

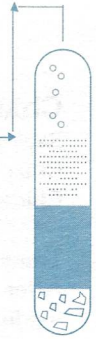
AIChESM

section

Chicago

Columns

Chicago Section
American Institute of Chemical Engineers
www.aiche-chicago.org



September Meeting Notice

Wednesday, September 8, 2004
Goose Island Brewing Inc
1800 N Clybourn Ave
Chicago, IL 60614
(312) 915-0071

Agenda

Cash Bar.....5:00pm
Dinner.....6:00pm
Cash Bar.....6:05pm
Thiele Award Presentation.....7:00pm
Cash Bar.....7:14pm
Speaker.....7:15pm
Chashh Brarr.....8:00pm

Cost

\$17 for members
\$20 for non-members
\$7 for AIChE student chapter members
(see your advisor).

Menu

Family Style. Baked Pretzels, Pub Chips,
Cheese and Vegetable Quesadillas, Grilled and
Crispy Chicken Tenders, Spinach and
Artichoke Dip.

Reservations

Make your reservations by calling the AIChE
Reservation Hotline at 847-588-3323 or
emailing evalopez@teianalytical.com.
Or register online at www.aiche-chicago.org.
Deadline is noon September 3, 2004.

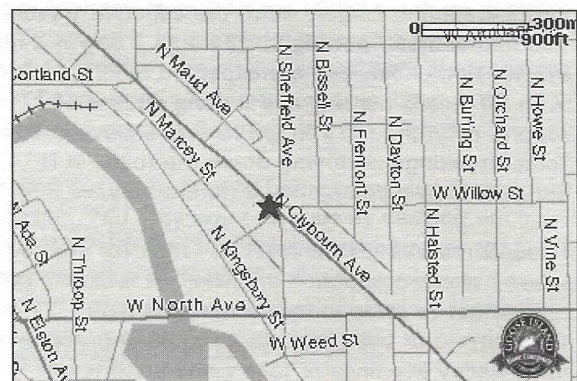
Topic and Speaker

The September meeting topic is Stress Management. At the time the newsletter went to print, there was no information available about the speaker. This, I might note, has resulted in a bit of stress for the newsletter editor.

But then, I'm sure the Goose Island will provide a means by which to, um, ~manage~ that stress...

Directions

Exit the Kennedy Expressway at North Avenue (IL 64), heading east. Approximately 1 mile to Sheffield Avenue, turn left. Turn left at the next light (Willow Street). The Clybourn Brewery is on your right at the next intersection (Marcey Street). Parking is free and ample. Or take the CTA Red Line subway, exit at North/Clybourn. Taxis are easily available on Clybourn.



Chair's Corner

Becky Wietting
Chair 2004-05
Chicago Section AIChE

Transition from Production to Sales

After 11 years of process and production engineering in chemical plants, I decided it was time for a change. Along the way, I had gotten an MBA and began looking for a change in my career path. I applied for a sales position in Cognis that naturally required 5 years of sales experience. In my estimation it is a catch 22. You can't get the experience because you can't get the job and vice versa. Luckily, I found some people willing to take a chance on me who let me have a shot at the esteemed Midwest region.

I consider this sales job to be a mastering of details. It is critical to have a good memory. You must keep straight every detail about every customer as well as every detail within your own organization. I personally represent 650 products, and therefore, I am always trying to learn more so I can effectively sell the right products to the right customer for the right application.

I have now been in the role of a salesperson for over 2 years, and quite successfully I might add. I have been fortunate to achieve above quota both years. Some of that has a lot to do with luck, and some of it has to do with very hard work.

The work is a different kind of "hard work" from production engineering. In the plant, you spend long hours troubleshooting production problems, writing procedures, and designing projects. In sales, you use your calculations a lot less, but the hours are much longer. With the constant travel, you find yourself putting in 12 hours a day at a minimum. Somehow, you are expected to keep up with 50 emails per day and writing dozens of reports even though you are almost always in customer meetings or driving down the road. It is exhausting in a completely different way.

I hadn't realized just how much I took for granted when I was a production engineer. It is now a privilege to get to sleep in my own bed at night. I miss the routines of being able to go to choir practice on Wednesday evenings or take piano lessons on Monday evenings. My hobbies have taken a hit as I am not home enough to keep up with them like I used to.

On the positive side, I have learned a lot about fine dining and which hotels are the most tolerable and inexpensive at the same time. I can navigate

almost any airport, rental car or city map. I have seen a few neat things along the way when time permitted such as Graceland.

As with everything in life, there are pros and cons to both types of jobs. I try to concentrate on making the best of it wherever I am and trying to learn as much as I can. The sales role is going to be one that more and more engineers will be working in. Chemical companies like Cognis have discovered that they can have fewer people in the sales force overall by having salespeople with technical backgrounds who can provide the customer with technical expertise as well as pricing and brochures. The sales roles are now filled with chemists and chemical engineers with MBA's. I am noticing that a lot of marketing positions are also requiring a technical degree.

If it is something you think you might like or something that will help you in your career development, watch for job openings in your companies and see what opportunities you can fill. It has been a great learning experience for me, and I hope it leads me to bigger and better jobs in the future.

Dr. Ted M. Knowlton Wins the 2004 Ernest W. Thiele Award

Congratulations to Dr. Ted Knowlton, Technical Director of the Particulate Solids Research Institute, for being awarded the 2004 Ernest W. Thiele award.

This prestigious award will be presented to Dr. Knowlton at the September 8, 2004 meeting of the Chicago AIChE section.

Dr. Knowlton is recognized for his fundamental contributions to the phenomena of particulate solids behavior and fluidization fields of Chemical Engineering. Dr. Knowlton, with worldwide recognition in the particulate solids area, has won this award for his leadership of the Particulate Solids Research Institute (PSRI) and earlier, the Fluidization Research and Consulting Group of the Institute of Gas Technology (IGT).

The Ernest W. Thiele award is presented annually to a Midwest region member of AIChE who has made outstanding contributions to advance the practice of Chemical Engineering. The award is sponsored by BP, and consists of a plaque and a \$1000 honorarium.

Please join us in congratulating Dr. Ted Knowlton on his achievement.

Produce Meaningful Programming for You and Your Company

It is time to begin planning a regional symposium for the Chicago Section. This meeting will consist of several sessions, developed locally, on a variety of topics. The variety will match the variety of technical interest in the Chicago Section. There are about 1500 chemical engineers that are members of this section in academia, industry, sales and consulting.

We have engineers practicing in the environmental, pharma, fine chemical, oil and gas, and nanotechnology industries, to name a few.

The Chicago Section Board is looking for volunteers for the Steering Committee for this Meeting. The Steering Committee will consist of the Chair of the Symposium, as well as volunteers that will chair the major committees. All Steering Committee volunteers should plan to attend the Symposium, and to garner sponsorship for it. This is an excellent opportunity for anyone looking for visibility for themselves and/or their company. For engineers in transition, this is an excellent networking opportunity.

The program will be set by the Steering Committee. Our vision is to have a one- or two-day meeting with a poster session, table top show, and training classes. Attendees could register for one day, or for the entire meeting. Each day would have morning and afternoon session(s) about three hours long. Possible session topics could be:

- ♦ Nanotechnology
- ♦ Sustainability
- ♦ Biotechnology
- ♦ Manufacturing Science
- ♦ Environmental

A call for papers will be held for engineers in the Chicago area and neighboring sections. Papers not fitting into any of the designated sessions will be featured in the poster session. Session Chairs will be named by the Steering Committee after it has formed.

If you are interested in participating on the Steering Committee, or have ideas for the sessions or training classes, please reply by September 10 to:

Rebecca Wietting (rebecca.wietting@cognis-us.com)
Annette Johnston (annette.johnston@abbott.com)
Dennis O'Brien (Dennis.O'Brien@uop.com)

Engineering Fun for Children

We have recently learned of an easy and fun way to reach out to young students. We encourage your participating. It requires only a small amount of your time, scheduled at your convenience.

The DuPage Children's Museum's Kids Design Network (KDN) is an on-line program that teaches elementary aged children about science and engineering. It is attracting children from all over the country, and gives them an opportunity to interact with real live engineers. It requires a very small and flexible time commitment on the engineer's part, but reaches and excites students that would otherwise never be exposed to engineering. On the KDN website (www.dupagechildrensmuseum.org/kdn) children investigate an engineering challenge, dream up a design to solve the challenge, and draw their design on the computer. At any time during the problem-solving or construction stage, the students can make an appointment to discuss it with a real engineer on the KDN Chatboard. Communication is in REAL-TIME - no waiting around for email. Both the student and engineer can see the design, mark on it, and type messages back and forth. Children build their projects with materials from their recycle bins and consult with the engineer if they have questions.

KDN is free to users and requires no special hardware or software, so it's accessible to children everywhere. In communities with few engineers and scientists, such as rural areas and inner cities, KDN provides children with unique new role models, mentors and career goals. How could an engineer not find this fun and rewarding?

Engineers set their own schedule - such as every other Monday from 9:00 to 10:00 for three months, for example. If an appointment with a student has been scheduled, the engineer logs onto the engineer chat board from any computer anywhere, and meets the student-engineer in cyber space.

To find out more about KDN, please visit their website. You may want to start by clicking on QUICK TOUR. For additional information or to volunteer as a KDN on-line engineer, please contact Lee Anne Burrough, KDN Project Manager, at kdn@dupagechildrensmuseum.org or 630-637-8000 x-3400.

We would really like to know how this is received by our members, and would be interested in any ideas of how we might do a better job of fostering this kind of thing. Please let Alan Zagoria (Alan.Zagoria@uop.com) know if you participate.

Networking Sessions

Out of work? Looking to change jobs, career paths, or network? Volunteer to coordinate an informal networking session. The sessions are intended to be informal, inexpensive networking opportunities outside of the monthly AIChE meetings. With a smaller group it is easier to get to know people and exchange ideas. A group of local section members has recently formed a group with an interest in the pharmaceutical industry. Coordinating a meeting is as simple as picking a place, date and time. Then invite a few people who have similar interests and ask them to invite several people. This is a great opportunity to expand your network base, find a new job, or just have an interesting conversation. If you need some ideas about how to get a group started, contact Alan Levine at alevine@pioneerenvironmental.com or call him at 773-368-2413.

Student Outreach Plans Workshop on Making Classroom Presentations

The Student Outreach Committee is working on ways to improve the Science Ambassador program, which brings chemical engineers into school classrooms to make presentations about the profession or about general science topics. One idea is to conduct a workshop this fall for members interested in learning how to make classroom presentations and for those members who have made presentations in the past and want to improve. The workshop would be conducted on a weekday evening in Niles. For background information on the Student Outreach programs, see <http://www.aiche-chicago.org/student.htm>. A complete Speakers Kit, including presentations with hands-on activities, is available there. If you are interested in attending the workshop, contact Ellen Sullivan at ejsullivan@teianalytical.com. We will try to set a date that accommodates everyone.

The objectives of the AIChE are to advance chemical engineering in theory and practice, to maintain a high professional standard among its members and to serve society, particularly where chemical engineering can contribute to the public interest. If you have any questions, comments or snide remarks regarding the newsletter, or are able to say "toy boat" ten times fast without messing up, please contact the editor at polarbear4x@yahoo.com.

Chicago Section Columns is published eight times a year by the Chicago Section AIChE. Opinions expressed herein are those of the authors and the newsletter editor (or, more to the point, the voices inside the editor's head) and are not necessarily those of the officers of the Chicago Section. So there.

Breakfast Cereals - One Of The First Health Foods

J. Peter Clark
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Oak Park, IL

Breakfast cereals as we know them today, ready to eat cereals, originated as proprietary foods at health spas in Michigan founded by rivals W. K. Kellogg and C. W. Post. These men believed that a diet high in cereal grains would cleanse the body and perform other wonders. However, the then available cereal gruels, like corn grits, were pretty unpalatable for eating in large doses. So after much experimentation, the rivals developed flakes of pre-cooked grains. The simplest and most popular of today's cereals are still made in much the same way.

Ready to eat (RTE) breakfast cereals, as distinguished from hot cereals, such as oat meal or Cream of Wheat, come now in a wide variety of forms, including flakes, puffed foams, extruded shapes, and shredded pillows. The overall processes are among the most complex and capital intensive in the food industry, but the products are also among the most profitable.

While the industry successfully fought off accusations of being an oligopoly, in fact one can argue that it is just that. Two firms, Kellogg and General Mills, have almost equal market shares and only two other firms, Kraft through its Post division, and Pepsico, through its Quaker division, have significant shares. Post previously bought the Nabisco cereal business and General Mills bought most of the Ralston Purina branded business. Ralston and a few other firms manufacture private label and generic breakfast cereals, which, collectively, represent a competitive threat because of their low prices.

RTE cereals are broadly divided into "kids" cereals and "adult" products, differing primarily in that the kids products are usually pre-sweetened and often are based on various novelties, such as cartoon characters.

Adult products may or may not be pre-sweetened, and often are made with older processes. A general process description includes the following steps: mixing of ingredients, cooking, forming, drying, equilibration, texturizing, finish dry or toasting, coating, drying, and packaging.

Raw materials may be whole grains or flour. Typical grains used include corn, wheat, rice and oats. Corn is usually in the form of flaking grits, made by dry corn milling, and typically consisting of $\frac{1}{2}$ or $\frac{1}{4}$ of a corn kernel. The germ and fines are other products

of dry milling. Dry milling has been a declining business as one of its other main customers, brewing, has converted to using corn syrup instead of brewing grits (a smaller size fraction).

Wheat and rice are used as whole kernels, usually with the bran at least partially removed by polishing. Oats are usually reduced to flour for RTE, while whole groats are used in oat meal.

During cooking, other ingredients are added such as salt, sugars, malt, enzymes, and water. Cooking is usually in batches, but may be continuous. Residence times can be multiple hours, and start up of a cereal line may take multiple shifts, because of the long residence time.

There is an inverse relationship between flavor and cooking, with long, old fashioned batch cooking generally producing better flavor, while short, continuous cooking, usually applied to flour-based products, generally produces less developed flavors, but is much more efficient.

Many of the process steps can be combined in one machine, a cooking extruder, to make shapes from cereal flours. In an extruder, the ingredients are mixed, cooked by heating through a jacket or by direct steam injection, forced through a die to form shapes, and may be puffed by the reduction in pressure as the dough moves through the die.

This relatively efficient process can be compared with others in which grains are cooked in one vessel, partially dried, flaked by passing through a set of rolls, equilibrated, dried again, and, perhaps, coated and then dried once more.

The products are certainly different, but the differences may not be worth the complexity, in some opinions. Companies that were somewhat later to the industry, such as Quaker and Ralston tended to emphasize extrusion, while the original companies tend to rely on older processes. One of the great and popular products, Cheerios by General Mills, uses gun puffing to expand dense little doughnut shapes made from oat flour, creating a starch foam which is set by toasting. Cheerios are so often used by mothers to pacify children that many people grow up with a life-long fondness for them, to the considerable satisfaction of General Mills.

Beyond flakes and formed shapes, two cereals that have always fascinated me are shredded wheat and Grape Nuts. Shredded wheat is made by cooking whole wheat grains until they are soft and pliable. A key step is holding the moist grain while it equilibrates, and I think, undergoes a slight fermentation

or enzymatic reaction. Then the grains are passed through grooved rolls which form them into continuous threads. These are matted together and stacked to form a ribbon from which large or small pillows are cut. The pieces are then dried. The final flavor is a result of the toasting reactions caused by heat acting on proteins, sugars and other components of the wheat, some of which are released in the cooking and aging.

Grape Nuts are made from a loaf of a special, very heavy bread, weighing about eight pounds. It is made by mixing a dough from wheat, barley, malt and other ingredients and is allowed to ferment. However, it is so heavy that it does not rise very much. Then it is deposited in pans and baked in an oven. The pans are emptied and the loaves are ground in a mill that sounds like those used in a pulp mill to grind timber. The ground bread is dried further and then ground again. The resulting particles are so dry and hard that for many years they were packaged in a plain cardboard carton with no liner (in contrast with most other cereals, that have a wax paper or, now, a polymer film inner bag). Plants that make Grape Nuts often use the material to air blast equipment, as it is an edible abrasive.

Variations on cereals can be achieved by additives such as raisins, marshmallow bits, nuts and freeze dried fruits. These add costs as they are generally more expensive than the cereal itself. They can also create an interesting thermodynamic issue, as in a closed, impervious container, such as a polymer film bag, the various components will eventually reach moisture equilibrium with each other. For instance, raisins have a higher moisture activity than bran flakes, so over time, the raisins will dry out and the flakes will get soft. One solution has been to coat the raisins with a dust of cereal flour and sugar, thus reducing the water activity of the piece to more closely match that of the cereal.

RTE breakfast cereals not only remain a popular food for the first meal of the day, but they have become accepted in other eating occasions, such as afternoon snacks and lunch. Recognizing this, some manufacturers have made snack portions, especially of such products as granola and pre-sweetened flakes. Others have produced, or had produced for them, hand-held snacks based on their cereals, such as both granola bars and crisped rice and marshmallow bars.

Cereal manufacture is one of the more complex and varied food processes. It uses many of the chemical engineer's tools, including chemical reactions, heat transfer, fluid flow and thermodynamics.

Chicago Section Sponsorship Program

The Chicago Section cordially invites area companies to get their story directly to our over 1,100 member chemical engineers through our Sponsorship Program. Companies can advertise their product and services, or present their business, environmental or safety achievements. This is a great way to target a technical audience heavily involved in the industry decision-making process.

There are several options available:

- ◆ Advertise in the *Columns* newsletter. The cost is only \$600 for a half page and \$350 for a quarter page. The copy must be submitted in MS Word 6.0 format (with the planned, reduced frequency of the newsletter, opportunities are less but still a viable resource).
- ◆ Sponsor a Section meeting. There are eight meetings a year and companies can present their story through a display table, posters, banners, or mention during the evening program. The fee for this is only \$250.
- ◆ Contribute towards the cost of specific section activities like Leadership training courses, Technical seminars, etc. during the course of the year. In return for this support, companies can attach their logo to prominently displayed posters or banners. The attendees for these events are usually decision-making engineers from many companies. A logo can also be attached to a gift that is presented to each attendee.
- ◆ Advertise in the Chicago section website; a diverse group of engineers will get acquainted with your company. The section web site is presently under review and will soon set up a revised structure.
- ◆ We are seeking sponsors for the technical seminars to be held later in the season, usually in February or March of 2005
- ◆ For more information, contact:

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Dennis O'Brien; UOP LLC,
dennis.obrien@uop.com, 847-391-2802
Or any member of the committee

Your initiating role is very essential for this program to work, and the Sponsorship Committee members will do all that is needed, once you come up with an opportunity. Please help us obtain funding if you are in a position to offer funds or know of someone in your company who can assist us. The committee looks forward to hearing from you.

IIT Student Chapter News

The Illinois Institute of Technology Student Chapter of AIChE hosted the annual North Central Regional Student Conference on April 1-3. Over 128 students from ten different universities across the Midwest participated in the weekend. The weekend was very successful with a student research paper competition, ChemE-car competition, career fair with dinner and guest speaker Robert Anderson, and company tours provided by BP-Warrenville, Corn Products Intl., WR Grace, and The Sherwin-Williams Company.

Companies represented at the career fair included Johnson Matthey Catalysts, Abbott Labs, Kraft, and Middough & Associates. Baxter sponsored the paper and ChemE-car competitions. Winners of the paper competition were: 1st-Cari Youngblood, Illinois Institute of Technology, 2nd-Andrew Smeltz, Ohio University, and 3rd-Natalie Nichols, University of Akron. The winners of the ChemE car competition were: 1st-Purdue University, 2nd-Michigan Tech, and 3rd-Cleveland State University. Judges for these events included Donald Duvall, Brad McKain, Stephen Schade, Clinton Butcher, Urmila Diwekar, and Said Al-Hallaj, and their participation was appreciated.

In addition to these events, several workshops were conducted on Saturday afternoon. The speakers included Brad McKain from Marathon Ashland LLP, John Rajan from Argonne National Laboratory, Viji Balasubramanian from IIT's BME Dept., Jim Gilliam and Dan Rusinak from Middough, and a panel of former IIT graduates. The topics varied from oil and petrochemicals to safety issues to biomedical issues and life following graduation.

The students of IIT's AIChE chapter would like to thank all of these companies and the Chicago Section for its support of the conference. This support was vital to the conference success.

Nominations Requested for the Ernest W. Thiele Award

The Ernest W. Thiele award is sponsored by BP and recognizes the outstanding contributions to our profession by a Midwest region chemical engineer. This award was established by the AIChE Chicago Section and is presented annually to a Midwest region AIChE member. This internationally recognized award consists of an engraved plaque and \$1000 honorarium presented at our sectional meeting.

Nomination forms and additional information can be obtained from the Thiele Committee Chair. Completed nominations are due to the committee chair no later than March 01, 2005.

One of the highest honors a distinguished chemical engineer can receive is our Chicago Section Thiele award. Please consider nominating a deserving engineer for this prestigious award.

Jim Simnick
BP Amoco Complex, J-8
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Naperville, IL 60566
Ph 630-420-5936
fax 630-420-4832
email: simnicjj@bp.com

Ernest W. Thiele Award Recipients

YEAR	RECIPIENT	AFFILIATION	RECOGNITION & ACHIEVEMENT
1983	E.W. Thiele	Standard Oil (Indiana)	Catalysis, Distillation fundamental advances
1985	B.B. Broughton	UOP	Aromatics Separation Processes, adsorptive separation
1986	T.J. Hanratty	Univ. Of Illinois	Advances in Fluid Mechanics
1987	G. Thodos	Northwestern	Physical Property Advances
1988	L.O. Stine	UOP	Petroleum/Petrochemical Processes
1989	D.T. Wasan	IIT	Research and Progress on Separation Processes
1990	R.S. Mah	Northwestern	Chemical Process System Analysis
1992	J.J. Carberry	Notre Dame	Chemical Reaction Engineering research, innovation, and education
1993	R. J. Bertolacini	Amoco	Catalysis research innovations and leadership
1994	J.W. Westwater	Univ. of Illinois	Research in Heat transfer and contributions in teaching
1995	Norman Li	UOP	Pioneering research in membranes and separations
1996	Rathin Datta	Argonne	Original research in metabolic engineering and membranes
1997	Hamid Arastoopour	IIT	Academic leadership and environmental engineering
1998	Arvind Varma	Notre Dame	Fundamental advances in synthesis of materials, catalysis and reactor stability
1999	S. George Bankoff	Northwestern	Heat transfer advances in chemical and nuclear engineering
2000	Henry Linden	IGT (retired)	Leadership of the Institute Of Gas Tech.
2001	Paul Sechrist	UOP	Contributions to computational fluid Mechanics, CCR, and FCC refining processes
2002	Julio Ottino	Northwestern	Research in Chaos Theory and mixing of solids and liquids
2003	Ali Cinar	IIT	Process modeling, monitoring and control
2004	Ted Knowlton	PSRI	Contributions to fundamental and applied research, and his leadership in the fields of fluidization and particulate solids.

Dated Mail

AICHESM

7177 N. Austin
Niles, IL 60714

American Institute of Chemical Engineers

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