do not design a questionnaire to find out this information. Just put some smart people in a room …and send [a] proposal out … for feedback"

"… I like the idea of sending people short [email] messages summarizing: when significant meeting deadlines are approaching, release of new issue of CAST news or listing its contents, and then pointing to the web for the details."

" A PDF of the hard copy [newsletter] by email or email with hyperlinks to articles, which could also be downloadable as PDF would be preferred because I have so many web sites that I am "supposed" to visit that I can't even visit a fraction of them."

One of the existential pleasures of being a newsletter editor is that the buck stops with him. The editor must provide a replacement if we do not have a timely feature article: in this case, "Disintermediation, Personalization, Mass Customization, Total Filtering...and Things That Go Bump on the Web", which is a review of the fascinating book, *The Control Revolution*. We hope that this replacement article -- despite the fact that it focuses on higher education -- proves to be both stimulating and provocative to all division members. Happy new millennium!

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ARTICLES

Disintermediation, Personalization, Mass Customization, Total Filtering, . . . and Things That Go Bump on the Web

A Book Review by Peter R. Rony

The Control Revolution. Andrew L. Shapiro. 286 pp. PublicAffairs. 1999. $25.

Introduction

During 1994, I presented a talk entitled "The Decline of the Information Gatekeepers" in the "New Horizons in Technical Communications and Exchange" session at a meeting of the Council of Chemical Research [**1**]. I tried to make sense of significant societal changes that had occurred during the 1980s and early 1990s, examples of which included the elimination of the Soviet Union's control over East Europe; the decline of the dominance of IBM and DEC in mainframes and minicomputers, respectively; and the decline in market share of the three major TV networks (ABC, NBC, and CBS). I recalled a comment by Arthur Fricke, a faculty colleague in 1975 at Virginia Tech -- "*The fact that oil companies have controlled the sources, processing, distribution and marketing of energy in the past does not imply that they must do so in the future*" [**2**] -- and provided a generalization -- "*Past gatekeepers need not become future gatekeepers*" -- applicable to many corporations other than oil companies, for example, IBM and Digital Equipment Corporation.

Why did these changes occur? … Because of significant advances in information and communication technologies, as summarized by the following 1994 list [**1**]:

Information Technologies that Challenge Barriers and Create Change

1. Inexpensive Computer & Communications Hardware/Software

- Rapidly increasing Performance/Price ratios [NOTE: In March 2000, Advanced Micro Devices beat Intel to the market with their 1-gigahertz Athlon microprocessor -- an achievement that will make PCs run 10 times faster than was possible six years ago.]
- Declining hardware and software costs
- Becoming commodity items
- Widespread penetration in business, academia, government, homes
- Next major task: networking of 100,000,000+ computers [NOTE: By 2006, the prediction is that more than 900 million electronic devices will be linked to the Internet. See the Toasternet discussion in *CAST Communications*, Vol 21, No 1.]

2. World Wide Web (WWW) and Internet

- Communicate text, images, audio, animations, and video anywhere in the world.
- Costs are distributed to organizations.
- 25,000,000+ Internet users in 1994; 150 countries; 35,000 different networks. [NOTE: Recent estimates are between 92 and 118 million current Internet users, 300 million e-mails a day, and 500 million Internet users by 2003!]
- Need higher-speed communication links everywhere.

3. 1994 CD-ROM Technology

- 640,000,000 bytes on a single CD-ROM disc (640 MB)
- IBM Special: 500 CD-ROM discs + jewel cases: $980; 1000 CD-ROM discs + jewel cases: $1330; low weight, inexpensive to mail
- CD-ROM disk drive: $200 to $600

4. CD-R Technology

- CD-R means CD-Recordable or write-once CD-ROM
- "Personal" CD-ROM publishing
- Currently, $3000 to $5000 for CD-R machine and $15 for blank CD-R discs
- In future, under $1000 for CD-R machine and under $5 for blank CD-R discs [NOTE: This prediction was too conservative. In 2000, CD-R drives are approximately $200 and blank CD-R discs are $2 or less; even CD-R/W discs and drives are available.]

5. Accessible Data Types

- Creation and manipulation of digital text, digital images, digital audio, digital animation, and digital video:
- Authoring systems
- Scientific visualization
- Lower-cost, more accessible, and more powerful hardware and software to do all of above

Why is information and communications technology so special in our society? One possible answer is that, in contrast to energy, momentum, mass, and charge, information is not a conserved quantity. Information can be created from scratch, can be totally destroyed, and can be replicated ad infinitum. Information processing is the

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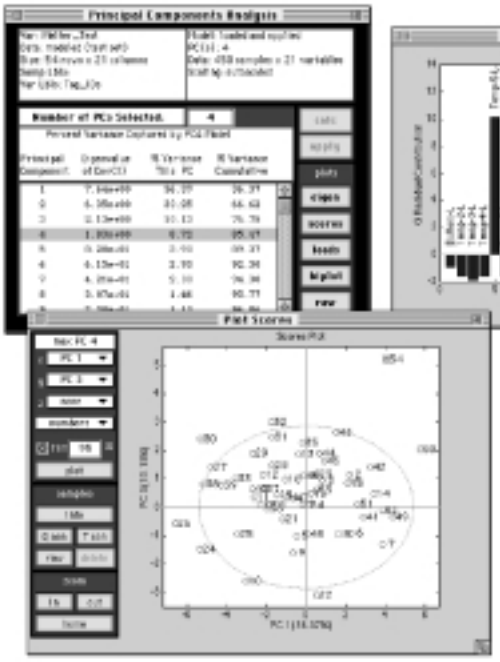

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antithesis of the basic conservation laws applied to chemical engineering processing.

The Control Revolution by Andrew L. Shapiro

In June 1999, a new book entitled *The Control Revolution: How the Internet is Putting Individuals in Charge and Changing the World We Know* [**3**] was published. Clearly, the thesis of "The Decline of the Information Gatekeepers" was on target but was only a fraction of a much larger and more interesting vision, namely, Shapiro's "Control Revolution". The purpose of this book review is to introduce you to the contents of Shapiro's interesting analysis, a book for engineering professionals, and to speculate about how his ideas pertain to the future of higher education.

Shapiro defines the term, Net, as *"the bundle of communications tools -- the Internet, interactive television, digital communications appliances, and their twenty-first century incarnations."* and argues that "*there is a common thread underlying [recent societal] developments. It is not just a change in how we compute or communicate. Rather, it is a potentially radical shift in who is in control—of information, experience, and resources."* Shapiro's book contains twenty-one chapters arranged in four parts -- Revolution, Resistance, Oversteer, and Balance. He discusses both the optimistic (Part 1. Revolution) and pessimistic (Part 3. Oversteer) perceptions of the Net, how institutions are trying to acquire new gatekeeper roles (Part 2. Resistance), and how people can balance the optimistic and pessimistic aspects (Part 4. Balance). The complete text of both the Introduction and Chapter One are available at www.controlrevolution.com/complete.html.

It is worthwhile to read this book in the context of its implications to higher education, bearing in mind that the "university" is one of the two longest-running gatekeepers in society, dating back to the Universities of Salamanca, Paris, and Bologna in the early 13th century. The book also applies generically to industry, if not to individual professionals whatever their field. Because the author says so little about higher education, I focused on this segment of society. The quotes are generic, however.

Although some chapters, *e.g.* Chapters 1, 5, 6, 7, 13, and 19, are more relevant to higher education than others, very little in this book explicitly discusses educators or higher education. Nevertheless, Shapiro's focus on concepts such as disintermediation, personalization, mass customization, total filtering, privacy, many-to-many interactivity, and local communities, allows some of his observations and conclusions to apply to higher education.

Rather than paraphrase the book, by Andrew Shapiro, the author, and PublicAffairs™ , the publisher, have given permission to me to provide selected quotes from Shapiro's chapters. According to Shapiro:

*"***Part One, Revolution***, explains how new technology is allowing individuals to take power from large institutions such as government, corporations, and the media. To an unprecedented degree, we can decide what news and entertainment we're exposed to, whom we socialize with, how we earn, and even how goods are distributed and political outcomes are reached. The potential for personal growth and social progress seems limitless. This shift in control, however, is no sure thing."*

Chapter 1. "We Have Revolution Now"

"What they suggest is a potentially momentous transfer of power from large institutions to individuals. The real change set in motion by the Internet may, in fact, be a control revolution, a vast transformation in who governs information, experience, and resources. Increasingly, it seems that <u>we</u> will." [p. 10]

"But these terms ("individuals" and "institutions") do capture something fundamental: The palpable sense of deciding for yourself as opposed to having some larger, impersonal <u>them</u> deciding for you. This includes choices about intake of news and other information, social interactions, education, and work, political life and collective resources. It is a time of diminishing stature for many authority figures: legislators and other public officials, news professionals, commercial middlemen, educators. Hierarchies are coming undone. Gatekeepers are being bypassed. Power is devolving to the "end users". [p. 10]

"The control revolution, in fact, has some of the texture of a subtle historical shift such as the agricultural revolution or the industrial revolution -- not in the sense that it will be centuries in the making, but because it may emerge undetected. At the same time, we will see that institutional resistance to this change may be just as inconspicuous." [p. 11]

"'Individuals are acquiring more control over their lives, their minds, and their bodies, even their genes,' says New York Times writer John Tierney. Biotechnology allows us to know things about our physical and psychological makeup that once were unknowable, such as the likelihood of getting cancer or of having a predisposition toward violence." [pp. 11-12]

Chapter 2. The Politics of Code

"… [The] Net is, first, characterized by <u>many-to-many interactivity</u>. Complicated as this may sound, there's nothing unusual about interactivity. After all, the

telegraph and telephone are interactive. But they only allow one-to-one communication between two parties. Mass media such as television and newspapers, on the other hand, are one-to-many but they're not interactive." [p. 15]

"Many-to-many interactivity has rightly been hailed as one of the most potentially democratic aspects of the Net because it allows individuals to be creators of content rather than just passive recipients, and active participants in dialogue instead of just bystanders." [p. 15]

Chapter 3. Gaining Control

"Personal satisfaction has become perhaps the central value in our use of computers. And why not? This new emphasis on gratification and comfort has allowed us to transform what were sources of confusion into sources of power." [p. 28]

"Publish online and caucus with fellow travelers, and you can change other people's views. Sign a digital petition and influence the political process. Buy stocks -- or groceries -- online and affect the economy. Telecommute from home and redefine work, while reducing auto traffic and air pollution. These are types of individual actions that are helping to produce a revolution in control." [p. 29]

"In fact, [cyberspace] is so close to us, so increasingly significant and indispensable, that it will eventually recede from the fore and even disappear. Disappear, that is, in the same sense that the wallpaper pattern in your bathroom eventually becomes so familiar that it fades away and escapes notice." [p. 31]

Chapter 4. Leibling's Revenge => The Power of Interactivity

"Optimists...see a cornucopia of information options where once the pickings were slim. A handful of television networks and major publishers are losing their dominance, they note, because of emerging technologies and changes in the marketplace. Nor only do we have more channels to watch and more titles to read, but technical innovations have given us more choice as consumers." [p. 40]

"Beyond thwarting censorship, the Net gives individuals unprecedented opportunities to share all sorts of creative expressions. Visual artists are building virtual galleries in which to show their work. Cartoonists are syndicating their strips online instead of in newspapers. Musicians are putting their compositions on the Internet for others to hear. …You won't need a radio station and broadcast license to be a deejay or a TV station to be a newscaster. All you'll need are the tools to get your message on the Net." [p. 42]

Chapter 5. Masters of Our Own Domains => Personalization of Experience

"Rather than having editors and producers determine what we read, hear, and watch -- as we do with newspapers or television -- we can use the interactivity of the Net to gather just the material we find interesting." [p. 45]

"There is, however, an important difference between personalization and narrowcasting: in the latter case, the individual still is receiving information packaged by someone else and it may arrive whether one requests it or not. What's novel about personalization, by contrast, is the ability of individuals to decide what information they receive and how they receive it." [p. 46]

"News is not the only thing that individuals are starting to personalize. 'Mass customization' is the term that manufacturers use to describe the personalization of consumer goods. Consumers use computers and the Net to give vendors precise information about what they want to buy." [p. 47]

"Beyond personalizing information and products, the Net also gives individuals the ability to redefine their work and social spaces. Employment, for example, is changing as more individuals can choose to work out of their homes. … A recent study of the American economy describes a 'free-agent nation' comprised of 25 million workers who are self-employed or independent contractors -- thanks in large part to new technologies such as the Internet." [p. 48]

"As President Clinton noted in 1997, 'It will literally be possible to start a company tomorrow, and next week do business in Japan and Germany and Chile, all without leaving your home, something that used to take years and years and years to do.'" [p. 48]

"Because individuals are judged online mostly by what they say, virtual communities would appear to soften social barriers caused by age, race, gender, and other fixed characteristics." [p. 49]

Chapter 6. The Decline of Middlemen: Day Trading and "Electrified Voting"

"What drew me to the [online brokerage web] site initially was the ability to get instant updates on the value of my small, yet growing, cache of securities. It's information I could never get before on my own. Beyond just quotes, I can get access to research from major investment houses, up-to-the-minute news about different companies, and even corporate filings. I also can look at graphs plotting the performance of any stock in scores of different ways." [p. 53]

"But right now, there's something on the screen more alluring than all that information. It is a big, clickable Send Order button that is going to let me do something I've never done before, something I wouldn't have cared to do: buy a stock without consulting [my stockbroker] or paying him his commission. In a flash, I've sidestepped the establishment and taken on the market by myself." [p. 53]

"Online investing shows how individuals are taking power from intermediaries." [p. 54]

"Disintermediation is the somewhat ungainly word that is used to describe this circumventing of middlemen. … The concept can be usefully expanded to describe the way that technology allows individuals to bypass editors, educators, and other gatekeepers who stand between us and whatever it is we seek. The control revolution allows us to take power from these intermediaries and put it in our own hands." [p. 55]

"Amazon.com for example, is frequently cited as an example of disintermediation. And yet, although Amazon allows individuals to bypass many middlemen in the book business -- most notably, local bookstores, it is itself an intermediary, albeit a new kind of digital middleman." [pp. 55-56]

*"***Part Two, Resistance***, shows how powerful entities are trying to limit our new digitally enabled autonomy. Some governments, for example, are restricting our access to certain content and preventing us from taking advantage of certain technologies. Some corporations are manipulating our information choices while creating the illusion of personal freedom. And we, unwittingly, may be their accomplices. Seduced by the rhetoric of individual power, we may not even realize that the old guard is still in charge. … At the same time, the new personal control is threatened by an equally menacing but less predictable foe: its own unyielding momentum. "*

Chapter 7. An Anxious State => Controlling Speech, Secrets, and Creativity

"Encryption is a process by which digital information is encoded so that it remains confidential. …. Encryption tools, then, are the locks and keys of the digital age." [p. 73]

"Copyright, in other words, establishes a careful equilibrium between the rights of owners of creative works and the rights of users. Digital storage of information, however, changes things, making it easier for anyone to reproduce and instantly distribute protected material. … The Net in particular -- with its digital, interactive, distributed-network architecture -- has drastically changed the dynamics, and the economics, of copying." [p. 79]

"The Net seems to be a gigantic copying machine. As a result, many owners of works, particularly large commercial content providers, face a new threat." [p. 79]

*"***Part Three, Oversteer***, warns that individual control can be pushed too far. Enthralled with the idea of taking power from politicians, media giants, and price-inflating middlemen, we may lose sight of the benefits of representative democracy and of the need for intermediaries who bring us reliable news and high-quality products and services. Comforted by the sanctuary of filtered order in a world of sensory overload, we might unintentionally narrow our horizons, depriving ourselves of opportunities. Cherished values like community, free speech, and privacy could be diminished."*

Chapter 9. Narrowing Our Horizons

"In an age of proliferating information, personalization becomes all the more necessary. Faced with a deluge of sensory stimuli, we must filter and select just so we can deal with what would otherwise be an overwhelming tidal wave of data." [p. 106]

"The precision of digital interactive technology, however, raises the impact of filtering to a different level. It makes possible what we might call total filtering, the ability to exercise nearly absolute personal control over experience that once was subject only to very approximate control." [p. 108]

Chapter 10. A Fraying Net

"'You can create your own universe, and you can do whatever you want within that. You don't have to deal with people'" [p. 119]

"Researchers who conducted one of the first longitudinal studies of the Internet's social impact, the HomeNet study, were surprised when their data suggested that Internet use increases feelings of isolation, loneliness, and depression. Contrary to the hypotheses they began with, they observed that regular users communicated less with family members, experienced a decline in their contacts with nearby social acquaintances, and felt more stress." [p. 122]

Chapter 11. Freedom From Speech

"The American system of freedom of expression includes a kind of unspoken compromise between the unpopular speaker and the reluctant listener." [p. 127]

"When potential listeners can effortlessly screen out unwanted views, the ability of speakers to have their expression heard will depend increasingly on their ability to penetrate barriers of exclusion." [p. 129]

Chapter 12. The Drudge Factor

"After years of practice, I can walk into a bookstore and understand its layout in a few seconds. I can glance at the spine of a book and make a good guess at its content from a number of signs. If I see the words Harvard University Press, I know it's probably not going to be a cheap romance. I go onto the Net and I don't have those skills." Umberto Eco [p. 139]

"Misinformation is only really dangerous when there is both an unreliable source and a credulous audience As the amount of questionable material increases, then, we need to be ever more cautious and skeptical." [p. 140]

Chapter 13. Shopper's Heaven?

"Middlemen make up a huge sector of our economy and a good percentage of the modern workforce. In the near term, then, the move toward electronic commerce could substantially disrupt conditions of labor and productivity." [p. 143]

"In product markets, the effect of disintermediation is being felt already in the area of digital goods such as music and software. The retail chain Egghead Software, for example, closed the last of 200 stores in February 1998, laying off some 800 people and moving its remaining 200 employees to Portland, Oregon, to sell software via the Internet." [p. 143]

"Richard Sclove, of the Loka Institute, ...predicts that as commerce moves to the Net we will experience a 'cybernetic Wal-Mart effect'. Many local businesses will be unable to compete with their giant new online competitors, just as small family stores were unable to keep up when huge chains like Wal-Mart or Kmart moved into their area. But Sclove predicts things will be worse this time: 'Online, you're not just competing with the Wal-Mart on the outskirts of your town. You're competing with the full global marketplace. … Online commerce can spread out into virtually every sector of the economy. So local service providers -- lawyers, stock brokers, insurance agents, travel agents, all those kind of folks who formerly were competing with each other in local economies -- are suddenly competing nationally or even globally." Pp. 143-144]

"Another area where we traditionally rely on intermediaries is in protecting the integrity of transactions and preventing fraud." [p. 148]

Chapter 14. Push-button Politics

"We could become not just citizens, but citizen-governors -- each of us playing a role in governing the distribution of resources, the wielding of state power, and the protection of rights." [p. 154]

Chapter 15. Privacy for Sale

"The prevailing wisdom in the U.S. (including in the Clinton administration) has been that technology will empower individuals to protect their own privacy -- with little or no help from government." [p. 159]

*"***Part Four, Balance,** *charts a path between this Scylla and Charibdis. It describes how we can reap the benefits of the new control without succumbing either to resistance or to excess. To preserve democracy, truth, and individual well-being in this uncertain age will require a renewed sense of personal responsibility and commitment to our communities, as well as a fresh approach to governance that takes into account the shifting of control from institutions to individuals. We must achieve a balance of power for the digital age—between self-interest and public interest, the market and government, personal control and shared power."*

Chapter 16. Mapping Principles (Rules and Contexts)

"What's the right metaphor? Is content on the Internet like printed material, which is generally immune from government regulation? Or is the Internet more similar to radio or television, which traditionally have been regulated because channels of communication are scarce and expensive? Or is it most like telephones and the mail, to which the rules of common carriage have been applied, ensuring low-cost, universal service? [p. 169]

Chapter 17. Shattering Illusions (Convenience and Choice)

"At a minimum, many of the small, alternative commercial sites might not survive, and this could affect the diversity of the Net, leaving us with fewer options to choose from." [p. 181]

Chapter 18. In Defense of Middlemen

"The lesson here that applies to intermediaries generally is that we usually don't need to bypass middlemen so much as we need to reform them -- or find new ones." [p. 191]

Chapter 19. In Defense of Accidents (Order and Chaos)

"Gup's composition is a delightful ode to accidents -- the small, unplanned occurrences that take us by surprise and uncover curious gems we would not otherwise have looked for or found. Sometimes these gems are people, sometimes natural phenomena, other times just random information that would have escaped our ken were it not for the presence of chance." [pp. 197-198]

"Randomness, serendipity, and surprise can account for some of the most pleasing aspects of life." [p. 198]
"Schools and universities have a special role to play in

seeing to it that citizens in the digital age do not fall into the trap of using individual control to indulge only their own interests." [p. 201]

"Encouraging people to encounter difference is another way of saying that we should occasionally give up control, loosening the taut order of habit and social constraint to see things from another perspective." [p. 202]

Chapter 20. Surf Globally, Network Locally (Individual and Community)

"The ease of exit from online associations means that we may form weak bonds with others faraway, often at the expense of the strong ties that come from shared experience with the friends and neighbors who live near us." [p. 209]

"We must recognize, for selfish and societal reasons alike, the importance of focusing on the local. For most of us, this is where we will find a true sense of belonging; shared experience, even if not ideal, creates a sense of commitment. For all of us, this is where democracy and social justice must first be achieved; getting our own house in order is always the first priority." [p. 209]

Chapter 21. The Tools of Democracy (Markets and Government)

"Part of the problem is that the control revolution does not assure a linear transfer of power from institutions to individuals. … But given the hugely disproportionate power of corporations, we simply may not be able to leverage our new abilities against the private sector." [p. 218]

"In the last five chapters, I have argued that balance can be achieved if we apply principles in context, reconcile convenience and choice, and recognize the value of middlemen, accidents, and localism." [p. 218]

Epilogue

"Even as public and private authorities must take into account the new personal control, there must be equilibrium between individual and institutional competence, personal goals and common ends, self-interest and public interest. Dedicating ourselves to such a balance of power means that we will take advantage of our new abilities, but not abuse them -- that we will both exercise our rights and fulfill our obligations."

The Control Revolution Applied to Higher Education: Twenty Questions

It is instructive to speculate concerning how Shapiro's concepts might apply to universities as gatekeepers. Some conclusions, questions, and supporting arguments include the following:

(1) Does diversity abound in the American system of higher education?

> Yes. A student can select among a variety of higher-education institutions, including research universities, liberal-arts colleges, religious-oriented colleges, community colleges, trade schools, military service education, urban and rural institutions. A student can select among fifty or more disciplines ranging from philosophy and music to chemistry and chemical engineering. The concept of elective courses permits a student to further personalize his/her educational experience, including the completion of a minor and the exploration, as a CO-OP, of the working environment associated with a career choice.

(2) Does a competent faculty advisor permit a student to personalize his/her academic career so that he/she can graduate with a unique set of knowledge, skills, and experience?

> Yes, provided that the advising function is handled well. The CO-OP program does an excellent job of augmenting student skills and experience. Competent academic advising remains a critical, and highly personal, aspect of higher education.

(3) Engineering colleges, departments, and faculty are the middlemen in higher-education institutions. Are any, or all, of these threatened by the disintermediation that is being caused by the existence of both the Net and distance learning?

> Bruce Finlayson, in his Philips Lecture on April 12, 1996 [**4**], concluded that: *"… professors <u>can</u> use technology, and there is some room for <u>faster, better, cheaper</u> education. Those attributes do not occur automatically, though, because some of the technologies are close to break even unless the learning methods are dramatically better than in the lecture format. It will require a lot of work on the part of professors to engage in these activities, and university administrators need to be conscious that there is a great difference between meeting a class in person, where corrections are easy and mistakes are not cast in stone, and meeting a class on TV, where preparation needs to be extensive.*

However, the Internet provides a way to share information, do it at long distances, and CD-ROMs provide the capability to learn by reading and listening and interacting. If professors are willing to explore the technologies, and watch their students, they will be amazed at how they react and what they learn. Also keep in mind that if our current students are from the Nintendo generation, then future professors will also be from the Nintendo generation, and you need to keep your job skills up-to-date. I encourage you to try it and have fun."

An essay, "Too Many Departments", written twenty-five years ago by Henry A. McGee, Jr. [**5**], addressed the issue of whether some states support too many chemical engineering departments at public institutions. More recently, during the 1990s, Henry was tasked with the job of founding a new College of Engineering at Virginia Commonwealth University in Richmond, VA. Why did the Commonwealth of Virginia feel it necessary to add a new College of Engineering to existing ones at Virginia Tech, the University of Virginia, and Hampton University? Because community leaders in Richmond felt that their large metropolitan area needed a College of Engineering in order to remain competitive in the competition to attract, to the Commonwealth, high-tech industry (for example, a billion-dollar, Motorola semiconductor fabrication plant located in Goochland County near Richmond).

A timely news item, "Online Education to Be Free", by Cindy Loose, appeared in the *Washington Post* on Wednesday, March 15, 2000: *"Billionaire Michael Saylor, founder and chief executive of the software company MicroStrategy, is donating $100 million as a first 'down payment' on a new online university that he says will offer 'Ivy League-quality education' through lectures from the world's 'geniuses and leaders' who will donate their services to get recognition (if they're unknown) or to contribute to posterity (if they are already famous). The university will soon begin hiring a chief administrator and curriculum experts, writers, editors, producers, marketers, and hardware and software experts. Saylor, who compares his idea to 19th century industrialist Andrew Carnegie's establishment of free public libraries, says, 'Universities will lose control of knowledge, as they should. We all share the right to our leaders and geniuses.'* "[**6**] This new university is still in the planning phase. Who knows if it will reach fruition. The suggestion that the world's geniuses and leaders will donate their services appears excessively optimistic, and perhaps unrealistic.

(4) At colleges and universities, is there a possibility of a significant transfer of power from administrators and faculty to students?

During the 1990s, the tide of public opinion has begun to turn from research to undergraduate education. For example, in the Commonwealth of Virginia, both the public and its legislators now pay considerably more attention, at its leading research institutions, to the quality of undergraduate education than to the quality of research accomplishments. Accreditation of engineering departments is moving steadily to undergraduate outcomes assessment, supported by extensive and varied performance measurements. Students in general have yet to make broad, concerted efforts to take more control over their education.

(5) What new work environments will chemical engineering graduates encounter in the 21st century?

Possible answers include telecommuting from homes, self-employment, independent contracting, increased incentives to become entrepreneurs, and a global perspective concerning chemical engineering opportunities. ChE seniors at Virginia Tech have recently become much more interested in courses offered by our College of Business. Business schools have already started to react to the "Control Revolution": every major school now has at least one course, if not whole programs, related to e-commerce. [**7**] *"Walls of brick and mortar are tumbling down as e-commerce creates virtual chemical companies.*"[**8**] See the answer to question (6).

(6) Compared to their early-1970s counterparts, will 21st-century chemical engineering graduates be more entrepreneurial and venturesome in their career choices?

In 1972, when I first joined academia, the prototypical successful career of a B.S. ChE graduate was a 40-year job in a large CPI company followed by retirement. At that time, I encountered few graduates who struck me as being entrepreneurial. It is likely that an increasing percentage of our ChE graduates will consider entrepreneurial pursuits during their professional lifetimes.

In a feature article on "E-commerce and the virtual chemical company", Peter J. Knox (editor-in-chief and associate publisher of *Chemical Processing*) observes that "*virtual companies are communities of conventional businesses that cooperate in ever-shifting alliances; they concentrate on their core competencies -- like manufacturing chemicals -- and let others take over secondary pursuits, such as trucking, packaging, or whatever.*"[**8**] Virtual companies will provide one

future avenue for entrepreneurial pursuits by chemical engineers. The virtual chemical company is also a consideration in answers to questions (5) and (16).

(7) Will engineering textbooks become personalized, allowing students to decide what information they receive and how they receive it? [**9**]

Stephen King's newest book, *Riding the Bullet*, sold over half a million copies on the web: 400,000 paid and free downloads within the first 24 hours. [**10**] In a *Newsweek* article, Steve Riggio, head of Barnesandnoble.com is quoted as follows: "*it's the liberation of publishing. With a keystroke, it's a worldwide market, no trucks, no printers, no publicity departments. It's friction free. If anybody doesn't think that's exciting, they really should return to the 19th century*." [**11**]

With the 648-KB program called Napster [**12**], a user downloads the program at no charge, types in the identity of the desired sound tracks (e.g., Jerry Garcia tunes, Gregorian chants, a movie soundtrack), and Napster lists what is available on MP3 format on hard drives scattered everywhere. After Napster finds the desired MP3 file, the user can download it. The Recording Industry Association of America (RIAA) has sued Napster in what may be a precedent-setting court case. [**13**] The RIAA is an example of another gatekeeper that is being challenged by new information technology. The Napster technology could be applied to the downloading of other types of files, not just MP3 music files.

(8) Amazon.com is cited as an example of disintermediation. Might a comparable "Academic.com" organization allow students to bypass middlemen in the education business, allowing Academic.com itself to become a new intermediary.

It's starting to happen already; not just billionaires are planning virtual universities. Harcourt General, www.harcourt.com, announced in June 1999 that they will create a for-profit, accredited, distance learning university. The institution will provide library support and academic counseling to students.

Many questions will remain unanswered in this essay:

(9) Will the many-to-many-interactivity quality of the Net encourage efforts by chemical engineering students to collaborate and compete among themselves as creators of content?

(10) Will Net-based laboratory experimental systems -- remotely accessible by TCP/IP -- replace resource-intensive undergraduate engineering laboratories?

(11) Will engineering students depend more on the Net than on university libraries to acquire engineering information?

The engineering students of the near future (9 to 17-year-olds) are already consistently using the Internet. Over half of those students who access the Internet use it for homework every week. [**14**]

(12) Will engineering students use technology to bypass educators and other gatekeepers who stand between them and their career goals?

Again, the Internet has enabled future college students (10^{th} to 12^{th} graders) to gather information without relying on the gatekeepers, *i.e.*, parents and guidance counselors. These students now rate college Web sites as their leading source of information and, even more startling, equate the quality of the Web site with the quality of the college itself. [**15**]

(13) In competition with distance learning and "Academic.com"-type middlemen, will the university of the 21st century increasingly emphasize (e.g., in ads appearing during football intermissions) the social aspects of the academic community? Examples include career advising, enhanced social contacts with student colleagues, a true sense of belonging, shared experience, a sense of commitment, and opportunities for service? Or, with the possibility of online classes in the next 20 years with 1000+ students each, will the university transform itself into the virtual-university?

(14) How will Net education, such as distance learning, protect the integrity of the educational process and prevent fraud?

(15) Will many of our small colleges not survive, thus affecting the diversity of higher education, and leaving students with fewer options to choose from?

(16) Will 21st-century engineering graduates increasingly compete for jobs with professionals who telecommute from elsewhere in the world?

(17) Will web-based education become so common that 21st-century engineering students will take it for granted?

(18) If 21st-century engineering students rely on the Net for their education, will they be able to identify the signs of quality?

(19) Will 21st-century students prefer isolation as opposed to randomness, serendipity, and surprise?

(20) Will the eternal struggle between hackers and computer security experts/anti-virus software put online education at risk?

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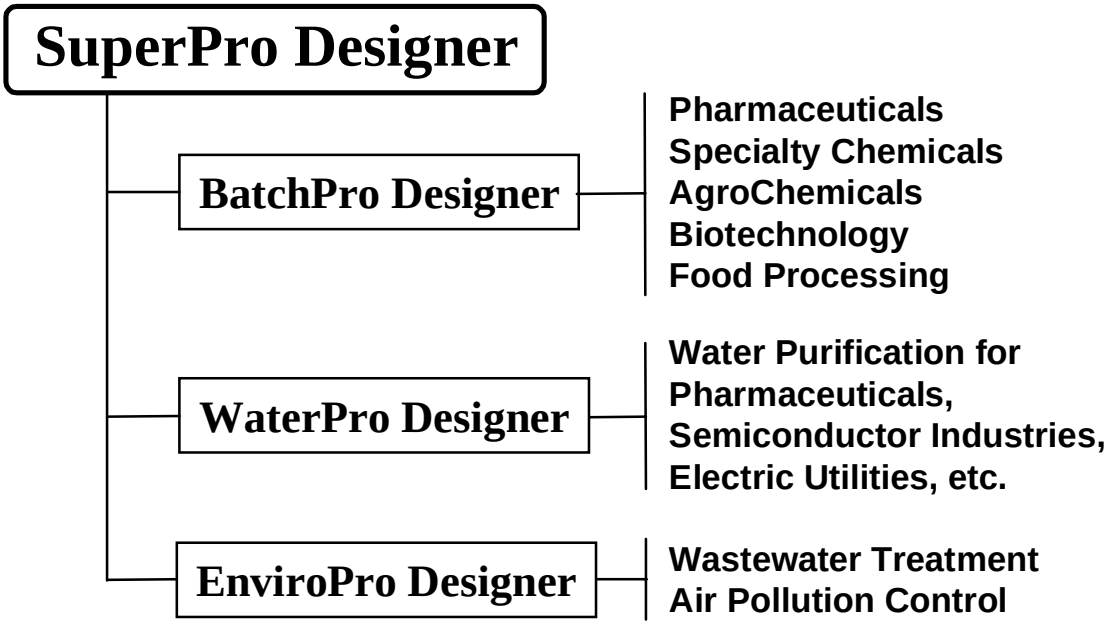

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COMMUNICATIONS

Jim Rawlings is the Recipient of the 1999 Computers in Chemical Engineering Award

By Jim Davis and Peter Rony

"For significant research, computing and systems technology transfer to industry, and valuable leadership and service to the CAST community," Jim Rawlings, won the 1999 CAST Computing in Engineering award. Dr. Rawlings received his Ph.D. in Chemical Engineering from the University of Wisconsin - Madison, where he is currently a Paul A. Elfers Professor of Chemical Engineering. He has written more than 30 papers highlighting model predictive control and has been quite active in technology transfer, notably through his development (with John Eaton) of OCTAVE. Jim's leadership of CAST Area 10b, the CAST Email List Archive, and willingness to chair IFAC and CPC meetings demonstrate his commitment to the Computing and Systems Technology community. Dr. Rawlings is also a member of the American Automatic Control Council, the American Chemical Society, the American Institute of Chemical Engineers, International Federation of Automatic Control, and the Society for Industrial and Applied Mathematics.

The extended citation stated: *"As described in supporting letters, James B. Rawlings has made significant contributions to many different aspects of computing and systems technology. He has made important original research contributions to the field of model based process measurement and control. Industry has shown their interest in this work by their support of the Texas-Wisconsin Modeling and Control Consortium. To further speed the industrial impact of these and other results Jim (with his former student, John Eaton) has provided OCTAVE software for students and industrial systems engineers. This software, freely downloadable from the web, is used around the world. To enable the transfer of computing and systems technology to industry, Jim (together with a colleague from Rice University, Tom Badgwell) has put on numerous short courses for industry in the area of model predictive control. The students not only learn to apply MPC to many practical problems, but they use OCTAVE to solve control system design problems - thus taking away new knowledge as well as an enabling software package. Jim Rawlings has provided valuable leadership and service to the computing and systems technology community through his organization of the programming of IFAC, ACC, AIChE, and CPC conferences, his journal editorship, and his contributions to the web-based computerization of CAST's communication with members."*

There are three major areas of accomplishment that are recognized by this award. The following quotations were obtained from the supporting letters.

(1) Significant Research Accomplishments:

"Rawlings is currently one of the leading figures in process control. His contributions over the past 15 years include the development of sophisticated control strategies that are well mated to process applications."

"Jim's greatest contribution to the chemical engineering literature over the past 10 years has been the 30 or so papers related to model predictive control…his papers are now cited in almost every MPC journal article I read" …"Rawlings has made significant scientific and technical contributions to the theory and applications of nonlinear model predictive control and moving horizon estimation."

"There are precious few researchers in the entire field of chemical engineering who will ever produce work fit to be considered a seminal and lasting contribution: Jim is destined to be one of them."

(2) Technology Transfer to Industry through Consprtia, Software, and Teaching:

"...The Texas-Wisconsin Control Consortia...is one of the top consortia in the world and has led to significant benefits to both industrial and academic research...Jim's teaching of numerous short courses on the fundamentals, implementation, and application of model predictive control have been superb and had a lasting influence on the control profession."

"He has chosen to actively collaborate with other faculty and industrial researchers...Jim has developed a highly successful continuing education course with Tom Badgwell ...so his influence is not just on the control literature but also on industrial practice"

"His commitment to technology transfer is also documented by the many short courses he has been...teaching…OCTAVE…(provides) all the computational functionality required to implement and experiment with modern control and estimation techniques... "

"One of Jim's most enduring contributions to the application of computing and systems technology in chemical engineering is the development (along with

former graduate student Dr. John Eaton) of OCTAVE. OCTAVE is used world-wide for teaching, research, and even for commercial applications. Jim has taught more than 10 short courses on model predictive control to industrial practitioners including DuPont control engineers."

(3) Leadership and Service to the Computing and Systems Technology Community:

"In addition to his outstanding research accomplishments, Jim's record shows a high quality of commitment and service to the profession…clearly seen...in the way he has led CAST Area lob and initiated many new project…the enhanced and extended the CAST web page to the point that it is an essential communications and distribution element to most CAST members."

*"Jim is a valued member of the control community by virtue of his service…he has chaired several important IFAC meetings and will chair WC VI in the year **2001.** He ...has conducted his programming responsibilities effectively and has broadened the involvement of the members..."*

"Jim has been a truly selfless citizen of the community… "

Ferhan Kayahan and John Baldwin Share the 1999 Computing Practice Award

By Jim Davis and Peter Rony

FERHAN KAYIHAN

The 1999 Computing Practice Award is presented to co-recipient Ferhan Kayihan for *"his pioneering work on the development of fundamental models and advanced control methods for processes of strategic importance to pulp and paper industry and for fostering research collaborations with academia."*

Dr. Kayihan is currently the President and owner of IETek, a consulting company that provides high-quality process systems engineering services to the Pulp and Paper Industry. He received his Ph.D. in Chemical Engineering from the University of California, Santa Barbara. He has made invaluable contributions to the pulp and paper industry, both through his studies in drying and stochastic dynamic modeling, as well as through his efforts to produce more collaboration between industry research and university research. Ferhan's continued support of young faculty members in the process control community and his organization of workshops and postdoctoral fellowships at Weyerhauser demonstrate his commitment to both the industrial and academic community. Dr. Kayihan is also a member of the American Institute of Chemical Engineers, The American Chemical Society, TAPPI, CPPA, FPRS, and IUFRO. He is an industrial trustee on CACHE.

Excerpts from the supporting statements on behalf of Dr. Kayahan include:

"I have viewed him to be the role model for the effective senior industrial technologist of the 21st century: an individual able to build and sustain effective research partnerships with academia which leverage his company's technical resources and bring value to all the partners."

"He has developed first principles mathematical models for some of the key process units in the pulp and paper industry. These include batch lumber kilns, Kamyr digesters and paper machines. His mathematical modeling of moisture transport during wood particle drying received the best paper award in 1988. His stochastic dynamic modeling work for batch lumber kilns was used to compute and implement optimal drying schedules. His findings have had drastic impact on the way Weyerhaeuser operated their kilns."

"In additional to his personal research accomplishments, Ferhan has also been a strong promoter and innovator in developing collaborative research partnerships with academia. He began this over a decade ago, before such collaborations had become widely discussed and practiced, and has made these collaborations successful because of the intense attention which he devoted to building effective working relationships with both the faculty member and the graduate students. He has been innovative in using internships, sabbatical leave, summer assignments, workshops, and other formats to bring academic researchers in contact with Weyerhaeuser researchers and plant engineers."

JOHN BALDWIN

The 1999 Computing Practice Award is presented to co-recipient John Baldwin for *"creating and leading the Process Data eXchange Institute, for fostering international data exchange standards, and for promoting use and improvements to process engineering computing tools."*

Dr. Baldwin earned his Master's and Ph.D. in Chemical Engineering from Texas A&M University, where he is currently a Senior Lecturer in the Chemical Engineering Department. Much of his work concerns the application of computing technology to solve problems in Chemical Engineering, and his organization of the Process Data eXchange Institute (pdXi) has proved to be a major

contribution. John has been active in the area of course development, where his accomplishments include creating a graduate level process design course, and chairing the committee on design, control, and computation courses at Texas A&M. Dr. Baldwin is also the Education Director for pdXi, the President of his consulting firm Process Information Technologies, Inc, and a member of the American Institute of Chemical Engineers.

The supporting statements on behalf of Dr. Baldwin made the following points:

"For many years to come the impact of John's vision and dedication will be felt by practitioners around the world."

"Throughout my work association with John, I have found him to be an innovative thinker, an excellent organizer and motivator of people, and an insightful manager who understands how organizations work together effectively."

"John's greatest contribution is the conception and organization of the Process Data exchange Institute, or pdXi. John Baldwin was the first to conceive and organize the idea of a cooperative effort to define an industry-wide, common file format that could be used to electronically exchange process engineering data among programs, databases and organizations. John first suggested this idea at the FOCAPD in the summer of 1989."

"The conception and formation of pdXi is a significant contribution to Chemical Engineering Computing Practice. pdXi was the first process industry consortium to undertake development of process industry electronic data exchange standards for technical data. In my opinion, of all the related similar efforts which have developed in the years since pdXi was formed, pdXi's technical work remains the most advanced and comprehensive in its scope and thoroughness."

"The number of simulators available to the students at Texas A&M has been increased to include all the major systems, Additionally, the ICARUS Process Evaluator (IPE) software for sizing, economic evaluation, and project planning has been added. We were fortunate to exploit his extensive industrial background on process design and development to better prepare our graduates for the real world job market. Thanks to John's efforts, our BS graduates now have hands on experience with various simulators and know the capabilities. Through his initiative, we are now using different aspects of simulators virtually in every undergraduate course."

"Kellogg became the first - and one of the most demanding -clients of Aspen Technology when we formed the company in 1981. Requirements articulated by John, based upon his experience at Kellogg, resulted in many enhancements and improvements in the ASPEN PLUS process simulator throughout the decade of the 1980s."

Pangiotis Christofides is the 1999 Ted Petersen Award Winner of the CAST Division

By Jim Davis and Peter Rony

For his outstanding contributions to the analysis and control of non-linear distributed parameter processes, Panngiotis D. Christofides received the 1999 CAST Ted Petersen award for the two papers,

"Feedback Control of Hyperbolic PDE Systems", AIChE J., 42(11), 3063-3086, 1996."

"Finite-Dimensional Control of Parabolic PDE Systems Using Approximate Inertial Manifolds", J. Math. Anal. Appl., 216, 398-420, 1997."

based on research performed by Dr. Christofides as a Ph.D. student. He received Master's degrees in Electrical Engineering and Mathematics, and a doctorate in Chemical Engineering from the University of Minnesota. He is currently an Assistant Professor of Chemical Engineering at UCLA, where he has received the 1997 Distinguished Teacher Award, the 1996 UCLA Council on Research Award, and the 1998 National Science Foundation CAREER Award. Dr. Christofides is also a member of the American Institute of Chemical Engineers, the Society of Industrial and Applied Mathematics, and the Technical Chamber of Greece.

The nomination package provided the following summary of the contribution of the papers:

"The development of control methods that deal systematically with nonlinearities and the spatially varying nature of chemical engineering processes is a major theoretical problem, whose practical importance ranges from traditional chemical operations (e.g., fixed- and packed-bed reactors) to modern technologies in materials processing (e.g., chemical vapor deposition reactors and rapid thermal processing). These papers developed, for the first time, rigorous, yet practical nonlinear control methods for transport-reaction processes modeled by nonlinear hyperbolic and parabolic partial differential equation (PDE) systems."

"The first paper developed a nonlinear distributed control method for convection-reaction processes modeled by nonlinear hyperbolic PDE systems. Such systems are characterized by spatial differential operators whose

eigenvalues cluster along vertical or nearly vertical asymptotes in the complex plane, which implies that an infinite number of eigenmodes is required to accurately describe their dynamic behavior. This prohibits the application of modal decomposition techniques to derive ODE models that approximately describe the dynamics of the PDE system and suggests addressing the control problem directly on the basis of the PDE system. Initially, the paper introduced a novel system-theoretic concept of 'characteristic index' which allows a precise characterization of the spatio-temporal interactions between controlled outputs and manipulated inputs in hyperbolic PDE systems. This concept was used to synthesize concrete nonlinear distributed state feedback control laws for stabilization and output tracking, developing essentially the 'distributed' analogue of the nonlinear state feedback synthesis methods that are the cornerstone of state-space nonlinear control methods for ordinary differential equation (ODE) systems. The paper proceeded with a generalization of Luenberger's state observer design approach in a PDE setting, and the combination of the state feedback controllers and the state observers for the synthesis of practically implementable nonlinear distributed output feedback controllers. In addition to new system-theoretic concepts and controller synthesis results, the paper also included a rigorous analysis of the closed-loop system using methods from functional analysis. This analysis provided precise conditions for closed-loop stability and robustness to modeling errors, expressed in terms of a new concept of infinite-dimensional zero dynamics. The paper also provided valuable insights on practical issues, such as the effect of the location of control actuators and measurement sensors on controllability and observability. Furthermore, to add a tutorial component, the paper presented the above development in parallel with treatments on control of linear PDE systems, as well as on geometric control of nonlinear ODE systems, identifying conceptual and technical analogies and differences, whenever appropriate. Finally, the paper illustrated the practical application of the developed method to a nonisothermal plug-flow reactor to control the product composition throughout the reactor, and demonstrated its advantages over nonlinear control schemes based on 'early-lumping' of the distributed parameter process."

"The second paper developed a method for the synthesis of nonlinear low-dimensional output feed-back controllers for diffusion-convection-reaction processes modeled by nonlinear parabolic PDE systems. In contrast to hyperbolic PDEs, parabolic PDEs involve spatial differential operators whose set of eigenvalues can be partitioned into a finite dimensional 'slow' set (which includes eigenvalues that are close to the imaginary axis) and an infinite dimensional 'fast' complement (which includes eigenvalues that are far in the left half plane). This separation of the eigenval-ues implies the existence of low-dimensional structures (called Inertial Manifolds) that capture the dominant dynamics of the PDE system, and suggests addressing the controller synthesis problem on the basis of low-dimensional ODE approximations of the PDE system. Initially, the paper used Galerkin's method to derive an approximate ODE system of dimension equal to the number of slow eigenvalues and employed singular perturbation methods to establish that the discrepancy between the solutions of this ODE system and the parabolic PDE system is proportional to the degree of separation of the slow and fast eigenvalues of the spatial operator. This implies that for parabolic PDE systems for which the separation of the slow and fast eigenvalues is not very large (e.g., when both diffusive and convective phenomena are important), the number of modes that should be re-tained to derive an ODE system that yields the desired degree of approximation may be very large, thereby leading to high dimensionality of the resulting controllers. To overcome the problem of high dimensionality, the paper proposed a novel procedure, based on singular perturbation theory, for the construction of approximations of the inertial manifold (called approximate inertial manifolds (AIMS)) of the PDE system. The AIMS were used for the derivation of ODE systems of dimension equal to the number of slow modes. The paper established that these ODE systems yield solutions which are close, upto a desired accuracy, to the ones of the PDE system, for almost all times. These ODE systems were then used as the basis for the synthesis, through geometric control methods, of low-dimensional nonlinear output feedback controllers that guarantee stability and enforce the output of the closed-loop parabolic PDE system to follow upto a desired accuracy, a pre-specified response for almost all times. In addition to new model reduction and controller synthesis results, the paper compared the proposed approach for the construction of AIMS with existing ones, and addressed practical issues on the computation of AIMS. The developed control method was used to synthesize a second-order nonlinear controller for a nonisothermal packed-bed reactor to control the temperature profile throughout the reactor; the performance of the controller was shown to be significantly superior to the one of a second-order nonlinear controller synthesized on the basis of an ODE approximation obtained from standard Galerkin's method."

"The theoretical concepts and the analysis/synthesis tools introduced in the first paper were also used as the basis for successfully addressing the problems of elimination of measurable disturbances via feedforward compensation, attenuation of parametric uncertainties via Lyapunov-based ro-bust contro land robustness to unmodeled dynamics via singular perturbation techniques for nonlinear hyperbolic PDE systems, in subsequent papers. The model reduction procedure introduced in the second paper was utilized on the synthesis of Lyapunov-based

controllers for parabolic PDEs with uncertainty while the developed finite-dimensional control algorithms were successfully implemented on diffusion-convection-reaction processes and a rapid thermal chemical vapor deposition reactor. Finally, the integration of the above results with recent developments on nonlinear model reduction and control of parabolic PDE systems with time-dependent spatial domains led to the first research monograph on nonlinear and robust control of nonlinear PDE systems."

Supporting letters stated the following:

"These papers establish Professor Christofides as a leader in this field. Both papers may very well become classics in this area."

"Taken as a whole, the two papers advance a consistent theoretical framework for the synthesis of controllers for distributed reacting processes. For example, there is a common set of control theoretical concepts on which the analysis and synthesis methodologies for the papers are based, e.g. feedforward compensation, attenuation of parametric uncertainties robustness to modeling errors, etc. In addition, the innovative concept of "characteristic index" (introduced in the fist paper) allows a very precise quantification of the spatio-temporal interactions between controlled outputs and manipulated inputs for dynamic distributed systems."

Karl Schnelle is the new Associate Editor of CAST Communications

Karl Schnelle is a Senior Scientist at Dow AgroSciences LLC. He received a BS degree from Vanderbilt University and a PhD degree in 1992 from Northwestern University, both in Chemical Engineering. Dr. Schnelle is associated with the Global Math Modeling group of Dow AgroSciences where he develops and applies optimization, simulation, and statistical techniques to solve issues in agrochemical R&D and manufacturing. Recent significant projects have involved prediction of environmental fate of agrochemicals, crop growth modeling, design and scheduling of manufacturing plants, supply chain planning, and advanced statistical analysis of plant data. He has been a member of CAST since 1992.

Karla Simpson is the Producer of CAST Communications

Karla Simpson is an Administrative Assistant for R&D Information Management at Dow AgroSciences LLC. She received a B.S. degree in Office Systems Administration from Ball State University. Karla was a sales representative for 13 years primarily selling microcomputer hardware, software, and training products before joining Dow AgroSciences in 1998. Her most significant achievements in the sales field were as follows: closing and managing an annual Quantity Purchase Contract for Microcomputers and Software awarded by the State of Indiana and City of Indianapolis two years consecutively, and closing the largest national instructor led training contract awarded to her employer in the Central Region. Karla has assembled five issues of the CAST newsletter for publication.

How to Contact the AIChE

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For answers to special questions, try one of the following staff:

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Past postings on the CAST10 Email List are archived on the World Wide Web at **http://www.che.wisc.edu/cast10**

Don't forget to look at our new website, www.castdiv.org

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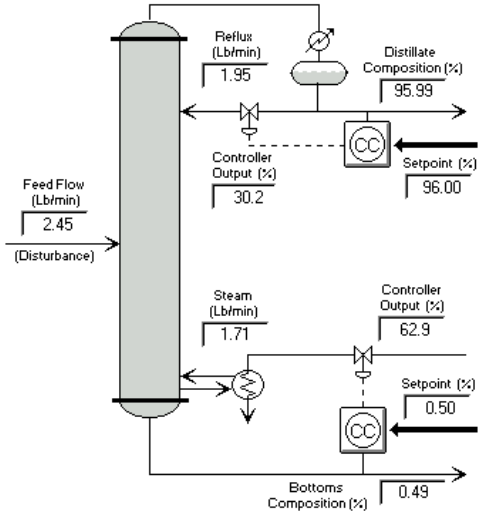

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MEETINGS, CONFERENCES, CONGRESSES, SHORT COURSES AND WORKSHOPS

To submit a paper for consideration at any event listed below, please contact the symposium coordinator or session chair directly. Many of these and other announcements, such as Calls for Papers, are distributed by electronic mail to the CAST Email List and are archived at http://www.che.wisc.edu/cast10/. AIChE also maintains lists of upcoming conferences at http://www.aiche.org/conferences/ and future ones at http://www.aiche.org/conferences/calendar/.

CAST Division sponsored meetings. For further information or details about each of the four CAST Division programming areas, contact the appropriate Area Program Coordinator as noted in the *CAST Communications* masthead. For general information concerning sessions and scheduling, or to correct errors in the listing, please contact CAST Division Programming Chair: Michael F. Malone, Department of Chemical Engineering, University of Massachusetts, Amherst, MA 01003-3110, 413-545-0838, 413-545-1647 (FAX), mmalone@ecs.umass.edu.

Year 2000

European Symposium on Computer Aided Process Engineering-10 (ESCAPE-10)
Palazzo Congressi (Villa Vittoria), Florence, Italy;
May 7-10, 2000
http://www.aidic.it/escape-10/escape10.html

This European Symposium on Computer Aided Process Engineering (ESCAPE) is the tenth event of a series, started in Elsinore Denmark in 1992, of annual Symposia promoted by the "Computer Aided Process Engineering (CAPE)" working group of the "European Federation of Chemical Engineering (EFCE)". The most recent symposia were organized in Budapest, Hungary 1999 (ESCAPE-9), Bruges, Belgium 1998 (ESCAPE-8), Trondheim, Norway 1997 (ESCAPE-7) and Rhodes, Greece 1996 (ESCAPE-6). Emphasis will be placed on two fields: Emerging Issues and Industrial Applications in Numerical Methods, Process Design, and Dynamics & Control; and a Process Integrated Approach for Environmental Benefit, Loss Prevention and Safety, and Computational Fluid Dynamics. ESCAPE-10 is organized by AIDIC, the Italian Association of Chemical Engineering, a member society of the European Federation of Chemical Engineering. Contact AIDIC, ESCAPE10 Secretariat, Piazza Morandi 2, 20121 Milano (Italy), Voice: +39-02-76021175, Fax: +39-02-799644, escape10@aidic.it http://www.aidic.it.

International Symposium on Advanced Control of Chemical Processes (ADCHEM 2000)
Palazzo dei Congressi, Pisa, Italy; June 14-16, 2000
http://adchem-2000.ing.unipi.it/ and http://adchem-2000.cheme.cmu.edu/

Organized under the auspices of IFAC, ADCHEM is a continuing series of international meetings held most recently in Banff, Canada (1997), Kyoto, Japan (1994), and Toulouse, France (1991). These meetings have traditionally focused on advances in methods for control and estimation and are part of a three year rotation of IFAC meetings in process control, which also include DYCOPS (Corfu, 1998) and the IFAC World Congress (Beijing, 1999). For the upcoming ADCHEM meeting, contributed papers were considered in modeling and simulation (including first principle models, data driven models, and model reduction for control and optimization), model based control (including linear and nonlinear MPC, linearizations based geometric concepts, etc.), real-time optimization (including optimization of steady state and dynamic models, and integration with control systems), process and control monitoring (including PCA and other statistical techniques, auditing of sensors, etc.), process identification (including estimation and filtering of linear and nonlinear systems), and process control applications and plant-wide control (including the control of environmental systems, petroleum refineries, etc.). Further information is available from adchem2000@ing.unipi.it or Prof. Claudio SCALI, Chemical Engineering Department, University of Pisa, Via Diotisalvi, 2 56026 Pisa (I), Tel: 0039-050-511241, Fax: 0039-050-511266, scali@ing.unipi.it, http://cpclab.ing.unipi.it/~scali.

2000 American Society for Engineering Education (ASEE) Annual Conference
America's Center, St. Louis, Missouri; June 18-21, 2000
http://asee.org/conferences/annual2000/

The 2000 Annual Conference is entitled "Engineering Education Beyond the Millennium". In keeping with the conference theme, some of the sessions that the ChE Division (CHED) is planning include (with tentative titles): CHED#5 - Information Technology: The Future of ChE Instruction and CHED#8 - ChE, Computers and the Next Millennium: Innovative Uses. The ChE Division Program Chair is Robert M. Ybarra, PhD143 Schrenk Hall, Department of Chemical Engineering University of Missouri-Rolla, Rolla, MO 65409-1230, Voice: 573-341-4424, FAX: 573-341-4377, rmybarra@umr.edu.

IFAC Symposium on System Identification, 2000
Fess Parker Doubletree Resort, Santa Barbara, California; June 21-23, 2000
http://www.ece.ucsb.edu/ccec/SYSID2000/

Please join us in Santa Barbara for the 12th IFAC SYSID symposium, sponsored by the IFAC Technical Committee on Modeling, Identification and Signal Processing; the American Automatic Control Council; and UCSB Electrical and Computer Engineering Dept. This triennial conference is IFAC's largest symposium and has not been held in the USA since 1982. It will be held the week before the 2000 ACC in Chicago so that visitors from overseas will be able to easily attend both conferences. Topics include theory, applications and case studies in the broad areas of: System identification; Adaptive control and signal processing; System monitoring; Modeling; Simulation; and Validation. For further information, please contact: sysid2000@ece.ucsb.edu.

2000 American Control Conference
Hyatt Regency Hotel, Chicago Illinois; June 28-30, 2000
http://che.vill.edu/acc2000/acc.html or
http://www.ece.nwu.edu/~ahaddad/aacc/acc.html

The American Automatic Control Council will hold the nineteenth ACC in Chicago, June 28-30, 2000. Held in cooperation with the International Federation of Automatic Control, this conference will bring together people working in control, automation, and related areas in the aerospace, chemical, electrical, mechanical, manufacturing, and process engineering fields. As in the past, the CAST Division will develop a number of invited, contributed, and tutorial sessions. The AIChE Society Review Chair is Ahmet Palazoglu, Department of Chemical Engineering and Materials Science, University of California, Davis, CA 95616-5294, 530-752-8774, 530-752-1031 (FAX), anpalazoglu@ucdavis.edu.

Seventh International Symposium on Process Systems Engineering (PSE-2000)
Keystone, Colorado; July 16-21, 2000
http://atom.ecn.purdue.edu/~pse2000/

PSE-2000 is the seventh in the triennial series of international symposia on process systems engineering and the first of the series to be held in the United States. The purpose of the meeting is to bring together the community of researchers and practitioners involved in the creation and application of computer-based methodologies for planning, design, operation, control, and maintenance of chemical processes. The special focus of PSE meetings is the integration of the enabling technologies and application domains. The conference is cosponsored by the European Federation of Chemical Engineering, the Inter American Confederation of Chemical Engineering, and the Asian Pacific Confederation of Chemical Engineering and will be organized in a large part by the CAST Division. The symposium will have both oral presentations and poster sessions in areas such as synthesis and design, modeling and simulation, control, planning and scheduling, operations, intelligent systems, and industrial applications and case studies. For further information, contact the conference chairs G. V. Reklaitis, School of Chemical Engineering, Purdue University, West Lafayette, IN 47907-1283, 765-494-4075, 765-494-0805 (FAX), reklaiti@ecn.purdue.edu or Jeffrey J. Siirola, Eastman Chemical Company, PO Box 1972, Kingsport, TN 37662-5150, 423-229-3069, 423-229-4558 (FAX), siirola@eastman.com.

International Conf. on Foundations of Molecular Modeling and Simulation (FOMMS-2000)
Keystone, Colorado; July 23-28, 2000
http://www.ecs.umass.edu/topical/FOMMS.html

The first Foundations of Molecular Modeling and Simulation Conference (FOMMS-2000) is being organized by the Thermodynamics and Transport Properties programming group of AIChE, the CAST Division, and CACHE Corporation with an emphasis on applications for industry. The creation, design, and control of product properties often requires an understanding of how molecular and mesoscopic features influence macroscopic behavior. Quantum mechanical computations provide a means to understand atomic and molecular-scale interactions from which statistical mechanics can estimate mesoscopic and macroscopic behavior. Exponential growth in computing power and theoretical and algorithmic advances are allowing these methods to address questions of practical importance. The aim of this conference is to bring together molecular simulation and computational chemistry innovators, hardware and software providers, and customers who use the tools of molecular modeling and simulation. The conference will consist of both invited speakers and contributed poster presentations. Focus areas are expected to include thermochemistry, catalysis and reaction kinetics, phase equilibria, transport and porous media, adsorption, fluids, micelles, colloids, and polymers, metals, ceramics, and semiconductors, computing architecture, human resource development, and education. The conference chairs are Peter T. Cummings, Department of Chemical Engineering, University of Tennessee, Knoxville, TN 37996-2200, 423-974-0227, 423-974-4910 (FAX), ptc@utk.edu and Phillip R. Westmoreland, Department of Chemical Engineering, University of Massachusetts, Amherst, MA 01003-3110, 413-545-1750, 413-545-1647 (FAX), westm@ecs.umass.edu.

IASTED International Conference on Intelligent Systems And Control 2000 (ISC 2000)
Honolulu, Hawaii; August 14-16, 2000
http://www.iasted.com/conferences/2000/hawaii/isc.htm

The International Conference on Intelligent Systems and Control creates a forum for scientists, engineers and practitioners throughout the world to present the latest research, results, and ideas in this area. Keynote addresses, contributed papers and tutorials will be included. ISC 2000 is sponsored by the International Association of Science and Technology for Development, IASTED, and the IASTED Technical Committee on Control. According to the website, the Secretariat should receive potential papers by May 1, 2000. Please contact IASTED Secretariat - ISC 2000, #80 4500 - 16 Avenue N. W. Calgary, Alberta CANADA T3B 0M6, Tel: (403) 288-1195, Fax: (403) 247-6851, 317@iasted.com , http://www.iasted.com.

First SIAM Conference on Computational Science and Engineering (CSE00)
Wyndham City Center Hotel, Washington, DC;
September 21-23, 2000
http://www.siam.org/meetings/cse00/

The Society for Industrial and Applied Mathematics, SIAM, is conducting this first conference on CS&E to bring together the tremendous range of major computational efforts on large problems in science and engineering. SAM wants to promote the interdisciplinary scientific culture required to meet these large-scale challenges. One of several invited minisymposia is "Advances in Mathematics and Computation in Chemical Engineering", chaired by Yuriko Renardy, renardyy@math.vt.edu and Antony Beris for area 10d of AIChE.

50th Canadian Society for Chemical Engineering Conference (CSChE 2000)
The Queen Elizabeth Hotel, Montréal, Québec, Canada;
October 15-18, 2000
http://www.csche2000.ca

As part of this conference, the Control and Systems Division of the CSChE is planning to hold sessions focused on emerging areas of process control as well as established application areas. CSChE 2000 Theme Organizers for Systems & Control are Michel Perrier, École Polytechnique, Michel.Perrier@urcpc.polymtl.ca; Fraser Forbes, University of Alberta, Fraser.Forbes@UAlberta.ca ; and Martin Guay, Queen's University, guaym@chee.queensu.ca

2000 AIChE Fall Annual Meeting
Westin Bonaventure/Sheraton Grande, Los Angeles, California; November 12-17, 2000
http://www.aiche.org/annual/

Meeting Program Chair: Mark J. McCready, Department of Chemical Engineering, University of Notre Dame, Notre Dame, IN 46556-5637, 219-631-7146, 219-631-8366 (FAX), la2000@nd.edu

The CAST Division is planning the following sessions for the Los Angeles Fall Annual Meeting. Deadline for submission of presentation proposals (through http://www.aiche.org/annual only) is May 1, 2000. The entire CAST program in Los Angeles is being cosponsored by the Society for Computer Simulation.

CAST Division Plenary Session

1. **Recent Developments in Computing and Systems Technology**. Antony N. Beris, University of Delaware (Chair) and Conor M. McDonald, E. I. du Pont de Nemours & Company (Co-Chair)

Area 10a: Systems and Process Design

1. **Process Synthesis.** Andreas A. Linninger, University of Illinois at Chicago (Chair) and Il Moon, Yonsei University (Co-Chair)

2. **Design and Analysis.** Costas D. Maranas, Pennsylvania State University (Chair) and Priscilla J. Hill, Mitsubishi Chemical Corporation (Co-Chair)

3. **Design for Flexible Manufacturing.** Vassilis S. Vassiliadis, University of Cambridge (Chair) and Katerina Papalexandri, BP Amoco (Co-Chair)

4. **Joint Area 10a and Area 10b Session: Integration of Design and Control**. Vipin Gopal, Honeywell Inc. (Chair) and Michael L. Luyben, E. I. du Pont de Nemours & Company (Co-Chair)

5. **Joint Area 10a and Area 10c Session**: **Batch Processing**. Chair: Jonathan Vinson, Searle, a Monsanto Company, jonathan.m.vinson@monsanto.com and Vice-Chair: Yinlun Huang, Wayne State University, yhuang@cheml.eng.wayne.edu

6. **Joint Area 10a and Area 10d Session: Modeling and Computations for Process Design**. Chair: Ashish Gupta, SUNY Buffalo, ashishg@eng.buffalo.edu And Vice-Chair: Heinz Preisig, h.preisig@tue.nl

7. **Joint Area 10a and Area 1a Session: Computational Chemistry in Design**. Luke E. K. Achenie, University of Connecticut (Chair) and Claire S. Adjiman, Imperial College of Science, Technology and Medicine (Co-Chair)

8. **Joint Area 10a and Area 2a Session: Design of Reactive Separation Systems**. Viswanathan Visweswaran, Mobil Technology Company (Chair) and Vivek Julka, Aspen Technology, Inc. (Co-Chair)

9. **Joint Area 10a and Area 2c Session: Computer-Aided Solvent Selection for Extraction**. Jeffrey S. Kanel, Union Carbide Corporation (Chair) and Vincent Van Brunt, University of South Carolina (Co-Chair)

10. **Joint Area 10a and Area 9 Session: Design for Environment and Safety**. Marianthi G. Ierapetritou, Rutgers University (Chair) and Ahmad A. Hamad, Solutia Inc. (Co-Chair)

Area 10b: Systems and Process Control

1. **Advances in Process Control.** Chair: Vasilios Manousiouthakis, UCLA, vasilios@ucla.edu and Co-Chair: Mayuresh V. Kothare, Lehigh University, mayuresh.kothare@lehigh.edu

2. **Modeling and Identification.** Chair: Frank Allgöwer, ETH Zentrum, allgower@ist.uni-stuttgart.de and Co-Chair Louis P. Russo, ExxonMobil Chemical Company, lrusso@houston.rr.com

3. **Plant-Wide Control.** Christos Georgakis, Lehigh University (Chair) and Kenneth A. Debelak, Vanderbilt University (Co-Chair)

4. **Novel Methods in Nonlinear Process Control.** Dennis D. Sourlas, University of Missouri, Rolla (Chair) and Martin Guay, Queen's University (Co-Chair)

5. **Process and Control System Monitoring.** Chair: Ali Cinar, Illinois Institute of Technology, cinar@iit.edu and Co-Chair: Michael A. Henson, Louisiana State University, henson@che.lsu.edu
6. **Joint Area 10b and Area 10c Session: Real Time Optimization**. Iauw-Bhieng Tjoa, Mitsubishi Chemical America, Inc. (Chair) and Thomas E. Marlin, McMaster University (Co-Chair)

7. **Joint Area 10b and Area 10d Session: Distributed Parameter Systems**. Panagiotis D. Christofides, University of California, Los Angeles (Chair) and Yannis G. Kevrekidis, Princeton University (Co-Chair)

8. **Joint Area 10b and Area 2a Session: Control of Separation Processes**. Athanasios Tsirukis, Air Products and Chemicals, Inc. (Chair) and To Be Announced by Area 2a (Co-Chair)

9. **Joint Area 10b and Area 3d Session: Control of Particulate Systems**. E. Scott Meadows, University of Delaware (Chair) and Doraiswami Ramkrishna, Purdue University (Co-Chair)

10. **Joint Area 10b and Area 4 Session: Teaching Process Control and Dynamics with Practical Examples.** Session Chair: Francis J. Doyle III, University of Delaware, fdoyle@udel.edu, Session Vice-Chair: Charles Coronella, University of Nevada-Reno, coronell@unr.edu

11. **Area T1, Fourth International Particle Technology Forum: Instrumentation and Control of Agglomeration Processes.** Session Chair: Paul Mort, Proctor and Gamble Company, mort.pr@pg.com and Session Vice-Chair: Francis J. Doyle III, University of Delaware, fdoyle@udel.edu

Area 10c: Computers in Operations and Information Processing

1. **Computer Integrated Manufacturing** (Cosponsored by the International Cooperation Committee of the Society of Chemical Engineers, Japan). Frank X. X. Zhu, University of Manchester Institute of Science and Technology (Chair) and Matthew J. Realff, Georgia Institute of Technology (Co-Chair)

2. **Planning and Scheduling.** Viswanathan Visweswaran, SCA Technologies, vishy.visweswaran@sca-tech.com, (Chair) and Marianthi G. Ierapetritou, Rutgers University, marianth@sol.rutgers.edu (Co-Chair)

3. **Simulation and Optimization of Dynamic Systems.** Chair: Vipin Gopal, Honeywell Technology Center, vipin@htc.honeywell.com and Co-Chair: Ashish Gupta, SUNY Buffalo, ashishg@eng.buffalo.edu
4. **Joint Area 10c and Area 15a Session: Computational Methods in the Food, Agricultural, and Pharmaceutical Industries.** Matthew H. Bassett, Dow AgroSciences (Chair) and Stephen P. Lombardo, The Coca-Cola Company (Co-Chair)

5. **Joint Area 10c and Area 15d/e Session: Modeling and Operations Methods in Biosystems.** Robert S.

Parker, University of Delaware (Chair) and Vassily Hatzimanikatis, Cargill Corn Milling Division (Co-Chair)

Area 10d: Applied Mathematics and Numerical Analysis

1. **Nonlinear Dynamics and Pattern Formation.** Ranganathan Narayanan, University of Florida (Chair) and Vemuri Balakotaiah, University of Houston (Co-Chair)

2. **Numerical Analysis.** Yuriko Renardy, Virginia Polytechnic Institute and State University (Chair) and Duane T. Johnson, University of Alabama (Co-Chair)

3. **Novel Computer Applications in Chemical Engineering.** Session Chairs Ashish Gupta, SUNY Buffalo, ashishg@eng.buffalo.edu and Mark Stadtherr, University of Notre Dame, markst@nd.edu

4. **Joint Area 10d and Area 1j Session: Novel Numerical Methods in Fluid Mechanics.** Radhakrishna Sureshkumar, Washington University (Chair) and Shiyi Chen, Los Alamos National Laboratory (Co-Chair)

5. **Joint Area 10d and Area 8d Session: Applied Mathematics in Materials Processing.** Stratos V. Sotirchos, University of Rochester (Chair) and Raymond A. Adomaitis, University of Maryland (Co-Chair)

6. **Joint Area 10d and Area 15d/e Session: Applied Mathematics in Bioengineering.** Kyriacos Zygourakis, Rice University (Chair), Ching-An Peng, University of Southern California (Co-Chair) and D. Rumschitzki, The City College of the City University of New York (Co-Chair)

CAST DIVISION POSTER SESSIONS

1. **Recent Developments in Systems and Process Design**. Urmila M. Diwekar, Carnegie Mellon University (Chair) and Ka M. Ng, University of Massachusetts (Co-Chair)
2. **Theory and Practice of Model Predictive Control**. Alex Z. Q. Zheng, University of Massachusetts (Chair) and Evelio Hernandez, Shell Norco Refining Company (Co-Chair)

3. **Topics in Systems and Process Control.** Jorge A. Mandler, Air Products and Chemicals, Inc. (Chair) and Costas Kravaris, University of Michigan (Co-Chair)

4. **Advances in Optimization.** Miguel J. Bagajewicz, University of Oklahoma (Chair) and Scott E. Keeler, Dow AgroSciences (Co-Chair)

5. **Process Safety - Design and Operation.** Katerina Papalexandri, BP Amoco (Chair) and Il Moon, Yonsei University (Co-Chair)

6. **Parallel Computing: Algorithms and Applications.** Mark A. Stadtherr, University of Notre Dame (Chair) and Ioannis P. Androulakis, Exxon Research and Engineering Company (Co-Chair)

7. **Issues and Topics in Computers in Operations and Information Processing.** Paul I. Barton, Massachusetts Institute of Technology (Chair) and Conor M. McDonald, E. I. du Pont de Nemours & Company (Co-Chair)

8. **Advances in Applied Mathematics**. Antony N. Beris, University of Delaware (Chair) and Prodromos Daoutidis, University of Minnesota (Co-Chair)

EDUCATIONAL COMPUTER SOFTWARE DEMONSTRATIONS (Joint with Group 4)

Douglas J. Cooper, University of Connecticut, cooper@engr.uconn.edu (Chair) and Jerry Bieszczad, Massachusetts Institute of Technology, jbieszcz@mit.edu (Vice-Chair)

Year 2001

Chemical Process Control: CPC 6
Westward Look Resort, Tucson, Arizona;
January 7-12, 2001
http://www.che.wisc.edu/cpc-6/

The following is a list of tentative sessions:

- Controller performance monitoring
- New and emerging tools from control theory
- Process modeling and identification
- Hybrid discrete and continuous systems
- Chemical reactors and separators
- Applications in the life sciences
- Poster session for contributed papers
- Summary session: issues in the emerging researcher, manufacturer, vendor triangle

Meeting Co-Chairs are:

James B. Rawlings, Department of Chemical Engineering, University of Wisconsin, Madison, Wisconsin, 1415

Engineering Drive, Madison, WI 53706-1691, (608) 263-5859, 608-265-8794 (Fax), jbraw@bevo.che.wisc.edu

Babatunde A. Ogunnaike, E. I. Dupont de Nemours and Co., Experimental Station, E1/104 Wilmington, DE 19880-0101, 302-695-2535, 302-695-2645 (Fax), ogunnaike@esspt0.dnet.dupont.com

2001 AIChE Spring National Meeting / Petrochemical & Refining Exposition
George R. Brown Convention Center, Houston, Texas; April 22-26, 2001
http://www.aiche.org/conferences/calendar/

Proposed CAST Division Programming as of 4 March 2000

Area 10a: Systems and Process Design

1. **Reviews and Tutorials in Process Design.** Luke E. K. Achenie (Chair) Department of Chemical Engineering University of Connecticut, Storrs, CT 06269-3222, 860-486-2756, 860-486-2959 (FAX) achenie@engr.uconn.edu and Mahmoud El-Halwagi (Co-Chair) Chemical Engineering Dept., Auburn University, Auburn, AL 36849-5127, 334-844-2064, 334-844-2063 (FAX) mahmoud@eng.auburn.edu

2. **Challenges for Design in Practice**. Ashish Gupta (Chair) Department of Chemical Engineering SUNY Buffalo, Buffalo, NY 14260-4200, 716-645-2911, 716-645-3822, ashisdhg@eng.buffalo.edu and Dilek Alkaya (Co-Chair) Institute for Complex Engineered Systems, Carnegie Mellon University, Pittsburgh, PA 15213-3890, 412-268-8531, 412-268-7139, dalkaya@globe.edrc.cmu.edu

3. **Separation Systems Synthesis.** L. N. Sridhar, Department of Chemical Engineering, Univ. of Puerto Rico, Mayaguez, PR 00681-9046, 787- 832-4040 x 3173, 787-265-3818 (FAX) L_sridhar@rumac.upr.clu.edu and Kirtan K. Trivedi (Co-Chair) Exxon Research and Engineering Co., 180 Park Avenue (FP102/D412) Florham Park, NJ 07932, 973-765-2612, 973-765-1648, kktrive@fpe.erenj.com

4. **Joint Area 10a and Area 9 Session: Design for Sustainability.** Urmila Diwekar (Chair), Dept. of Engineering and Public Policy, Carnegie Mellon University, Pittsburgh, PA 15213-3890, 412-268-3003, 412-268-3757, urmila@cmu.edu and Scott Butner, Pacific Northwest National Laboratory, Seattle, WA. 206-528-3290, butner@battelle.org

Area 10b: Systems and Process Control

1. **Applications of Process Control.** Michael Nikolaou (Chair), Chemical Engineering, S235, University of Houston, Houston, TX 77204-4792, 713-743-4309, 713-743-4323, nikolaou@uh.edu and Derrick Kozub (Co-chair) Derrick J. Kozub (Co-Chair) Equilon Enterprises LLC, Westhollow Technology Center, Houston, TX, 281-544-8020, djkozub@equilon.com

Area 10c: Computers in Operations and Information Processing

1. **Practical Challenges in Process Monitoring.** Miguel J. Bagajewicz (Chair), School of Chemical Engineering and Materials Science, University of Oklahoma, 100 E. Boyd St., Room T-335, Norman, OK 73019, 405-325-5458, 405-325-5813 (FAX), bagajewicz@ou.edu, Carl A. Schweiger (Co-Chair), Pavilion Technologies Inc., 11100 Metric Blvd. #700, Austin, TX 78758-4018, 512-438-1552, 512-438-1401 (FAX), cschweiger@pav.com

2. **Tutorial on Supply Chain Management Techniques.** Vipin Gopal (Chair), Honeywell Technology Center, 3660 Technology Drive, Minneapolis, MN 55418, 612-951-7236, 612-951-7438 (FAX), vipin@htc.honeywell.com and Dimitrios Varvarezos (Co-Chair), Aspen Technology, 9896 Bissonnet, Houston, TX, 77036-8220, 713-313-5097, 713-313-5200 (FAX) Dimitrios.Varvarezos@aspentech.com

YEAR 2001 CAST PROGRAMMING CONTACTS

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CAST Division Programming Vice-Chair: Lorenz T. Biegler, Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, 412-268-2232, 412-268-7139, lb01+@andrew.cmu.edu

Area 10a Program Coordinator for 2001: Ka M. Ng, Department of Chemical Engineering, University of Massachusetts, Amherst, MA 01003-3110, 413-545-0096, 413-545-1647 (FAX), ng@ecs.umass.edu

Area 10b Program Coordinator for 2001: Jorge A. Mandler, Air Products and Chemicals, Inc., 7201 Hamilton Blvd., Allentown, PA 18195-1501, 610-481-3413, 610-481-4948 (FAX), mandleja@apci.com

Area 10c Program Coordinator for 2001: Paul I. Barton, Department of Chemical Engineering, Massachusetts Institute of Technology 66-464, Cambridge, MA 02139, 617-253-6526, 617-258-5042 (FAX), pib@mit.edu

Society for Computer Simulation: Ariel Sharon, Computer Simulation Technologies, Inc., 459 Quail Drive, Naperville, IL 60565, 708-983-5195, 708-983-5249 (FAX), asharon@ix.netcom.com

Society of Chemical Engineers, Japan: Iori Hashimoto, Chemical Engineering Department, Kyoto University, Yoshida-Honmachi Sakyo-ku, Kyoto 606-01, JAPAN 81-75-753-5567, 81-75-752-9639 (FAX), hashimoto@cheme.kyoto-u.ac.jp

ESCAPE-11, European Symposium of Computer Aided Process Engineering
Scanticon Conference Center, Kolding, Denmark;
May 27-30, 2001
http://www.escape11.kt.dtu.dk/escmain/index.html

Abstracts are due July 1, 2000. Contact Rafiqul Gani (rag@kt.dtu.dk) or Sten Bay Jørgensen (sbj@kt.dtu.dk). Symposium secretariat: Anette Havstreym / Bente Hansen, CAPEC, Department of Chemical Engineering, Building 229, Technical University of Denmark, DK-2800 Lyngby, Denmark, Fax: +45 45 88 22 58, ah@kt.dtu.dk, http://www.capec.kt.dtu.dk

2001 American Control Conference
Crystal Gateway Marriott, Arlington, Virginia;
June 18-20, 2001
http://acc2001.che.ufl.edu/ or
http://www.ece.nwu.edu/~ahaddad/aacc/acc.html#acc01

General Chair: Bruce H. Krogh, Electrical and Computer Engineering Department, Carnegie Mellon University, 412-268-2472 (voice), 412-268-3890 (fax), krogh@ece.cmu.edu, http://euler.ece.cmu.edu/people/fac/krogh.html

Program Chair: B. Wayne Bequette, Rensselear Polytechnic Institute, 518-276-6683 (voice), 518-276-4030 (fax), bequeb@rpi.edu, http://www.rpi.edu/dept/chem-eng/WWW/faculty/bequette/

8th International Conference on Computer Applications in Biotechnology (CAB8)
Chateau Frontenac, Quebec City, Canada; June 24-27, 2001
http://www.gch.polymtl.ca/cab8/

The conference on Computer Applications in Biotechnology is organized every three years and aims to stimulate contacts between specialists active in academic research and industrial development in all majors areas in biotechnology where computers are used to aid bioprocess design, supervision, diagnosis, operation, optimization and control. CAB8 is sponsored by the IFAC Technical Committee on Control of Biotechnological Processes, IFAC Technical Committee on Chemical Process Control, and European Federation of Biotechnology. The Conference Secretariat is Ecole Polytechnique, Department of Chemical Engineering, C.P. 6079 Succursale Centre-ville, Montreal, Quebec, Canada H3C 3A7, Tel: +1.514.340.4613, Fax: +1.514.340.4159, cab8@gch.polymtl.ca.

2001 AIChE Fall Annual Meeting
Reno Hilton, Reno, Nevada; November 4-9, 2001
http://www.aiche.org/conferences/calendar/

Proposed CAST Division Programming as of 4 March 2000

CAST Division Plenary Session

1. **Recent Developments in Computing and Systems Technology.** Ka M. Ng (Chair) Department of Chemical Engineering, University of Massachusetts, Amherst, MA 01003-3110, 413-545-0096, 413-545-1647 (FAX), ng@ecs.umass.edu and Jorge A. Mandler (Co-Chair) Air Products and Chemicals, Inc., 7201 Hamilton Blvd., Allentown, PA 18195-1501, 610-481-3413, 610-481-4948 (FAX), mandleja@apci.com

Area 10a: Systems and Process Design

1. **Process Synthesis.** Priscilla J. Hill (Chair) Development and Engineering Research Center Mitsubishi Chemical Corp., Mizushima Plant, 3-10, Ushiodori, Kurashiki, Okayama 712, Japan, 086-457-2980, 086-457-2989 (FAX), phill@seigi2.mt.m-kagaku.co.jp and David Miller (Co-Chair) Chemical Engineering, Michigan Technological University, Chemical Sciences and Engineering Bldg., 1400 Townsend Drive, Houghton, MI 49931-1295, 906-487-1956, 906-487-3213 (FAX), millerd@mtu.edu

2. **Design and Analysis.** Vivek Julka (Chair) Aspen Technology Inc., Ten Canal Park, Cambridge, MA 02141-2201, 617-949-1213, 617-949-1030 (FAX), vivek.julka@aspentech.com and Piyush B. Shah (Co-Chair) AEA Technology Engineering Software, 707-8th Ave. SW, Suite 800, Calgary, Alberta T2P 3V3, Canada, 403-520-6659, 403- 520-6060 (FAX) piyush.shah@hyprotech.com

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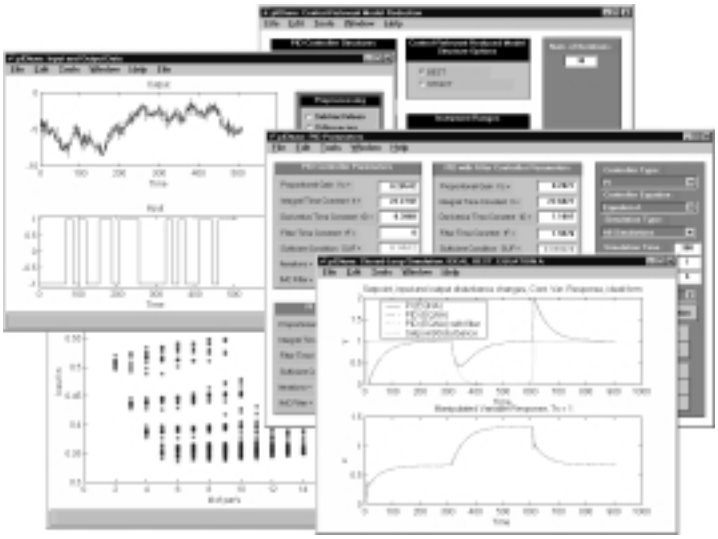

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3. **Joint Area 10a and Area 12 Session: Design of Batch Processes.** Dennis Sourlas (Chair) Department of Chemical Engineering, Univ. of Missouri Rolla, 1870 Miner Circle, G31 Schrenk Hall, Rolla, Missouri 65409-1230, 573-341-6331, 573-341-4377, sourlas@umr.edu and Christine B. Seymour (Co-Chair), Searle Company, 4901 Searle Parkway, Skokie, IL 60077, 847-982-7628, 847-982-7465 (FAX), christine.b.seymour@monsanto.com

4. **Joint Area 10a and Area 9 Session: Design for Energy and Environment.** Manish Sinha (Chair) General Motors, Global Alternative Propulsion Center, Mail Code 144-001-101, 10 Carriage Street, PO Box 603, Honeoye Falls, NY 14472-0603, 716-624-6733, 716-624-6610 (FAX) manish_sinha@hotmail.com and Naresh Suchak (Co-Chair), BOC Gases, 575 Mountain Ave, Murray Hill, NJ 07974, 908-771-4756, 908-508-3814 (FAX), naresh.suchak@us.gases.boc.com

5. **Joint Area 10a and Area 10d Session: Modeling and Computations for Process Design.** Ashish Gupta (Chair) Department of Chemical Engineering, SUNY Buffalo, Buffalo, NY 14260-4200, 716-645-2911, 716-645-3822 (FAX), ashishg@eng.buffalo.edu and Victor R. Vasquez (Co-Chair) Chemical Engineering Department, Univ. of Nevada Mail Stop 170, Reno, Nevada 89557-0136, 775-784-6060, 775-784-4764 (FAX), vvasquez@unr.edu

6. **Joint Area 10a and Area 1a Session: Computational Chemistry in Design.** J. Karl Johnson (Chair) Department of Chemical Engineering, 1242 Benedum Hall, University of Pittsburgh, Pittsburgh, PA 15261, 412-624-5644, 412-624-9639 (FAX), karlj@puccini.che.pitt.edu (Chair) and Kyle V. Camarda (Co-Chair), Chemical and Petroleum Engineering, Univ. of Kansas, 4006 Learned Hall, Lawrence, KS 66045-2223, 785-864-2908, 785-864-4967 (FAX), camarda@ukans.edu

7. **Joint Area 10a and Area 2a Session: Design of Reaction and Separation Systems.** Raymond Rooks (Chair), Union Carbide Corporation, PO Box 8361, South Charleston, WV 25303, 304-747-5826, 304-747-5744 (FAX), rooksre@ucarb.com and Steinar Hauan (Co-Chair) Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA 15213-3890, 412-268-4393, 412-268-7139, s.hauan@cmu.edu

8. **Joint Area 10a and Area 10c Session: Flexibility and Operability in Design**. Marianthi Ierapetritou (Chair), Dept. of Chemical and Biochemical Engineering, Rutgers University, 98 Brett Road, Piscataway, NJ 08854-8058, 732-445-2971, 732-445-2421, marianth@sol.rutgers.edu and Sanjay K. Joshi, Bayer Corp., 8500 West Bay Road, MS52, Baytown, TX 77520-9730, 281-383-7544, 281-383-7530 (FAX) sanjay.joshi.b@bayer.com

Area 10b: Systems and Process Control

1. **Advances in Process Control.** Frank Allgöwer (Chair), Institut für Systemtheorie technischer Prozesse, Universität Stuttgart, Pfaffenwaldring 9, 70550 Stuttgart, Germany, 49-711-685-6294, 49-711-685-6371 (FAX), allgower@ist.uni-stuttgart.de , and Richard D. Braatz, Department of Chemical Engineering, University of Illinois at Urbana-Champaign, 93 Roger Adams Laboratory, Box C-3, 600 South Matthews Ave., Urbana, IL 61801, 217-333-5073, 217-333-5052 (FAX), braatz@uiuc.edu

2. **Quantifying the Benefits of Advanced Control.** José A. Romagnoli (Chair), Department of Chemical Engineering, The University of Sydney, Sydney, NSW, 2006, Australia, 61-2-9351-4794, 61-2-9351-2854 (FAX), jose@chem.eng.usyd.edu.au and Jorge A. Mandler (Co-chair), Air Products and Chemicals, Inc., 7201 Hamilton Blvd., Allentown, PA 18195, 610-481-3413, 610-481-4948 (FAX), mandleja@apci.com

3. **Fast Modeling and Identification.** S. Joe Qin (Chair), University of Texas at Austin, Austin, TX 78712, 512-471-4417, 512-471-7060 (FAX), qin@che.utexas.edu and Simone de Oliveira Kothare (Co-chair), Air Products and Chemicals, Inc., 7201 Hamilton Blvd., Allentown, PA 18195, 610-481-6170, 610-481-4948 (FAX), kotharsl@apci.com

4. **Process and Control System Monitoring.** Bhavik R. Bakshi (Chair), Department of Chemical Engineering, The Ohio State University, 140 West 19th Ave., Columbus, OH 43210-1180, 614-292-4904, 614-292-3769 (FAX), bakshi.2@osu.edu and Apostolos Rigopoulos (Co-chair), Weyerhaeuser Corp., WTC 1B20, PO Box 2999, Tacoma, WA 98477-2999, 253-924-5934, 253-924-4380 (FAX), apostolos.rigopoulos@wdni.com

5. **Novel Formulations of Model Predictive Control.** Kenneth R. Muske (Chair), Department of Chemical Engineering, Villanova University, 800 Lancaster Ave., Villanova, PA 19085-1681, 610-519-6195, 610-519-7354 (FAX), krmuske@kayak.che.vill.edu and Thomas A. Badgwell (Co-chair), Aspen Technology, Inc., 9896 Bissonnet, Houston, TX 77036-8220, 713-313-1497, 713-313-5200 (FAX), tom.badgwell@aspentech.com

6. **Practical Approaches to Nonlinear Control.** Jay H. Lee (Chair), School of Chemical Engineering, Purdue University, West Lafayette, IN, 47907-1283, 765-494-4088, 765-494-0805 (FAX), jhl@ecn.purdue.edu and Brian L. Cooley (Co-chair), Exxon Chemical Company, Baton Rouge Plastics Plant, 11675 Scotland-Zachary Highway, Baton Rouge, LA, 70807-1840, 225-778-5504, 225-778-5304 (FAX), Brian.L.Cooley@exxon.com

7. **Data-Driven Approaches to Process Control.** Babatunde A. Ogunnaike (Chair), E. I. DuPont de Nemours and Co., Experimental Station, E1/104, Wilmington, DE 19880-0101, 302-695-2535, 302-695-2645 (FAX), oggunaike@esspt0.dnet.dupont.com and Sheyla L. Rivera (Co-chair), Frito-Lay, Inc., P.O. Box 660634, Dallas, Texas, 75266-0634, 972-334-4975, 972-334-4444 (FAX), Sheyla.Rivera@fritolay.com

8. **Joint Area 8e and Area 10b Session: Control of Semiconductor Processes.** Oscar D. Crisalle (Chair), Department of Chemical Engineering, Building 723, Room 227, PO Box 116005, University of Florida, Gainesville, FL, 32611-6005, 352-392-5120, 352-392-9513, crisalle@che.ufl.edu and Mayuresh V. Kothare (Co-chair), Department of Chemical Engineering, Lehigh University, Bethlehem, PA, 18015-4791, 610-758-6654, 610-758-5057 (FAX), mvk2@lehigh.edu

9. **Joint Area 10b and Area 15d/e Session: Modeling and Control of Biomedical Systems.** Francis J. Doyle, III (Chair), Department of Chemical Engineering, University of Delaware, Newark, DE, 19711, 302-831-0760, 302-831-0457 (FAX), fdoyle@udel.edu and Robert S. Parker (Co-chair), Department of Chemical and Petroleum Engineering, University of Pittsburgh, 1249 Benedum Hall, Pittsburgh, PA, 15261, 412-624-9630, 412-624-9639 (FAX), rparker@engrng.pitt.edu

10. **Joint Area 10b and Area 15c Session: Analysis and Control of Biological Systems.** Michael A. Henson (Chair), Department of Chemical Engineering, Louisiana State University, 3314 Chemical Engineering Building, Baton Rouge, LA 70803-7303, 225-388-3690, 225-388-1476 (FAX), henson@che.lsu.edu and M. Nazmul Karim (Co-chair), Department of Chemical and Bioresource Engineering, Colorado State University, Fort Collins, Colorado, 80523-1370, 970-491-6779, 970-491-7369 (FAX), karim@engr.colostate.edu

11. **Joint Area 10b and Area 10d Session: Control of Distributed Parameter Systems.** Raymond A. Adomaitis (Chair), Department of Chemical Engineering, University of Maryland, College Park, MD 20742-2111, 301-405-2969, 301-314-9920 (FAX), adomaiti@isr.umd.edu and Prodromos Daoutidis, Department of Chemical Engineering & Materials Science, University of Minnesota, 421 Washington Ave. SE, Minneapolis, MN 55455, 612-625-8818, 612-626-7246 (FAX), daoutidi@cems.umn.edu

12. **Joint Area 10b and Area 10c Session**: **Integration Between Scheduling, Planning and Control.** Daniel E. Rivera (Chair), Department of Chemical, Bio & Materials Engineering, Arizona State University, Box 876006, Tempe, Arizona, 85287-6006, 602-965-9476, 602-965-2910 (FAX), rivera@asuvax.eas.asu.edu and Joseph F. Pekny (Co-chair), School of Chemical Engineering, Purdue University, West Lafayette, IN 47907-1283, 765-494-7901, 765-494-0805 (FAX), pekny@ecn.purdue.edu

13. **Role of Rigorous Simulations and Experiments in Control.** Ferhan Kayihan (Chair), Integrated Engineering Technologies, 5533 Beverly Ave NE, Tacoma, WA 98422-1402, 253-925-2179, 253-925-5023 (FAX), fkayihan@ietek.net and Edward S. Meadows (Co-chair), Department of Chemical Engineering, University of Delaware, Newark, Delaware, 19716, 301-831-0726, 302-831-1048, esm@fourier.che.udel.edu

14. **Joint Area 17 and Area 10b Session: Simulation and Process Control in Forest Products.** L.L. Edwards (Chair), Department of Chemical Engineering, University of Idaho, BEL 308, Moscow, Idaho 83843, 208-885-6793, 208-885-7462 and Anthony Swanda (Co-chair), Weyerhaeuser Corp., WTC 1B21, PO Box 2999, Tacoma, WA 98477-2999, 253-924-5511, 253-924-4380, tony.swanda@weyerhaeuser.com

Area 10c: Computers in Operations and Information Processing

1. **Advances in Optimization.** Nick Sahinidis (Chair), Dept of Chemical Engineering, University of Illinois, Urbana, IL 61801, 217-244-1304, 217-333-5052 (FAX), nikos@uiuc.edu and Metin Turkay (Co-chair), Mitsubishi Chemical Corporation, Mizushima Plant, 3-10, Ushiodori, Kurashiki, Okayama 712-8054, Japan, 086-457-2809, 086-457-2989 (FAX), mturkay@seigi2.mt.m-kagaku.co.jp

2. **Supply Chain Management and Inventory Minimization.** (Co-sponsored by the International Cooperation Committee of the Society of Chemical Engineers, Japan). Shinji Hasebe (Chair), Department of Chemical Engineering, Kyoto University, Sakyo, Kyoto 606-8501, Japan +81 75-753-5587, +81 75-752-9639 (FAX), hasebe@cheme.kyoto-u.ac.jp and Costas

D. Maranas (Co-Chair), Department of Chemical Engineering, The Pennsylvania State University, 112A Fenske Laboratory, University Park, PA 16802, 814-863-9958, 814-865-7846 (FAX), costas@psu.edu

3. **Systems Engineering Approaches in Bioinformatics.** Chris Floudas (Chair), Department of Chemical Engineering, Princeton University, Princeton, NJ 08544, 609-258-4595, 609-258-2391 (FAX), floudas@titan.princeton.edu and Scott Keeler (Co-chair), Dow AgroSciences, 9330 Zionsville Road, Indianapolis, IN 46268-1053, 317-337-3138, 317-337-3215 (FAX), skeeler@dowagro.com . (*Potentially part of a topical conference on Bioinformatics)*

4. **Joint Area 10c and Area 12 Session: Applications of Scheduling and Planning in Batch Processes.** Christine B. Seymour (Chair) Monsanto, 4901 Searle Parkway, Skokie, IL 60077. 847-982-7628, 847-982-7465 (FAX) christine.b.seymour@monsanto.com and Marianthi G. Ierapetritou (Co-Chair) Department of Chemical and Biochemical Engineering, Rutgers University, Piscataway, NJ 08854-8058, 732-445-2971, 732-445-2421 (FAX), marianth@sol.rutgers.edu *(Potentially part of a topical conference on Batch Processing)*

5. **Joint Area 10b and Area 10c Session**: **Integration Between Scheduling, Planning and Control.** Daniel E. Rivera (Chair), Department of Chemical, Bio & Materials Engineering, Arizona State University, Box 876006, Tempe, Arizona, 85287-6006, 602-965-9476, 602-965-2910 (FAX), rivera@asuvax.eas.asu.edu and Joseph F. Pekny (Co-chair), School of Chemical Engineering, Purdue University, West Lafayette, IN 47907-1283, 765-494-7901, 765-494-0805 (FAX), pekny@ecn.purdue.edu

6. **Joint Area 10a and Area 10c Session: Flexibility and Operability in Design**. Marianthi Ierapetritou (Chair), Dept. of Chemical and Biochemical Engineering, Rutgers University, 98 Brett Road, Piscataway, NJ 08854-8058, 732-445-2971, 732-445-2421, marianth@sol.rutgers.edu and Sanjay K. Joshi, Bayer Corp., 8500 West Bay Road, MS52, Baytown, TX 77520-9730, 281-383-7544, 281-383-7530 (FAX) Sanjay.Joshi.B@bayer.com

7. **Unconventional Applications of Tools in Operations and Information Processing.** Ioannis P. Androulakis (Chair), Corporate Research Science Laboratories, Exxon Research and Engineering Co., Route 22 East, Clinton Township, Annandale, NJ 08801, 908-730-2111, 908-730-3344 (FAX), ipandro@erenj.com and Miguel J. Bagajewicz (Co-Chair), School of Chemical Engineering and Materials Science, University of Oklahoma, 100 E. Boyd St., Room T-335, Norman, OK 73019, 405-325-5458, 405-325-5813 (FAX), bagajewicz@ou.edu

8. **Joint Area 10c and Area 10d Session: High Performance Parallel Computing Applications**. Mark A. Stadtherr (Chair), Department of Chemical Engineering, University of Notre Dame, Notre Dame, IN 46556, 219-631-9318, 219-631-8366 (FAX) markst@nd.edu and Kyle V. Camarda (Co-Chair) Department of Chemical and Petroleum Engineering, University of Kansas, Lawrence, KS, 66045, 785-864-2908, 785-864-4967 (FAX) camarda@ukans.edu

9. **Joint Area 10c and Area 15a Session: Computational Methods in the Food, Agricultural and Pharmaceutical Industries.** Stephen P. Lombardo (Chair), Process Systems Development, The Coca-Cola Company, TEC 225c, Drawer 1734, Atlanta, GA 30301, 404-676-0541, 404-676-2840 (FAX), lombardo@coca-cola.com and Nick Sahinidis (Co-chair), Dept of Chemical Engineering, University of Illinois, Urbana, IL 61801, 217-244-1304, 217-333-5052 (FAX), nikos@uiuc.edu

Area 10d: Applied Mathematics and Numerical Analysis

1. **Nonlinear Dynamics and Pattern Formation.** Duane T. Johnson (Chair) Department of Chemical Engineering, The University of Alabama, A134 Bevill Bldg., Box 870203,Tuscaloosa, AL 35487-0203, 205-348-8402, 205-348-7558 (FAX) djohnson@coe.eng.ua.edu and Ranganathan Narayanan (Co-Chair) Department of Chemical Engineering, University of Florida, Gainesville, FL 32611, 352-392-9103, 352-392-9513 (FAX) ranga@gibbs.che.ufl.edu

2. **Fundamental Advances in Applied Mathematics.** Panagiotis D. Christofides (Chair) Department of Chemical Engineering, University of California, Los Angeles, CA 90095-1592, 310-794-1015, 310-206-4107 (FAX) pdc@seas.ucla.edu and Nikolaos Kazantzis (Co-Chair) Department of Chemical Engineering, Texas A&M University, College Station, TX 77843-3122, 409-845-3492, 409-845-6446 (FAX) kazantzis@che.tamu.edu

3. **Computational Methods and Numerical Analysis.** Yuriko Renardy (Chair) Department of Mathematics, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061-0123, 703-231-8258, 540-231-5960, renardyy@math.vt.edu and Radhakrishna Sureshkumar (Co-Chair) Department of Chemical

Engineering, Washington University, St. Louis, MO 63130-4899, 314- 935-4988, 314-935-7211 (FAX), suresh@poly1.wustl.edu

4. **Joint Area 10b and Area 10d Session: Control of Distributed Parameter Systems.** Raymond A. Adomaitis (Chair) Department of Chemical Engineering, University of Maryland, College Park, MD, 20742-2111, 301-405-2969, 301-314-9920 (FAX) adomaiti@isr.umd.edu and Prodromos Daoutidis (Co-Chair) Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN 55455, 612-625-8818, 612-626-7246 (FAX) daoutidi@cems.umn.edu

5. **Joint Area 10a and Area 10d Session: Modeling and Computations for Process Design.** Ashish Gupta, Department of Chemical Engineering, SUNY Buffalo, Buffalo, NY 14260-4200, 716-645-2911, 716-645-3822 (FAX) ashishg@eng.buffalo.edu and Victor Vasquez (Co-Chair) Department of Chemical Engineering, University of Nevada, Reno, Nevada 89557-0136, 775-784-6060, 775-784-4764 (FAX) vvasquez@unr.edu

6. **Joint Area 10d and Area 15d/e Session: Applied Mathematics in Bioengineering**. Kyriacos Zygourakis (Chair) Department of Chemical Engineering, Rice University, Houston, TX, 77251-1892, 713-285-5208, 713-285-5478 (FAX) kyzy@rice.edu and 15d/e Co-Chair TBA

7. **Joint Area 10c and Area 10d Session: High Performance Parallel Computing Applications**. Mark A. Stadtherr (Chair), Department of Chemical Engineering, University of Notre Dame, Notre Dame, IN 46556, 219-631-9318, 219-631-8366 (FAX) markst@nd.edu and Kyle V. Camarda (Co-Chair) Department of Chemical and Petroleum Engineering, University of Kansas, Lawrence, KS, 66045, 785-864-2908, 785-864-4967 (FAX) camarda@ukans.edu

8. **Joint Area 10d and Area 3c Session: Computational and Numerical Approaches in Particle Flows.** Jennifer Sinclair (Chair). School of Chemical Engineering, Purdue University, West Lafayette, IN 47907, 765-494-2257; 765-494-0805 (FAX); jlds@ucn.purdue.edu and Pedro Arce (Co-Chair), Chemical Engineering and Geophysical Fluid Dynamics Institute, GFDI, Florida State University, 2525 Pottsdamer Street, Tallahassee, Fl 31310; 850-410-6166; 850-410-6150 (FAX); arce@eng.fsu.edu

9. **Joint Area 10d and Area 1j Session: Novel Numerical Methods in Fluid Mechanics.** Radhakrishna Sureshkumar (Chair) Department of Chemical Engineering, Washington University, St. Louis, MO 63130-4899, 314-935-4988, suresh@poly1.wustl.edu and Area 1j Co-Chair TBA

10. **Joint Area 10d and Area 8j Session: Modeling and Simulation of Materials Processing.** Stratis V. Sotirchos (Chair) Department of Chemical Engineering, University of Rochester, Rochester, NY 14627-0166, 716-275-4626, 716-442-6686 (FAX) svs2@che.rochester.edu and Jeffrey J. Derby (Co-Chair) Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN 55455, 612-625-8881, 612-626-7246 (FAX) derby@tc.umn.edu

11. **Joint Area 10d and Area 8e Session: Multi-Scale Modeling in Chemical and Materials Engineering.** Dionisios Vlachos (Chair) Department of Chemical Engineering, University of Massachusetts, Amherst, MA 01003-3110, 413-545-6143, 413-545-1647 (FAX) vlachos@ecs.umass.edu and Co-Chair TBA

CAST DIVISION POSTER SESSION

1. **Topics in Systems and Process Design.** Ka M. Ng (Chair), Department of Chemical Engineering, University of Massachusetts, Amherst, MA 01003-3110, 413-545-0096, 413-545-1647 (FAX), ng@ecs.umass.edu and Luke E. K. Achenie (Co-Chair) Department of Chemical Engineering, U-222, University of Connecticut, 191 Auditorium Road, Storrs, Connecticut 06269-3222, 860-486-2756, 860-486-2959 (FAX) luke.achenie@uconn.edu

2. **Topics in Systems and Process Control.** B. Wayne Bequette (Chair), Department of Chemical Engineering, Rensselear Polytechnic Institute, 110 Eighth St., Troy, NY 12180-3590, 518-276-6683, 518-276-4030 (FAX), bequeb@rpi.edu and Dilek Alkaya (Co-chair), Engineering Design Research Center - EDRC, Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, 15213-3890, 412-268-8531, 412-268-7139 (FAX), alkaya@aqua.cheme.cmu.edu

3. **Issues and Topics in Computers in Operations and Information Processing**. Bing Tjoa (Chair) Mitsubishi Chemical Research & Innovation Center, 44 Castro St., Suite 505, Mt. View CA 94041, 650-694-7922 x116, 650-694-7935 (FAX), tjoa@mcric.com and Paul I. Barton (Co-Chair) Department of Chemical Engineering, Massachusetts Institute of Technology 66-464, Cambridge, MA 02139, 617-253-6526, 617-258-5042 (FAX), pib@mit.edu

4. **Topics in Applied Mathematics.** Prodromos Daoutidis (Chair) Department of Chemical Engineering and Material Science, University of Minnesota, Minneapolis, MN 55455-0132, 612-625-8818, 612-626-7246 (FAX), daoutidi@cems.umn.edu and Radhakrishna Sureshkumar, 314A Urbauer Hall, Department of Chemical Engineering, Washington University, St. Louis MO, 63130, 314-935-4988, 314-935-7211 (FAX), suresh@poly1.wustl.edu

2003 AIChE Spring National Meeting / Petrochemical & Refining Exposition
George R. Brown Convention Center, Houston, TX;
March 9-13, 2003
http://www.aiche.org/conferences/calendar

2003 AIChE Fall Annual Meeting
San Francisco Hilton, San Francisco, CA;
November 16-21, 2003
http://www.aiche.org/conferences/calendar

Year 2002

2002 American Control Conference
Anchorage Hilton Hotel, Anchorage, Alaska;
May 8-10, 2002
http://www.ent.ohiou.edu/~acc2002/ or
http://www.ece.nwu.edu/~ahaddad/aacc/acc.html#acc02

General Chair: R. R. Rhinehart,
rrr@gibbs.cheng.okstate.edu
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Future CAST Division Programming

The CAST Division plans to actively participate at the AIChE Meetings listed below. Everyone interested in CAST program development is encouraged to attend the Area Programming Meetings at locations and times published in the Committee Meetings Directory available at the next AIChE Meeting Registration Area. Those who cannot attend the area program meetings are encouraged to bring their specific ideas for programming to the attention of the Area Program Coordinators indicated on the *CAST Communications* masthead.

2002 AIChE Spring National Meeting
New Orleans Hilton, New Orleans, LA; March 10-14, 2002
http://www.aiche.org/conferences/calendar

2002 AIChE Fall Annual Meeting
Dates and Location To Be Announced
http://www.aiche.org/conferences/calendar

Past postings on the CAST10 Email List are archived on the World Wide Web at http://www.che.wisc.edu/cast10

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