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Dear Alumni...

It is once again my great pleasure to update you on the activities of our faculty and students during 1998. It was another productive year for our faculty and students. This year only, we are sending the Annual Report out at a different time. The Annual Report has traditionally been published in Spring and the newsletter in late Fall. Next year we will return to our usual schedule. I also wanted to let you know that Karen Hendricks (B.S., ChE 1971) was named to the OSU Board of Trustees. Karen is the President, Chair of the Board and CEO of Baldwin Piano and Organ. Karen and her husband, Milton, are establishing The Milton H. and Karen L. Hendricks Scholarship Fund. We would all like to congratulate Karen and thank her for her devotion and service to OSU and the Department.

We have been hard at work preparing for the ABET accreditation team that will visit us very soon. Professor Jim Rathman has taken the lead in this endeavor and we feel well prepared. I would like to mention that the annual AIChE meeting will be held in Dallas, Texas, this year at the Wyndham Anatole Hotel, October 31 through November 5. The Department will sponsor a reception at the Wyndham on Wednesday, November 3, from 6:30 to 8:30 pm in Atrium I. All Alumni in the Dallas area or attending the meeting are encouraged to stop by and visit us there. For the local alumni in the Columbus area, I would like to remind you that the College has a tailgate before each home game and the Department student chapter of AIChE sponsors one for each home game after school starts. Alumni are very welcome to stop by at either of these events. As always, if you happen to be in the Columbus area, please consider stopping by and visiting us.

Professor Umit S. Ozkan had an amazing year. She was awarded the Professional Progress in Engineering Award (PPEA) from the Iowa State University of Science and Technology in April of 1999, the OSU Emerging Academic Leaders Program Award, the 1998 Award for Excellence in Catalysis Research from the Cleveland-Pittsburgh Catalysis Society, and the prestigious OSU Distinguished Scholar Award. The Distinguished Scholar Award was presented during a visit to her class by President Kirwan. Her students have also been quite successful. Junko Mitome received a Best Poster Award at the 16th North American Meeting of the Catalysis Society. At the Tri-State Catalysis Society Annual meeting, Rick Watson, received the First Place Award and Junko Mitome and Enrique Aceves, received third place awards in the poster competition.

Professor Bhavik Bakshi was promoted to Associate Professor with tenure and he received an OSU College of Engineering Lumley Engineering Research Award and the National Science Foundation Faculty Early Career Enhancement Award. Emeritus Professor Robert S. Brodkey was honored with a session in honor of his 70th birthday at the AIChE Fluid Mechanics section in November. Professor Jeffrey J. Chalmers was promoted to full Professor and received a Research Accomplishment Award from the College of Engineering. Prof. Chalmers also filed two patents in 1998. In the next alumni newsletter we will highlight his invention as I am sure you will find it very interesting. Professor Kenneth Cox was Chair of the Programming Group on Chemical Engineering Fundamentals at AIChE. He is instrumental in implementing a new design software (HYSIS) in the teaching of four ChE design courses. Professor James F. Davis was named Interim Chief Information Officer for the Ohio State University and received a software license. Professor Liang-Shih Fan received a Lumley Research Award in 1998 from the College of Engineering, and in 1999 received the Peter L. Scott Faculty
Dear Alumni...

Award for Excellence in Engineering Education. He also recently received the American Association for Engineering Education (ASEE) Union Carbide Lectureship Award. Professor Martin Feinberg was Chair of the Department Faculty Search Committee. His personal efforts have been instrumental in successfully recruiting two exceptionally outstanding faculty members. He also received the MacQuigg Outstanding Teaching Award. His graduate course, “Applied Mathematics in Chemical Engineering” has now become a required course for graduate students. Professor James Rathman is the first ChE Professor to teach Introduction to Engineering, a new freshman core course in the College of Engineering. In addition, Prof. Rathman has devoted a large amount of time to preparing the Department ABET accreditation materials and other proposals.

The new CAPCE (Center for Advanced Polymer and Composite Engineering) continues to prosper. Professor L. James Lee, the Director, received the 1998 Best Paper Award, Processing Category, at the 53rd Annual Conference of the Society of the Plastics Industry held in Nashville, Tennessee. He, along with Professor David Tomasko, received the Maro Future Technology Award at the 1998 SPE ANTEC Meeting, and he received an Honorary Professorship at the East China University of Science and Technology, Shanghai, China. He will be taking charge of this year’s faculty search committee, a job that requires much time and thought. Professor Kurt Koelling, Associate Director of the Center, received the National Science Fellowship/Lucent Technologies Industrial Ecology Research Fellowship. Professor Koelling is also the AIChE Student Chapter advisor, and under his leadership they have been active and quite successful. One of our student chapter members, Lori Burgess, received the Central Ohio Section Outstanding Student Award, and another student, Tim Dennis, received the first place paper award at the Regional Student Conference. He has been invited to give his paper at the upcoming AIChE meeting this fall for the National competition. The student have regular meetings and other fellowship activities. The President represents the group to the ChE Alumni Association.

Professor Tomasko shared the Maro Future Technology Award with Jim Lee and received both a 1999 Lumley Research Award and a MacQuigg Outstanding Teaching Award. An undergraduate researcher in his group, Tim Denison, received first prize in the Denman Undergraduate Research Forum. In addition, he provides significant services to the Department in the areas of curriculum, students needing special assistance, academic probation, etc. He is also in charge of our diversity efforts in recruitment and retention.

Professor S.T. Yang has been particularly active in the Department in setting the seminar schedules, directing the publication of a new graduate brochure, revamping the graduate recruiting effort program, etc. In addition he has kept an active research role and was appointed Visiting Professor, Swiss Federal Institute of Technology at Lausanne, where he spent March to June 1998 as part of his sabbatical. He is the 1999 Chair of the Graduate Studies Committee in charge of Teaching Assistant recruitment and development and graduate student recruitment.

Professor Jacques Zakin is active in many areas. He was the first recipient of the OSU College of Engineering Career Services Award in 1998. He also received the Distinguished Visiting Professor Award from the Mexican Academy of Sciences and the Mexico-USA Foundation for Science, 1998-99, a 1999 Engineering Research Accomplishment Award, and was US Coordinator for a Turkey-Israel-US Workshop to promote collaborative research, held at the Technion in Haifa, Israel in March.

We are also proud of the following undergraduate students who received Undergraduate Research Scholar Awards. The Department has been encouraging students to get involved in research at the undergraduate level in order to foster their interest in research and/or academic careers and to make them better prepared for the workplace. The 1998 award winners were Nicholas Riyanto (Weavers), Fery Pranadi (Koelling), Shawn Brueggemeier (Tomasko),
Dear Alumni...

Gunartiris Karim (Yang), Todd Gibson (Chalmers), and Fang Yang (Zakin). We congratulate these students and their advisors (in parentheses) for putting forth this extra effort.

In the next newsletter we will inform you of the number of members of the “Jewels Club.” I thank all of you who so generously contribute to our efforts here. Although we must congratulate Ron Harris on his tremendous opportunity to join Nabisco as Vice President in charge of Research, we are going to sorely miss all of the service activities he was involved in while living in Columbus after retiring from Kraft. Ron recently received a Distinguished Meritorious Service Award, which is given to individuals “whose sustained and extraordinary personal service has had significant and lasting effect on the advancement of the College of Engineering.” Paul Bates received the Distinguished Alumnus Award. These award winners will be highlighted in our next newsletter.

On another note, I would like to encourage those of you that are able to approach your companies about making student awards. These awards do not have to be large, they can range from $100 to $1,000 and be named after the Company making the award. This type of encouragement is truly helpful to students and lets them know that the world cares about producing fine chemical engineers.

I will close noting that two new faculty members will join us over the next two years. We will be highlighting their careers thus far so that you can understand how pleased we are that they are joining us. The Department is prospering and growing and this is due, in no small part, to the encouragement from our Alumni and friends. Thank you all again for the important part you play in our continued success.

Best Regards,

Liang-Shih Fan, Chair, and Distinguished University Professor

LSF:kd

P.S. It is not too late to fill out the form to be a founding member of the Jewels Club. If you have lost your coupon just write Account 54019 and make the check payable to Chemical Engineering. We would like to remind everyone that it is necessary to put “chemical engineering” on all funds sent to the University (and also on matching gift forms) in order that we receive your donation. If you have any questions about this please call us at 614-292-7907. Thank you again for your help in making this an outstanding department.
Texnikoi is an organization of undergraduate students in the College of Engineering whose purpose is to recognize qualities of leadership, integrity, and personality as exemplified by active participation and leadership in extracurricular activities.

Nancy C. Dawes is currently a Principal Scientist for Procter & Gamble. She received her bachelor’s degree in chemical engineering from Ohio State in 1981, Magna Cum Laude.

Nancy has devoted her entire career to Procter & Gamble. She began working for P&G immediately following graduation in 1981 as an engineer in research and food product development. In 1989 she was promoted to Section Head of Salted Snacks Product Development, and presently is Principal Scientist in P&G’s Skin Care Product Development.

Nancy, active in the Girl Scouts of America, has an extensive record of service to OSU. She was the recruiter assigned to OSU from 1989-1993, was awarded P&G’s Recruiter of the Year Award and has belonged to the OSU Chemical Engineering Industrial Advisory Committee since 1993.

Photo and announcement provided by News in Engineering (Spring 1999), a production of the Ohio State University College of Engineering.
The Distinguished Scholar Award recognizes exceptional scholarly accomplishments by senior professors who have compiled a substantial body of research, as well as the work of younger faculty members who have demonstrated great scholarly potential. Recipients are nominated by their departments and chosen by a committee of senior faculty, including several past recipients of the awards. Distinguished Scholars receive a $3,000 honorarium and a $20,000 research grant to be used during the next three years.

Since joining Ohio State in 1985, Dr. Umit Ozkan has become an international leader in heterogeneous catalysis—the modification of chemical reactions between gases, liquids, or both at the surface of a material that acts as a catalyst. She has garnered government and commercial funding to build a state-of-the-art laboratory that supports one of the strongest heterogeneous catalysis programs in the nation. Students appreciate the high-caliber work they are able to perform in the laboratory. Her work affects many societal and economic issues, in particular energy, the environment and the economics of chemical processes. “Creative scholarship should be judged by its quality rather than by how much it weighs,” wrote one of Ozkan’s colleagues. “In this regard Umit has performed some really seminal research.” Among her numerous awards, she has received the National Science Foundation Woman Faculty Award for Excellence in Teaching and Research.

Dr. Ozkan says: “Our research studies reactions that take place on the surfaces of solid catalysts, which are materials that can change the reaction rate or reaction pathway without being consumed during the process. The most gratifying aspect about doing research is working with a group of young researchers who, through their enthusiasm, curiosity, energy, and dedication, keep inspiring me and motivating me. I consider my research group to be my family, and they remain part of my family even after they graduate and leave Ohio State. There is nothing more gratifying than seeing my students prosper in their careers and in their lives.”

Photo and announcement provided by Ohio State Alumni Magazine (June/July/August 1999) and On Campus (May 13, 1999)
Faculty and Research Areas


**Cox, Kenneth R.**, Associate Professor, P.E., Ph.D., University of Illinois at Urbana 1979. Molecular Thermodynamics, Colloid and Interface Science, Physical Chemistry of Aqueous Systems, Polymer Phase Behavior, and Computational Chemistry.

**Davis, James F.**, Professor, Ph.D., Northwestern University 1981. Artificial Intelligence in Diagnosis and Control, Intelligent Control, Data Interpretation, Pattern Recognition, Neural Networks, Systems Integration, Model Integration.

**Fan, Liang-Shih**, Distinguished University Professor and Chair, Ph.D., West Virginia University 1975. Fluidization, Powder Technology, Multiphase and Particulate Reaction Engineering, and Mathematical Modeling.

**Feinberg, Martin**, The Richard M. Morrow Professor of Chemical Engineering, Ph.D., Princeton University 1968. Chemical Reaction Network Theory, Reactor Design with Complex Chemistry.

**Friedman, Morton H.**, Professor, Ph.D., Michigan University 1961. Biomedical Engineering and Hemodynamics.

**Hershey, Harry C.**, Professor Emeritus, Ph.D., University of Missouri-Rolla 1965. Thermodynamics and Environmental Engineering.

**Koelling, Kurt W.**, Associate Professor, Ph.D., Princeton University, 1992. Polymer Processing, Rheology of Complex Fluids, Biocompatible Polymers.

**Lee, L. James**, Professor, Ph.D., University of Minnesota 1979. Novel Polymer Processing, Composite Manufacturing, Microfabrication Thermoset Polymers.


**Tomasko, David L.**, Assistant Professor, Ph.D., University of Illinois at Urbana 1992. Intermolecular Interactions in Supercritical Fluids, Supercritical Fluid Extraction, and Molecular Thermodynamics.

**Yang, Shang-Tian**, Professor, Ph.D., Purdue University 1984. Biochemical Engineering and Biotechnology, Fermentation and Cell Culture Processes, and Tissue Engineering.

Department Faculty and Staff

Professors
Robert S. Brodkey (Emeritus)
Jeffrey J. Chalmers
James F. Davis
Liang-Shih Fan
Martin Feinberg
Morton H. Friedman (Biomed. Eng.)
Harry C. Hershey (Emeritus)
L. James Lee
Umit S. Ozkan
H.C. (Slip) Slider (Emeritus)
Edwin E. Smith (Emeritus)
Thomas L. Sweeney (Emeritus)
Jacques L. Zakin

Associate Professors
Bhavik R. Bakshi
Kenneth R. Cox
Kurt W. Koelling
James F. Rathman
David L. Tomasko

Visiting Scholars
Michelle Almendrala
Noel Cabigon
Marilou Dalida
Perfecto Dizon
Antonio Mateo
Masayuki Nakamura
Jian Ni
Geraldo Talisic
Selman Torlar
Boming Yu

Research Scientist
Peijun Jiang

Post Doctoral Research Associates
Rajeev Agnihotri
Phillip Ellison
Yu-Liang Huang
Yoon-Seob Lee
Xukun Luo
David Miller
Yang Zhao

Department Administrative Staff

Academic Advisor
Sherry McDonald

Assistant to the Department Chair
Kathleen Doddroe

Assistant to the Graduate Chair
Kathleen Monegan

Administrative Associate, Fiscal
Nancy Jacobs

Administrative Associate, Human Resources
Nadine Lineback

Administrative Associate, CAPCE
Paula Stevenson

Office Assistant
Paul Gudde

Graduate Administrative Assistant, Editorial
Karen Gonser

Design Engineer
Chris Gecik

Instrument Makers
Carl Scott
Paul Green

Program Assistant
Lisa Brown

Director, KCGL
Geoff Hulse

Systems Analyst
Mike Davis

Systems Engineer
Dave Jones
PUBLICATIONS
Books and Book Chapters


Refereed Papers


Brodkey, R.S., and S. Haam. “Motions or Dispersed Beads Obtained by Particle Tracking Velocimetry Measurements, Part II.” *Int. J. Multiphase Flow,* in press.


**Proceedings Publications**


Technical Reports


Invited Lectures, Seminars, and Short Courses


Patents and Software Licenses


Davis, J.F. “Licensed State Estimator Software Developed at Ohio State University to Honeywell.”
Publications and Proceedings


Cox, K.R. “Applications of Computational Molecular Modeling.” Joint Meeting of Columbus Area AIChE and ACS. December 8, 1998.


Fan, L.-S. “Particle Dynamics of Gas-Liquid-Solid Fluidization.” Department of Chemical Engineering, Purdue University. February 1999.


Lee, L.J. “Phase Separation and Shrinkage Control of Low Profile Unsaturated Polyester Resins.” National Taiwan University of Science & Technology. Taipei, Taiwan. 1998.


Additional Paper Presentations


Organizers and Session Chairs of National and International Meetings


Chalmers, J.J. Meeting Co-Chair, Cell Culture Engineering VI. San Diego, California. February, 1998.


Publications and Proceedings


Zakin, J.L. Chair, Two Sessions on Surfactants, 5th European Rheology Conference. Portorož, Slovenia. September 6-11, 1998.

Editorial Boards, National Committees and Other Professional Activities


Brodkey, R.S. Member, North American Mixing Forum (NAMF).


Cox, K.R. Editorial Board, Fluid Phase Equilibria. 1991 to present.


Cox, K.R. Co-Founder and Discussion Co-Chair, AIChE Discussion Group on Applications of Computational Chemistry. 1992 to present.


Publications and Proceedings

Davis, J.F. Project Subcommittee, Honeywell Abnormal Situation Management Consortium.

Davis, J.F. 2nd Vice President, Computing and Systems Technology Division, AIChE. Elected 1998.


Fan, L.-S. Group 7E - Multiphase Flow, Member, 1989-date; Chair, 1992-to-date; Group 7C - Multiphase Heat Transfer, Chair, 1994-to-date; Particle Technology Forum (PTF), Founding Chairman, 1992-1994; Education Committee, 1996-to-date; Fluidization and Multiphase Group of PTF Advisory Subcommittee, Chairman, 1992-to-date. Division 7 - Heat Transfer and Energy Conversion, Director, 1992-1998, Division Award Committee, 1993-1995; Donald P. Kern Award Committee, 98-99.

Fan, L.-S. Director, Ohio State University Coal Research Program. 1987 to date. (Program theme: Dry sorbent injection technology for air pollution control in coal combustion).


Fan, L.-S. Member, Advisory Committee, New Jersey Institute of Technology Particle Technology Center. 1996 to date.


Fan, L.-S. Member, Advisory Board to the President and the Provost, The Ohio State University. June 1996 to date.

Fan, L.-S. Judge, State Science Fair (Ohio) for Junior and Senior High Schools in the State of Ohio. April 18, 1998.


Lee, L.J. Director, NSF Center for Advanced Polymer and Composite Engineering. 1997 to date.

Lee, L.J. Member, Board of Trustees, Edison Polymer Innovation Corporation. 1998 to date.
Publications and Proceedings


Lee, L.J. Panel Reviewer, National Science Foundation.


Lee, L.J. Paper Reviewer for many technical journals in the field of polymer and chemical engineering.


Ozkan, U.S. Secretary, Petroleum Chemistry Division, American Chemical Society. 1997-1998.

Ozkan, U.S. Co-Chair, Continuing Symposia in Catalysis, American Chemical Society Colloids and Surface Chemistry Division. 1994-2000.


Ozkan, U.S. Guest Editor, Catalysis Today. 1995-98.

Ozkan, U.S. Panel Reviewer, National Science Foundation POWRE Program.


Rathman, J.F. Member: AICHE, ACS, ASEE.


Tomasko, Member: AIChE, ACS, International Society for the Advancement of Supercritical Fluids.

Yang, S.-T. Director, Ohio Bioprocessing Research Consortium.

Zakin, J.L. ABET Accreditation Panel.

Zakin, J.L. Editorial Board, Chemical Engineering Research Compendium.

Zakin, J.L. Registered Professional Engineer, Ohio.

Honors and Awards


Brodkey, R.S. A session in the fluid mechanics section was held in honor of Prof. Brodkey's 70th Birthday.


Davis, J.F. Promoted to Interim Chief Information Officer, Ohio State University. Management responsibility for central technology operations-550 staff and students, $30+ million annually.

Fan, L.-S. Lumley Research Award, College of Engineering. 1998.

Fan, L.-S. ASEE Chemical Engineering Division Union Carbide Lectureship Award. 1999.

Fan, L.-S. Clara M. and Peter L. Scott Faculty Award for Excellence in Engineering Education. The Ohio State University. 1999.

Feinberg, M. McQuigg Award for Excellence in Undergraduate Teaching, College of Engineering, The Ohio State University. May 1999.


Lee, L.J. Honorary Professor of East China University of Science and Technology. Shanghai, China.

Ozkan, U.S. Distinguished Scholar Award, The Ohio State University. 1999.

Ozkan, U.S. Professional Progress Award, College of Engineering, Iowa State University. 1999.


Ozkan, U.S. Emerging Academic Leaders Program Award, The Ohio State University. 1998.


Zakin, J.L. Distinguished Visiting Professor Award, Mexican Academy of Sciences and the Mexico-USA Foundation for Science. 1998-99.

Zakin, J.L. Career Services Award, The Ohio State University. 1998.


Publications and Proceedings

Zakin, J.L. IPNS Research Award for 6 days of experiments at Argonne's SAND Instrument for "SANS Study of Drag Reducing Cationic Surfactant Systems."

Zakin, J.L. Philippine Overseas Sandwich Program of Engineering and Science Education Project (ESEP).

Zakin, J.L. MITI, Mechanical Engineering Lab Grant for Consumeable Chemicals and Software.


Zakin, J.L. Student Award: Wilfredo Morales – Owens Corning Senior Honors Research Award.


Family Photo

Tom Koffolt visits the Department and has his photo taken with his father's portrait
<table>
<thead>
<tr>
<th>Budget</th>
<th>PI/Title/Sponsor</th>
<th>Project Period</th>
</tr>
</thead>
</table>
| $15,000 | **Bakshi, B.R.**  
Multiscale Analysis & Modeling.  
DuPont Educational Aid Program | 07/01/97 – 06/31/98  |
| $210,000| **Bakshi, B.R.**  
Data Rectification, Process Monitoring, Fault Diagnosis  
and Their Identification by Multiscale Empirical Modeling.  
National Science Foundation | 06/01/98 – 05/31/02  |
| $80,000 | **Brodkey, R.S., and Y. Guezennec**  
Flow Visualization of Forced and Natural Convection in  
Internal Cavities.  
University of Idaho | 09/15/97 – 09/14/00  |
| $60,000 | **Brodkey, R.S.**  
Validation of DNS, Development of LES, and CFD  
Modeling of an Opposed Jet Mixer Based on Time-Resolved, Full-Field, Velocity Vector Measurements  
And the Extension to Impeller Driven Mixing Vessels Viewed from a Rotating Frame of Reference.  
ACS-PRF | 07/01/99 – 09/30/01  |
| $70,000 | **Brodkey, R.S., J.J. Chalmers, and Y. Guezennec**  
Using Time-Dependent Mixing in Stirred Vessels to  
Optimize Mixing Processes and to Minimize Waste in Reactive Systems.  
NSF Combined GOALI Environmental and Equipment Grant | 07/01/99 – 09/30/00  |
| $66,000 | **Chalmers, J.J., and M. Zborowski**  
Development of Analog Cell Separation Based on Surface Marker Density.  
Whitaker Foundation | 04/97 – 04/98        |
| $514,902| **Chalmers, J.J., and M. Zborowski**  
Cell Separation by Magnetic Flow Sorting.  
National Cancer Institute | 03/97 – 01/00        |
<table>
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<tr>
<th>Amount</th>
<th>Funding Body/Project Description</th>
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| $375,000 | Chalmers, J.J., and M. Zborowski  
Magnetic Flow Sorting for Clinical Stem Cell Isolation.  
NOVAMEDICS |
| $460,180 | Chalmers, J.J., and M. Zborowski  
Determination of Cellular Properties Based on the  
Distribution of Cell Velocities Induced by External Fields.  
NSF |
| $70,000 | Chalmers, J.J., R.S. Brodkey, and Y. Guezennecc  
Using Time-Dependent Mixing in Stirred Vessels to  
Optimize Mixing Processes and to Minimize Waste in  
Reactive Systems.  
NSF Combined GOALI Environmental & Equipment Grant |
| $100,000 | Chalmers, J.J., J. Rathman, and K. Cox  
Improved Surfactants for Cell Culture.  
NIH SBIR with Antrace, Inc. |
| $22,360  | Chalmers, J.J.  
Characterization of Bench and Pilot Scale Bioreactors with  
Respect to their Hydrodynamic Environment.  
Genentech, Inc. |
| $750,000 | Fan, L.-S.  
Bubble Dynamics at High Pressures and High Temperatures.  
U.S. DOE/Air Product |
| $160,000 | Fan, L.-S.  
U.S. DOE/Washington University |
| $300,000 | Fan, L.-S.  
Transport Phenomena of High Temperature/High Pressure  
Gas-Liquid-Solid Fluidized Beds.  
NSF |
| $150,000 | Fan, L.-S.  
Particulates and Multiphase Flow Research.  
Industrial Consortium |
| $450,000 | Fan, L.-S.  
SO₂ and Air Toxics Control Using Calcium-Based Sorbents.  
Ohio Coal Development Office |
<table>
<thead>
<tr>
<th>Amount</th>
<th>Researcher</th>
<th>Title</th>
<th>Institution/Program</th>
<th>Start Date</th>
<th>End Date</th>
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<tbody>
<tr>
<td>$135,000</td>
<td>Fan, L.-S.</td>
<td>Kinetics of FeCl₃ Oxidation in Ultrafast Reactor.</td>
<td>DuPont Chemicals</td>
<td>03/97</td>
<td>02/98</td>
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<td>$160,000</td>
<td>Fan, L.-S.</td>
<td>Hydrodynamics of Slurry Bubble Columns.</td>
<td>U.S. DOE/Washington University</td>
<td>09/99</td>
<td>09/02</td>
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<td>$295,000</td>
<td>Fan, L.-S.</td>
<td>High Pressure Gas-Liquid-Solid Fluidization.</td>
<td>NSF</td>
<td>07/99</td>
<td>06/02</td>
</tr>
<tr>
<td>$217,356</td>
<td>Feinberg, M.</td>
<td>The Behavior and Design of Reactors with Complex Chemistry.</td>
<td>NSF</td>
<td>09/01/96</td>
<td>08/31/99</td>
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<td>$50,000</td>
<td>Feinberg, M.</td>
<td>Optimal Reactor Design from a Geometric Viewpoint.</td>
<td>Petroleum Research Fund</td>
<td>08/01/95</td>
<td>08/31/99</td>
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<td>$1,351,000</td>
<td>Friedman, M.</td>
<td>Dynamics of Flow-Dependent Arterial Permeability.</td>
<td>NIH</td>
<td>04/01/94</td>
<td>03/31/00</td>
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<td>$1,906,000</td>
<td>Friedman, M.</td>
<td>Coronary Artery Dynamic Geometry and Atherosclerosis.</td>
<td>NIH</td>
<td>04/01/99</td>
<td>03/31/04</td>
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<tr>
<td>$5,000</td>
<td>Friedman, M.</td>
<td>Role of Vessel Geometry and Hemodynamics in Human Coronary Atherogenesis.</td>
<td>NATO (Travel Grant)</td>
<td>08/01/96</td>
<td>12/31/99</td>
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<td>$20,000</td>
<td>Koelling, K.W.</td>
<td>Extensional Rheology of Polymeric Fluids.</td>
<td>DuPont Educational Aid Program</td>
<td>07/01/97</td>
<td>06/30/98</td>
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<td>$310,000</td>
<td>Koelling, K.W.</td>
<td>Extensional Rheology of Polymer Melts and Solutions: Impact on Processing.</td>
<td>NSF, Faculty Early CAREER Development Program</td>
<td>07/01/96</td>
<td>06/30/00</td>
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<tr>
<td>$100,000</td>
<td>Koelling, K.W., J.A. Stuart and B. Lilly</td>
<td>Models and Instruction for Life Cycle Material Content Decisions. NSF and Lucent Technologies</td>
<td>10/97 – 09/99</td>
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<td>$375,000</td>
<td>Koelling, K.W., L.J. Lee, and T. Luscher</td>
<td>Industry/University Cooperative Research Center (I/UCRC) for Advanced Polymer and Composite Engineering (CAPCE). NSF Industry/University Cooperative Research Center Program</td>
<td>10/97 – 09/02</td>
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<td>$25,000</td>
<td>Koelling, K.W.</td>
<td>Thin Wall Injection Molding of PVC Materials. GEON Company</td>
<td>01/01/98 – 12/31/98</td>
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<td>$10,000</td>
<td>Koelling, K.W.</td>
<td>Advanced Injection Molding of Thermoplastics. Dow Chemical Company</td>
<td>04/98 – 03/99</td>
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<td>$190,000</td>
<td>Koelling, K.W., L.J. Lee, and D.L. Tomasko</td>
<td>Supercritical Fluid Enhanced Polymer and Composite Extrusion. NSF Industry/University Cooperative Research Center Program</td>
<td>10/98 – 09/00</td>
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<td>$320,000</td>
<td>Lee, L.J., and K.W. Koelling</td>
<td>Analysis of Vacuum Infusion Resin Transfer Molding. NSF</td>
<td>07/15/97 – 07/14/00</td>
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<tr>
<td>$60,000</td>
<td>Lee, L.J., and A. Benatar</td>
<td>Development of Fast Cure Adhesive Materials and Processes. Edison Welding Institute</td>
<td>01/97 – 12/98</td>
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</table>
**Sponsored Research**

<table>
<thead>
<tr>
<th>Amount</th>
<th>Sponsoring Author(s)</th>
<th>Start Date - End Date</th>
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</table>
| $47,000 | **Lee, L.J.**  
Analysis of Prepreg/Auto clave Process.  
Dow Chemical | 08/97 – 07/98 |
| $500,000 | **Lee, L.J., K.W. Koelling, and T. Luscher**  
Operating Grant for an Industry/University Cooperative.  
NSF | 10/01/97 – 09/30/02 |
| $187,500 | **Lee, L.J., K. Koelling, and T. Luscher**  
Center for Advanced Polymer and Composite Engineering.  
Ohio Board of Regents | 10/01/97 – 09/30/99 |
| $60,000  | **Lee, L.J.**  
Study of Polyketones Based LPA.  
Shell Chemical | 02/01/98 – 01/31/99 |
| $250,000 | **Lee, L.J., K.W. Koelling, and T. Luscher**  
Polymer and Composite Engineering.  
Edison Polymer Innovation Corporation | 03/15/98 – 03/14/00 |
| $20,000 | **Lee, L.J.**  
Analysis of Vacuum Infusion Resin Transfer Molding.  
NSF | 04/98 – 03/00 |
| $190,006 | **Lee, L.J., D. Tomasko, and K.W. Koelling**  
Supercritical Fluids Enhanced Polymer Extrusion.  
NSF | 09/98 – 08/00 |
| $350,631 | **Lee, L.J., J. Castro, and T. Osswald**  
A Novel Solventless Approach to Manufacture Pre-pregs  
And Laminates with Improved Dimensional Consistency  
For Electronic Applications.  
NSF | 04/99 – 03/02 |
| $203,922 | **Lee, L.J., and K.W. Koelling**  
Analysis of the De-Airing Process in Glass Windshield  
Lamination.  
DuPont | 09/01/97 – 08/31/00 |
| $5,000   | **Lee, L.J.**  
Interdisciplinary Seminar Series on Frontiers of Polymer and  
Composite Engineering and Science.  
OSU Office of Research | 1998 |
<table>
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<tr>
<th>Amount</th>
<th>Investigator, Affiliation</th>
<th>Description</th>
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<th>Start Date - End Date</th>
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<td>$330,316</td>
<td>Ozkan, U.S.</td>
<td>Partial Oxidation of Lower Alkanes.</td>
<td>NSF</td>
<td>09/94 - 09/99</td>
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<td>$35,000</td>
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<td>Lower Alkane Oxidation.</td>
<td>Elf-Atochem</td>
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<td>$5,000</td>
<td>Ozkan, U.S.</td>
<td>Research Experience for Undergraduates.</td>
<td>NSF</td>
<td>06/01/97 - 05/31/98</td>
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<td>$75,000</td>
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<td>Catalytic Simultaneous Reduction of NO\textsubscript{x} and SO\textsubscript{2}.</td>
<td>Ohio Coal Development Office</td>
<td>09/01/98 - 09/01/99</td>
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<td>$238,100</td>
<td>Ozkan, U.S.</td>
<td>Fundamental Studies of OXO Aldehyde Hydrogenation Reactions.</td>
<td>Exxon Chemical</td>
<td>12/01/98 - 06/01/00</td>
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<td>$240,000</td>
<td>Rathman, J.</td>
<td>Aqueous Surfactant Solutions as Replacements for Volatile Organic Solvents in Chemical Manufacture.</td>
<td>NSF, Environmentally Conscious Manufacturing Program</td>
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<td>$100,000</td>
<td>Rathman, J., J. Chalmers, and K. Cox</td>
<td>Improved Surfactants for Cell Culture.</td>
<td>NIH SBIR with Anatrace, Inc.</td>
<td>01/98 - 12/98</td>
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<td>$1,400,000</td>
<td>Rathman, J., and L.-S. Fan</td>
<td>Consortium for Development and Commercialization of Fine Particle Technologies.</td>
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<td>$80,000</td>
<td>Rathman, J., Caffrey, D. Tomasko, and Walker</td>
<td>Environmentally Benign Sorbents for Removal of Toxic Chemicals from Water.</td>
<td>OSU Interdisciplinary Seed Grant Program</td>
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<td>$5,000</td>
<td>Rathman, J., and J.L. Zakin</td>
<td>Interdisciplinary Seminar Series on Environmental Studies in Complex Fluids and Urban Runoff</td>
<td>OSU Office of Research</td>
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<td>Amount</td>
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<td>$108,491</td>
<td>Tomasko, D.L.</td>
<td>Environmentally Benign Crystallization – Supercritical Fluids As Separable and recoverable Antisolvents, Emission Reduction Research Center. NSF/IUCRC</td>
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<td>$20,000</td>
<td>Tomasko, D.L.</td>
<td>Crossover Phenomena in Adsorption from Supercritical Fluids. American Chemical Society Petroleum Research Fund</td>
<td>05/96 – 08/98</td>
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<td>$190,000</td>
<td>Tomasko, D.L., L.J. Lee, and K.W. Koelling</td>
<td>Supercritical Fluid Enhanced Polymer and Composite Extrusion. NSF-ECE</td>
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<td>$70,000</td>
<td>Yang, S.-T.</td>
<td>Novel Metabolic and Process Engineering Approaches for Enhanced Propionic Acid Production from Plant Biomass. Consortium for Plant Biotechnology Research (Dept. of Energy)</td>
<td>09/96 – 08/98</td>
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<td>$50,000</td>
<td>Yang, S.-T.</td>
<td>Development and Scale-Up of an Extractive Fermentation Process for Carboxylic Acids Production from Food Processing Byproducts. Midwest Advanced Food Manufacturing Alliance</td>
<td>10/96 – 02/98</td>
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<td>$193,148</td>
<td>Yang, S.-T.</td>
<td>Artificial Placenta for In Vitro Drug Screening and Toxicology. NIH</td>
<td>04/98 – 03/00</td>
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<td>$120,000</td>
<td>Yang, S.-T.</td>
<td>Galacto-Oligosaccharides Production from Lactose by Immobilized B-Galactosidase. USDA-CSREES</td>
<td>09/98 – 08/00</td>
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<td>$60,250</td>
<td>Zakin, J.L.</td>
<td>Turkey-Israel-U.S. Chemical Engineering Workshop. NSF (Travel Grant)</td>
<td>2/1/99 – 7/31/99</td>
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</table>
Row 1: Doug Krysiak, Steven Solomon, William Werner, Nicole Voss, Wailok Yee, Gregory Bass, Brian Collett, Erin Conner, Dr. Robert Brodkey

Row 2: Andrew Fisher, Dr. Umit Ozkan, Mike Davis, Amy Bridges, Xiudong Sun, Hung-Tzu Chiu, Gim Pee, Ramya Murali

Row 3: Joshua Looper, Erin Bennett, Shannon Wallace, Imrana Islam, Nicole Johnson, Dr. David Tomasko

Row 4: Dr. L.-S. Fan, Carrie Chambers, Jeff Craig, Tavip Tobing, Matt Seikel, S.M. Bederul Islam

Row 5: Wen Li, David Bressler, Dr. Jacques Zakin, Todd Yunker, Aravind Asthagiri, Leander Richards

Row 6: Robert Nack, Carl Scott, Jeff Ku, Yani Angsani, Dr. James Rathman

Row 7: Dr. Ken Cox, Shriniwas Chauk, Jang Won Kim, Fadi Idrissi, Fadhel Zammouri, Ed Legenza, Steve Pitrone, Raed Mohamed, Dr. L. James Lee
Chemical Engineering Graduates (1997-98)

Bachelor of Science

August 1997
Nathan A. Albert
Sam S. Ang
James L. Bickett, II
Dawn R. Demko
Paula E. Garcia
Erin L. Glaser (cum laude with distinction)
Prasad A. Gupte
Mitesh A. Kadakia
Wayne A. Pettay, III
Novin Teguh
Jaideep N. Vaidya (cum laude)
She-Chit Wong

December 1997
Jamie A. Deist
Michael J. Wirtz
Bryan C. Wisecup

March 1998
Jonathan S. Piazza
David J. Semersky
Gary O. Spitznogle
Matthew J. Tessman

June 1998
Aravind R. Asthagiri (cum laude)
Matthew G. Aubert (magna cum laude)
Dora Babai
Gregory B. Bass (summa cum laude)
Erin C. Bennett
Kang Chen
Brian R. Collett
Erin S. Conner (cum laude)
Jeffrey B. Craig
Philip R. Dahlstrom
Michael F. Davis
Jason T. Ebin
Brian E. Hawkins (cum laude with distinction)
Ronald M. Howard, Jr.
Shawn W. Hull
Nicole Johnson
Chemical Engineering Graduates (1997-98)

Master of Science

Zafar Ali
J.F. Davis
“On-Line State Estimation in Intelligent Diagnostic Decision Support Systems for Large Scale Process Operations”

Yani Aangsani
J.F. Rathman
“Design of Silica Mesostructures Using Simple Organic Additives and the Synthesis of Mesoporous Film at Liquid/Liquid Interfaces”

Abdu Y. Bunch
U.S. Ozkan
“An Investigation of the Indole Hydrodenitrogenation Network over Nickel-Molybdenum and Molybdenum Sulfide Catalysts”

Kristin R. Cutright
K.W. Koelling
“Experimental Verification of C-Mold and Effects of Complex Gas Channels on Mold Filling and Mechanical Properties for Gas-Assisted Injection Molded Parts”

Mark D. Elkovich
L.J. Lee and D.L. Tomasko
“Supercritical Fluid Assisted Polymer Blending”

Elnipiki Gregoiriades
J.J. Chalmers
“Cell Damage in Microcarrier and Suspended Cultures of Chinese Hamster Ovary Cells in an Extensional Flow as a Function of Local Energy Dissipation”

Amit Jain

Yi-Je Juang
L.J. Lee
“Analysis of De-Airing Process in Windshield Manufacturing”

Amy L. Kneidel
S.-T. Yang
“Biodegradation of Trichoroethylene by Methylosinus trichosporium OB3b Immobilized in a Fibrous Bed Bioreactor”

Cesar J. Mauras
J.J. Chalmers
“Quantification of Biofilms Using Confocal Microscopy and Image Analysis”

Mohamed N. Nounou
B.R. Bakshi
“On-Line Multiscale Rectification of Process Data with Gaussian and Non-Gaussian Errors without Process Model”

Minesh R. Tendulkar
K.W. Koelling
“Gass Bubble Dynamics in Viscous Newtonian Fluids under Non-Isothermal Conditions”
Chemical Engineering Graduates (1997-98)

Zhifeng Wang           J.F. Rathman
"Application of Lecithin to the Biotransformation of Cholesterol to ADD/AD"

Hong Wu               J.F. Davis

Doctor of Philosophy

Rajeev Agnihotri      L.-S. Fan
"High Reactivity Ca-Based Sorbents for SO$_2$ and As$_2$O$_3$ Removal at Elevated Temperatures: Experimental & Modeling"

Hung-Tzu Chiu          L.J. Lee
"CV/FEM Simulation of Composite and Polymer Processing"

John D. Clay           K.W. Koelling
"Molecular Degradation of Polymer Solutions in a Fast Transient Extensional Flow"

Zuwei Jin              S.-T. Yang
"Continuous Extractive Fermentation Using Hollow Fiber Membrane Extractors for Enhanced Propionate Production"

Wen Li                 L.J. Lee
"Integrated Analysis of Low Profile Unsaturated Polyester Resin Cured at Low Temperatures"

Xukun Luo              L.-S. Fan
"High Pressure Three-Phase Fluidization: Hydrodynamics and Transport Phenomena"

Liping Sun             J.J. Chalmers
"Immunomagnetic Cell Separation"

Xiudong Sun            L.J. Lee
"Analysis of Vacuum Assisted Resin Transfer Molding"
American Institute of Chemists
Outstanding Senior
James W. Holder

Outstanding Graduate Student
Rick B. Watson

Outstanding Postdoctor
Yang Zhao

ChE Department Awards
Outstanding Sophomore Award for Academic Excellence
Shawn Bruggemeier

Outstanding Senior Award for Academic Excellence
Shannon M. Novosad
Andrew T. Fisher
Samir Verma

Outstanding Senior Award for Research
Gregory B. Bass

Outstanding Graduate Award for Academic Achievement
Xiudong Sun

Outstanding Postdoctoral Award for Research Excellence
Gurkan Karakas
Yasuo Kawaguchi
Suhas Mahuli
### Fellowship and Scholarship Students

<table>
<thead>
<tr>
<th>Scholarship/Award</th>
<th>Students</th>
</tr>
</thead>
</table>
| Alcoa Michael Koob                                      | David H. George Scholarship  
Kevin Good  
Mohamadou Sarr  
Clayt Robinson  
Evan Wagner  
Benjamin Wakefield                                      |
| Harold Almen Scholarship Jonathan Kiel                  | The Smith Howland and Aristech Chemical Corp. Scholarship  
Rebecca Morbitzer  
Tedilea Watts                                              |
| Amoco Scholarship Ricky Gray Daniel Schneider Phillip Smith | Webster B. Kay Scholarship  
Abraham Middleton  
Vanessa Guscoff                                           |
| Aristech Scholarship James Holder Lorie Burgess         | Lubrizol Foundation Scholarship  
Kevin Woleab                                                |
| Ashland Oil Scholarship Marcin Telko Erin Wehlage       | Proctor & Gamble Scholarship Jeremy Merling                              |
| Paul Bates Scholarship Anita Nuckols Dameon Medley      | Aldrich Syverson Scholarship Debra Jakielski Christopher Legge           |
| Class of 1941 Fund Jason McComas Michelle Gunyula Molly Simenz | Union Carbide Scholarship Benjamin Buss Shannon Ryan                     |
| Dow Chemical Scholarship Christopher Gygax              | Harry B. Warner Scholarship Stephen Cummings Craig Lytle Shellie Porter Jason Vititoe |
| Dow Outstanding Junior Award Brian McLain               | William H. Whirl Scholarship Leslie Crook                                |
| Dorothy J. & Herbert L. Fenburr Scholarship Peter Kern Heather King Alison Mahood | James R. Withrow Memorial Scholarship Tricia Brewer Vivi Dana            |
|                                                        |                                                                        |
## Graduate Students (by Advisor)

<table>
<thead>
<tr>
<th>Student</th>
<th>Degree</th>
<th>Advisor</th>
<th>Degree</th>
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<tbody>
<tr>
<td>Bhavik Bakshi</td>
<td>PhD</td>
<td>Kurt Koelling</td>
<td>MS</td>
</tr>
<tr>
<td>Wen-Shian Chen (w/Fan)</td>
<td>MS</td>
<td>Denitra Bruer</td>
<td>PhD</td>
</tr>
<tr>
<td>Travis Horstman</td>
<td>PhD</td>
<td>Jose Garcia</td>
<td>PhD</td>
</tr>
<tr>
<td>Oscar Lara (w/Chalmers)</td>
<td>MS</td>
<td>Vishal Gauri</td>
<td>PhD</td>
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<tr>
<td>Mohamed Nounou</td>
<td>PhD</td>
<td>Xiangmin Han (w/Lee &amp;</td>
<td>PhD</td>
</tr>
<tr>
<td>Ramon Strauss</td>
<td>MS</td>
<td>Tomasko)</td>
<td>PhD</td>
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<tr>
<td></td>
<td></td>
<td>Kai Kang</td>
<td>MS</td>
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<tr>
<td></td>
<td></td>
<td>Hung Nguyen</td>
<td>PhD</td>
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<tr>
<td></td>
<td></td>
<td>Guoqun Xu</td>
<td>MS</td>
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<td></td>
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<td>Hua Wang (w/Lee)</td>
<td>MS</td>
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<td>Yijie Wang</td>
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<td>Liyong Yu</td>
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<tr>
<td>Jeffrey Chalmers</td>
<td>MS</td>
<td>Yani Angsani</td>
<td>MS</td>
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<tr>
<td>Kristen Comella</td>
<td>PhD</td>
<td>Turgut Battal</td>
<td>PhD</td>
</tr>
<tr>
<td>Oscar Lara (w/Bakshi)</td>
<td>MS</td>
<td>Jeff Clogston (w/Tomasko)</td>
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<tr>
<td>Ningning Ma</td>
<td>PhD</td>
<td>Janine Lawrence</td>
<td>MS</td>
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<tr>
<td>Kara McCloskey</td>
<td>PhD</td>
<td>Gim Yang Pee (w/Weavers)</td>
<td>MS</td>
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<tr>
<td></td>
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<td>Haiying Zhou</td>
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<td>Ken Cox</td>
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<td>Patricia Frink</td>
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<td>Xia Caao</td>
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<td>Regis Geisler</td>
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<td>Liang-Shih Fan</td>
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<td>James Rathman</td>
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<td>James Bach</td>
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<td>Yani Angsani</td>
<td>PhD</td>
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<td>Himanshu Gupta</td>
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<td>Xiangmin Han (w/Koelling</td>
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<td>Wai Man Lau</td>
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<td>Raashina Humayan</td>
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<td>Santhosh Misro</td>
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<td>Jiangwon Kim</td>
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<tr>
<td>Guoqiang Yang</td>
<td>PhD</td>
<td>Yijee Wang</td>
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<td>Shang-Tian Yang</td>
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<td>David Tomasko</td>
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<td>Jiangwon Kim</td>
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<tr>
<td>Jacques Zakin</td>
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<td>Zhiqing Lin</td>
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**Placement Information**

### Employers that Hired B.S Graduates

<table>
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<tbody>
<tr>
<td>Abbot Laboratories</td>
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<tr>
<td>Adsorption Research</td>
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<tr>
<td>American Electric Power</td>
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<tr>
<td>Amko Service Co.</td>
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<tr>
<td>Andersen Consulting</td>
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<tr>
<td>Archer Daniels Midland</td>
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<tr>
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<tr>
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<td>Bechtel Savannah River Co.</td>
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<tr>
<td>BP Oil</td>
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<tr>
<td>Dow Corning Corp.</td>
<td>MI</td>
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<tr>
<td>Eli Lilly</td>
<td>IN</td>
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<tr>
<td>Exxon</td>
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<tr>
<td>Foseco, Inc.</td>
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<td>Goodyear Tire &amp; Rubber</td>
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<tr>
<td>Guardian Industries</td>
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<td>International Paper</td>
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<td>Lincoln Electric Co.</td>
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<td>RWD Technologies</td>
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<td>Superior Graphite</td>
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<td>Westinghouse</td>
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### Status of B.S. Graduates (SU 97 - SP 98)

<table>
<thead>
<tr>
<th>No. of B.S. Grads</th>
<th>% Reg'd w/ECS*</th>
<th>% Report Employ.</th>
<th>% to Grad Sch.</th>
<th>% to Military</th>
<th>% Other Plans+</th>
<th>% Seek Employ.</th>
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<th>Avg. An. Salary</th>
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<td>87.7</td>
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* Registered with Engineering Career Services
+ Includes Returned Overseas

### Summary of Recruiting Activities

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<th>Year</th>
<th>No. of Employer Divs. Conducting Interviews</th>
<th>No. of Interviews</th>
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### Yearly Starting Salaries

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<td>1995-96</td>
<td>$38,356</td>
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Placement data from Engineering Career Services 1998 Annual Report
## Course Enrollment

### Summer Quarter 1997

<table>
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<tr>
<th>Term</th>
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<tbody>
<tr>
<td><strong>First Term</strong></td>
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<td></td>
<td>ChE 801 Advanced Special Problems in ChE</td>
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</tr>
<tr>
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### Autumn Quarter 1997

<table>
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<tr>
<td>ChE 200 ChE &amp; Process Calculations</td>
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<tr>
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<tr>
<td>ChE 712 Catalysis &amp; Catalytic Processes</td>
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<tr>
<td>ChE 760 ChE Economy and Strategy</td>
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<tr>
<td>ChE 761 ChE Processes</td>
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<td>ChE 773 Intro to High Polymer Engineering</td>
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<td>ChE 812 Advanced ChE Kinetics I</td>
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<td>ChE 776 Principles of Polymer Conversion Ops.</td>
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### Spring Quarter 1998

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### Summer Quarter 1998

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<td>ChE 694 Group Studies</td>
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<td>ChE 801 Advanced Special Problems in ChE</td>
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### Autumn Quarter 1998

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## Winter Quarter 1999

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R.S. Brodkey: Three-dimensional particle tracks in an opposed-jet mixer configuration

The particle tracks are computed from first principles using actually measured full-field, time-resolved velocity vector measurements obtained from our recently developed particle tracking velocimetry system.
1998-99 Department Seminar Speakers

Autumn 1998

September 24  Introduction to New Graduate Students

October 1     Prof. Zhongyao Shen, Tsinghua University, Beijing, China.
              “Overexpression of Lambda Phage Lysis Genes in E. Coli for Disruption Cell and Recovery Intracellular Products.”

October 15    Prof. Robert Simha, Case Western Reserve University, Cleveland, Ohio.

October 22    Prof. John Kardos, University of Washington, St. Louis, Missouri.

October 29    Dr. Robert G. Laughlin, The Procter & Gamble Co., Cincinnati, Ohio.
              “Thermodynamics of Phase Transition in Aqueous Surfactant Systems.”

November 5    Dr. Isamu Kusaka, University of Chicago, Chicago, Illinois.
              “Molecular Theory of Vapor Phase Nucleation.”

November 12   GRIP.

November 19   AIChE (No Seminar).

November 26   Thanksgiving (No Seminar).

December 3    Prof. Alan Hatton, Massachusetts Institute of Technology, Cambridge, Massachusetts.
              “The Dynamics of Micelle-to-Vesicle Transitions in Mixed Anionic/Cationic Surfactant Systems.”

Winter 1999

January 7     Maria Papadki, Massachusetts Institute of Technology.
              “Towards a Functional Tissue Engineered Cardiac Muscle.”

January 14    L.E. Scriven, University of Minnesota.
              “Liquid is Readily Coated, but Coating Cannot be Liquid.”

January 28    Lee Magid, University of Tennessee.

February 4    Talid Sinno, Massachusetts Institute of Technology.
              “Modeling Microdefect Formation in Crystalline Silicon Growth from the Melt.”

February 11   Dan Klingenberg, University of Wisconsin.
              “Flowing Flexible Fiber Suspensions.”

February 18   Steve Foster, EHS, The Ohio State University.
              “General Hazardous Materials Communication Policy of the Ohio State University.”

February 25   Jeff Varner, ETH-Zurich.
              “The Role of Self-Optimizing Adaptive Cybernetic Models in Metabolic Engineering.”

March 2       Christopher Rao, University of Wisconsin.
              “Moving Horizon Strategies of Constrained State Estimation.”
1998-99 Department Seminar Speakers

March 4  Chris MaCosko, University of Minnesota.  
"Morphology Development During Polymer-Polymer Blending."

March 11  William Miller, Northwestern University.  
"Effects of Carbon Dioxide and Ammonia on Cell Growth, Metabolism, Protein Production, and Glycosylation."

Spring 1999

April 1  Richard A. Vaia, Air Force Research Laboratory, Polymer Branch, Wright Paterson AFB.  
"Impact of Mesoscopic Structure on the Behavior of Polymer-Inorganic Nanocomposites."

April 8  H. Henning Winter, University of Massachusetts at Amherst.  
"Shear Induced Rotation of Liquid Crystal Molecules."

April 15  Ica Manas-Zloczower, Dept. of Macromolecular Science, Case Western Reserve Univ.  
"Influence of Design on Mixing Performance in Polymer Processing Equipment."

April 22  C. Judson King, University of California at Berkeley.  
Bill Lowrie’s Lecture.

May 6  Howard Brener, Massachusetts Institute of Technology.

May 13  Reg Davis, Particle Technology.

May 20  Jeff Sirola, Eastern Chemical Company.  
"Industrial Examples of Process Synthesis and Integration."

May 27  Keith Johnston, University of Texas at Austin.  
"Environmentally Benign CO2: Colloid and Interface Science."
## Alumni Donors

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<td>1930</td>
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<td>1935</td>
<td>Dr. Linton E. Simerl</td>
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<tr>
<td>1936</td>
<td>Richard A. Miller, Dr. Robert N. Miller</td>
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<tr>
<td>1937</td>
<td>Nicholas Fatica, Donald C. Miller, Frederick R. Pullen, Dr. George H. Sheets, Robert T. Whitaker</td>
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<tr>
<td>1939</td>
<td>Ira J. Kail, Dillard W. Kuhiman, Ralph E. Quigley, Howard G. Rohrer, Dr. Charles A. Rohrmann, Prof. Bernard R. Sarchet</td>
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<td>1940</td>
<td>Clay H. Aneshansley, Charles H. Boardman III, Loren F. Grandey, Robert L. Huffman, John H. Miller</td>
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<td>1941</td>
<td>Thomas F. Lavery</td>
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<td>1942</td>
<td>Dr. Donald S. Arnold, Randal E. Bailey, Dr. Forrest R. Hurley, Richard R. Whiston</td>
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<td>1943</td>
<td>Walter E. Craw, Dalton F. Drake, Glenn L. Gifford, Leonard A. Harris, Carlyle E. Shoemaker, Dr. Wade Wolfe, Jr., Hong Tse Yee</td>
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<td>1946</td>
<td>Kenneth A. Brandstetter</td>
</tr>
<tr>
<td>1947</td>
<td>Lewis C. Hullinger, John M. Kolbas, Dr. John B. Martin, Aloysius M. Sebian</td>
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<td>1951</td>
<td>Charles E. Breithaupt, Charles L. Dornbusch, David B. Speed, Dr. David A. Strang, Clarence J. Svoboda, Dr. Robert B. Weiser</td>
</tr>
<tr>
<td>1952</td>
<td>Robert F. Aldrich, Donald E. Haupt, Richard E. Saylor, Dr. David G. Stephan</td>
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<td>1955</td>
<td>John H. Hoge</td>
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<tr>
<td>1956</td>
<td>William D. Coe</td>
</tr>
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<td>1957</td>
<td>Walter R. Andrews, Jr., Paul J. Kienholz</td>
</tr>
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<td>1958</td>
<td>Dr. Edward H. Bollinger, James R. Facer, Werner S. Lichtenstein, Richard M. Smith, James W. Stark, Dr. Lawrence R. Steele</td>
</tr>
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<td>1959</td>
<td>Lee W. Addie, James O. Albery, James H. LaHue, Darryl J. Von Lehndorff, Dr. Gerald A. Wilcox</td>
</tr>
<tr>
<td>1961</td>
<td>Paul R. Bigley, Dr. Edward R. Corino, Kenneth D. McDaniel</td>
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<td>1962</td>
<td>C. David Osburn, Dean Snider</td>
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<td>1963</td>
<td>Nelson W. Barnhill, Robert P. Kasper, Fred A. Shaffstall, W. Howard Sidner, Kay Logan Snider</td>
</tr>
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<td>1964</td>
<td>Dr. Michael B. Cutlip, James A. Moomaw, Girish D. Parikh</td>
</tr>
<tr>
<td>1965</td>
<td>Oliver L. Davies, John P. Gegner, Dr. Kiu Hee Lee, Frederick J. Rerko</td>
</tr>
<tr>
<td>1966</td>
<td>William F. Deerhake, Linda Lowe Jarrett, William G. Lowrie, Glenn L. McKee</td>
</tr>
<tr>
<td>1967</td>
<td>Graham F. Painter, Jr., John M. Yacher</td>
</tr>
</tbody>
</table>
1998 Contributors

1968
Raymond A. Foisset

1969
Smith E. Howland
Dr. M. Anandha Rao
John W. Toussant

1970
Bradford F. Dunn
David R. Grove
Richard B. Strait
Dr. Rosa Uy

1971
Kerry George Hertenstein
Jeffrey L. Kosch
William E. Pritchard
Dr. Stephen Zananycz

1972
David H. Armstrong
Dr. Martin R. Okos

1973
John C. Bost
David A. Dargan
Norman F. Lucas, Jr.

1974
Steven M. Brown
Stephen M. Irwin
James A. McCaw, Jr.
John E. Myers
Michael A. Patterson

1976
Dr. Donald W. Buchanan, Jr.

1978
Douglas T. Brown
Dr. Neil P. Stuber
Paul W. Vance, Jr.
Richard J. Yoch

1979
John F. Kreinbrink
David M. Schilling
David J. Wasele

1980
Carol Bur Ehrman
Fred D. Ehrman
Matthew J. Galosi
Mark A. George
Pankaj P. Shah

1981
Christine P. Brown
Nancy Coultrip Dawes
William J. Dawson
H. Charles Wolf, Jr.

1982
Christina Stark Sistrunk
Dr. Andrew M. Weber III

1983
Dr. Cheryl Kennedy Alfieri
Dr. Samuel D. Fink
Carolyn M. Lin
Robert L. Newman
James M. Sauer

1984
Mark S. Bitto
Robert G. Larsen
Gregory M. Masica
Scott R. Northrup

1985
Douglas J. Ball
Roger G. Facer
Timothy A. Johnson
David J. Moonay
Dr. Richard T. Strait
Sharyn A. Veley

1986
Mark M. Mansour
Norman M. Powell
Dr. Sik Kwan Shum

1987
Jeffrey D. Adams
Karen Graham Johnson
Maureen M. McClain
D. Brian Noe

1988
John A. Bohlmann
Eric S. Delligatti
Amy Schmitt Doty

1989
Stuart F. Doty

1990
Craig M. Kehres
Darrin L. Lacheta
James V. Lombardi
Alex C. Woravka

1994
Dr. John D. Clay

1997
Sam Shehyee Ang
Marc D. Luker
Robert T. Scheele

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Sue A. Purvis

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Second Row: Chandler, Ferguson, Wilkinson, Kreager, Coffey, Norris, Kilian, Nelson, Chernin, Clark, Lindsay, Entwisle, Masse, MacGregor

Third Row: Schlosser, Van Hying, Bartrug, Colmery, Young, Hoorman, Haring, Martin, Caris, Izant, Peters, Svoboda, Newton

Fourth Row: Maple, Weiser, Gossard, Voelkerding, Eilerman, Dornbusch, Slattery, Mezger, Rice, Strang, Narwold, Boyer, Mengert, Ody

Fifth Row: Boch, Can, Speed, Detamore, Carrol, Beckett, Aberhalden, Breithaupt, Fetter, Lavin, Dubes, Garmus, Harris
<table>
<thead>
<tr>
<th>Year</th>
<th>Names</th>
</tr>
</thead>
</table>
| 1924 | Carroll M. Allen*  
Andrew I. Andrews  
Raymond S. Carter*  
Tien I. Chen  
Charles C. Clark  
Homer L. Cupples*  
Folsom E. Drummond  
John E. Fergus*  
Ralph H. Ferguson*  
John M. Flikkema  
George F. Friauf*  
Howard E. Fritz*  
Charles T. Harman  
Paul O. Holmstrom*  
Glenn R. Hull  
Virgil C. Hutton*  
William S. Jones  
Frank J. Keohane*  
Joseph Koffolt*  
Clifford F. Landin  
Toh Liu  
Dale M. Philipp  
Harold T. Reiner-Ruff*  
Albert Routa  
George W. Ruhl*  
James R. Wall  
John L. Ware*  
Clifford A. Weis*  
William H. Whirl* |
| 1929 | James P. Altom*  
Leo H. Brandt*  
Arthur R. Choppin*  
Harion M. Crawford*  
Charles G. Duncombe  
Frank L. Durr*  
Harvey G. Greer*  
William A. Hammond*  
Lyle K. Herndon*  
Julius L. Hoelscher  
Ming T. Hsieh*  
Mary L. (Bucher) Junkin*  
Robert C. Kintner*  
Joseph H. Koffolt*  
Elwood B. Layfield  
Louis H. Mapel*  
Ralph C. Martin  
William J. Michel*  
Harold L. Parker*  
Carl D. Roess*  
Bradway St. John Phillips*  
John L. Walsmith* |
| 1934 | Ralph H. Wing*  
George Zinzalian*  
Walter A. Barres  
Hsu-Yung Chao  
Charles W. Choi  
Edwin J. Corell  
Claude R. Croft*  
Robert H. Crossley  
Walter C. Croydale  
John G. Damous*  
George K. Dumbaude*  
Herbert L. Fenburt*  
Clarence N. Fisher  
Leonard L. Fortune*  
Olaf G. Graff  
Edwin A. Harper  
Owen G. Howard  
Wei C. Hsieh  
Harold D. Kaufmann  
Humbert C. Lancia  
William J. Lawless  
Charles T. Lewis  
Scott C. Lyon  
Theodore Marks*  
William D. Martin  
William A. Menges*  
Lewis E. Michael  
William J. Miles*  
Howard L. Millisor*  
Ivan A. Planck  
Alexander Redniss*  
Edward M. Schoenborn*  
Edward E. Slowier  
Stanley W. Snyder*  
Lawrence E. Stout*  
William F. Swink  
Raymond H. Tseng  
Hyman H. Weinberg  
Sylvestre J. Weiskircher*  
Robert H. Work  
Fred Yenkin* |
| 1939 | Raymond J. Anderson*  
Francis D. Beckel*  
Sol Berg (Robert S.)  
Nicholas L. Berzy*  
George B. Brookover*  
John E. Chenevey  
Hsi C. Cheng  
Robert W. Conaway  
Harold P. Connare  
George M. Correll  
Robert H. Dewart  
Albert R. Downing  
Fredrick Eastman  
Carl D. Fischer  
Robert R. Foltz  
Dwight A. Francis  
Sam Friedman  
John D. George*  
Jack A. Gerster*  
Gordon W. Goldrick*  
Allen I. Gordon*  
Harold F. Haakenberg*  
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Willis E. Jackson  
Ira J. Kail  
Ellsworth E. Kimmel Jr.  
John S. King  
Lewis R. Krieg  
Dillard W. Kuhlman  
Gerhard F. Lamers  
Robert G. Lilley  
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John M. McEwen  
Edwin W. Mann*  
James E. Manner  
Robert P. Mitchell  
Alexander Newhouse*  
Richard E. Ogden*  
Cameron E. Pontius*  
Ralph E. Quigley  
Robert S. Radow  
Merrill L. Riehl  
George E. Roese  
Howard G. Rohrer  
Charles A. Rohman  
Leland F. Roy  
Bernard R. Sarchet  
Robert E. Scheiber*  
Randal E. Smith  
Joel S. Stahl  
Paul L. Suter  
Samuel Teplitz  
Richard P. Theado  
Arthus Thomas Jr.  
Roy W. Thompson  
George S. Tobias  
Charles H. Voit*  
Harry B. Warner  
Clayton W. Weber  
William C. O. White*  
Burton M. Wolf  
William D. Woodford |
| 1944 | Edward W. Bailey  
Seward M. Bazler  
Wallace L. Bostwick  
Edward A. Broestl  
Melvin L. Buie  
David N. Clark  
John Draghice*  
John P. Geier  
William R. Harris  
Clarence A. Haverly Jr.  
William R. Johnson*  
Herman P. Kackenemester  
Marshall C. Kidd  
Theodore E. Kopowski  
Kenneth E. Kress*  
Kenneth C. Lacy*  
Mauno J. Laituri  
Myrl E. Miller  
Richard D. Mitchell  
George H. Mongomery  
Edward W. Powell  
Mayer Schwartz  
Edwin E. Smith  
Charles E. Stahl  
Grover C. Strickler Jr.  
John I. Sebenick*  
Thomas H. Wilson  
Philip A. Yount |
| 1949 | Donald S. Arnold  
William D. Arthur  
Paul E. Bates  
Clair M. Bemiss  
Harish C. Bijawat  
Dayle F. Bockhorst  
Bernard C. Booth  
Elmer J. Bradbury  
Lloyd T. Bunn  
John Burgbacher  
Lee B. Canfield  
Laurence T. Chase*  
Charles W. Conklin  
Joseph W. Connolly  
Marco Cramer*  
Gordon G. Cross  
Kurt Dubowski  
Robert C. Dunn  
George W. Egger |
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Thomas O. Feasel*
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Francis E. Fowler
Edward E. Galloway
Raymond W. Garris
Raymond D. Hammond
Robert L. Harbour
Thomas A. Haverfield
Allen C. Heldenreich
Richard P. Heintz
Maurice R. Hetler
Bruce E. Hill
William H. Hoge
Wilbur C. Hoover
Huan Y. Hsung
Walter D. Hunter
James F. Irwin
Theodore M. Jenny
Morgan E. Jones
Robert A. Jones
William G. Jurevic
John H. Kerstetter Jr.
William K. Kinzer
William G. Knapp
Rudolph Knaus
Robert E. Kraus
Rodney J. Koenig
Rine Kruger Jr.
Richard H. Lepley
George R. Lewis
Ting H. Ling
Frederick A. MacDougall
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Herbert C. McKee
Bryce McMullen
Aaron L. Medin
Jack R. Metcalf
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Richard N. Miller
William C. Miller*
Basil H. Minnich
Ralph I. Mitchell
John D. Mueller
Julian Newman*
Richard S. Olafson*
Chi-Ti Pan
Dean B. Plotts
Morton Pollock
Eugene C. Pontius*
Theodore A. Rado
George Rambosek
Roy E. Retzke
Samuel Riccardi
Donald R. Roberts
Aaron Rose
John P. Rosser
Glen D. Schaaf
R. Ted Scharenberg
Norbert K. Schneider*
John J. Sebnick*
Joseph C. Shaw
Edward A. Shaud
Charles R. Shepherd
John W. Shock Jr.*
Robert M. Shuster
Edwin E. Smith
Roland I. Spencer
Howard R. Steele
David F. Stewart
Ralph F. Stringle Jr.
Aaron J. Supouret
Aaron J. Supowit
John W. Thompson
Augustus R. Van Kleeck
John M. Wallin
Francis A. Warren
Edward W. Wiederhold
George H. Whipple
David L. Wiggins*
Thomas H. Wilson*
Howard G. Wittmer Jr.
Pei-Sin-Yu
Charles E. Ziants
William H. Sprout
Charles Thacker
Abdul-Rahman A. Uthman
Augustus R. Van Kleeck
Floyd A. Veley
Douglas Weir
Robert E. Weiser
James Yerina

1959
Lee W. Addie
James O. Albery
Thomas M. Bates
Cesar B. Bautista
Sanford G. Bloom
Eugene M. Bond
Charles H. Brown
Sun W. Chun
Ronald E. Davis
Thomas O. Dobbins
Charles E. Drum
Dean W. Fisher
Julius Foris Jr.
William O. Glomb Jr.*
Robert L. Halsey
Richard L. Hempt
Melvin E. Hoover
Lloyd G. Jones
Lawrence W. Jordan Jr.
Dae Sik Kim
Ronald M. Kovach
John P. Kuhn
James W. Lacksonen
James H. Laughlin
Darryl J. von Lehmen
Glenn F. Leverett
Arthur W. Liles
Roland G. Lindsey
James E. Long
David P. Macarces
Brian L. Nyquist
Chikatsu Okagawa
William S. Palmer Jr.
Edward R. Purves
Ora L. Reedy
Prabhakar K. Sanghuni
Francis E. Smith
Shashikant K. Sonawala
James L. Thompson
Foo H. Tse
William B. Van Sise
Joseph H. Weinberg
Gerald A. Wilcox

1964
Allen R. Axline
Jerry R. Barber
Gary L. Beeler
Reinhold Betschel
Wayne O. Betz
Sanford G. Bloom
John H. Buddemeyer
Sun W. Chen
Alkis Constantinides
William C. Corder
Gary L. Crook
Ralph S. Cunningham
Michael Cutlip
Michael F. Dague
Rodrigo Donodo-Hederra
Robert G. Dunn
William R. Ferris
Lewis E. Gates
Michael R. Gildorf*
Walter R. Hayhow
David E. Hazlebeck
Robert J. Heaston
Allan E. Jones
Dennis W. Kirsch
James W. Lacksonen
James C. Leslie
Dennis C. McAdams
James A. Moomaw
Jerome W. Mills
Daniel L. Pachko
Girish D. Parikh
James B. Sapp
Thomas J. Scattoloni
Douglas E. Skillcorn
Gustavo A. Tomayo
Edward A. Vajnar
William V. Whitmer
Donald J. Wilhelm
Edwin J. Wilson
Benjamin C. Yao

1969
Yong J. Ahn
Mazen E. Ballantyne
Peter N. Bartram
Scott M. Barrick
Robert A. Baxter
John H. Becher
James L. Braun
Michael J. Corman
John J. Curran
James F. Dietz
Thomas W. Doub

56
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1974
Steven H. Alkire
John J. Antolik
Peter N. Bartram
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Hernan G. Bravo
Edward D. Brooks*
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Raymond T. Collins
Kenneth R. Cox
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Linda M. Curran
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Bruce K. Dawson
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Leslie S. Fishler
James D. Fleshman
Herbert Flugin
Mark E. Forry
Timothy L. Goslin

1979
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Tom H. Asimou
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Douglas T. Brown
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James L. Buchwalter
Kevin R. Cole
Adela B. Concha
Steven M. Dreher
David W. Dunn
Fred O. Engelhardt
Alan L. Fisk Jr.
David M. Frederick
Kurt A. Goehring

1984
Siamanto Abrani
Yousef G. Aouad
Allyn W. Armstrong
David C. Arters
Mark A. Baich
Steven J. Baker
Elliott I. Beraha
Mark S. Bitto
David M. Blischak
Mark J. Burket
Jeffrey L. Burton
John G. Burnmeister
Patrick T. Canavan
Cathy M. Champagne
Scott M. Clements
Roger P. Coffman
Mark O. Dailey
Kenneth J. Danter
Teresa L. Datz
Ronald DeYoung
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Scott R. Ellis
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Terrell J. Green
Mark J. Gruber
Kristin A. Hannahs
Wendell E. Harkins
Stephen P. Hayden
Scott J. Hermann
Daniel R. Hertzler
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Keith M. Hogan
Harold L. Hon
William E. Hounshell
Tzu-Chien Hsu
S.V.S. Jagannadh
Bassam F. Jirjis
Dean Johnson
Carolyn S. Jones
Hans Jordan
Daniel V. Joyce
Paul R. Katterle
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Shubriar Khabiri
Robert G. Larsen
Shelly R. Leah
Yin-Ming Lee
Alan J. Lekan
Jer-Sheng Liou
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- James C. Allen
- Mark W. Anderson
- David C. Arters
- Yong-Kook Bae
- Craig B. Barry
- David J. Bartolec
- Daniel V. Bogoevski
- Catherine L. Bothe
- Linda J. Broadbelt
- Scott L. Buckland
- Christopher J. Caudell
- Hsuan Chang
- Aileen S. Chou
- John E. Collins
- Jennifer E. Craig
- Shashikant G. Damani
- William C. Dorman Jr.
- Stuart F. Doty
- Katerina M. Efimoff
- Lisa J. Fletcher
- Julie A. Fogarty
- Mario A. Formica
- James A. Foulk
- Brian K. Furlong
- Barton J. Giridwood
- Johanna E. Griffiths
- Keith J. Grover
- Laura A. Hause
- Eric J. Hrbac
- Chang-Hsi Hsiao
- Chih-Pen Hsu
- Sheng T. Hsu
- Koji Inokuchi
- Satyavolu Jagannadha
- Chien-Sheng Jiang
- Bruce E. Kreischer
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- Johnwei Muljono
- Abeer M. Osman
- Stephen Otero Jr.
- Stephen R. Phillips
- Michael J. Pishkula
- Robert R. Procter
- Thanuvai S. Ramesh
- Amy J. Reynolds
- Sharon A. Senger
- Richard W. Shields
- Sik K. Shum
- Brian L. Smith
- Michael J. Smith
- Gyung-Ho Song
- Minming Sungkono
- Amy K. Turner
- Jonathan M. Vinson
- Kuan J. Wang
- James R. Whiteley
- Michele R. Young

1994
- Lisa J. Apel
- Todd H. Charske
- Gwendolyn L. Cheney
- Yuen-Yuen Chiu
- John D. Clay
- Mark W. Cleary
- Trevor H. Cooke
- Denise N. Cromes
- Nilay S. Dalal
- James N. Dawson
- Matthew J. DeWitt
- Kathryn H. Ferguson
- Miguel A. Garcia-Briones
- Donna K. Gardner
- Michael R. Giffen
- Richard W. Gill
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- Lori E. Goins
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- Scott E. Johnson
- Sror Kat-Kuooy
- Donald B. Kennedy
- Paul R. Kust
- Laura E. Lander
- John M. Lenczyk
- Jason M. Long
- John T. Martin
- Mark M. Menning
- Lee R. Moore
- Richard S. Morgan
- Roger T. Morris
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- Jay M. Nardi
- Paul A. Nelson
- Rolland E. Neutzling

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Craig T. Olwert
Nirukkumar C. Patel
Michael L. Peterson
Robert L. Pfaffle
Todd E. Richmond
Joseph M. Rusack
Webster Schooley
Susan E. Schuett
Trent A. Shidaker
Cincin Siswanto
Kumar K. Sravana
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Cincinnati, OH 45241

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Development Engineering & Technical Services
Eli Lilly and Company
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Lafayette, IN 47902

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East Hanover, NJ 07936

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Photo of group of people