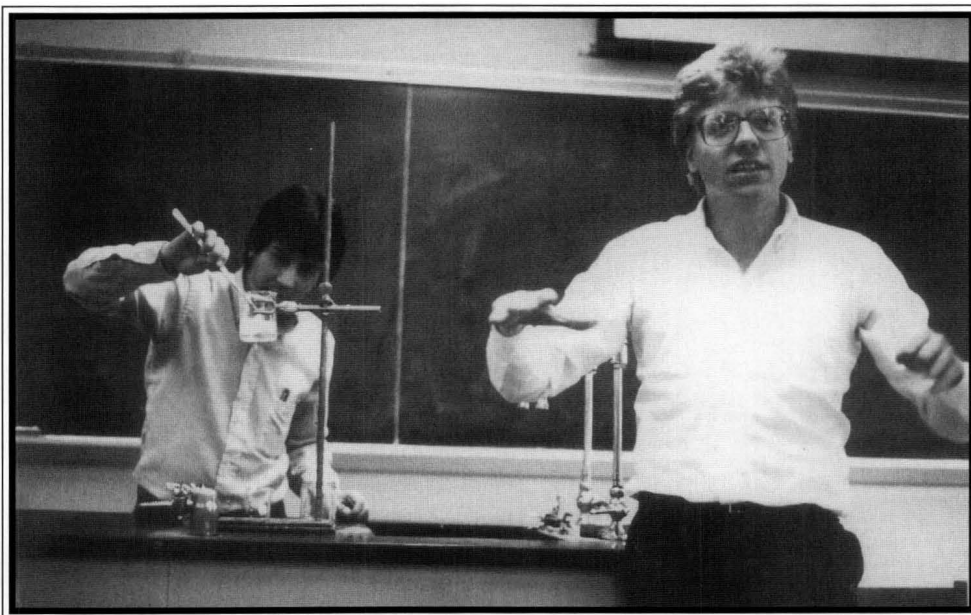


## Minnesota's MATT TIRRELL



*Matt and teaching assistant Rafael Galvan demonstrating nylon polymerization during a polymer chemistry lecture. Galvan, now at Dow Chemical, coauthored Polymerization Process Modeling with Matt, Neil Dotson (Eastman Chemical), and Bob Lawrence (University of Massachusetts).*

### WRITTEN BY HIS COLLEAGUES

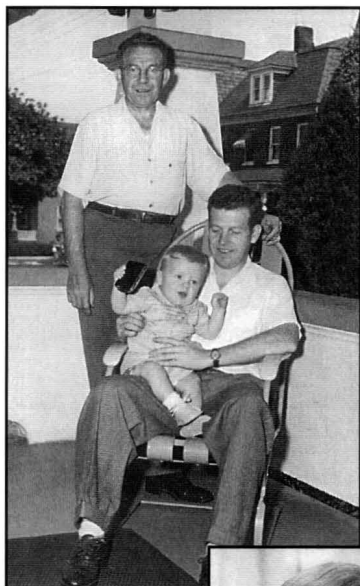
*University of Minnesota • Minneapolis, MN 55455*

In a department that has been home to such chemical engineering legends as Neil Amundson, Rutherford Aris, and Skip Scriven, Matt Tirrell has carved out a niche for himself as a modern-day Renaissance Man. Applying a notably broad knowledge of chemical engineering and materials science to a mulligan stew of engineering research, he is a marked asset to a department emphasizing collegiality and a team-teaching philosophy.

Abundant energy and a gift for organization allow Matt to keep multiple and varied projects moving forward at the same time. After 18 years of making a name for himself, Matt took the reins of the Chemical Engineering and Materials Science Department at the University of Minnesota in

1995, and in so doing he added one more huge responsibility to his shoulders, but he did it without neglecting his other duties as scholar, teacher, mentor, editor, and researcher. His colleagues are justifiably amazed and proud of his diversity and leadership.

Matt was born September 5, 1950, in Phillipsburg, New Jersey, on the Delaware River border with Pennsylvania, and is the oldest of three children. His younger brother, Dave, also developed a strong interest in polymer chemistry and is currently Professor of Chemistry and Chemical Engineering at Caltech. The youngest sibling, Mary, is raising three children in Bangor, Pennsylvania, close to Phillipsburg, and helps in her husband's construction business in addition



◀ *Matthew V. Tirrell, Matthew V. Tirrell, Jr., and Matthew V. Tirrell, III, (our Matt), at 9 months, on the family porch in Phillipsburg, New Jersey.*



▲ *Matt (3) and Dave (9 months). Dave had Matt's support even before he could sit up by himself. Dave followed a similar career path and is now a professor at Caltech.*



*Matt, proud graduate of Belvidere High School in 1968. ▶*

to working hard on the local school board.

Matt's parents were divorced when he was still quite young, and he was largely raised by his mother. His summers were spent at a swimming club, playing golf, and working as a caddie. One of his childhood friends was Jeff Brinker, who is now a ceramist at Sandia and a chemical engineering professor at the University of New Mexico.

Matt entered college at Northwestern University in 1968. While trying to decide the direction of studies he would take, he was swept up in the anti-war protests of the early 70s, with the result that for a short time he considered a life in politics. It's to our benefit that he decided on a more concrete, if no less contentious, field.

While at Northwestern, Matt became interested in polymers during a co-op term spent doing PVC compounding at Cincinnati Milacron. When he returned to campus, he sought out Bill Graessley for a polymer undergraduate research project. (Matt spoke at Bill's retirement from Princeton in May.) After gradu-

## Matt's Mentors

**Joe McHale** (Chemistry, Belvidere High School) excited Matt's interest in chemistry (and his brother Dave's too!) and encouraged him to enter the field.

**Josh Dranoff** (Chemical Engineering, Northwestern) taught in Northwestern's high school summer program between Matt's junior and senior years. He helped Matt see possibilities in chemical engineering as a career. Matt's dad, who was an ME, also encouraged him to consider chemical engineering over chemistry.

**Bill Graessley** (Chemical Engineering, Northwestern) On returning from his Milacron co-op to Northwestern, Matt sought out Graessley to learn more about polymers. Bill asked Matt to set up the first anionic polymerization experiments. He did—in a coke bottle. Matt continued working in Bill's lab when he wasn't co-oping. The position had perks such as a desk—not bad for an undergraduate. Graessley encouraged Matt to go on to graduate school.

**Stan Middleman** (University of Massachusetts) Matt picked polymer science and engineering at University of Massachusetts because of its polymer reputation and because it brought him closer to his chemistry interests. A Northwestern University friend, Bob Weiss was already there. Matt picked Stan as his advisor for the interesting and imaginative research he was doing. Stan was an excellent teacher, a model Matt emulated when he went to Minnesota.

**Skip Scriven and Chris Macosko** (University of Minnesota) Jim Douglas recommended that Matt "go for the best," and he did. Among many things he learned from faculty in his early years at Minnesota include Chris Macosko setting the tone of collaboration and sharing all major equipment and Skip Scriven modeling organization of large quantities of information from seemingly diverse fields.

**Minnesota's five  
"living Heads":**

**Tirrell (1995 - present)**

**Rutherford Aris (1975 - 78)**

**Ken Keller (1978 - 80)**

**Neal Amundson (1950 - 75)**

**and**

**Ted Davis (1980 - 95)**



ating from Northwestern, Matt chose the University of Massachusetts for graduate studies in the Polymer Science and Engineering Department.

In 1977, Tirrell accepted an offer to join the Chemical Engineering and Materials Science Department at the University of Minnesota, and he has been there ever since. When the Department Head, Ted Davis, left to become Dean of the Institute of Technology, Matt became the new Department Head at Minnesota. Along with the usual daily challenges of running a large department (not the least of which is communicating to 30-plus busy, outstanding, and very active faculty), Matt's tenure has the added responsibilities of overseeing a transition to the semester system and planning a building addition.

Matt's leadership style clearly leans toward the inclusive. It is important to him that the faculty be kept fully informed at each developmental stage of major projects. In a tradition started by Neal Amundson, many of the faculty share a large round table during lunchtime, facilitating the exchange of ideas and information. By involving as many faculty as possible in all facets of departmental matters, he helps them focus on the common goal of "how best can we project our unified department to the several external constituencies, *i.e.*, the chemical engineering, materials science, biomedical, polymer chemistry communities, *etc.*"

When prompted, Matt is more than willing to talk about the strengths of his department. He believes that an excellent and caring staff in the office, the shop, the lab, in computing, and in accounting is the backbone of the department. Selfless colleagues, notably Associate Head William Gerberich, the Directors of Undergraduate Studies, David Shores and Wei-Shou Hu (Materials Science and Chemical Engineering, respectively) and of Graduate Studies, John Weaver and Lanny Schmidt, (Materials Science and Chemical Engineer-

ing, respectively) make his job a lot easier. He is grateful for their willingness to manage the huge burden of the semester transition, a project in which "no one wants to invest time, but the outcome of which concerns everyone."

One of the difficult challenges faced by a department head is maintaining connections to his own research community, but Matt has managed quite well in that respect. His research focuses on huge molecules in small spaces, and his work with block copolymers has led to innovations that have allowed oil companies to extract more oil from porous rocks and to create smoother-flowing solutions used in paints, solvents, and toner for copying machines. Later, while leading the polymer program at the Center for Interfacial Engineering (CIE, an NSF-funded academic/industry/government collaboration), several companies with specific research problems expressed an interest in pursuing biomedical applications of polymer research. Having done his PhD thesis on the effect of flow on proteins, Matt jumped at the chance to expand the program. He developed the notion that some of the same ideas used to prevent fine particles in inks and toner from forming clumps could be used in biomedical engineering problems. As a result, part of his research group began working on treating surfaces to improve biological interaction. A new Biomedical Interfacial Engineering arm was added to the CIE, which later developed close contacts with the Biomedical Engineering Center (BMEC) at the Medical School.

Matt is valued as a conduit for interactions between the physical sciences and the medical school at Minnesota. As Prof. Leo Furcht, Head of the Department of Laboratory Medicine and Pathology has put it, "Matt has proved his skill at building consensus among people from many departments who have mutual and conflicting interests. Added to that, he is internationally regarded as a leader and innovator in polymer science, which is critical to the future of bio-

***His research focuses on huge molecules in small spaces, and his work with block copolymers has led to innovations that have allowed oil companies to extract more oil from porous rocks and to create smoother-flowing solutions used in paints, solvents, and toner for copying machines.***

medical engineering.”

Tirrell has a reputation among his graduate students, (38 PhD students and 13 MS students) as a resourceful and caring mentor. His dedication to their education is a result of his pride in his students. He relishes their successes. Matt is known to show remarkable restraint in letting his protégés find their own direction and to think for themselves, guiding them with a gentle hand when they seem to be heading off course. Rasti Levicky, soon to be teaching at Columbia, echoes the thoughts of many of Tirrell's former students when he says, “I learned independence from Matt's being open to what I thought were interesting and important things to do.” Matt has an informal style that encourages students to discuss issues with him, and believing it important to their education, he fosters interactions among the students themselves. He gets them to talk as a way to learn. He also stresses the importance of communication in writing and oral presentations. “If you cannot make your information come across to your audience, you have to question your own understanding of the material.”

It is clear that Matt enjoys his work. In 1992, during a trip to NIST in Washington, DC, Matt, Frank Bates, and graduate student Kurt Koppi (now at Dow Chemical) were trying out for the first time an instrument Koppi had built. They sat down and almost immediately discovered something they hadn't expected—block copolymer orientation *perpendicular* to the flow. They had a great time collecting valuable data on a process that had never been seen before, reveling in the excitement of first discovery. The data was shortly thereafter written up for *Physical Review Letters*, and has become a frequently cited paper.

Matt's goes to great lengths to help his students find interesting jobs after they have completed their studies. They must see something they like about the way he manages his group since a large proportion of them choose academic

### **Tirrell's Former Students and Post-Docs Now in Academia**

Natash Balsara • *Polytechnic University*  
Ioannis Bitsanis • *University of Florida*  
Arup Chakraborty • *University of California, Berkeley*  
Nily Dan • *University of Delaware*  
Angela Dillow • *University of Massachusetts*  
Steve Granick • *University of Illinois*  
Nino Grizzuti • *University of Naples*  
Michael Kilbey • *Clemson University*  
Rasti Levicky • *Columbia University*  
Jaye Magda • *University of Utah*  
Guangzhao Mao • *Wayne State University*  
James Schneider • *Carnegie Mellon University*  
John Torkelson • *Northwestern University*

careers for themselves. They see him working extremely hard, juggling many projects, and doing it well, and it obviously inspires them to do the same. As Kurt Koppi says, “Matt is a terrific mentor. His diverse background spans the whole spectrum of chemical engineering. The depth and breadth of his knowledge helps his students when they are learning to do research, learning to focus their thoughts and to see the overall picture. Matt is able to help them sort out the key features and organize their thought processes to get to the main issues.” In 1981, thanks to the nomination of his students, Matt's

teaching was recognized with a Gordon Starr Outstanding Contribution Award.

Matt has been similarly dedicated to the health of his profession. He has served on the editorial boards of *Journal of Polymer Science*, *Polymer Physics Edition*, *Macromolecules*, *Journal of Chemical Physics*, *Journal of Rheology*, and other idea forums. His most demanding service position currently is as editor of *the AIChE Journal*.

In the course of his career Matt has also earned the recognition of his peers. He has received the NSF Presidential Young Investigator Award, a Guggenheim Fellowship, the AIChE's Allan P. Colburn and Charles M.A. Stine Awards, the John H. Dillon Medal from the American Physical Society, the Alumni Merit Award from Northwestern University, and last year was elected a member of the National Academy of Engineering.

Tirrell's accomplishments have not gone unnoticed by the University of Minnesota. When the University began a capital campaign to increase the school's endowment, part of its program was to increase the number of endowed chairs to help retain accomplished professors. At a youthful 36,

***A gourmet,  
Matt has  
developed a  
flair for  
preparing  
exquisite  
meals. With a  
special  
appreciation  
for French  
Provençal  
and  
Mediterranean  
cuisines, he  
has built a  
collection of  
some 200  
cookbooks  
with recipes  
from around  
the world. . .  
In addition to  
cooking . . .  
[Matt enjoys]  
rugby . . .  
distance  
running . . .  
[and] golf.***

Matt was singled out for the Shell Chair, which Matt has used to enhance the polymer facilities at Minnesota and to nurture his research group.

Attracting and keeping Matt was a shrewd move for Minnesota. Matt has served the University community far beyond the call of duty, an indication of how deeply he believes in the value of education. He has acted on numerous committees, including (currently) the key Faculty Consultative Committee, and has led faculty searches, chaired two separate departments, been a faculty representative to the Senate, and chairman of the faculty club.

Among his many attributes, Matt is a fund-raiser *par excellence*. Both chemical engineering and materials science, and the Biomedical Engineering Center are vastly better off as a result of his efforts. What makes him successful at it? He works hard to



*In light of Matt's reputation as a cook, an invitation to dinner at "Chez Tirrell" is a coveted prize!*

identify possible sources, he addresses himself to links of common purpose between the University department and the funding source, he draws in and ties together disparately skilled colleagues to present cogent possibilities, and he pays attention to the little details that give proposals their air of imminent success. In other words, Matt is comfortable thinking both big and small.

Outside the University, Matt has done volunteer work for the American Civil Liberties Union and has been on the board of directors of a prominent Minneapolis theatre, Theatre de la Jeune Lune. He likes being involved, feeling that he's contributing something to his community.

As hard as he works at his public duties, in private, Matt really cooks. A gourmet, Matt has developed a flair for preparing exquisite meals. With a special appreciation for French Provençal and Mediterranean cuisines, he has built a collection of some 200 cookbooks with recipes from around the world. In addition to cooking, as an assistant professor, rugby was Matt's game, but as an associate professor he turned to more genteel pursuits—distance running. He completed two Twin Cities Marathons and for five years belonged to an afternoon running club. Now, while he has again taken up distance running, he keeps up his health principally through membership in a fitness club and by golfing (in 1995, his best-ball foursome won the department's



◀ *Matt and his wife, Pam, enjoy traveling together. Here, they have just landed in Beijing, China.*

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*The Tirrell family—Matt with his mother, Lorraine, his sister Mary, and his brother Dave. ▼*



coveted “Amundson Open” title).

Matt also enjoys other sports, such as skiing and biking, but acknowledges that a love of sports *can* get out of hand. He credits his wife Pam for helping him “balance my conventional male tendency to antisocial activities such as sports” with movies and plays. Nevertheless, Matt holds Minnesota Timberwolves season tickets.

Pam and Matt met when she was a writer and editor for University Relations at Minnesota. Matt had won an NSF Presidential Young Investigator Award and Pam was assigned to interview him. We can only speculate that she liked what she saw. Pam grew up in International Falls, Minnesota (“America’s Icebox”) and remembers separate changing rooms for boys and girls on the city’s many ice rinks. She says, “It was tough to play hockey in a skirt, but we did.” Pam has since moved on to work in guest relations at the historic St. Paul Hotel. She and Matt share a restored townhouse near downtown St. Paul, not far from where F. Scott Fitzgerald, and later Garrison Keilor, lived. Pam and Matt have no children, but enjoy visiting with their twelve nieces and nephews.

That Matt maintains continuity in his many interests is all the more remarkable when one realizes how much time he spends in the air. Traveling has played a significant role in Matt’s career, and brings together the two strands of his public and private life. He has been a visiting professor in cities like Bahia Blanca, Guadalajara, Canberra, and Paris. He recently received notification that he’d surpassed one million actual miles traveled (to say nothing of frequent-flier bonus miles), and even this understates the extent of his travels. He often accepts speaking invitations, and his various collaborations require him to take quick trip here and there to keep up with projects. For example, his consulting work with the state and

government consortium, French Petroleum Institute in Paris, takes him back to France at least once a year.

For his effort, there have been numerous returns for Matt. He has seen academic programs started, students graduating, projects being well funded, professional honors and awards coming his way. . . but what higher honor could there be than to have a former graduate student say, as many of Matt’s students do, “When I meet people in the field, I’m proud to tell them I worked with Matt Tirrell.”

As you converse with Matt Tirrell you realize that you are with a unique individual; one with the rare ability to convey ideas in well-crafted complete sentences. Everything Matt says is well considered and easy to follow. This characteristic may be the key to his success in both research and in teaching. “To help myself pay attention in lectures during my sophomore year at Northwestern, I started to think about how I would explain the subject. I feel that this carries over directly to research. Explaining things clearly is intimately connected to doing good research.” As the end of your appointment approaches, you notice Matt cocks his head to check the time on your watch. This busy man does not wear one. With a subtle and not unfriendly gesture, Matt suggests he must be going. □