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

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Executive Committee—Use Exec. Committee Cast.doc (Because of extended margin settings, inserting the file in the CAST doc Creates problems with layout and footers.)

EDITORIAL NOTES

About This Issue
By Peter R. Rony, Scott E. Keeler, and Jeff Siirola

As the editor of any professional magazine would testify, it is a thrill to receive and publish a high-quality article that will have immediate impact on a profession. Today, September 9, 1998, we have just received the initial draft of "Info Transfer: An Emerging ChE Discipline," by John Baldwin, Tom Teague, and Dave Witherell. We have held up the publication of this issue in order to give these authors sufficient time to answer the editor's original question -- What is PDXi? -- in the manner that they believe would be best for the CAST Division readers. It was worth the wait, and they have done far more than simply answer our question.

We have notified these authors that they, or PDXi, own the copyright to the article, and can do whatever they please with it, e.g., disseminate reprints, republish it in foreign magazines, etc. It has been the long-term policy of CAST Communications to NOT claim ownership of any article or communication. In fact, we encourage authors to copyright their articles in their own name.

This issue also celebrates our three 1998 CAST Division award winners:

Mark A. Stadherr (University of Notre Dame), Computing and Chemical Engineering Award; Babatunde A. Ogunnaike (E.I.DuPont de Nemours & Co.), Computing Practice Award; Dennis Sourlas (University of Missouri-Rolla), Ted Petersen Student Paper Award.

Based upon the nomination packages, Herb Britt (Aspen Technology, Inc.) has written this issue's descriptions of the contributions of our award winners. Such descriptions -- a tradition at CAST Communications -- are not only an archival resource, but do proper justice to our winners.

According to Jeff Siirola, AIChE has decided to call the whole Spring 1999 (Houston) CAST program a "topical conference" entitled Process Systems Engineering with the Presentation Record collected into a preprint volume with an earlier-than-normal deadline. The Houston meeting announcement with the following accordingly has been changed to:

1999 AIChE Spring National Meeting
Topical Conference on Process Systems Engineering
Houston, Texas
March 14-18, 1999

Meeting Program Chair: Peter Wanser, Fluor Daniel, PO Box 5014, Sugarland, TX 77487, 281-263-6906, 281-263-3772 (FAX), peter.wanser@fluordaniel.com.

The CAST Email List provides a mechanism for rapid distribution by electronic mail of meeting announcements, calls for papers, and related types of information. To subscribe to the List, send a message consisting of the single word **subscribe** to cast10-REQUEST@bevo.che.wisc.edu.

ARTICLES

Info Transfer: An Emerging ChE Discipline

by John Baldwin, Tom Teague, and Dave Witherell

Introduction

It is generally acknowledged that 30-50% of an engineer's work time is spent finding and manipulating technical data. Often the data is found on paper and valuable engineering time is spent re-entering the data into one automated system or another. Considering the many times that the same process information is exchanged between people in owner, contractor, and supplier companies over the life cycle of a process facility, the current cost of info transfer is very high.

What is Info Transfer?

Chemical engineers have long studied the phenomena associated with transfer – heat transfer, mass transfer and momentum transfer. A new discipline is now emerging: *Info Transfer*.

> *Chemical Engineering Info Transfer is the exchange of process engineering technical information among the many people and organizations that conceive, design, construct, supply to and operate process plants.*

Chemical Engineering Info Transfer is not new. Info Transfer has traditionally been carried out in the form of paper documents such as design basis memoranda, PFD's and P&ID's, equipment data sheets, major equipment lists, line summaries, etc. Process and equipment calculations were automated 20-30 years ago, but drawings and data sheets were still prepared manually. The production of these engineering documents has migrated to electronic tools over the last 10-15 years, but the information content in these documents can still only be understood through human interpretation. Despite the great progress in automating process engineering calculations and the production of electronic engineering drawings and documents over the last 30 years, these automation tools are still "islands of automation." In order to use these tools, engineers must re-interpret and re-key process engineering information many times during the life cycle of a process facility. This is the equivalent of getting in a boat to travel between islands.

The schedule delays and labor costs associated with Info Transfer processes constrains the effectiveness of current engineering work process. To get an idea of current Info Transfer processes, see the series of sidebars about a process engineer named Pat going through a process evaluation activity. Automation of Info Transfer processes offers the opportunity to reduce labor costs significantly, improve accuracy, and achieve improved designs by allowing more time for creative problem solving by process engineers. Automated Info Transfer offers the equivalent of building highways between the islands, greatly speeding the effort needed to move data around between various programs used in process engineering.

Pat's Project

Pat is a process engineer in the process department of EZ Petrochemicals Company. Pat has a new idea for a potential major revamp project for EZ's Quick Run plant to increase the plant capacity with a new, improved reactor and separation process. Pat is given 4 weeks to study the project technical feasibility and overall project economics. If the project economics look favorable, then EZ will bid, evaluate and select an engineering contractor to handle detailed design and construction. EZ engineers will participate with the contractor during plant startup and operate and maintain the new/modified plant.

Pat first gathers the pertinent thermodynamic phase equilibrium and reaction kinetic data for the process. Some of the data is obtained by doing a query on the ACCU-PROP database. The database query results are available as a *printable text file.* Some data are obtained from an *electronic spreadsheet* provided by EZ's research laboratory. The lab also has a data regression program that can be used to fit the experimental data to determine reaction rate constants and binary coefficients for the phase equilibrium model. Pat **retypes** the lab data from the database query report file and the spreadsheet into a data regression program to obtain reaction rate constants and binary coefficients for the phase equilibrium models. The results from the data regression program are available in a *printable text file*.

Next, Pat **retypes** the data regression reaction constants and the binary coefficients as partial input to the AFAST1 process simulator. After debugging the base case simulation, Pat runs about 10 study cases on the process simulator to optimize the base case design and to check various design assumptions and off-design conditions. The process simulator produces *10 printable text files* corresponding to the 10 simulation cases and a *printable flowsheet diagram* that also contains a stream property summary.

In order to do preliminary project economics, Pat needs to size the process equipment using the AFAST1 simulator results. Pat **retypes** the process simulator results from the base case and the 10 simulator study cases into to 6 different equipment design tools (some in-house tools, some vendor software) to design the process vessels, heat exchangers, pumps and tower internals. Each of these equipment programs *produces printable text files* for base case designs and off-design performance rating cases.

Pat's Project Continues

In order to complete the cost estimate, Pat needs to run preliminary economics using the 4COST estimating tool, which

accepts key equipment size and feedstock cost parameters as input. Also, Pat wants to check up on two of the process vessels and one of the heat exchangers by filling out an equipment data sheet and soliciting cost estimates from several prospective vendors for each piece of equipment. Pat **retypes** the equipment size data from the 6 equipment design programs into 4COST and runs the costing program several times, using various economic assumptions. The 4COST program produces *printable text files*. In order to get vendor quotations for the vessels and the heat exchanger, Pat **retypes** the process data and preliminary equipment sizing results onto an *electronic spreadsheet* and *prints the paper copy* and sends it to the vendor via fax. The vendor representatives **retype** the customer data into their internal data sheets, look up relevant product data in their *paper catalog or electronic database,* and do some additional design work. Then they **retype** data from the catalog onto their electronic data sheet (using a different format than Pat's), add the additional design results and the cost quotation, *print the data sheet* and return the quotations via fax. Pat **retypes** the cost quotations, the revised equipment data sheets containing the revised equipment designs and portions of the 4COST results into an electronic spreadsheet which summarizes the project economics.

At this point, Pat completes the first iteration on the initial process design concept and the project economics turns out to be marginal. Pat is running up close to the 4-week deadline. If Pat had more time, there are some process modifications that could be evaluated to see if the project economics could be improved. Instead, the project is shelved as uneconomic. We can ask at this point, "Was this uneconomic project a missed opportunity?"

Let's assume for the moment that the economics had turned out better. What are the next steps in current Info Transfer practice?

First, Pat would have spent some additional time preparing a Design Basis Memorandum (DBM) using an electronic word processor and combining the key engineering results from *printed program outputs, printed electronic spreadsheets and printed process flow diagrams*. The *printed DBM* would have formed a key part of an engineering contractor bid package. EZ would have used these *printed documents* to request bids from several engineering contractor companies to do a more detailed plant design and economics study. Each of the contractors who responded to EZ's bid package included about 100 hours of engineering labor to **retype** and recreate the original process design work electronically, using the contractor's set of analysis tools, which are not necessarily the same ones that EZ uses. EZ evaluates 4 bids and awards the detailed engineering design study to AAABC Engineering.

More information about pdXi can be found on the AICHE Website: www.aiche.org/pdXi

AAABC Engineering assigns the project to a team of four people. The first step of the project is for AAABC's engineers to **retype** EZ's technical data from the *paper DBM* into AAABC's engineering database system (EDBASE) and to reproduce the process simulation results using AAABC's preferred process simulator, AGOOD1-2. The project team spends the initial few weeks with the EZ engineers reproducing the original study and optimizing the initial process design to improve the project economics, using a work process similar to that used by EZ during the initial study. To reduce the uncertainty in the equipment costs, all the equipment is redesigned by AAABC's equipment design specialists using the more optimized process design results from 10 AGOOD1-2 process simulation runs and sent to various equipment vendors essentially using the *paper-based process* that EZ used. The difference is that there are many more quotations that are processed; and when the *paper-based* quotations are returned from the equipment vendor, AAABC engineers **retype** the design data into EDBASE. The EDBASE system can produce *printed* equipment data sheets, but they are in a somewhat different format than the ones that EZ uses.

The AAABC instrumentation and controls specialist takes the results from the preliminary *paper* Process Flow Diagram (PFD) and the instrumentation guidelines from EZ's *paper* DBM and starts work on designing the instrumentation and control systems. For portions of the new designs the dynamic behaviors are not well understood, so the process data from the AGOOD1-2 steady state simulator and the equipment size data from EDBASE are **retyped** into the ADYNAMIC1 process simulator to design the control systems. The original paper PFD and the added instrumentation and control system design are used to create a set of Piping and Instrumentation Diagrams (P&ID's) using the SMART-PID system. In addition to the P&ID's, the SMART-PID system can also produce *printed* instrument data sheets and line lists.

Next, the AAABC plant layout specialist uses EZ's plant layout recommended guidelines, which are described in the *printed DBM*, and works with a 3-D CAD operator to do the major plant equipment layout and pipe routing. In order to do this task, the major equipment dimensions available from the equipment sizing activity are **retyped** by the CAD operator into the MODEL-IT CAD system. Also, the instrument and control end-measurement device and control valve placement information is **retyped** from the SMART-PID system into the MODEL-IT system. After the major equipment and control valves are placed, the CAD operator uses the MODEL-IT system to produce a *printed 2-D isometric drawing* for use by the hydraulics specialist to do line and valve sizing.

Pat's Project Concludes

The hydraulics specialist at AAABC **retypes** process and equipment data from EDBASE and pipe routing geometry from the Model-IT system into the DELTA-P fluid flow hydraulics program to size the process lines. Pressure drops associated with valves and fittings are determined by retrieving piping equivalent lengths from *paper vendor catalogs*. DELTA-P results are *printable text files*. Some ideas are generated during the hydraulics study for re-routing lines and are redlined on the *isometric drawing*. Key line sizing results are then **retyped** into the EDBASE, MODEL-IT and SMART-PID systems.

The costing specialist uses the information from EDBASE and **retypes** key data into the COST-IT economic analysis program, which uses the more detailed equipment, instrument and bulk information to produce a more accurate cost.

At the conclusion of the detailed engineering design study, AAABC produces a *paper* design package which includes the cost estimate and a set of *paper* PFD's, P&ID's, equipment summaries and equipment data sheets, instrument summaries and instrument data sheets, line summaries, and utility summaries. The results are passed back to EZ Peterochemicals via *paper documents* because EZ doesn't use EDBASE, SMART-PID or MODEL-IT CAD systems.

The story of Pat's Project shows that project information needs to be shared during its life cycle with many other companies - equipment suppliers, construction contractors and subcontractors. Finally, it returns to the owner-operator. *Most of these exchanges are done via paper.* During plant operations, the owner-operator generates and uses vast quantities of technical data using many different plant automation and plant automation support systems, many of which offer more opportunities to re-enter data manually. Each time *paper is exchanged*, there is the potential cost of re-entering data into another automated system in the recipient company. Figure 1 illustrates current practice for Chemical Engineering Info Transfer.

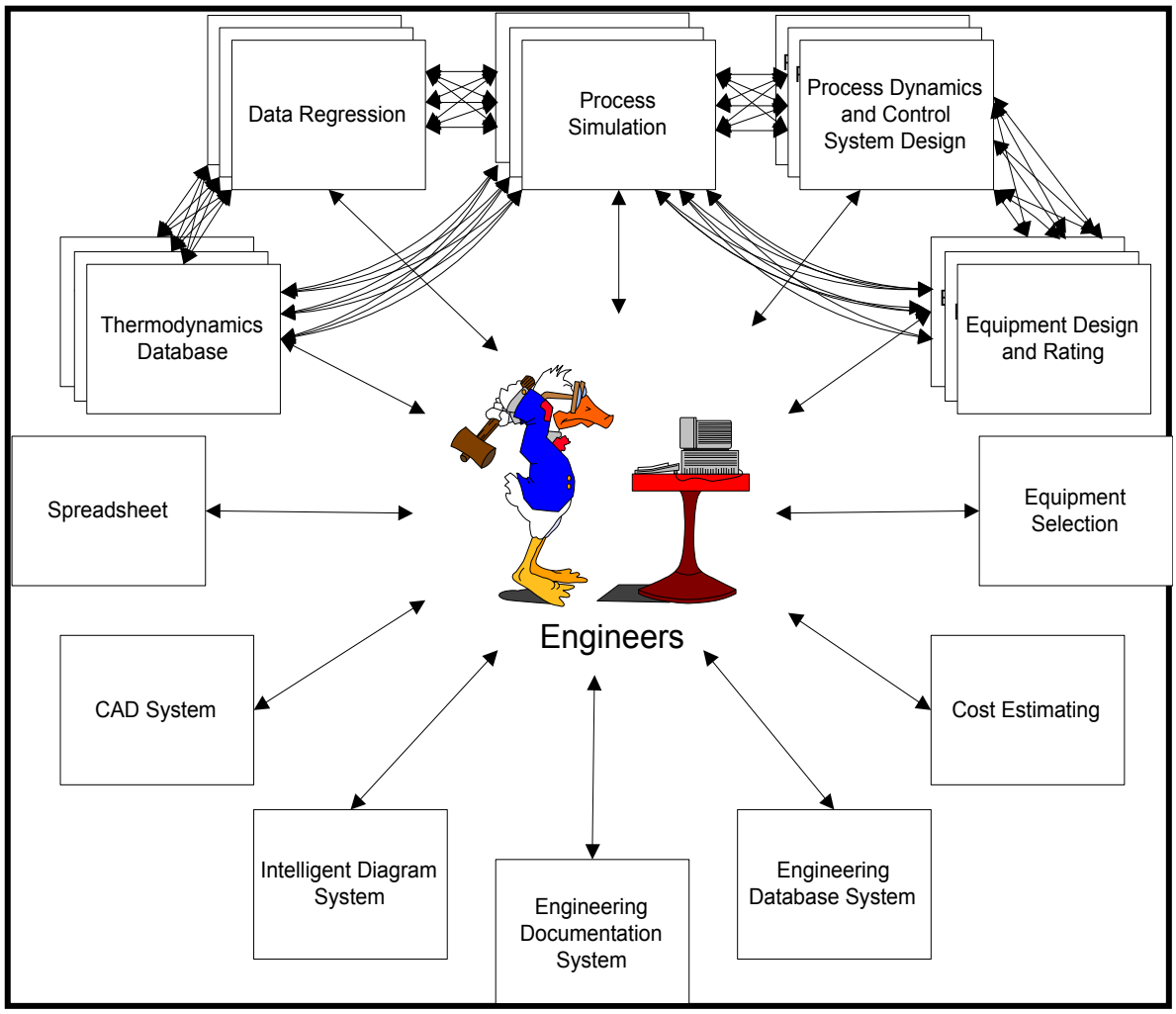

Figure 1. Current practices for Chemical Engineering Info Transfer.

A Formal Method to Automate Info Transfer

So what's new about Info Transfer now? Significant international efforts are underway to accomplish Info Transfer through automated processes rather than through manual processes to reduce the costs while simultaneously improving the accuracy of Info Transfer. In order to automate data transfer effectively, however, the process industry needs a common language for Info Transfer.

> *The information content of process engineering documents must be well understood and defined formally through consensus, and then brought into practice through software tools used by process engineers.*
>
> *This is the emerging Chemical Engineering discipline of Info Transfer.*

This discipline of Info Transfer has several steps:

Step 1. Understand and formally define the business work processes by developing a business activity model and a set of usage scenarios that involve economically important data exchanges. Review and agree upon the formal usage scenarios and business activity model.

Step 2. Develop a formal object-oriented data model of the engineering data involved in the data exchange usage scenarios identified in step 1. This data model includes:

a) Class definitions that name and describe engineering objects,

b) Class attributes that name and describe detailed data and data values associated with the engineering objects,

c) Relationships that name and describe the relationships between classes – e.g., one object is a kind of another object, one object has another object, etc., and

d) Formal descriptions and detailed text definitions of all objects, attributes and relationships in the model.

Review and agree upon the formal data model that describes the engineering data.

Step 3. Formally describe the data model with an object-oriented computer language that can be processed with a computer program.

Step 4. Develop a utility program that uses the object-oriented description of the data model as input and which can read and write text files in a prescribed standard format according to the data model.

Step 5. Define an application programming interface (API) which can be used to easily map standard data model data descriptions to application program data descriptions.

Step 6. Build a reusable link library utility program that supports the API and construct an application program to read and write standard format text files.

Step 7. Build program-specific interfaces which use the API and the reusable link library utility to build specific application program interfaces in at least two existing computer programs which will read and write the standard format text files (by application program owners).

Step 8. Automatically exchange data between two or more application programs without having to manually re-interpret or re-key the data (by users).

The reason users can automatically exchange data at this point is because the application program owners have reached consensus about a formal data model, data definitions and API function calls, and have agreed to work the "mapping" problem once for their application. The mapping problem is simply the translation of data between the standard data description and API function calls and the specific application's data description. This mapping process can be expensive, especially if an application owner has to implement several interfaces for different programs. The advantage to application owners is that they only have to work the data mapping problem one time rather than many times. The application users gain the direct benefit of automated data exchanges. The application owner gains benefits from only having to build one interface rather than many to meet the needs of their users. The approach of using a reusable link library is a further advantage to application owners in that building standards-compliant data exchange interfaces is complex and expensive. By using a shared-cost, reusable link library, application owners can implement the standard interfaces at much lower cost.

The International Standards process, known as ISO 10303 – Standards for the Exchange of Product Data, informally known as STEP is developing an internationally agreed approach for steps 1-3 of the Info Transfer methodology described above. pdXi has been sponsoring one of these standards, known as AP 231. Two other standards are under development and these are described in more detail in the sidebar titled – ISO STEP Standards for Product Data Exchange. AP 231, which is pdXi's contribution to the STEP standards, is currently at Committee Draft (CD) stage and has received extensive international comment. The next stage is to incorporate international review comments of the CD and to demonstrate standards-based data exchange. This will enable AP 231 to move to Draft International Standard (DIS) status, and then International Standard (IS). This process is expected to take another 1-2 years.

pdXi's Experience with Info Transfer

pdXi has been conducting joint-industry research in Info Transfer since 1991. pdXi is the oldest, most experienced organization in developing Info Transfer methodology for the process industries. Since 1994, pdXi has known that steps 4-7 of the Info Transfer process are as necessary as steps 1-3 to achieve the practically used successful Info Transfer described in step 8. In parallel to the AP 231 development (steps 1-3 to produce version 2 of the pdXi data model), pdXi has sponsored the development of an API

software utility (steps 4-6) using the pdXi data model, Version 1, which was completed in 1994. The initial version of the API software utility was completed early in 1998. The initial pdXi implementations of step 7, where applications build interfaces using the API toolkit, are expected to be underway later this year and the initial practical use (step 8) of pdXi data exchanges are expected to occur in 1999. After the standards are produced, pdXi expects to upgrade its API software toolkit to support the AP 231 data model.

The scope of the current pdXi data model includes:

- Chemical_reaction_data
- Control_strategy
- Heat_transfer_equipment
- Major_process_equipment
- Mass_transfer_equipment
- Material_data
- Material_transfer_equipment
- Plant_context
- Plant_item_definition
- Plant_system_definition
- Process_description
- Process_flow_diagram
- Process_simulation_data
- Process_vessel_equipment
- Stream_data
- Substance_experimental_data
- Substance_model_data
- Unit_operation

While the scope of Versions 1 and 2 of the pdXi data model is extensive, there is much work left to do. pdXi understands the complete methodology for Info Transfer now, and is close to reaching step 8 by next year. pdXi expects to continue extending the data model and API toolkit in the future to meet the needs of the process industry as it automates Info Transfer processes.

What is pdXi?

pdXi is a leveraged, cooperative effort by process industry companies and its suppliers to create and use industry-wide standards to automate the exchange of process engineering technical data.

Broadly used automation of process data exchange is expected to reduce costs dramatically and improve the technical work processes both within a company, and between a company and its key business partners.

What does pdXi do?

pdXi undertakes three major technical activities:

1. Creates and maintains data models that formally describe and define process engineering technical data in sufficient detail to permit automated data exchange,
2. Sponsors the development of the ISO 10303 STEP standard, part AP 231,
3. Sponsors the development of a software toolkit to enable individual application programs and databases to read and write STEP part 21 data exchange files more easily.

In addition to these major technical activities, pdXi is currently seeking to offer improved communication and education services about automated process data exchange to the process industry via the World Wide Web, publications, seminars, and training courses.

How is pdXi organized?

pdXi is officially organized as a non-profit, sponsored research initiative under the American Institute of Chemical Engineers (AIChE). pdXi membership is open to any company, worldwide, who shares an interest in pdXi's goals and technical work activities. pdXi is an international organization with current member companies from North America and Europe.

Each member company is a voting member of pdXi's two major committees – the Administrative Committee and the Technical Committee. The Administrative Committee is responsible for executing the official business of pdXi. The Technical Committee is responsible for conducting the technical work activities of pdXi. These two committees currently meet twice per year to conduct pdXi's official business. There are two elected officer positions for each committee – Chair and Vice-Chair of the Technical and Administrative Committees. These four elected officers and a representative from AIChE comprise the pdXi Operating Committee. The Operating Committee conducts pdXi's official business when the committees are not in session.

In addition to these major committees, pdXi has a part-time technical director and sub-committees that undertake and coordinate the specific tasks and work activities of pdXi during and between official pdXi meetings. The pdXi Technical Committee currently has 2 major subcommittees – the Standards subcommittee and the Implementation subcommittee.

A Solution to the Paper Exchange Problem

The Process Data eXchange Institute (pdXi) and other organizations in the process industry are involved in developing international process technical data exchange standards for the process industry to reduce significantly this massive amount of engineering work-effort waste. These efforts in formulating standards using the ISO 10303 Standards for the Exchange of Product Data (STEP) have

been underway in the process industry for about 5 years (see Sidebar).

Automation systems that support these international standards will offer substantial value to the companies that use them, because many thousands of work-hours will be saved across the industry by avoidance of manual re-entry of data. *When automated data exchange is implemented by industry, all of the data exchange scenarios described in Pat's Project can largely be done through automation, a*nd engineering time can be more productively used for value-added activities.

The process industries need to understand and develop data exchange standards jointly because there are hundreds of automation systems in the process industry, none of which clearly dominate the industry. Each of these systems stores process information organized in their own way and using their own terminology to describe the data. For example, one system may store compositions using mole fractions and total flow, while another system may store compositions using molar flow rates.

When automating data exchange between two of these systems, a cross-reference map always needs to be developed, because their terminology and internal data structures are likely to be different. Building such data maps is expensive and accordingly make the cost of custom point-to-point data exchanges expensive to develop. Furthermore, these interfaces also need to be maintained, because the automation systems using the data exchange mechanism change over time. Building the many point-to-point data exchanges illustrated in Figure 1 to accomplish the required data cross-reference mapping to other automation systems is prohibitively expensive. Process data exchange standards provide an industry-consensus, common language and electronic data format for describing technical data as illustrated in Figure 2. By building a single data mapping to the standard terminology and format, an application can share information with many other applications for the cost of building one interface.

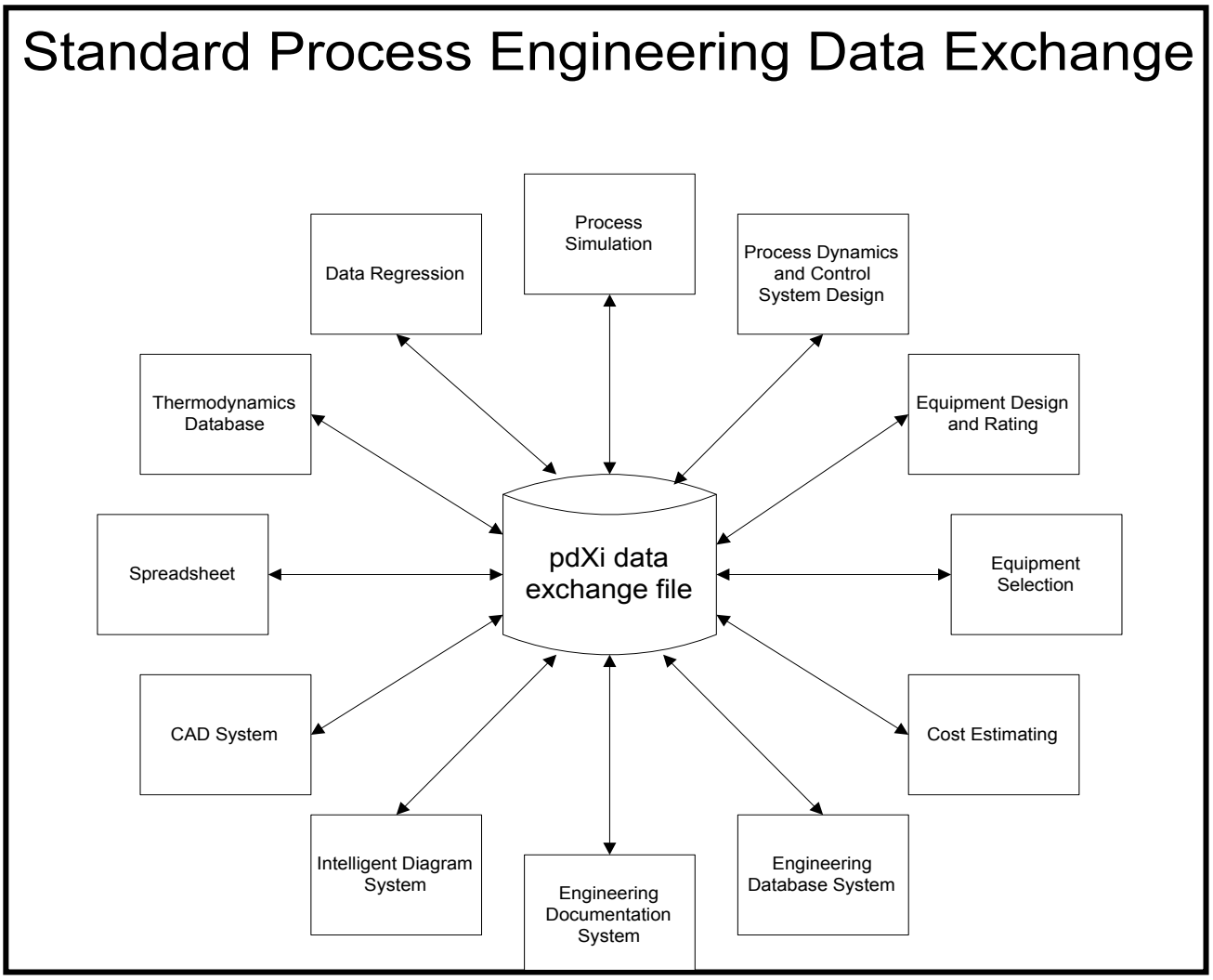

Figure 2. Standard approach to data exchange using common terminology and data organization.

ISO STEP Standards for Product Data Exchange

The word ISO comes from the Greek word meaning "equal" and the International Organization for Standardization, a worldwide federation of national standards bodies, has adopted it as its acronym. Approximately 26 members are dedicated to developing worldwide standards for products and services. When a product or service is ISO compliant, it has met stringent requirements set by this international organization. Recognizing that the world is a large place to standardize, ISO has divided its work into technical committees and subcommittees. The exchange of process engineering data was delegated to Technical Committee 184, Subcommittee 4. The ISO 10303 (STEP) is the standard for the exchange of engineering data for the Process Industries.

STEP is an acronym for **ST**andard for the **E**xchange of **P**roduct model data and implies an industrial data language for the neutral data representation of industrial data. Some industries in the automotive and aerospace area are already using the STEP format for data exchange. In the Process Industries a number of Application Protocols (AP's) are being developed to enable the transfer of engineering data with STEP throughout the life cycle of the process. The life cycle engineering data transfer needs for an operating unit or plant are huge. Therefore, to help solve this problem, ISO 10303 has approved the following:

- AP 212 Electrotechnical Installations (German consortium)
- AP 221 Plant Systems Design and Hardware Specifications (European consortium)
- AP 225 Building Shapes (German consortium)
- AP 227 Three Dimensional Plant Design and Piping Design (PlantStep – USA)
- AP 230 Structural Steel (UK consortium)
- AP 231 Conceptual Process Design (pdXi – USA)
- AP 23x Operations (Japanese consortium)

Each AP is moving along a path that generally takes several years and results in an International Standard (IS) if approved by 75% of the member countries. The lengthy process begins with the development of an Activity Model (AAM) which shows the "big picture" for the exchange problem. Then Application Models (ARM's) are developed and finally mapped to the STEP Exchange Model via the Application Interpretive Model (AIM). The AIM is the high level ISO Model that enables data transfer to other AP's and other ISO Models. Once all of these models are put together the AP is ready for its first International ballot known as a CD (Committee Draft) ballot. The sponsoring organization (pdXi for AP 231) reviews and responds to CD ballot comments and develops conformance classes and test problems to demonstrate the model as proposed and amended by CD ballot comments. At this stage the AP is ready for another ballot known as a Draft International Standard (DIS). Review comments from this ballot processare addressed and incorporated into the AP. Finally, the AP is ready for issuance as an International Standard (IS). It's certainly easy to see why the development of an ISO Standard takes so long, but each step in the process is necessary for ISO Certification.

Benefits of Automated Process Data Exchange

The expected benefits of automated process data exchange to operating companies and engineering and construction companies include reduced engineering costs, shortened project schedules, and improved quality of engineering results, that is, improved plant designs and plant operations. For Pat's Project, which is played out above in a manual environment, each time information was retyped, it can now be transmitted via either a standard interchange file or by a program interface which maps the transmitted data according to the data model supported by the standard(s).

For Pat's Project, if the results are the same, then fewer work hours are used to get to the results. However, there is a chance that a missed opportunity might be recovered if one of the approaches that was not evaluated completely due to schedule restraints is indeed the one that is profitable. The work hours are important, but the potential for a new business opportunity far out-weighs the savings in work hours.

According to a DuPont study[1], the ability to do electronic Info Transfer could result in savings of several tens of millions of dollars over the life cycle of a typical process facility. Broad, industry-wide application of electronic data exchange could result in hundreds of millions, or perhaps billions, of dollars while significantly changing the work practices of process engineering. For a typical large company which does process engineering projects, hundreds, and probably thousands, of engineering work-hours will be saved annually by reducing, if not eliminating, the current practice of manual data entry and re-entry of data.

The Need for Continued Cooperation

pdXi is currently on the verge of achieving practical benefits from its Info Transfer research. More than ever before, cooperative effort and active participation are needed from the process industry. *Practical automation of Info Transfer is not a problem that will be solved by the software vendors alone.* Broad participation by owner-operator companies, engineering and construction contractors, software suppliers and equipment suppliers is needed to ensure a successful outcome. We encourage all

[1] Halford, Joe, and Betteridge, Bryce L. , Economic Impact of Computing Data Standards**,** paper 89a, Session 89, AIChE Spring, 1996 meeting.

process industry companies to participate actively in pdXi (see "Benefits of pdXi membership" below).

In Conclusion

The pdXi organization is making excellent progress toward providing a revolutionary improvement to the practice of Info Transfer. The solution involves a disciplined approach toward achieving a coordinated, agreed-upon standard for data representation and a practical-to-use software tool-kit. This combination allows owners of both new and legacy automation systems to achieve economical automated technical data exchange in the process industry.

Benefits of pdXi Membership

- *Access to and use of the pdXi software toolkit.* The pdXi data exchange toolkit provides a cost-effective, practical means for any technical software application or database owner to achieve standards compliance by providing an easy to use tool for mapping an application's data onto the standard.
- Input and influence on the development of international standards. By working actively with pdXi staff and experts from other pdXi sponsor companies prospective sponsor companies can influence these standards to ensure business value is achieved when they are put into practice.
- Leveraged investment in solving a difficult problem. Prospective pdXi sponsor companies can gain access to $2.5 million worth of data modeling research and working software to apply the research results for approximately $15-30k/year, a leverage factor of about 80-160.
- Sponsors gain a high leverage factor for ongoing pdXi services. Each dollar invested in pdXi returns greater than 20 times the benefit versus going it alone.
- Access to Info Transfer expertise. Even though the AP 231 model is publicly available, it is complicated to understand without help. Sponsors gain access to knowledge and expertise on how to apply the data exchange standards within their own companies that would otherwise take a substantial time investment from their own staff.
- Sponsors can solve the expensive data mapping problem one time. Sponsors who implement data exchange interfaces in their technical application software or databases will only have to implement one interface, rather than many point-to-point interfaces, or using manual transcription of data, as is the current practice. The cost of developing and supporting one custom point-to-point interface is at least equivalent to the annual cost of pdXi membership. If a sponsor company has many such potential interfaces to support, the payback to support just one standard interface is substantial.

About the Authors

John Baldwin is the Technical Director of pdXi. John participated in the original formation of pdXi and served as the original Administrative Committee Chair. He obtained his Ph.D. in Chemical Engineering from Texas A&M in 1968 and returned there to teach senior plant design in 1995. Most of John's technical career at Union Carbide (13 years) and M. W. Kellogg (12 years) focused on the effective use of computing tools. In addition to teaching at A&M, John now also has an active consulting business on the use of information during the full life cycle of processes.

Tom Teague is Exxon Production Research Company's representative to pdXi and is the Administrative Committee Chair. Tom worked with John Baldwin and others to form pdXi from 1989 to 1991, and has previously served as Technical Committee Vice-Chairman and Chairman. Tom obtained his Ph.D. in Chemical Engineering from Carnegie-Mellon University in 1980. For most of his 18-year tenure at Exxon, Tom has led a technical software group that is responsible for providing process engineering and artificial lift technical software to Exxon's worldwide upstream petroleum engineers.

Dave Witherell is Union Carbide's representative to pdXi and is currently the Technical Committee Chair. Dave also chairs the Standard's Subcommittee and, as such, is directly interested in the ISO process discussed in the article. Dave obtained his BS in Chemical Engineering from Virginia Polytechnic Institute and State University in 1969 and an MBA from West Virginia University in 1972. The last several years of Dave's Union Carbide career have been devoted to Engineering Automation issues. He has also had prior experience with data transfer as the lead process engineer on two major capital projects and has practiced Process Synthesis Technology as a Senior Technologist with both Linnhoff March and Union Carbide.

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COMMUNICATIONS

Computing in Chemical Engineering Award Goes to Mark Stadtherr of Notre Dame

Professor of Chemical Engineering Mark A. Stadtherr is this year's winner of the Computing in Chemical Engineering Award. Mark received this honor "For his innovative problem-solving strategies for process simulation and optimization, and his pioneering work on applying advanced computer architectures in chemical engineering computing."

Dr. Stadtherr is recognized internationally for his many contributions to state-of-the-art computing methods in process engineering.

Advanced Computer Architectures
To exploit the computational power of advanced computer architectures for solving process engineering problems, Stadtherr has been a leader in using methods such as vector and parallel processing, instead of standard numerical methods. His seminal research on the key sparse matrix problem broke new ground, and led to new methods exhibiting dramatic performance improvements, which have been incorporated in supercomputer versions of commercial simulators.

Non-Linear Equations and Process Optimization
Stadtherr has demonstrated more efficient methods for solving large sparse systems of linear equations, a critical step in equation-based process simulation and optimization. His research on sparse matrix strategies with a "two-pass" approach, which can exploit the structure of process engineering problems, has enabled the efficient solution of larger, more complex problems.

Implementations of Stadtherr's techniques for linear equation solving, as well as for solving nonlinear systems using both equation-based and simultaneous modular formulations, are now widely used in industry and in commercial simulators.

Stadtherr has also developed novel interval techniques for solving difficult nonlinear equation systems, such as the calculation of highly non-ideal phase equilibria, in both serial and parallel environments. These techniques are capable of finding all possible solutions where multiple solutions exist.

Professional Leadership
Widely recognized for his research and professional innovations, Stadtherr has introduced advanced computer architectures in chemical engineering to broad national and international audiences. He helped establish the NSF Supercomputer Centers, has chaired eight sessions on advanced computer architectures at AIChE national meetings, and lectured on this topic at plenary sessions of major international meetings. In three articles for *Chemical Engineering Progress,* he wrote about advanced computing technology for the entire audience of AIChE readers.

Through his contributions, as well as those of over 20 Ph.D. students, Mark Stadtherr has had a remarkable impact on process simulation and optimization technology.

Comments from Supporters
Comments from the letters in support of Mark Stadtherr for the award include:

"Mark's most important contribution to computing in chemical engineering lies in the solution of large, sparse sets of algebraic equations."

"Unlike most researchers. . .Mark's papers have provided a comprehensive treatment of his algorithms in the context of many existing, and competing, algorithms, and provide test results for a host of problems of varying complexity and in competition with existing algorithms. This degree of thoroughness is rare. . ."

"Mark was the first to recognize and promote the potential benefits of using supercomputers in chemical process engineering. Since the early 1980s, Mark and his students have developed vector/parallel processing strategies that outperform traditional sequential approaches to process simulation by an order of magnitude or more in many cases."

"Prof. Mark Stadtherr has always been at the top of my list when it comes to high-performance computing and process simulation."

"Mark's diligence and creativity in the pursuit of research in the area of high performance computing and numerical methods for process systems applications have been outstanding contributions to the application of computing and systems technology to chemical engineering. Evidence for Mark's contributions are both direct through the influence his research has had on numerical methods applied in software packages and indirect as indicated by the number of his former students who are involved in positions that involve delivering computing capability for daily engineering use. . . Nearly every one of his almost ninety publications and one hundred fifteen technical presentations has dealt with the application of computing in engineering practice or techniques that make computation more practical."

"As an educator, Mark has developed new computational courses that have influenced hundreds of students… Research and teaching by people like Mark has helped to make computation a central part of chemical engineering practice."

Babatunde Ogunnaike Wins CAST Division Computing Practice Award

The 1998 CAST Computing Practice Award goes to Dr. Babatunde Ogunnaike "For designing and implementing novel control schemes, for the inspirational mentoring and teaching of young engineers, and for the scholarly publication of systems technology fundamentals."

Tunde, as he is known to colleagues, has made unusually broad contributions to the practice of computing and systems technology because of his dual career in industry and academia.

Advanced Control Schemes
Tunde is well known for pioneering advanced concepts in process control and related areas. While at Shell Development, he participated in the formulation of DMC and related control schemes. Since joining Dupont he has developed and applied online state estimation, process identification, and control algorithms in a variety of applications, including high purity distillation columns, polymerization reactors, and inorganic chemical processes. In many cases new and novel designs were employed. He has developed these innovative ideas in collaboration with colleagues and visiting researchers, and demonstrated considerable leadership skill in putting the innovations to practical use.

Academic Contributions
At the University of Lagos in Nigeria and at the University of Wisconsin, where Tunde taught chemical engineering at the graduate and undergraduate levels, he was known for his mentoring, his creative ideas, and his energetic teaching style. These contributions continue in his current teaching at the University of Delaware. Students there benefit from his industrial experience as well. Recently he developed a new course in applied statistics, and he is active in the development of an engineering control laboratory for undergraduates.

Influential Publications
In 1994 Tunde published the book *Process Dynamics, Modeling, and Control* (Oxford University Press), which is now used as a textbook around the world. More than 30 Chemical Engineering Departments have adopted this text for their process control course. Tunde has published many influential journal articles, book chapters, and an earlier, innovative text on mathematical modeling. In addition, he has made numerous conference and workshop presentations for national and international audiences.

Professional Leadership
On an international scale, Tunde has effectively influenced the systems area through his leadership activities. He is currently the program chairman of area 10B of the CAST Division, and has been active in programming for several international conferences. Tunde is a member of the Editorial Board for the ACS publication *I&EC Research,* and is an associate editor of the journal *IEEE Transactions on Control System Technology*.

From Letters of Support
Among the many endorsements of Tunde's accomplishments were these:

". . . I have been astounded by Tunde's wide range of interests, high level of energy and tremendous accomplishments. He is an extremely gifted and productive researcher whose achievements over the past 20 years have clearly put him at the top of his field."

". . . for many researchers in process systems engineering, Dr. Ogunnaike has defined the recent advanced process control accomplishments at DuPont and has been one of the major players in making them visible to the academic community. For this achievement as well as a rich career of teaching and research accomplishments, he has my strongest recommendation. . .

". . . I discovered first-hand the tremendous role that Tunde serves as a mentor in the process control community. . . it is quite clear that Tunde's influence was to steer them towards problems of high industrial relevance."

"Tunde fulfills all of the requirements that one associates with a 'leader' in the process control community."

"Tunde does it all, and does it all well."

"Tunde's research ideas have had major impact. He has given invited plenary lectures at major control meetings (DYCORD, CPC), and he has delivered timely reviews on a number of topics such as the industrial prospects for nonlinear control."

". . .his contributions have resulted in one of the fastest progressions to Research Fellow on record. . . . those rapid promotions have been applauded by his peers and those that he has surpassed. Tunde is the recognized process control leader in DuPont."

"Best Achievable Decentralized Performance," by Dennis Sourlas, Wins Ted Peterson Student Paper Award

Dr. Dennis Sourlas has been awarded the Ted Peterson Student Paper Award "For pioneering contributions to decentralized process control theory and application, through solution of the best achievable decentralized performance problem."

The doctoral research done by Dr. Sourlas at the University of California, Los Angeles, has been recognized as singularly important to the process control industry by worldwide leaders in the area of decentralized control. There is a need for control optimization in complex plants and in interconnected plants, where computational and communication overhead may impede performance.

Others have been unable to solve problems of optimal control design with structural constraints by standard techniques. He formulates a problem as a decentralized control parameterization, then incorporates impulse response sequences to convert it to an infinite dimensional problem. Sourlas devised a numerical procedure using a series of finite dimensional approximations, to arrive at a robust solution. Sourlas' approach may be expected to have an appreciable impact in numerous control design problems. It offers an original approach to many control problems.

The many comments in support of Dennis Sourlas' nomination included:

". . .I feel very confident in my ability to judge Dr. Sourlas' research work and compare it to the work of other Ph.D.s from Chemical Engineering who specialize in process control and optimization and have graduated within the last five years. In that context, I can not think of any other candidate who is more deserving of the Ted Peterson Student Paper Award."

"This is the first approach to incorporate impulse response sequences in the decentralized control constraint. I expect the impact of the paper to be far reaching. In fact, many control design problems with structural constraints, such as the simultaneous stabilization problem, can also be solved using a similar approach. Thus, this paper has developed a general solution technique to a large class of nonconvex control problems."

Turn-Key Training in Process Control

A Specialty of the Process Control Consortium at The University of Connecticut

Designed for Industry

Our popular training system is comprised of virtual-world software, a 150 page workbook and a series of self-paced computer exercises in automatic process control. The training is perfect for engineers and operators, designers and managers who want to learn practical control analysis and tuning methods for production and pilot-plant operation. Early lessons build a useful background for novices interested in important fundamentals while later lessons expand and refine existing skills of the experienced practitioner.

Self-Paced or Instructor Guided

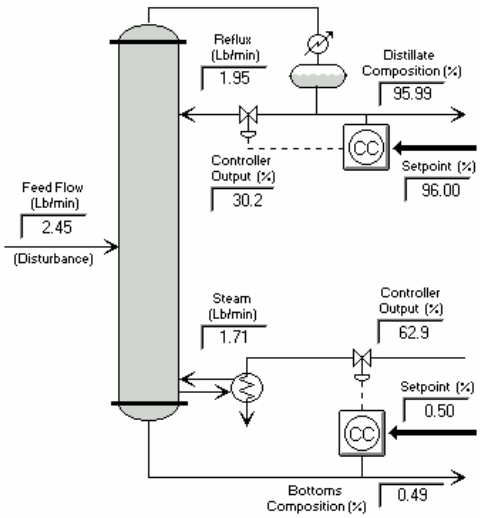
Membership in UConn's Process Control Consortium provides your company access to this training system. Your learning can be self-paced or an instructor guided experience. Your own in-house guru can lead a class using the materials provided to Consortium members, or we can provide an expert instructor who will run a turn-key course at your site at your convenience.

Hands-On and Real-World

Consortium members receive a corporate site license to Control Station™, a novel training simulator used in over 100 control courses worldwide. Use Control Station to explore control challenges on a heat exchanger, mixing tank, jacketed reactor and distillation column. You can even design your own custom transfer function process.

Teaching Proven Methods

- Fundamentals of Process Dynamics and Control
- Fitting Process Models to Plant Data
- Using Process Models for Controller Tuning
- Tuning P-Only, PI, PD, and PID Controllers
- Cascade Controller Design and Implementation
- Feed Forward Control with Feedback Trim
- Smith Predictor for Dead Time Compensation
- Multivariable Control and Decoupling
- Parameter Scheduling and Adaptive Control



Download a Demo

A demo copy of Control Station and information about the Process Control Consortium and our unique training system is available at:
www.ControlStation.com

www.ControlStation.com

Contact Doug Cooper at (860) 486-4092 or cooper@engr.uconn.edu

"Decentralized and Simultaneous control have been extensively studied in the past by researchers in all control communities. Nevertheless, no one was able to quantify the best achievable performance for these strategies, over all stabilizing controllers. Most techniques aimed at simply ensuring stabilization. Dennis has presented an optimization based methodology that addressees these problems. Employing novel parameterizations of all decentralized and/or simultaneously stabilizing controllers, he demonstrated that both types of control problems can be transformed into quadratically constrained optimization problems, over stable mappings."

". . . I believe the highest form of endorsement I can give to Dr. Sourlas' work is the fact that my own students are now studying his approach to see how it applies to problems in nonlinear optimal control. The problems we are interested in require innovative approaches; we performed an extensive literature search, and most of the relevant papers we discovered cite Dr. Sourlas' nominated paper (and those who do not cite it should have, since they are really using the same approach)."

". . . his impressive analytical skills are matched by his equally impressive expertise with computational methods. This is a rare combination indeed, which explains why he has been and will continue to be successful not only in developing new techniques for process control and optimization, but also in making them accessible to process control engineers via software that is both computationally efficient and user-friendly. These qualifications, coupled with the importance of his past and future research contributions for the critical areas of manufacturing process design and optimization, richly augment the importance of the paper for which he is nominated. . ."

"Dr. Sourlas became a key contributor to the solution of decentralized control problems while he was still a graduate student by publishing in leading journals and refereed conference proceedings. These decentralized control problems are of great importance and relevance not only for process control in chemical engineering but for the entire discipline of control engineering."

How to Contact the AIChE

Taken from the University of Florida AIChE web site, below are given several of the many ways to contact the American Institute of Chemical Engineers for information.

"One-stop shopping" for admissions, publication sales, meeting registration, dues bills, and other AlChE products and services may be obtained from the:

AIChExpress Service Center
3 Park Avenue
New York, NY 10016-5901
Telephone: 1-800-AIChemE
Fax: (212) 591-8888
E-mail: xpress@aiche.org

For the AIChE Headquarters:

American Institute of Chemical Engineers (AIChE)
3 Park Avenue
New York, NY 10016-5901
General Inquiries: (212) 591-7338
Fax: (212) 591-8882
AIChE WebSite: www.aiche.org
Insurance Programs
Seabury & Smith: (800) 982-4243

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

Dean Kevlin
Director, Education Services
Telephone: (212) 591-7526
E-Mail: deank@aiche.org

Diana McCauley
Director, Member Services
Telephone: (212) 591-7329
E-Mail: dianm@aiche.org

Betty Feehan
Manager, Career Services, Member Services
Telephone: (212) 591-7524
E-Mail: bettf@aiche.org

Margie Joy Walden
Manager, Member Activity Groups, Member Services
Telephone: (212) 591-7652
E-Mail: margw@aiche.org

Jo-Anne Hand
Manager, Membership Development
Telephone: (212) 591-7174
E-Mail: joanh@aiche.org

Joe Cramer
Director, Programming
Telephone: (212) 591-7950
E-Mail: josec@aiche.org

Sean Bersell

Senior Director, Public Affairs
Telephone: (202) 962-8690
1300 I Street, NW, Suite 1090 East Tower
Washington, D.C. 20005

Scott Hamilton
Manager, Communications, Public Affairs
Telephone: (212) 591-7660
E-Mail: scoth@aiche.org

Senior Director, Publications and Information Systems
Telephone: (212) 591-7335
E-Mail: steps@aiche.org

Lois DeLong
Manager, *ChAPTER ONE*, Publications & Information Systems
Telephone: (212) 591-7661
E-Mail: loisd@aiche.org

Not sure who to call? Try (212) 705-7338. The receptionist will refer you to the appropriate person.

Steve Smith

MEETINGS, CONFERENCES, CONGRESSES, SHORT COURSES AND WORKSHOPS

To submit a paper for consideration at any event listed below, please contact the symposium coordinator or session chair directly. For further information or details about each of the four CAST Division programming areas, contact the appropriate Area Program Coordinator as noted in the masthead. For general information concerning CAST Division sessions and scheduling, or to correct errors in this listing, please contact Jeffrey J. Siirola, CAST Division Programming Chair, Eastman Chemical Company, PO Box 1972, Kingsport, TN 37662-5150, 423-229-3069, 423-229-4558 (FAX), siirola@eastman.com. Many of these and other announcements of interest are distributed by electronic mail to the CAST Email List and are archived on the world wide web at http://www.che.wisc.edu/cast10/.

Automatic Control of Food and Biological Processes (ACoFoP IV)
Göteborg, Sweden
September 21-23, 1998

Following the success of ACoFoP I, II, and III held in Paris, the Food Working Party of the European Federation of Chemical Engineering is organizing another international symposium on Automatic Control of Food and Biological Processes to take place in Göteborg on September 21-23 1998. Proceedings will be published and distributed at the symposium. The conference language will be English. The objectives of the symposium will be to present results of recent research and industrial developments in process control of food and biological processes, and to promote discussions between process engineers and scientists from the food and biotechnology industry and process control engineers. The themes of the conference will include sensors (including biosensors), image processing and machine vision, on-line measuring systems, software for sensors and estimators, sensor fusion, on-line quality control, in-line sensor applications in industry, simulation in connection to process control, simulation for training in production, computer-aided design of process control, use of artificial intelligence, decision support, robotics, optimal and adaptive control, simulation of continuous and batch processes including environmental aspects, process modeling, dynamic modeling, predictive modeling, scheduling, and computer-aided engineering/computer-integrated manufacturing. For additional information, contact Christina Skjöldebrand, SIK, PO Box 5401, S-402 29 Göteborg, SWEDEN, 46-31-335-5600, 46-31-83-3782 (FAX). For additional information, browse http://www.sik.se/acofop/.

26th Australian Chemical Engineering Conference (CHEMECA '98)
Port Douglas, North Queensland
September 28-30, 1998

The theme for the conference, "Creating Competitive Resources", we believe reflects the exciting developments taking place in North Queensland. We invite papers that cover our theme. For a guide, we are looking at running three streams possibly covering the following subjects: the chemical process industries of the Asia Pacific region; management, process management, best practice programs, project management, and consulting practice; energy - coal, gas, electricity, oil, refining, efficiency, renewables, and greenpower; minerals, metals and light metals; sugar and food technology and production, and fertilizers; environmental/reef ecology/technical aspects of ecotourism; space technology; fundamentals - thermodynamics, heat and mass transfer, membrane processes, reaction kinetics, catalysis, adsorption, reactor design, evaporation, fluid flow and rheology; education; cleaner production; biotechnology, biomedical engineering; safety and risk engineering; fine particle technology; and process modeling and control. The conference will feature a number of workshops including mixing in the process industries; process modeling and control; hazards, hazardous materials and risk assessment;

fine particle technology; and environmental engineering. For additional information, contact Chemeca '98 Conference Secretariat, Department of Chemical Engineering, The University of Queensland, Queensland 4072 AUSTRALIA, 61-7-3365-4199 (FAX), bobn@cheque.uq.edu.au.

1998 AIChE Fall Annual Meeting
Miami Beach, Florida
November 15-20, 1998

Meeting Program Chair: Stanley I. Sandler, Department of Chemical Engineering, University of Delaware, Newark, DE 19716, 302-831-2945, 302-831-4466 (FAX), miami98@che.udel.edu. Speakers are reminded that the deadline for submission of their hardcopy presentation record manuscript (with a Permission to Reproduce Manuscript form) to the AIChE Manuscript Center in New York is October 1, 1998.

The CAST Division is planning the following sessions for the Miami Beach Fall Annual Meeting which is being cosponsored by the Society for Computer Simulation.

CAST Division Plenary Session

1. Recent Developments in Computing and Systems Technology. Scott E. Keeler, Dow AgroSciences (Chair) and Kyriacos Zygourakis, Rice University (Co-Chair).

Area 10a: Systems and Process Design

1. Process Synthesis. Viswanathan Visweswaran, Mobil Technology Company (Chair) and Matthew J. Realff, Georgia Institute of Technology (Co-Chair).

2. Design and Analysis. Dennis D. Sourlas, University of Missouri, Rolla (Chair) and Michael L. Luyben, E. I. du Pont de Nemours & Company (Co-Chair).

3. Process and Product Design. Yinlun Huang, Wayne State University (Chair) and Luke Achenie, University of Connecticut (Co-Chair).

4. Design for Polymer Production and Processing. Steve Wilkinson, E. I. Du Pont de Nemours & Company (Chair) Costas D. Maranas, Pennsylvania State University (Co-Chair).

5. Analysis and Synthesis. Yinlun Huang, Wayne State University (Chair) and Steve Wilkinson, E. I. Du Pont de Nemours & Company (Co-Chair).

Joint Area 10a and Area 10c Sessions

1. Batch Processing. Christine B. Seymour, Searle Company (Chair) and Marianthi G. Ierapetritou, Princeton University (Co-Chair).
2. Design for Flexibility and Operability. Stratos Pistikopoulos, Imperial College (Chair) and Jorge A. Mandler, Air Products and Chemicals, Inc. (Co-Chair).

Joint Area 10a and Area 2g Session

1. Design of Reactive Distillation. Michael F. Malone, University of Massachusetts (Chair) and Jeff DeGarmo, Koch Engineering Company, Inc. (Co-Chair).

Area 10b: Systems and Process Control

1. Process Control Applications. James B. Riggs, Texas Technical University (Chair) and Jorge A. Mandler, Air Products and Chemicals, Inc. (Co-Chair).

2. Process and Controller Performance Monitoring. Bhavik R. Bakshi, Ohio State University (Chair) and George N. Charos, Amoco Corporation (Co-Chair).

3. Batch Process Control. Masoud Soroush, Drexel University (Chair) and Sheyla L. Rivera, Frito-Lay, Inc. (Co-Chair).

4. Nonlinear Control. Thomas A. Badgwell, Rice University (Chair) and Alex Z. Q. Zheng, University of Massachusetts (Co-Chair).

5. Plant-wide Control. Richard D. Braatz, University of Illinois (Chair) and B. Erik Ydstie, Carnegie Mellon University (Co-Chair).

6. State and Parameter Estimation. Kenneth R. Muske, Villanova University (Chair) and David H. Gay, E. I. du Pont de Nemours & Company (Co-Chair).

7. Data-driven Approaches to Process Control. Jay H. Lee, Purdue University (Chair) and Lloyd Johnston, University of New South Wales (Co-Chair).

8. Advances in Process Simulation, Control, and Optimization. S. Joe Qin, University of Texas (Chair) and B. Wayne Bequette, Rensselear Polytechnic Institute (Co-Chair).

Joint Area 10b and Area 3d Session

1. Modeling and Control of Particulate Systems. Brian J. Ennis, E&G Associates (Chair) and Martin Pottmann, E. I. du Pont de Nemours & Company (Co-Chair).

Joint Area 10b and Area 8e Session

1. Design and Control of Microelectronics Manufacturing Processes. Panagiotis D. Christofides, University of

California, Los Angeles (Chair) and Dennis D. Sourlas, University of Missouri, Rolla (Co-Chair).

Joint Area 10b and Area 15c Session

1. Advances in Bioprocessing: Sensors, Control, and Optimization. Christos Hatzis, A. E. Staley, Inc. (Chair) and Michael A. Henson, Louisiana State University (Co-Chair).

Area 10c: Computers in Operations and Information Processing

1. Computer Integrated Manufacturing in the Chemical Process Industries (Cosponsored by the International Cooperation Committee of the Society of Chemical Engineers, Japan). Bhavik R. Bakshi, Ohio State University (Chair) and Shinji Hasebe, Kyoto University (Co-Chair).

2-3. Advances in Optimization I and II. Iauw-Bhieng Tjoa, Mitsubishi Chemical America, Inc. (Chair) and Nikolaos V. Sahinidis, University of Illinois (Co-Chair).

4. Uncertainty and Risk in Process Operations and Monitoring. Lloyd Johnston, University of New South Wales (Chair) and Viswanathan Visweswaran, Mobil Technology Company (Co-Chair).

5. High Performance Computing. Mark A. Stadtherr, University of Notre Dame (Chair) and Matthew H. Bassett, Dow AgroSciences (Co-Chair).

6. Applications of Simulation and Optimization. Scott E. Keeler, Dow AgroSciences (Chair) and Conor M. McDonald, E. I. du Pont de Nemours & Company (Co-Chair).

Joint Area 10c and Group 6a Sessions

1. Computational Fluid Mixing: Process Improvement. Steven R. Strand, Dow Chemical Company (Chair) and Richard D. LaRoche, Silicon Graphics/Cray Research (Co-Chair).

2. Computational Mixing in Operations. Alan B. Coon, UOP, Inc. (Chair) and Ralph W. Pike, Louisiana State University (Co-Chair).

Joint Area 10c and Area 15a Session

1. Computational Methods in the Food Industry. Federico Carvallo, Kraft Foods, Inc. (Chair) and Matthew J. Realff, Georgia Institute of Technology (Co-Chair).

Area 10d: Applied Mathematics and Numerical Analysis

1. Population Balances and Applications. Doraiswami Ramkrishna, Purdue University (Chair) and Ka M. Ng, University of Massachusetts (Co-Chair).

2. Nonlinear Dynamics. Vemuri Balakotaiah, University of Houston (Chair) and Hsueh-Chia Chang, University of Notre Dame (Co-Chair).

3. Computational, Integral and Spectral Methods in Engineering Applications. Pedro Arce, FAMU/FSU College of Engineering (Chair) and Lakshmi N. Sridhar, University of Puerto Rico (Co-Chair).

4. Parallel Computing Applications. Antony N. Beris, University of Delaware (Chair) and Joseph F. Pekny, Purdue University (Co-Chair).

Joint Area 10d and Area 8e Session

1. Applied Mathematics in Materials Processing. Ioannis G. Kevrekidis, Princeton University (Chair) and T. J. Mountziaris, State University of New York at Buffalo (Co-Chair).

Joint Area 10d and Area 15d/e Session

1. Applied Mathematics in Bioengineering. Sriram Neelamegham, State University of New York at Buffalo (Chair), and Richard Dickinson, University of Florida (Co-Chair).

CAST DIVISION POSTER SESSION

Section A. Recent News in Systems and Process Design. Amy R. Ciric, University of Cincinnati (Chair) and Mahmoud El-Halwagi, Auburn University (Co-Chair).

Section B. Recent Advances in Process Control. Dennis D. Sourlas, University of Missouri, Rolla (Chair) and Prodromos Daoutidis, University of Minnesota (Co-Chair).

Section C. Intelligent Systems in Process Operations. James F. Davis, Ohio State University (Chair) and J. Robert Whiteley, Oklahoma State University (Co-Chair).

Section D. Advances in Applied Mathematics. Kyriacos Zygourakis, Rice University (Chair) and Pedro Arce, FAMU/FSU College of Engineering (Co-Chair).

Section E. Issues and Topics in Computers in Operations and Information Processing. Scott E. Keeler, Dow AgroSciences (Chair) and Conor M. McDonald, E. I. du Pont de Nemours & Company (Co-Chair).

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Section F. Demonstrations of Software for Process Control Education. Douglas J. Cooper, University of Connecticut (Chair).

EDUCATIONAL COMPUTER SOFTWARE DEMONSTRATIONS (Joint Effort with Group 4)

Douglas J. Cooper, University of Connecticut (Coordinator) and John T. Bell, University of Michigan (Coordinator).

International Conference on Process Integration (PI '99)
Copenhagen, Denmark
March 7-10, 1999

Process integration is a powerful tool for resource optimization in the process industries. The main objectives of this conference organized by the International Energy Agency and the Nordic Energy Research Program are to convey and demonstrate the usefulness of process integration in solving a large number of tasks in a wide range of industries, and to identify future trends and end-user needs. The role of process integration in both energy and environmental matters will be addressed through state-of-the-art presentations by leading developers and users. Sessions will discuss methodologies, industrial applications, software features, and future trends and needs. For additional information contact the conference secretariat Anette Faber, Association of Danish Electric Utilities, Rosenørns Alle 9, DK-1970 Frederiksberg C, DENMARK, 45-35-39-0111, 45-35-39-5958 (FAX), anette.faber@danel.dk.

1999 AIChE Spring National Meeting
Topical Conference on Process Systems Engineering
Houston, Texas
March 14-18, 1999

Meeting Program Chair: Peter Wanser, Fluor Daniel, PO Box 5014, Sugarland, TX 77487, 281-263-6906, 281-263-3772 (FAX), peter.wanser@fluordaniel.com.

The CAST Division is planning the following sessions for the Houston Spring National Meeting. AIChE has bundled these CAST sessions into a Process Systems Engineering topical conference. Presentation records for all sessions will be available as a preprint volume from AIChE. This topical conference is being cosponsored by the Society for Computer Simulation.

Area 10a: Systems and Process Design

1. Process Integration in Industrial Practice. Luke E. K. Achenie, University of Connecticut (Chair) and Kirtan K. Trivedi, Parsons Energy and Chemicals Group Inc. (Co-Chair).

2. Practical Process Synthesis. Andreas A. Linninger, University of Illinois at Chicago (Chair) and Metin Türkay, Mitsubishi Chemical Corporation (Co-Chair).

3. Advances in Commercial Design Software. Michael F. Malone, University of Massachusetts (Chair), Raymond Rooks, Simulation Sciences, Inc., (Co-Chair), Francisco J. L. Castillo, Hyprotech (Co-Chair), and Vivek Julka, Aspen Technology, Inc. (Co-Chair).

Joint Area 10a and Area 10c Session

1. Internet Applications in Chemical Engineering. Matthew J. Realff, Georgia Institute of Technology (Chair) and Kirtan K. Trivedi, Parsons Energy and Chemicals Group Inc. (Co-Chair).

Joint Area 10a and Area 10d Session

1. Design for Particulate Systems and Solids Processing. Peter J. T. Verheijen, Technical University Delft (Chair) and Jonathan M. Vinson, G. D. Searle (Co-Chair).

Joint Area 10a and Area 9 Session

1. Methods and Tools for Managing Environmental Risks. Herberto Cabezas, United States Environmental Protection Agency (Chair), and Russell F. Dunn, Solutia Inc. (Co-Chair).

Area 10b: Systems and Process Control

1-2. Theory and Advanced Applications of Advanced Process Control I and II. Michael Nikolaou, University of Houston (Chair) and Louis P. Russo, Exxon Chemical Company (Co-Chair).

Area 10c: Computers in Operations and Information Processing

1. Potential Benefits of Global Optimization in Industrial Practice. Luke Achenie, University of Connecticut (Chair) and Iauw-Bhieng Tjoa, Mitsubishi Chemical America, Inc. (Co-Chair).

2. Practical Challenges of Data Reconciliation. Miguel J. Bagajewicz, University of Oklahoma (Chair) and Lionel O'Young, Mitsubishi Chemical America, Inc. (Co-Chair).

European Symposium on Computer Aided Process Engineering (ESCAPE 9) and Second Conference on Process Integration, Modeling, and Optimization for Energy Saving and Pollution Reduction (PRES '99)
Joint Symposium
Budapest, Hungary
May 31-June 2, 1999

The aim of the ESCAPE-9 symposium will be to review the latest developments in process systems engineering and computer aided process engineering, with emphasis on the use of computers and information technology (methods and tools) in the design and operation of process industry. Main themes of the program will include process synthesis, design, and optimization; process dynamics, control, and operation; modeling and simulation; intelligent systems and information; industrial applications and case studies; education and training in computer aided applications; and new ideas. For more information, contact Zsolt Fonyó, Technical University of Budapest, H-1111 Budapest, Műegyetem rkp. 3, HUNGARY, 36-1-463-2202, 36-1-463-3197 (FAX), fonyo.vmt@chem.bme.hu or browse http://www.dcs.vein.hu/ESCAPE-9/.

The aim of the PRES '99 symposium will be to review the latest developments and applications of process integration for energy conservation and pollution reduction. Main topics of the symposium will include methods and applications concerning the planning, design, and operation of batch and continuous processes for the processing industries including chemical, petrochemical, pharmaceutical, pulp and paper, food and drink, and power generation. For more information, contact F. Friedler, University of Veszprém, H-8200 Veszprém, Egyetem u. 10, HUNGARY, 36-88-424-483, 36-88-428-275 (FAX), pres@dcs.vein.hu or browse http://www.dcs.vein.hu/PRES.

1999 American Control Conference
San Diego, California
June 2-4, 1999

The American Automatic Control Council will hold the eighteenth ACC at the Hyatt Regency Hotel, San Diego, June 2-4, 1999. 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. Invited sessions are expected to include nonlinear model reduction techniques, inferential and product quality control, biomedical control systems, and monitoring and control of polymerization processes. Tutorial sessions include model predictive control and statistical process control. The AIChE Society Review Chair is B. Wayne Bequette, Department of Chemical Engineering, Rensselear Polytechnic Institute, Troy, NY 12180-3590, 518-276-6683, 518-276-4030 (FAX), bequette@rpi.edu. The deadline for contributed papers is September 1, 1998. For more information, browse http://www.marquette.edu/acc1999/.

Symposium on Industrial Applications of Chemical Process Control
Beijing, China
July 5-9, 1999

A symposium on Industrial Applications of Chemical Process Control will be held as part of the 14th World Congress of the International Federation of Automatic Control. Topics to be addressed include modeling for control, identification, model-based control, nonlinear control, fault detection and safety, monitoring, and performance assessment, unit process control, plant-wide control, and optimization in operations, control, and process management. For more information contact the IFAC'99 IPC Secretariat Jifeng Zhang, Institute of Systems Science, Chinese Academy of Sciences, Beijing 100080, P. R. CHINA, 86-10-62532161, 86-10-62587343 (FAX), IFAC99@iss03.iss.ac.cn, or browse http://www.ia.ac.cn/ifac99/ifac99.html.

Monitoring and Control of Bioprocesses
Ninth European Congress on Biotechnology (ECB9)
Brussels, Belgium
July 11-15, 1999

The European Congress on Biotechnology (ECB), a fundamental science based but application directed biotechnology conference, is an event that is organized every two years. As for the previous ECBs, invited sessions on Monitoring and Control of Bioprocesses are planned. Papers are solicited which address theoretical and application problems associated with monitoring and control of bioprocesses. Topics may include, but are not limited to, process monitoring and control, nonlinear and robust control, optimal control, batch process control and discrete event systems, and process control applications. Extended abstract deadline is September 1, 1998. For more information, contact Jan Van Impe, Department of Food and Microbial Technology, BioTeC - Bioprocess Technology and Control, Katholieke Universteit Leuven, Kardinaal Mercierlaan 92, B-3001 Heverlee, BELGIUM, 32-16-321466, 32-16-321960 (FAX), jan.vanimpe@agr.kuleuven.ac.be or Denis Dochain, CESAME, Université Catholique de Louvain, Batiment Euler, 4-6 Avenue Georges Lemaître, B-1348 Louvain-la-Neuve, BELGIUM, 32-10-472378, 32-10-472180 (FAX), dochain@auto.ucl.ac.be.

Fifth International Conference on Foundations of Computer-Aided Process Design (FOCAPD-99)
Breckenridge, Colorado
July 18-23, 1999

Foundations of Computer-Aided Process Design, cosponsored by the CAST Division and CACHE Corporation, is the fifth in the series of conferences dealing with the use of computers in support of chemical process

design and will be held July 18-23, 1999 in Breckenridge, Colorado. Conference topics and issues are expected to include state-of-the-art and grand-challenge problems in process design (green chemistries, waste minimization and recycling for pollution prevention; design for operability, control, and inherently safer processes; and capacity utilization, costs, and productivity), fundamental design theories and methods (process design and synthesis methods; operability and control issues in process design; computational fluid dynamics and transport modeling; and basic data and properties for process design), environments and new tools for effective process design (distributed computing and distributed tools for process design; integrated and open software environments for process design; dynamic models and modeling for the design of process systems; and managing the process of process design), and applications and emerging areas (batch process design for specialty chemicals and pharmaceuticals; integration of molecular and mechanistic chemistry with design; integrated process and product design; and education and training for effective design). For more information, contact the conference chairs Michael F. Malone, Department of Chemical Engineering, University of Massachusetts, Amherst, MA 01003-3110, 413-545-0838, 413-545-1133 (FAX), mmalone@ecs.umass.edu or James A. Trainham, E. I. du Pont de Nemours & Company, PO Box 80101, Wilmington, DE 19880-0101, DE, 302-992-3898, 302-992-2035 (FAX), james.a.trainham@usa.dupont.com. To initiate the application process, send address information and a statement of interest to CACHE Corporation, PO Box 7939, Austin, TX 78713-7939, 512-471-4933, 512-295-4498 (FAX). Applications must be postmarked by January 15, 1999.

1999 European Control Conference
Karlsruhe, Germany
August 31 - September 3, 1999

The European Control Conference (ECC) is an event that is organized every two years, with the aim to stimulate contacts between scientists active in the area of Systems and Control. The first four conferences took place in Grenoble (1991), Groningen (1993), Rome (1995) and Brussels (1997). The fifth ECC will be held in Karlsruhe, Germany, in 1999. The scope of the conference includes all aspects of Systems and Control, and ranges from subjects within the framework of fundamental research to engineering applications. Topics of interest include multivariable and nonlinear control, system modeling, system identification, adaptive control, optimal control, filtering, robotics, aerospace systems, neural networks applied to control, control of chemical processes, and bioreactor control. For more information contact Frank Allgower, Automatic Control Laboratory, ETH Zurich, CH-8092 Zurich, SWITZERLAND, 41-1-632-3557, 41-1-632-1211 (FAX), allgower@aut.ee.ethz.ch.

1999 AIChE Fall Annual Meeting
Dallas, Texas
October 31-November 5, 1999

Meeting Program Chair: Robert H. Davis, Department of Chemical Engineering, University of Colorado, Boulder, CO 80309-0424, 303-492-7314, 303-492-4341 (FAX), davisr@spot.colorado.edu.

The CAST Division is planning the following sessions for the Dallas Fall Annual Meeting which have been approved by AIChE and the Meeting Program Chair. A first call for papers for this meeting appears later in this issue. Deadline for submission of presentation proposals (via the world wide web only) is March 15 or April 15, 1999 (depending on the Area review procedures). The entire CAST program in Dallas is being cosponsored by the Society for Computer Simulation.

CAST Division Plenary Session

1. Recent Developments in Computing and Systems Technology. Mahmoud El-Halwagi, Auburn University (Chair) and B. Wayne Bequette, Rensselear Polytechnic Institute (Co-Chair).

Area 10a: Systems and Process Design

1. Process Synthesis. Metin Türkay, Mitsubishi Chemical Corporation (Chair) and Andreas Linninger, University of Illinois - Chicago (Co-Chair).

2. Design and Analysis. Katerina Papalexandri, Chemical Process Engineering Research Institute (Chair) and Jonathan M. Vinson, G. D. Searle (Co-Chair).

3. Advanced Process Integration. Pricilla J. Hill, Mitsubishi Chemical Corporation, (Chair) and Il Moon, Yonsei University (Co-Chair).

4. Technology Transfer in Process Design. Gavin P. Towler, UOP, Inc. (Chair) and Vivek Julka, Aspen Technology, Inc. (Co-Chair).

5. Separations System Synthesis. Ashish Gupta, SUNY Buffalo (Chair) and Dante Bonaquist, Praxair (Co-Chair).

Joint Area 10a and Area 10b Session

1. Interaction of Design and Control. Dennis D. Sourlas, University of Missouri, Rolla (Chair) and Christine B. Seymour, Searle Company (Co-Chair), and Jorge A. Mandler, Air Products and Chemicals, Inc. (Co-Chair).

Joint Area 10a and Area 10c Session

1. Design and Operation of Batch Processes. Ekaterini Korovessi, E. I. du Pont de Nemours & Company (Chair) and Vipin Gopal, Honeywell Inc. (Co-Chair).

Area 10b: Systems and Process Control

1. Advances in Process Control. Oscar D. Crisalle, University of Florida (Chair) and Michael A. Henson, Louisiana State University (Co-Chair).

2. Nonlinear Control. Thomas A. Badgwell, Rice University (Chair) and Prodromos Daoutidis, University of Minnesota (Co-Chair).

3. Applications of Process Control. Sheyla L. Rivera, Frito-Lay, Inc. (Chair) and Kenneth R. Muske, Villanova University (Co-Chair).

4. Controller and Process Monitoring. Bhavik R. Bakshi, Ohio State University (Chair) and George N. Charos, Amoco Corporation (Co-Chair).

5. Process Modeling, Identification, and Estimation. Masoud Soroush, Drexel University (Chair) and Mikhail Skliar, University of Utah (Co-Chair).

6. Advances in Model Predictive Control. Alex Z. Q. Zheng, University of Massachusetts (Chair) and Michael Nikolaou, University of Houston (Co-Chair).

Joint Area 10b and Area 10c Session

1. Advances and Applications in SQC/SPC. S. Joe Qin, University of Texas (Chair) and Urmila M. Diwekar, Carnegie Mellon University (Co-Chair).

Joint Area 10b and Area 3c Session

1. Challenges in Control of Solids Processing Systems. George E. Klinzing, University of Pittsburgh (Chair) and B. Wayne Bequette, Rensselear Polytechnic Institute (Co-Chair).

Joint Area 10b and Area 8e Session

1. Control of Microelectronic Manufacturing. Stephanie W. Butler, Texas Instruments (Chair) and Panagiotis D. Christofides, University of California, Los Angeles (Co-Chair).

Joint Area 10b and Area 17 Session

1. Process Control and Simulation in the Forest Products Industry. Eric M. Hanczyc, Weyerhaeuser (Chair) and Francis J. Doyle III, University of Delaware (Co-Chair).

Area 10c: Computers in Operations and Information Processing

1. Computer Integrated Manufacturing in the Chemical Process Industries - Advances and Industrial Applications (Cosponsored by the International Cooperation Committee of the Society of Chemical Engineers, Japan). Shinji Hasebe, Kyoto University (Chair) and Conor M. McDonald, E. I. du Pont de Nemours & Company (Co-Chair).

2. Planning, Scheduling, and Supply Chain Management. Marianthi G. Ierapetritou, Princeton University (Chair) and Antonis C. Kokossis, University of Manchester Institute of Science and Technology (Co-Chair).

Joint Area 10c and Area 12a Session

1. Advances in Optimization: Case Studies. Yinlun Huang, Wayne State University (Chair) and Miguel J. Bagajewicz, University of Oklahoma (Co-Chair).

Joint Area 10c and Area 15a Session

1. Computational Methods in the Food Processing Industry. Stephen P. Lombardo, The Coca-Cola Company (Chair) and Joseph F. Pekny, Purdue University (Co-Chair).

Joint Area 10c and Group 16a Session

1. Molecular Modeling for Refinery Optimization. Michael T. Klein, University of Delaware (Chair) and Gavin P. Towler, UOP, Inc. (Co-Chair).

Area 10d: Applied Mathematics and Numerical Analysis

1. Pattern Formation and Instabilities in Physicochemical Systems. Vemuri Balakotaiah, University of Houston (Chair) and Ranga Narayanan, University of Florida (Co-Chair).

2. Applications of Parallel Computing Strategies in Engineering Systems. Antony N. Beris, University of Delaware (Chair) and Jeffrey J. Derby, University of Minnesota (Co-Chair).

3. Stochastic Processes. Doraiswami Ramkrishna, Purdue University (Chair) and Kyriacos Zygourakis, Rice University (Co-Chair).

4. Fundamental Advances in Applied Mathematics. Raymond A. Adomaitis, University of Maryland (Chair) and Panagiotis D. Christofides, University of California, Los Angeles (Co-Chair).

5. D. Ramkrishna Symposium: Cybernetics, Operator-Theoretic, and Self-Similar Approaches in Chemical Engineering. Pedro Arce, FAMU/FSU College of

Engineering (Chair) and E. Terry Papoutsakis, Northwestern University (Co-Chair).

Joint Area 10d and Area 15de Session

1. Applied Mathematics in Bioengineering. Chair to be named by Area 15de and Kyriacos Zygourakis, Rice University (Co-Chair).

CAST DIVISION POSTER SESSION

Section A. Recent Developments in Systems and Process Design. Mahmoud El-Halwagi, Auburn University (Chair) and Urmila M. Diwekar, Carnegie Mellon University (Co-Chair)

Section B. Topics in Systems and Process Control. Kenneth R. Muske, Villanova University (Chair) and Richard D. Braatz, University of Illinois (Co-Chair).

Section C. High Performance Computing. Mark A. Stadtherr, University of Notre Dame (Chair) and Luke E. K. Achenie, University of Connecticut (Co-Chair).

Section D. Process Operability. Stratos Pistikopoulos, Imperial College (Chair) and Il Moon, Yonsei University (Co-Chair).

Section E. Issues in Computers in Operations and Information Processing. Nikolaos V. Sahinidis, University of Illinois (Chair) and Conor M. McDonald, E. I. du Pont de Nemours & Company (Co-Chair).

Section F. Advances in Applied Mathematics. Pedro Arce, FAMU/FSU College of Engineering (Chair) and Antony N. Beris, University of Delaware (Co-Chair).

Section G. Demonstrations of Software for Process Control Education. Douglas J. Cooper, University of Connecticut (Chair).

EDUCATIONAL COMPUTER SOFTWARE DEMONSTRATIONS (Joint Effort with Group 4)

Douglas J. Cooper, University of Connecticut (coordinator) and John T. Bell, University of Michigan (coordinator).

2000 American Control Conference
Chicago Illinois
June 28-30, 2000

The American Automatic Control Council will hold the nineteenth ACC at the Hyatt Regency Hotel, 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, 916-752-8774, 916-752-1031 (FAX), anpalazoglu@ucdavis.edu. The deadline for contributed papers is September 15, 1999. For more information, browse http://www.ece.nwu.edu/~ahaddad/aacc/acc.html.

Seventh International Symposium on Process Systems Engineering (PSE-2000)
Keystone, Colorado
July 16-21, 2000

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 Interamerican Confederation of Chemical Engineering, and the Asian Pacific Confederation of Chemical Engineering and will be organized in 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 Conference on Foundations of Molecular Modeling and Simulation (FOMMS-2000)
Keystone, Colorado
July 23-28, 2000

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. For additional information, contact the conference chairs Peter T. Cummings, Department of Chemical Engineering, University of Tennessee, Knoxville, TN 37996-2200, 423-974-0227, 423-974-4910 (FAX), ptc@utk.edu or 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 or browse http://www.ecs.umass.edu/topical/FOMMS.html.

2000 CAST Division Programming

The CAST Division is expected to actively participate at the 2000 AIChE Spring National Meeting in Atlanta and the 2000 Fall Annual Meeting in Los Angeles. Programming for these two meetings will be planned during the Miami Beach AIChE meeting in November. 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 Meeting Registration Area. Those who cannot attend the area program meetings are encouraged to bring their ideas to the attention of the Area Program Coordinators for 2000 at the addresses indicated on the masthead.

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

CALLS FOR PAPERS FOR CAST SESSIONS

Final Call for CAST Sessions
1999 AIChE Spring National Meeting
Houston, Texas
March 14-18, 1999

The names, addresses, and telephone numbers of the session chairs are given on the next several pages, as are brief statements of the topics to receive special emphasis in selecting manuscripts for these sessions. Prospective session participants are encouraged to observe the deadlines, which have been established but may be changed, by the Meeting Program Chair, Peter Wanser. A complete call for papers for all sessions at this meeting may be accessed at http://www.aiche.org/meeting/1999/spring/cfp/.

AIChE is currently soliciting electronic submission of proposals-to-present via the world-wide-web only. To submit via the web, access http://www.aiche.org. Do not send proposals-to-present to the session chair email addresses.

Houston Meeting deadlines:

September 1, 1998: Submit a proposal-to-present electronically to AIChE via web access at http://www.aiche.org. AIChE will forward proposals to the corresponding session chairs.

October 1, 1998: Session content finalized and authors informed of selection. Authors of accepted proposals may update abstracts electronically.

February 1, 1999: Authors submit hardcopy of manuscript (presentation record) with a Permission to Reproduce Manuscript form to AIChE Manuscript Center.

March 14, 1999: Speakers bring 60 hardcopies of visual aids for distribution to the audience at the presentation. (This is a CAST Division policy intended to improve the quality of presentations and the benefit to the audience.)

Please note that there is an AIChE limitation that no person may author or co-author more than four contributions at any one meeting.

Authors submitting by the above deadlines will be notified of decisions on acceptance as close to October 1 as the schedules of the session chairs, the Meeting Program Chair, and AIChE permit. Abstracts of accepted proposals will be available on the web for public browsing approximately one month before the meeting.

Presenters at AIChE meetings are reminded to send a hardcopy record of their presentation to the AIChE Manuscript Center no later than one month before the meeting. The purpose of this requirement is to improve the quality of presentations generally as well as to enable AIChE to more broadly disseminate ideas and results by

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filling requests for copies of presentation records during and after each meeting. Formal full-length manuscripts are encouraged by AIChE and many of the programming groups. The CAST Division has elected not to mandate any specific length or format requirements for presentation records for its sessions. However, the minimally acceptable content does consist of an introduction, results, discussion, and references which may be augmented with figures and tables, presentation visual aids, or poster panels. The Executive Board of the National Program Committee has adopted the policy that the advanced submission of a hardcopy presentation record be a condition for presenting at AIChE-sponsored meetings.

Area 10a: Systems and Process Design

1. Process Integration in Industrial Practice.

Papers are being sought for recent applications and developments in process integration. Whereas the emphasis is on proven success stories in industrial practice, new concepts that have a high potential for successful implementation in industry are also welcome. Contributions should demonstrate efficient methods in the context of process design, simulation and optimization of industrially-relevant chemical processes. Non-traditional but promising methods such as neuro-fuzzy logic concepts, petri-nets, etc. are also encouraged. The contributions can address grassroots or retrofit problems. The area of application is open. Examples include overall plant efficiency, yield enhancement, energy conservation, pollution prevention, and overall plant profitability.

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2. Practical Process Synthesis.

This session invites contributions form industry and academia in the general area of process synthesis. Special attention will be given to presentations which document successful applications of methodological approaches in process design. In particular, we want to encourage industrial contributors to share their recent experience in using systematic methodologies, combinatorial or programming techniques in chemical process development. New theoretical strategies like network synthesis, graphical methods, rigorous or heuristic optimization techniques for flowsheet generation are equally welcome.

Session Chair
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3. Advances in Commercial Design Software.

Papers are requested describing original research and development on the application of commercial software to design or retrofit industrial processing plants. Papers are desired which focus on novel or non-conventional applications to design or improve processes as opposed to the simulation or rating of processes. Although the emphasis will be placed on existing commercial software, original work that highlights needed methods not available in commercial software are also welcome. The selection criteria are new results substantiated by specific examples of industrial importance. Marketing presentations are prohibited.

Session Chair
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Joint Area 10a and Area 10c Session

1. Internet Applications in Chemical Engineering.

Inter- and Intranet technology is having a profound impact on the availability, dissemination and use of information that can be represented in electronic media. The objective of this session is to highlight existing applications of Inter- and Intranet technology to chemical engineering practice and to provide a forum for debate on what applications we may see in the near future. We encourage participation from all sectors of chemical engineering, and are particularly interested in presentations and papers from industrial users that highlight existing or planned uses of the net, from software vendors that are building frameworks and specific application tools that take advantage of the network structure, from content providers that are developing network resources of information for chemical engineers, and from academicians who are developing research platforms and tools for industrial or academic use. We would like to see papers that are not just compilations of web pages or which will result in "point and click" presentations. We want contributions that delve more deeply into the issues of delivering information and applications in this environment. We would like each contribution to highlight the important reasons, decisions, pitfalls and economic motivations for moving from the current means of delivering the application to a net-based one, and where applicable explain why the project was inconceivable without the net.

Session Chair
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Joint Area 10a and Area 10d Session

1. Population Balances and Applications.

Papers are solicited about the modeling, optimization and design of systems involving population balances. We consider among others solids processes, and handling; crystallization, fluidized bed systems; colloid systems and biological systems. Papers on the design, modeling, and control of such systems are also welcome.

Session Chair
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Area 10b: Systems and Process Control

1-2. Theory and Applications of Advanced Process Control I and II.

Papers are solicited in the area of theory and applications of advanced process control. Particular emphasis is placed on the relationship between recent theoretical developments and industrial applications. Papers on industrial needs, novel applications to experimental processes, industrial

application studies, as well as critical and tutorial reviews of recent theoretical advances in advanced process control are especially encouraged. Specific advanced process control topics of interest include, but are not limited to, process modeling, identification, monitoring, estimation, on-line optimization, and fault detection.

Session Chair
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Area 10c: Computers in Operations and Information Processing

1. Potential Benefits of Global Optimization in Industrial Practice.

In the last several years the academic community have published many new results on global optimization. However, very few successful industrial applications of global optimization have been reported. This is due partly to the traditional gap between academic research and industrial application. In this session, we are striving to reduce this gap. We will invite two top researchers in global optimization, and up to four industrial practitioners who have had experience with optimization in the CPI to discuss the potential benefits of global optimization to the CPI, and to identify areas where global optimization will find a niche. The discussants will also try to identify what further developments in academia and industry will lead to the broad acceptance of global optimization as an enabling technology. Readers are encouraged to nominate industrial practitioners who will serve as suitable discussants for this session. The session will be tentatively organized as a tutorial on global optimization, with presentations by industrial practitioners, and open discussion addressing the issues identified above.

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2. Practical Challenges of Data Reconciliation.

Data is one of the main assets of any company, especially for chemical companies, since huge amount of data are available at a processing plant and the R&D laboratory. Unfortunately not all the data are "good". There are many errors and noises while collecting the data. Consequently in order to extract meaningful information, data reconciliation technology is required. In the last decade, several computer-aided methods have been introduced to perform plant monitoring, control, accounting, etc. To gain benefit from using these methodologies, it is necessary to feed in the "correct" data with the "correct" model. Thus, data reconciliation became a key ingredient for applying the advanced technologies. Since the appearance of the first commercial data reconciliation packages several issues remained the object of active research: the detection of biased instruments and leaks, instrument variance estimation, among others. Other issues are still confined to academia, like dynamic data reconciliation and optimal sensor location. This session is aimed at discussing the current challenges that the area of data reconciliation is facing in practice and the directions of research taking place in academia. We invite practitioners, software vendors and developers from academia to participate in this forum and contribute to a lively discussion of these issues.

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First Call for CAST Sessions
1999 AIChE Fall Annual Meeting
Dallas, Texas
October 31-November 5, 1999

The names, addresses, and telephone numbers of the session chairs are given on the next several pages, as are brief statements of the topics to receive special emphasis in selecting manuscripts for these sessions. Prospective session participants are encouraged to observe the deadlines that have been established, but may be changed, by the Meeting Program Chair, Robert H. Davis. A complete call for papers for all sessions at this meeting may be accessed at http://www.aiche.org/meeting/1999/annual/cfp/.

AIChE is currently soliciting electronic submission of proposals-to-present via the world wide web only. To submit via the web, access http://www.aiche.org. Do not send proposals-to-present to the session chair email addresses.

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

Because of the large number of anticipated presentation proposals for annual meetings and the limited symposia space available, in order to maximize the number of good proposals that can be accepted and generally improve programming quality, all proposals for Fall 1999 programming in CAST Areas 10a, 10b, and 10c must be submitted to AIChE ONE MONTH EARLIER than the generally published deadline in order to accommodate the Centralized Review process. Please note that CAST Area 10d and CAST sessions cosponsored with other AIChE programming groups DO NOT participate in the Centralized Review process, and therefore remain governed by the standard deadline.

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

1. Abstracts will receive anonymous reviews by three or four session chairs, co-chairs, and Area Program Coordinators for technical content, novelty and style. Submissions may be shifted between sessions or other CAST areas as appropriate.

2. Each area will sponsor one section of the Division Poster Session. Some areas may develop a topical theme for their section while others may have a more general scope to accommodate late news. Unless directed otherwise by the author, all proposals will be considered for both symposium and poster sessions.

Dallas Meeting Deadlines:

March 15, 1999 (10a, 10b, and 10c): Submit a proposal-to-present electronically to AIChE via web access at http://www.aiche.org. AIChE will forward the proposals to CAST for the Centralized Review.

April 15, 1999 (10d, and sessions cosponsored with other programming groups): Submit a proposal-to-present electronically to AIChE via web access at http://www.aiche.org. AIChE will forward proposals to the corresponding session chairs.

May 1, 1999: Session content finalized and authors informed of selection. Authors of accepted proposals may update abstracts electronically.

October 1, 1999: Authors submit hardcopy manuscript (presentation record) with a Permission to Reproduce Manuscript form to AIChE Manuscript Center.

October 31, 1999: Speakers bring 60 hardcopies of visual aids for distribution to the audience at the presentation. (This is a CAST Division policy intended to improve the quality of presentations and the benefit to the audience.)

Please note that there is an AIChE limitation that no person may author or co-author more than four contributions at any one meeting.

Authors submitting by the above deadlines will be notified of decisions on acceptance as close to May 1 as the schedules of the reviewers, session chairs, the Meeting Program Chair, and AIChE permit. Abstracts of accepted proposals will be available on the web for public browsing approximately one month before the meeting.

Presenters at AIChE meetings are reminded to send a hardcopy record of their presentation to the AIChE Manuscript Center no later than one month before the meeting. The purpose of this requirement is to improve the quality of presentations generally as well as to enable AIChE to more broadly disseminate ideas and results by filling requests for copies of presentation records during and after each meeting. Formal, full-length manuscripts are encouraged by AIChE and many of the programming groups. The CAST Division has elected not to mandate any specific length or format requirements for presentation records for its sessions. However, the minimally acceptable content does consist of an introduction, results, discussion, and references which may be augmented with figures and tables, presentation visual aids, or poster panels. The Executive Board of the National Program Committee has adopted the policy that the advanced submission of a hardcopy presentation record is a condition for presenting at AIChE-sponsored meetings.

CAST Division Plenary Session

1. Recent Developments in Computing and Systems Technology.

Plenary papers describing recent advances, and new challenges in each of the CAST areas (Systems and Process Design, Systems and Process Control, Computers in Operations and Information Processing, and Applied Mathematics and Numerical Analysis) will be invited by the CAST programming board. The papers are intended to be accessible to a wide audience with interests in any and all of the CAST areas. It is anticipated that this session will be scheduled on Monday morning and that no other CAST sessions will be scheduled in parallel in order to facilitate the broadest possible communication.

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Area 10a: Systems and Process Design

1. Process Synthesis.

This session invites contributions from academia and industry in the area of process synthesis. Topics of interest include, but are not limited to, flowsheet synthesis, synthesis of energy integrated processes, reactor network synthesis, synthesis of separation and reactive separation systems, and synthesis of environmentally friendly processes. Practical applications, and new strategies for flowsheet generation, model development and solution techniques are particularly encouraged.

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2. Design and Analysis.

Technologies that support the design and analysis of chemical processes are the main focus of this session. We invite papers describing developments, methodologies, tools and case-studies in areas such as process modeling, analysis and modeling of unit operations, integrated design, process optimization, etc. Emphasis is placed on studies aiming to improve production versatility and responsiveness and increase process efficiency and environmental awareness. We would like to encourage the submitters to discuss the impact of their research on traditional engineering practice towards these targets.

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3. Advanced Process Integration.

We invite papers that deal with new and innovative methods for integration of chemical process systems. Topics of interest include, but are not limited to, heat exchanger, reactor, or separation system networks; optimization of process flowsheets; process units with simultaneous reaction and separation; and interdisciplinary areas such as safety or environmental analysis which integrate design with operation aspects. Both industrial and academic papers are sought describing general procedures, theoretical developments, methodologies, tools and case studies.

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4. Technology Transfer in Process Design.

This session will address experiences in transferring design tools and methodologies from developers to industrial users. Developers include academics, software companies, consultants and industrial researchers. Papers describing novel approaches to technology transfer and giving case examples that show how new methods gained industrial application will be given preference.

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5. Separations System Synthesis.

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Joint Area 10a and Area 10b Session

1. Interaction of Design and Control.

This session focuses on the general topic of the interaction between process design and process control. Poor control of a chemical process can sometimes be the result of limitations in the plant design. Significant improvements in dynamic process controllability can often be achieved at the design stage by examining issues such as disturbance rejection, startup/shutdown, and variable grade/rate production. Both industrial and academic papers are sought which address the problem of incorporating controllability and operability into the process design (general procedures, methodologies, tools, case studies, etc.).

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Joint Area 10a and Area 10c Session

1. Design and Operation of Batch Processes.

Papers are invited in the general area of design and operation of batch processes. Topics of interest include, but are not limited to, flowsheet synthesis, scale-up, process modeling, design, rating and/or retrofit of existing facilities, operations planning and modeling (including modeling under uncertainty), sequencing and scheduling, and optimization. Contributions that describe industrial applications are particularly encouraged.

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Area 10b: Systems and Process Control

1. Advances in Process Control.

This session emphasizes papers that address recent advances in the control of chemical process systems. Priority will be given to papers that discuss novel theories, new and innovative strategies, novel applications or the definition of new problem areas. Papers that demonstrate the application of existing theory to new problem areas are also welcome. The contribution of the paper to the advancement of the state-of-the-art should be clearly stated in the abstract. The topic and research areas are open; however, authors are strongly discouraged from submitting to this session papers that would be better suited for presentation in the following sessions sponsored by the Area 10b of CAST: Nonlinear Control, Applications of Process Control, Controller and Process Monitoring, Process Modeling, Identification, and Estimation, Advances in Model Predictive Control, Advances and Applications in SQC/SPC, Challenges in Control of Solids Processing Systems, Control of Microelectronics Manufacturing, and Process Control and Simulation in the Forest Products Industry.

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2. Nonlinear Control.

Contributions are sought in the general area of nonlinear control including, but not limited to, model predictive control, control of differential-algebraic systems, differential geometric control, modeling of nonlinear systems, and nonlinear dynamic analysis of control systems.

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3. Applications of Process Control.

All interested persons are invited to submit papers that address the application of advanced control to the chemical processing industry. We are soliciting papers that demonstrate how industry has benefited or how industry could benefit from advanced control.

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4. Controller and Process Monitoring.

The focus of this session is on the theoretical and application studies related to control system performance monitoring and process performance monitoring and diagnosis. It covers the methods to ensure process safety, high product quality, process operability, optimum process performance, economic viability, and process profitability. Industrial implementations are particularly welcome. Topics include but are not limited to multivariate statistical methods, neural networks, process chemometrics, fuzzy logic, artificial intelligence for monitoring and diagnosis, and statistical process control.

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CAST Programming Tips
2. Submission of Proposals-to-Present to multiple sessions is permitted by AIChE and the web software, but may decrease chances of acceptance by the CAST Division.

5. Process Modeling, Identification, and Estimation.

Contributions are sought in the general areas of process modeling, identification, and estimation. Papers presenting new theoretical and/or application results are solicited. Higher priority will be given to real-time studies and to contributions from the process industry. Areas of interest include, but are not limited to, first-principles modeling for control and monitoring; open-loop and closed-loop model identification for control and monitoring; model reduction for control and monitoring; state and/or parameter estimation; and industrial challenges in modeling and estimation.

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6. Advances in Model Predictive Control.

Papers addressing new theoretical developments, applications and implementations in the area of model predictive control are solicited. Topics of interest include, but are not limited to, novel MPC algorithms; stability issues; robustness issues; tracking; estimation techniques; implementation issues; applications and case studies.

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Joint Area 10b and Area 10c Session

1. Advances and Applications in SQC/SPC.

This session invites contributions in the state of the art advances and applications in the area of statistical quality control and statistical process control (SQC/SPC). Contributions are encouraged, but not limited to, the following topics: advances in the theory of multivariate SPC/SQC; root cause identification and classification; dynamic process monitoring; SPC in the context of controller feedback; multiscale analysis for process monitoring; controller performance and process monitoring; and new applications in both batch and continuous industrial processes.

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Joint Area 10b and Area 3c Session

1. Challenges in Control of Solids Processing Systems.

Solids processing has generally not been associated with high tech and as such the topic of control in this field has not progressed beyond a few applications. With our increased understanding of these operations and the ability to employ new sensors and computer interfaces the potential for controlling these processing has increased significantly. This session will explore solids processing control operations mainly from a case study viewpoint. A number of industries and individuals have been applying modern control techniques and philosophies to the field and these individuals will be sought as prime presenters in the session.

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Joint Area 10b and Area 8e Session

1. Control of Microelectronic Manufacturing.

Papers are sought which describe process control applications to microelectronic manufacturing processes. Real-time (within a batch) control and run-to-run (batch to batch) control are both of interest, especially papers examining the co-optimization of both levels. Papers concerning controller design, including model development for control, model reduction, and optimization methods are desired. Controller monitoring and performance assessment papers are also applicable. In addition to fault detection, fault classification papers are also solicited. Novel integrated metrology solutions are also of interest. For all papers, a clear statement of the engineering problem to be solved should be provided, along with an assessment of the solution being proposed and the benefits achieved.

CAST Programming Tips
3. It is AIChE policy that a person may not author or co-author more than four presentations at any one meeting. The CAST Division supports this policy.

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Joint Area 10b and Area 17 Session

1. Process Control and Simulation in the Forest Products Industry.

The pulp and paper industry (PPI) represents a very capital-intensive component of the US manufacturing sector. In order to maintain and enhance the global competitiveness of the US PPI, new results in advanced simulation and control technology are required to complement the existing systems in the pulp and paper mills. In this session, we invite contributions from both academia and industry. Although not limited to the following areas, we seek papers that describe the development and application of modeling and control techniques in the broad areas of model-based control design (including, e.g., internal model control (IMC) and model predictive control (MPC)); grade transition control (e.g., hardwood/softwood swings, production rate changes); fundamental dynamic modeling (from single unit to mill-wide); and process performance monitoring. These techniques can be considered for individual units (e.g., pulp digester, paper machine, etc.), mill sections (e.g., chemical recovery, papermaking, etc.), or the entire mill-wide enterprise.

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Area 10c: Computers in Operations and Information Processing

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

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

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2. Planning, Scheduling, and Supply Chain Management.

Papers are solicited in the area of process operations with an emphasis on contributions that present applications of optimization to planning, scheduling, and supply chain management problems. Papers with a strong relevance to industrial applications are particularly encouraged.

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Joint Area 10c and Area 12a Session

1. Advances in Optimization: Case Studies.

Papers are solicited which describe case studies in optimization of processes in the chemical industries. Papers that address the following issues are especially encouraged: 1) Usage of new algorithms for nonlinear, mixed integer, global and stochastic optimization for design and retrofit as well as for process and product development, and 2) novel applications of optimization techniques for solving problems related to chemical process operations, scheduling and planning. Priority will be given to methods that have proven useful in practice. Industrial examples are especially welcomed.

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Joint Area 10c and Area 15a Session

1. Computational Methods in the Food Processing Industry.

There has been an explosion of new food and beverage products in recent years. As a result processors are constantly looking for methods to maximize the flexibility and agility of new and existing manufacturing facilities. To aid in the prioritization of potential improvements and assessment of new technologies, they are applying computer modeling tools to evaluate costs/benefits. Simulation, scheduling, and design software are being employed to optimize manufacturing layouts, material flows, and task sequencing. The purpose of this session is to examine existing applications in the food process industry, and innovative academic and industrial research that could lead to new areas of opportunity in the future.

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CAST Programming Tips
4. Every presenter is expected to send a hardcopy record of their presentation (with a Permission to Reproduce Manuscript Form) to the AIChE Manuscript Center no later than one month before the meeting. Full-length manuscripts are encouraged by AIChE. The CAST Division has elected not to mandate any specific length or format requirements for presentation records for its sessions. However, the minimally acceptable content does consist of an introduction, results, discussion, and references which may be augmented with figures and tables, presentation visual aids, or poster panels.

Joint Area 10c and Group 16a Session

1. Molecular Modeling for Refinery Optimization.

There have been considerable recent advances in the modeling of hydrocarbon mixtures, and the reaction and separation processes of oil refining and petrochemicals manufacture. Molecular modeling approaches allow detailed chemical information to be captured for use in refinery design and optimization. This session will describe fundamental advances in refinery modeling and show how these can be implemented to improve prediction and optimization of refinery performance.

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Area 10d: Applied Mathematics and Numerical Analysis

1. Pattern Formation and Instabilities in Physicochemical Systems.

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

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2. Applications of Parallel Computing Strategies in Engineering Systems.

Parallel computing offers our best hope to escape the computational limitations of single processor performance. Moreover, in addition to the adaptation of standard numerical methods to this new computational environment (like finite elements, spectral methods, boundary element methods, Monte Carlo methods etc.) we also see new emerging computational paradigms: Cellular automata, Bounding Optimization Methods, etc. Chemical Engineering Applications could not have remained unaffected from these revolutionary changes. As a result, we invite contributions from all areas in chemical engineering where parallel computers have, or are about to have, a substantial impact.

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3. Stochastic Processes.

This symposium will focus on applications of probabilistic concepts to continuous and discrete models of chemical engineering systems. Topics of interest include (but are not limited to) chemical reaction models, percolation processes and population balance models.

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4. Fundamental Advances in Applied Mathematics.

Papers are solicited which focus on fundamental developments in applied mathematics which are useful in the context of chemical engineering problems. Of particular interest are developments related to the model reduction of nonlinear distributed parameter systems, such as nonlinear Galerkin and other, advanced discretization methods.

Issues in mathematical fluid dynamics, geometric methods, developments in stochastic PDEs, and nonlinear dynamics will also be considered.

Session Chair
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5. D. Ramkrishna Symposium: Cybernetics, Operator-Theoretic, and Self-Similar Approaches in Chemical Engineering.

Professor D. Ramkrishna, the Harry C. Pfeffer Distinguished Professor of Chemical Engineering at Purdue University has made seminal contributions to our profession. Among the areas where they can be found include operator-theoretic methods, dynamics of biosystems (where he has pioneered a cybernetic modeling approach that has helped to understand the complex behaviors of such systems), and the self-similar and scaling approaches applied to liquid-liquid dispersions. Professor Ramkrishna has distinguished himself by elegant and systematic approaches to the analysis of the problems in the areas mentioned above. This session will highlight his efforts by research contributions and keynote lectures that will help to provide a perspective to the subject.

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Joint Area 10d and Area 15de Session

1. Applied Mathematics in Bioengineering.
The symposium will focus on the application of mathematics to bioengineering, with an emphasis to experimental results and computational simulations. Topics include (but are not limited to) models describing cell biophysics, drug delivery, microbial transport, environmental interactions, genetic engineering and pharmacokinetic applications, cybernetic model development and reflex circuitry modeling.

Session Chair
To be named by Area 15de

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CAST DIVISION POSTER SESSION

Section A. Recent Developments in Systems and Process Design.

This poster session will present new and interesting results in systems and process design. Poster topics include, but are not limited to, process synthesis and optimization, design under uncertainty, synthesis of reaction, separation, heat exchanger networks, and hybrid systems, environmentally oriented design, and design for controllability and flexibility.

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Section B. Topics in Systems and Process Control.

All interested persons are invited to submit poster presentations that address topics in the area of chemical process control. Papers that present new theoretical results, innovative strategies, new applications, and new problem areas are strongly encouraged. Prospective authors should clearly state the contribution of their work to the advancement of the current state of knowledge in the field. The topic and research area is open.

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Section C. High Performance Computing.

Impressive gains in computing technology, especially the widespread availability of parallel computing hardware, as well as recent advances in the enabling software technology, are making possible today the solution of large-scale, realistically modeled chemical process engineering problems, even in a real-time environment. Papers are sought that describe: (i) novel numerical algorithms and codes that promote the use of high performance computing in process engineering, and (ii) applications of high performance computing technology and techniques to solve large-scale process engineering problems. Applications of interest include process simulation, online and off-line optimization, and control. Also of interest are applications in fundamental process modeling, including transport phenomena, molecular dynamics, etc. Industrial applications are particularly welcome.

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Section D. Process Operability.

Contributions are sought describing new ideas and methodologies for the operability of chemical processing systems. Research areas include, but are not limited to, operability objectives such as flexibility, reliability, controllability, maintainability, safety and environmental protection. We would like to encourage submitters to discuss the impact on the incorporation of model uncertainties in the suggested approach. Industrial practice on plant operation should be emphasized.

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Section E. Issues in Computers in Operations and Information Processing.

Poster papers are solicited that describe results in the area of process operations and information processing. Theoretical developments and applications are welcome. Topics may include, but are not limited to: planning, scheduling, and supply chain management; decision support systems; process performance monitoring and diagnosis; optimization; fault detection and classification; quality management; chemometrics and applied statistics.

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Section F. Advances in Applied Mathematics.

Posters describing recent original results of interest in the areas of applied mathematics and numerical analysis are solicited.

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Section G. Demonstrations of Software for Process Control Education.

Process control education is benefiting from software tools that help in the design, analysis and simulation of dynamic processes and their associated control systems. New training simulators that bridge the gap between the abstraction of the textbook theory and the tactile nature of the laboratory are also gaining importance in process control education. This session will showcase such software currently available for the benefit of student learning in process control. Presenters will be provided space including a table, power strip and bulletin board where you can demonstrate your software and display poster material.

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EDUCATIONAL COMPUTER SOFTWARE DEMONSTRATIONS (Joint Effort with Group 4)

This session will present live software demonstrations that showcase how computers are enhancing instruction in the chemical engineering curriculum. Software will be considered which show a novel pedagogy for the classroom or laboratory, for presenting information, assessing student knowledge, helping students explore new concepts, or helping them analyze important problems. Presenters will be provided space including a table, power strip and bulletin board where you can demonstrate your software and display poster material.

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CAST Programming Tips
5. In addition, it is a CAST Division requirement that every speaker bring a sufficient number of hardcopies of their visual aids for distribution to the audience at the presentation.

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

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I am a member of AIChE: _____ Yes _____ No

(If not, I understand that I must join AIChE within a one-year period to continue as a CAST Division member.)

_____ My CAST dues of $10 are enclosed

_____ I will pay my CAST Division dues with my annual AIChE dues

Please mail this application to:

American Institute of Chemical Engineers
Computing and Systems Technology Division
3 Park Avenue
New York, NY 10016-5901

American Institute of Chemical Engineers
1999 Award Nomination Form*

A. Background Data

1. Name of the Award _____ Today's Date _____
2. Name of Nominee_____ Date of Birth _____
3. Present Position (exact title)

_____

4. Education

Institution	Degree Received	Year Received	Field

5. Positions Held

Company or Institution	Position or Title	Dates

6. Academic and Professional Honors (include awards, memberships in honorary societies and fraternities, prizes) and date the honor was received. Use separate page.
7. Technical and Professional Society Memberships and Offices. Use separate page.
8. Sponsor's Name and Address

_____

_____

_____

Sponsor's Signature

_____

*A person may be nominated for only one award in a given year.

THE DEADLINE FOR AWARD NOMINATIONS IS April 15, 1999.

B. Citation

1. A brief statement, not to exceed 250 words, of why the candidate should receive this award. (Use separate sheet of paper, please.)
2. Proposed citation (not more than 25 carefully edited words that reflect specific accomplishments).

C. Qualifications

Each award has a different set of qualifications. These are described in the awards brochure. After reading them, please fill in the following information about the nominee where appropriate. Use a separate sheet for each item if necessary.

1. Selected Bibliography (include books, patents, and major papers published).
2. Specific identification and evaluation of the accomplishments on which the nomination is based.
3. If the nominee has previously received any award from AIChE or one of its Division, an explicit statement of new accomplishments or work over and above those cited for the earlier award(s).
4. Other pertinent information.

D. Supporting Letters and Documents

List of no more than five individuals whose letters are attached.

	Name	**Affiliation**
1.		
2.		
3.		
4.		
5.		

Please send the completed form and supplement sheets to the CAST Division 2nd Vice Chair, Herb Britt,

Aspen Technology, Inc., 10 Canal Park, Cambridge, MA 02141-2201, E-mail: britt@aspentec.com,

Phone: 617-577-0100, Fax: 617-577-0303

THE DEADLINE FOR AWARD NOMINATIONS IS April 15, 1999.

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American Institute of Chemical Engineers
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New York, NY 10017

DATED MATERIAL
DO NOT DELAY