

CHE AT THE**UNIVERSITY OF MARYLAND**

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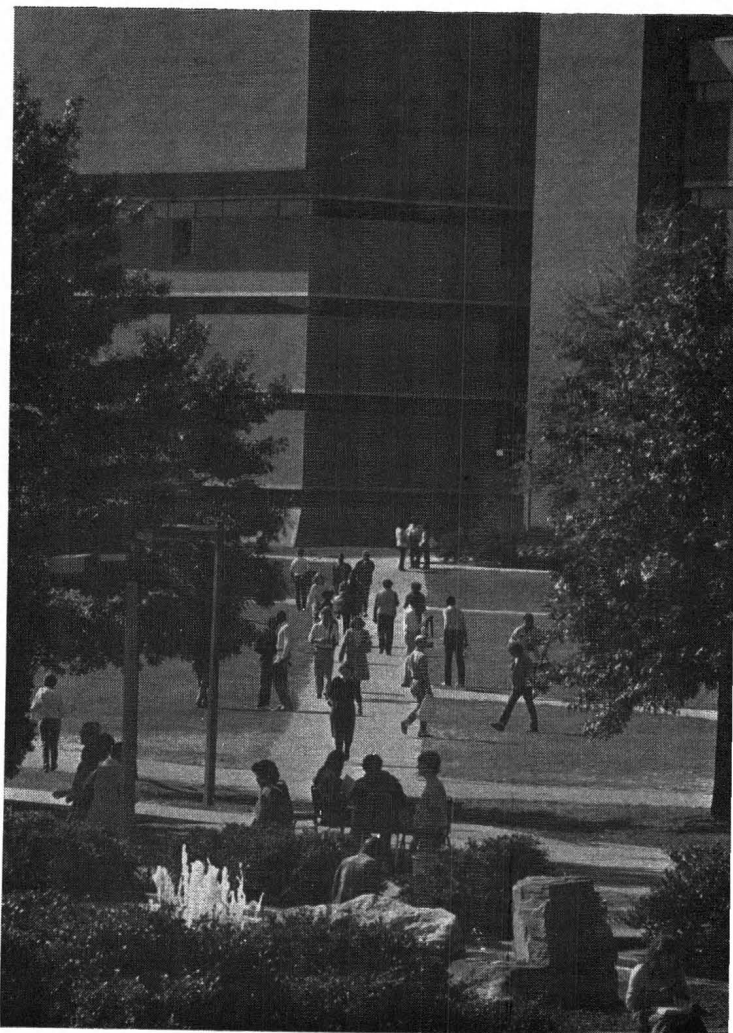
*University of Maryland
College Park, MD 20742*

ENGINEERING AT MARYLAND dates back to course instruction in surveying and construction given in 1859 within the Maryland Agricultural College. From this historical perspective, chemical engineering is a relative newcomer to Maryland. Formal degree programs in mechanical (1894), civil (1900), and electrical (1908) predate chemical engineering, as do a series of reorganizations which led to the University of Maryland system and the College of Engineering as we know them today.

Chemical engineering at the University of Maryland began in 1937 when, under founder and first chairman Wilbert J. Huff, the four year program leading to the baccalaureate degree (BS) was introduced. Graduate programs at the MS and the PhD levels were initiated in 1938 and 1939 respectively, marking the first of the graduate degree programs within the College of Engineering at the University of Maryland.

Today chemical engineering is one of eight programs within the College of Engineering and one of three programs administered through the Department of Chemical and Nuclear Engineering. Approximately 80 BS, 12 MS, and 3 PhD candidates graduate from the chemical engineering program per year at the present time.

The University of Maryland is a comprehensive public system of five campuses: The University of Maryland at Baltimore (UMAB), the University of Maryland Baltimore County (UMBC), the University of Maryland College Park (UMCP), the University of Maryland Eastern Shore (UMES) and the University of Maryland University College (UMUC). The College of Engineering is one of 16 colleges and professional schools



in the university.

Prior to 1984-'85, the degree granting activities of the college were only at the College Park campus. Effective this fall, undergraduate degree programs in chemical engineering and mechanical engineering are also offered at UMBC, and plans have been approved which permit the initiation of graduate engineering degree programs. The programs at both UMCP and UMBC are coordinated by the Dean of the College of Engineer-

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ing, George Dieter, residing at UMCP and Associate Dean Albert Gomezplata, residing at UMBC. The college offers accredited four year BS degree programs in designated fields of engineering, including chemical engineering, as well as a co-op plan of study and a BS in engineering with interdisciplinary areas of specialization.

LOCATION OF CHE AND FACILITIES

As noted above, chemical engineering is offered as an undergraduate degree program at both UMCP and UMBC. Graduate degrees are offered only at UMCP. College Park is home for the majority of the program's current faculty and activities. The campus is located in an urban setting, triangulated by Annapolis (20 miles to the east), Baltimore City (25 miles to the northeast), and the White House in Washington, D.C. (10 miles to the southwest). The chemical engineering, nuclear engineering, and engineering materials programs form the Department of Chemical and Nuclear Engineering. Collectively they occupy the chemical engineering building on the northern side of the campus adjacent to chemistry, mathematics, physics and the other departments of engineering. UMBC is located in Catonsville, just southwest of the City of Baltimore. The campus features modern architecture in a rural setting.

Research facilities at College Park feature biochemical engineering laboratories, the laboratory for aerosol mechanics, the laboratory for process analysis and simulation, polymer characterization and process laboratories and multiphase flow laboratories. The nuclear engineering program provides access to a Co-60 source, a LINAC, a 250 kilowatt pool reactor and, most recently, a 300 psig, 1/3 scale thermal-hydraulic simulation loop of a nuclear reactor system. Facilities in X-ray analysis, crystal growth and materials testing are available in the engineering materials program.

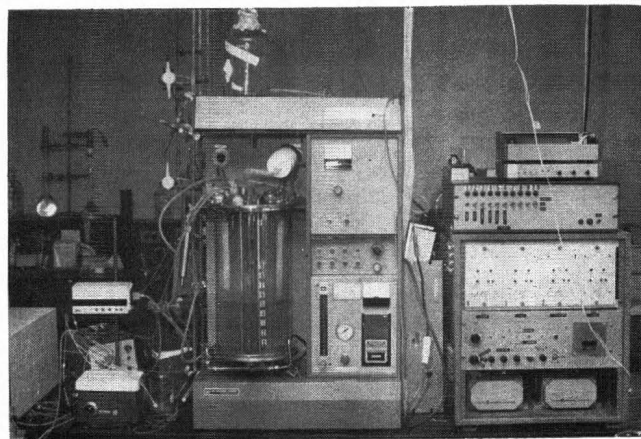
NEW ACTIVITIES AT MARYLAND

The present is a time of rapid progressive change at the University of Maryland. Under the

dynamic leadership of President John Toll and UMCP Chancellor John B. Slaughter, with Dean George Dieter at the helm for the College of Engineering, the change has been particularly significant for the college. Resources have been provided for a major enhancement of engineering at Maryland. An undergraduate enrollment limitation plan has been implemented on the College Park Campus and, as noted earlier, engineering programs have been initiated at UMBC.

One of the newest additions to the College of Engineering is the Engineering Research Center (ERC), established to promote industry-university interactions. Under Director Herb Rabin, an engineering extension service has been initiated to serve throughout the state, areas of technology have been identified for initial emphasis by the center, and plans are being drawn for an incubator program directed to the fostering of entrepreneurial activity.

The impact on chemical engineering has been quite significant. A particular emphasis has been placed on the enhancement of our biochemical engineering research program. An important as-



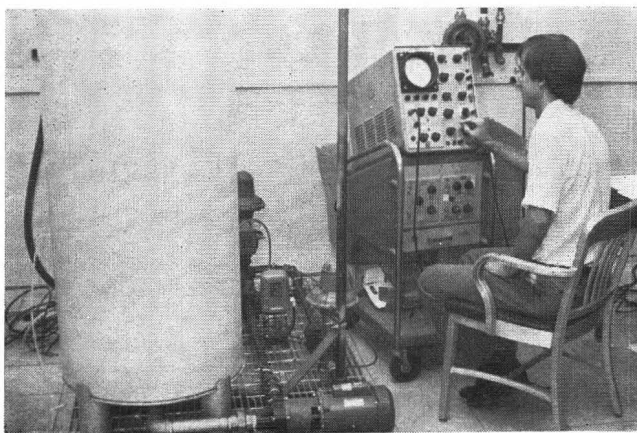
The 14 liter computer controlled fermentor in the Biochemical Engineering Laboratory.

pect of the enhancement is a co-operative undertaking with the ERC which has identified biochemical engineering as one of the areas for initial emphasis by the center. Under the auspices of the ERC, a 500 liter fermentor system together with auxiliary analysis and separations equipment has been ordered, with delivery expected in March 1985. In addition, the ERC staff position of Manager, Chemical Engineering Programs, has been established to coordinate collaborative research activities between the faculty and local

industry. As of this writing, candidates are being interviewed for this position. Initial emphasis is to be given to biochemical engineering and the closely related areas of process simulation and control research within chemical engineering.

The equipment acquisitions of the ERC in biochemical engineering are viewed as the first step in the development of a pilot plant facility for scale-up and developmental research on bioprocesses. The facility is to be located in the chemical engineering building, complementing the bench scale fermentors, analytical equipment, and PDP 11/34 data acquisition and control system presently in our biochemical engineering laboratories.

The emphasis on biochemical engineering within chemical engineering and the ERC reflects but one aspect of a university-wide emphasis on biotechnology. At the university level, Vice-Presi-



Undergraduate Steve Ahnert putting the final touches on a new liquid level module in the Undergraduate Process Control Laboratory.

dent of Academic Affairs Rita Colwell has initiated the formation of four centers emphasizing areas of biotechnology. The first is to be the Center for Advanced Research in Biotechnology (CARB), representing a collaborative effort between Montgomery County, the National Bureau of Standards and the University of Maryland. At the present time a full-time director for CARB is being recruited, and plans for a building for the activities of CARB at Shady Grove, Maryland, are being finalized.

The chemical engineering initiative at UMBC as well as the emphasis on biochemical engineering faculty additions at UMCP will increase the number of chemical engineering faculty in the Program to nearly twenty in the next several years and will provide unique opportunities for

interaction with faculty experts in the biosciences at UMBC, UMCP and UMAB. The enrollment limitation plan of the college is just beginning to alleviate a very heavy undergraduate load in chemical engineering, permitting the allocation of more faculty time and resources to the expansion of the PhD program and the research activities of the faculty. In addition to biochemical engineering, the program has particular research strengths in aerosol mechanics, process simulation and control, multiphase flow, and polymers. Within the department, polymers has been identified as a primary area for development in the Engineering Materials Program, directed by John D. Hoffman. Adding to an already strong metallurgy program under Richard J. Arsenault, the emphasis on polymers will provide opportunities for collaboration with the chemical engineering faculty working in the area. Overall, chemical engineering at the University of Maryland is very much alive and looking towards the future.

CURRENT PROGRAM FACULTY

Chemical engineering faculty at the University of Maryland currently number thirteen, with eleven having primary duties at UMCP and two at UMBC. Currently the program has two open faculty positions at College Park and plans to add three or four additional faculty at UMBC over the next two years.

An ever-present pipe and a collection of owl figurines are sufficient clues to identify **Robert B. Beckmann** (Wisconsin, 1944). On the off chance that one of the clues is missed, identity is insured if a bow string tie, immaculate doodling, a print-perfect style of written communication, or amusing tales of horror from the senior design course are detected. Bob served as chairman of the department in the early '60's, building the graduate program before moving on to a tour of duty as dean of the college. Well known for his work on behalf of accreditation across the country, Bob provides the capstone on the design requirement of the curriculum while annually adding to his repertoire of anecdotes.

Theodore W. Cadman (Carnegie-Mellon, 1966) serves as the department chairman and strives to maintain his sanity with an active research program involving process control innovations and applications to fermentation operations and modern process simulation techniques. He is also an avid microcomputer enthusiast with a particular zeal for incorporating their use throughout

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the chemical engineering curriculum. To relieve the stress and tensions of departmental administration, Ted is an intrepid gardener, within certain constraints (anything planted has to be hardy, perennial, and serve to minimize or lessen lawn mowing), an inveterate do-it-yourselfer home remodeler and, in case of severe frustrations, he lays concrete block at his Chesapeake Bay retreat.

Richard V. Calabrese (Massachusetts, 1976) has research interests in two primary areas: turbulent two phase flow and the transport and transformation of atmospheric pollutants. Turbulent circulation patterns and drop/bubble breakup correlations abound in his studies in the former area. In the latter, Rich has been wide-ranging. The prediction of polycyclic aromatic hydrocarbon (PAH's) concentrations as a result of residential wood burning is a current project. As is the consequence analysis of nuclear reactor accidents, a segment of an Information System Study being completed by the Nuclear Engineering Program and the University Research Foundation at Maryland.

With less than a year in the Program, **Kyu-Yong Choi** (Wisconsin-Madison, 1983) is still setting his feet at Maryland. A product of Wisconsin at Madison, studying under Dr. Harmon Ray, Kyu-Yong has selected polymerization reaction engineering, with an emphasis on control, as his primary research activity. Lately, he has been particularly busy initiating his experimental program.

Stowe Davison (Maryland, 1984) is the newest member of the faculty and the first to be hired for the degree program at UMBC. A graduate of Maryland, Stowe completed his doctorate under James Gentry. He is an expert in computer applications and has selected the theoretical and experimental study of aerosol charging to begin his academic research career. In addition to being a gifted teacher, Stowe is quite at home in the laboratory and lately has been putting his practical skills to the real test by virtually rebuilding his home in College Park.

Interested in a new process? See **Larry L. Gasner** (M.I.T., 1971). Larry has a practical engineering bent which stands him well in all of his activities. With primary interests in the development and scale-up of bioprocesses, Larry is

anxiously awaiting the arrival of the 500 liter fermentor system. Well, perhaps just a little less anxiously than implied, since Larry is looking forward to spending time in Germany with the vendor, finalizing the plans for the system and reviewing the construction progress.

James W. Gentry (Texas-Austin, 1969) brings his scientific and mathematical skills to bear on the study of aerosols. A prolific publisher of research findings on the behavior of non-spherical and ultrafine aerosols, Jim has an extensive collection of books and classical records including the collected works of 19th century mathematicians, bound sets of Texas Football, and the collected works of J. S. Bach.

Albert Gomezplata (Rensselaer, 1959) serves as Associate Dean of Engineering with responsibility for the activities at UMBC. As a member of the chemical engineering faculty since 1958 and a former chairman of the department, Al is well equipped to initiate the programs at Catonsville and to foster the development of chemical engineering at the Baltimore County campus. On a time available basis, Al crosses the street to his sailboat on the waters in Annapolis and is an avid do-it-yourselfer when it comes to keeping his automobile(s) running.

Juan Hong's (Purdue, 1979) forte is biochemical engineering with a particular focus on biomass and product formation and separation processes. An avid experimentalist, Juan is equally skilled in analysis and modeling techniques and, as many a graduate student will attest, presents a mean course in thermodynamics.

Although categorized under the nuclear engineering faculty in the listings of the Department, **Yih-Yun Hsu's** (Illinois, 1958) chemical engineering background and expertise in heat transfer and two-phase flow make him a valuable contributor to the program's activities. YY, as he is known, particularly enjoys teaching heat transfer to the Junior chemical engineers.

Mention interaction analysis and one is assured of attracting the attention of **Thomas J. McAvoy** (Princeton, 1964). Together with strategies for distillation column control and short-cut modeling techniques, Tom brings a practical, enthusiastic bent to process dynamics and control. In the ap-

appropriate season, bluefish on the Chesapeake Bay and ice hockey are known to be competitors. Tom is director for the Center for Process Analysis, Control and Simulation, promoting interaction with industry in practical applications of control. Among the center's activities are a biennial short course, "Applications of Advanced Control in the Chemical Process Industries," and a series of videotapes featuring international experts on dynamics and control. In addition to his research activities, Tom has modernized the undergraduate process control laboratory using modular experimental units featuring a liquid level system interfaced to an APPLE microcomputer data acquisition and control system.

Gregarious **Thomas M. Regan** (Tulane, 1967) serves as the undergraduate advisor for the chemical engineering program. In addition to being a mainstay in undergraduate course instruction, including unit operations laboratory, Tom has culinary skills which rate par excellence.

Wilburn C. Schroeder's (Michigan, 1933) part time professorial position in chemical engineering dates back to 1953. It has always been part time and Will is always in every weekday, breaking precisely at 11:30 AM for lunch with several of the faculty at a local restaurant. Lunch is well worth the while to hear of his trips to Indonesia to build ammonia plants, tales of his tour of Germany immediately after World War II while at the Bureau of Mines, or for a discussion of the latest coal conversion technology—including the Schroeder Process—or national politics and the state of the market on the hour. Will's personality and expertise in energy, coal technology, and economics are particularly appreciated by the seniors in his classes who are given a view of chemical engineering that is not reflected in any text.

One of the quietest members of the Program is **Theodore G. Smith** (Washington University, 1960). Ted's research interests are focused on the study of polymer blends and the properties of polymers, particularly mass transfer. This fall he has also undertaken the particularly challenging and interesting task of using microcomputers in the introductory sophomore class. With funds provided by the university and the college, 24 Zenith 150 microcomputers have been purchased for the undergraduate program. Microcomputers were also purchased for use in the introductory freshmen courses taught within mechanical engineering, so Ted should find his task somewhat easier the second time around.

ADDITIONAL FACULTY

Nuclear Engineering Program: Kazys K. Almenas (Warsaw, 1968); Dick Duffey (Maryland, 1956); Mohammed Modarres (M.I.T., 1979); Frank J. Munno (Florida, 1964); Gary A. Pertmer (Missouri-Columbia, 1978); Marvin L. Roush (Maryland, 1964); Joseph Silverman (Columbia, 1951).

Engineering Materials Program: Richard J. Arsenault (Northwestern, 1962); John D. Hoffman (Princeton, 1949); Marc L. Mansfield (Dartmouth, 1981).

ACKNOWLEDGMENTS

The review by Thomas M. Regan is greatly appreciated.

ChE book reviews

INTRODUCTION TO PROCESS ECONOMICS, 2nd Edition

*By F. A. Holland, F. A. Watson and J. K. Wilkinson
John Wiley & Sons, 1983, xv: + 346 pages. \$21.95.*

**Reviewed by V. W. Uhl
University of Virginia**

The scope of this book exceeds the title term "process economics" as generally understood. The latter half of the book treats topics which deal with management techniques and business considerations. Overall, the level and content put the work in the double category of an undergraduate text and an introduction for engineers in industry to economic evaluation and management topics. The book will first be generally characterized. After the contents are delineated, there is a detailed commentary and then a thumbnail appraisal.

The treatment, although orderly, is uneven with respect to writing quality, intensity of the text, and the mode of demonstrating concepts and techniques. Some handling is inadequate while other material appears extraneous. The wide disparity in the quality of the style—stodgy in the beginning, felicitous later—suggests that each author may have written different sections, and they did not collaborate on editing. Some concepts are artfully and thoroughly developed; then essentials such as assets and depreciation are improperly presented and clumsily explained. In the last half some listed topics, such as cost benefit