Journal of Tau Alpha Pi

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Journal of Tau Alpha Pi

Executive Director/Secretary
Editor Frederick J. Berger

Tau Alpha Pi Journal is the official publication of Tau Alpha Pi, National Honor Society of Engineering Technologies. Write Professor Frederick J. Berger (Executive Director), Editor, P.O. Box 266, Riverdale, New York 10471. The opinions expressed are those of contributors and do not necessarily reflect those of the editorial staff of Tau Alpha Pi.

STATEMENT FROM THE EXECUTIVE DIRECTOR-SECRETARY

Each year **I** take pride in editing the Tau Alpha Pi Journal. Since Tau Alpha Pi chapters are autonomous, the

For the Journal to communicate thoroughly, news and articles for publication should reach me no later than July 1. Each chapter should forward news of activities, planned projects, dates of events, and names of officers. Requests for certificates, keys, and organizational information should be forwarded in advance so that I may have two weeks to prepare and mail materials. All correspondence should be sent to me at P.O. Box 266, Riverdale, New York 10471. I may be reached by phone at (212) 884-4162.

Tau Alpha Pi, as most of us know, is the national honor society for the engineering technologies. It is to the engineering technologies what Phi Beta Kappa is to the liberal arts and what Tau Beta Pi is to engineering science. It is, I emphasize, an honor society, not a club, extending recognition to the highest 4% of the total engineering-technology enrollment. It differs from the other two national honor societies in that it includes both associate and baccalaureate students and in the fact that it is not centralized. It shares with them the objective to inspire, as well as recognize, excellence in scholarship, character, and leadership traits. Colleges and universities are asked to be sure that Tau Alpha Pi is appropriately listed in their catalogues.

In order to inspire students to achieve excellence, Tau Alpha Pi must be made visible. That is why we have encouraged the casting of the large replica of the key, the mounting of the emblem as a plaque, the maintaining of bulletin boards and display cases that publicize Tau Alpha Pi activities, and the wearing of the key and pendant. I should at this time remind chapters that the design of the key and emblem must be duplicated with uniform precision. Tau Alpha Pi does not permit variations in pattern. I ask all chapters planning the construction of a plaque or enlarged key please to check with me before incurring expenditure of time and funds. Please send me specifications (prints, pictures) prior to casting and also installation plans and inscription. These plans require my approval so that we prevent erroneous replicas. I hope soon to have a pattern which will be available for use by **our chapters.**

The number of Tau Alpha Pi chapters continues to increase. During the 1985- 1986 academic year, six chapters were chartered: Beta Pi (State University of New York at Binghamton), Beta Omicron (Westchester Community College), Gamma Eta (University of Akron), Mu Gamma (Spartanburg Technical College), Omicron Zeta (County College of Morris, New Jersey), and Alpha

Maine (University of Maine at Orono). I extend a warm welcome to these chapters, and I thank them for inviting me to their chartering ceremonies. In one instance I regretfully could not be present. I want to thank Dr. James A. Chisman of Mu Beta for ably representing me at the chartering of Mu Gamma. At this point, I again remind newly established chapters (and those long established) to identify alumni members, maintain updated rosters, and keep an active alumni membership. It seems to me that in too many chapters alumni are relegated to forgotten files.

During a year changes occur among faculty advisers. To those who have served with dedication and left their positions, I express my appreciation: Professor John Hennings (Beta Gamma), Dr. Lillian Gottesman (Beta Delta), Dr. George DeSain (Beta XI), Professor Carol F. Liebman (Delta Gamma), Professor Richard A. Bain and Dr. Leslie Thede (Epsilon Alpha), Professor M.E. Mauer (Zeta Epsilon), Professor Lee Sweinberg (Iota Beta, WilkesBarre Campus), Dr. John Tridico (Kappa Alpha), Dr. Ralph L. Boyers (Lambda Gamma), Professor Ralph H. Preiser (Nu Epsilon), Professor F.W. Emshousen (Pi Alpha), Dr. Roland S. Strawn and Dr. Tom Kanneman (Upsilon Beta), Professor Joseph O'Connell (Upsilon Delta), and Professor Frank M. Rafchiek (Alpha Washington).

To those who have accepted the position of faculty adviser, I offer greetings and thanks: Professor Frank Scalzo (Beta Gamma); Dr. Louis De Acetis (Beta Delta); Professor Alan C. Dixon (Beta Theta); Professors Ernest A. Jeorg, Kevin B. Slavin, Emilio Escaladas, Jerome Mouldovan, John Olenik (Beta Omicron); Dr. Andre J. Lavin and Professors Richard Culver, Frank M. Cardullo, Chittaranjan Sahay (Beta Pi); Professors Janet B. Van Doren, Minnie C. Pritchard, David J. Robinson (Gamma Eta); Professor Nonna Kliss Lehmkuhl (Delta Beta); Provost Paul L. Ryan (Delta Epsilon); Professors Robert J. Buczynski and Thomas H.

Delta (Iota Beta, Wilkes-Barre Campus); Drs. Earl E. Gottsman and Arjun B. Markhijani (Kappa Alpha); Professor William T. Divver and Dr. Steven W. Faulkner (Mu Gamma); Professors Joseph E. Vallely, William E. Barnes, Ronald J. Cieplik, Stephen G. Fogle, Xavier F. Gonzales (Omicron Zeta); Professor Robert English (Pi Alpha); Professor Robert Anderson (Pi Delta); Professor Martin Helperin (Upsilon Delta); Professor Allan Fillip (Chi Beta); Professor Barbara Powell (Omega Alpha); Professor Lawrence E. Rafter (Omega Beta); Professor William Dawes (Alpha Kansas); Professor Henry B. Metcalf, John J. McDonough, Howard M. Gray, Keith E. Hamilton, Russell Z. Johnston, Jr. (Alpha Maine); Professor Bob Phinney (Alpha Washington).

To those faculty advisers who continue to serve I express my gratitude.

In the course of a year, also, I have the opportunity and pleasure to bestowe the most distinguished meritorious award on individuals who have contributed significantly to Tau Alpha Pi. I granted three such meritorious certificates and

engraved pendants to the following recipients: to Dr. Lillian Gottesman (Beta Delta) on April 10, 1986, for dedicated service as faculty adviser over many years and for her contribution to the Tau Alpha P1 Journal to Dr. David R. Reyes-Guerra, Executive Director, ABET (Accreditation Board for Engineering and Technology), on June 24, 1986, for his dedication to the upgrading of the engineering-technologies programs to ensure quality education for the engineering-technology students; to Dr. John J. Tridico (Kappa Alpha) on February 12, 1986, for his devoted service as faculty adviser for thirteen years and for having sponsored the Kappa Alpha chapter.

Recently, on June 21, 1986, your executive director was honored by Capitol Tech (Laurel, Maryland). I was awarded an honorary D. Sc. degree in recognition of my scholarly and professional achievements and my service to the engineering-technology profession and Tau Alpha Pi. On this same date, the honorary D. Sc. was awarded to Dr. Burton I. Edelson, associate administrator of NASA (National Aeronautics and Space Administration), for his significant contributions to space science. Dr. Edelson's address given at the Capitol Tech commencement exercises is included in this Journal, as is my acceptance speech.

Left to right: President G. Wiliam Troxler, John G. Puente (Chairman, Trustees), Frederick J. Berger, and Burton I. Edelson.

As I sat **at the graduation** exercises of **Capitol Tech, I pondered again,** as **I had** done many times before, over the reference to graduation as a commencement. The word commencement,as we know, means a beginning. The graduate begins a new phase of his career and professional pursuits, having been

encouraged by his attainment of a college degree and the recognition extended **to him. The** diploma gives him entrance into the career of his choice and **advanced** study **or training. It enables him to move forward.**

It occurred to me that membership in Tau Alpha Pi bears striking similarity to the symbolism of commencement. It recognizes past achievement and awards recognition. And it is a beginning of ongoing and renewed striving to achieve scholastically and professionally. This motif of ceaseless striving is contained in the candle-lighting, which is an integral part of the initiation ceremony, and also in the key.

There is no doubt that candle-lighting has symbolic connotation. In these days of electricity we do not need candles for either light or warmth. The candles symbolize light – the light of learning as against the darkness of ignorance – and enlightenment of wisdom. The lit candle passes on to members the awesome responsibility of leadership that commands them to go forward, casting a ray of light in what can be a world darkened by despair.

The initiate goes forward, then, as does the graduate, striving to better himself and his world. The initiate carries, also, the Tau Alpha Pi key. I pondered, too, as to why this bronze casting of an insignia is called a key. Again, the key is symbolic. It suggests an object that unlocks doors – the doors to learning, to uncovering knowledge as yet unknown,to space exploration, to advanced technology, to cures for illnesses and,hopefully, to a peaceful world.

Frederick J. Berger
Executive Director-Secretary
Tau Alpha Pi

1986

ENGINEERING TECHNOLOGY ACCREDITATION: WHY AND HOW

The interest of the Accreditation Board for Engineering and Technology (ABET) and its predecessor organization, the Engineers' Council for Professional Development (ECPD), in engineering technology goes back almost to ABET's origin as an accrediting agency. ECPD was established in 1932 under the joint sponsorship of seven engineering societies, and conducted its first round of accreditation actions from 1935 to 1937. Within two years the issue of accrediting programs "of the technical institute type" was being raised. The advent of World War II brought most accrediting activity to a standstill and thereby delayed the initiation of engineering-technology accreditation. Once begun, its growth was rapid and continuous, and its effect on the development of engineering technology education has been dramatic. This paper will trace where engineering technology accreditation has been, where it is now, and where it is likely to lead in the future.

The 1939 report of the ECPD Committee on Engineering Schools, while taking the position that accreditation of technical institutes was not an appropriate function for itself, recognized that "these institutes are important in our educational system and that the accrediting of them would be desirable, but should be done by representatives of the technical institute group." This was sufficient encouragement. President Park R. Kolbe of Drexel Institute promptly called a meeting of technical institute officials and submitted a petition to ECPD requesting "a study of the possibility of some form of accrediting" for those institutions. ECPD responded by forming a committee. The committee reported that "certification of technical institutes should be encouraged by all concerned but that any such program should be conducted by the technical institutes themselves."

of the University of California, and Dean Holbrook of the University of Pittsburgh became chairman.

In 1943 the committee resumed its deliberations under the chairmanship of Dr. Hammond of what was then Pennsylvania State College. By 1944 the committee had developed a tentative set of qualifications, prepared an inclusive report, and submitted a formal recommendation that ECPD undertake the accrediting of technical institute programs. Before the end of the year all ECPD societies had approved, and a new subcommittee was appointed to develop criteria and procedures.

These backgrounds and interests were clearly reflected in the initial objectives and procedures developed, approved, and placed into effect when

accrediting activities were resumed by ECPD in 1945. "Each program or curriculum will be recognized in terms of its own purposes, scope duration, and content." Programs had to be technological in content and at least one year (full time) in duration. The records of graduates in industry were a factor, and accreditation would be granted for three or five years. The country was divided into eight regions, each with a list of approved evaluators, and the first visits were conducted.

The programs accredited between 1946 and 1957 were characterized by wide variability in type, duration, nomenclature, content, and graduation credentials. Accordingly, the ECPD listings were very detailed, as indicated above. In fact, the Subcommittee on Technical Institutes felt that it had neither the authority nor the expertise to establish curricular criteria since there was no organized body comparable to the major engineering societies that represented the technical institute community. However, the need for refinement in the objectives and procedures became apparent as ECPD gained experience and its workload grew.

Two significant actions took place in 1947. Although many programs titled "engineering" continued to receive accreditation, a policy was adopted denying accreditation to "any curriculum for which the claim is made that it produces qualified engineers," and the annual program listings from 1948 on included a prominent statement that all programs, regardless of their title, were accredited as of "technical institute type." The Subcommittee also voted that it was not its province "to pass upon curricula that lead to baccalaureate degrees," a policy that would hold good for almost 20 years.

During the same period a number of changes marked the rapid development of technical education under the stimulus of accreditation. In 1948, the word "technician" first appeared in the titles of programs accredited at Milwaukee School of Engineering, and "technology" in one at R.C.A. Institutes. Associate degrees first appeared in 1951 at the University of Houston and Rochester Institute of Technology. (A year earlier a Purdue program leading to the Associate Technical Aide diploma had been recognized.) By 1955 a movement was underway within the Subcommittee to bring the accreditation standards into line with the advances in technician education, sparked by an Engineers Joint Council conference on engineering technology and the call for a major study under the auspices of ASEE. This resulted in 1958 in the requirement that programs be at least two years in duration and include the word "technology" as the final noun in their titles in order to be considered for accreditation. In 1959 a new, simpler format for listing programs went into effect along with the policy that day, evening, and co-op programs and geographically separated units of institutions be evaluated for accreditation separately.

Between 1956 and 1963 the much-talked-about ASEE study finally took place under a Carnegie Corporation grant and was published in the report

Characteristics of Excellence in Engineering Technology Education. In the interim the Subcommittee granted its first extension of accreditation on the basis of progress reports (1961) and was allowed to cease accrediting correspondence programs (1962), a change it had sought since *1955!* Also in 1962 the subcommittee organization was changed to parallel that of its parent ECPD Committee on Education. These changes were made in anticipation of the ASEE Characteristics of Excellence report, which ECPD felt would finally provide an authoritative basis for establishing firth curricular criteria.

The publication and acceptance of the ASEE report in 1963 led immediately to a major revision of the criteria. For the first time, quantitative curricular requirements were established: one-half year of basic science and mathematics including principles of calculus, one-fourth year of non-technical courses including written and oral communications,

Education and Accreditation (EE&A) and Engineering Technology (ET) Committees. In 1964 ECPD formally requested recognition from the National Commission on Accreditation (NCA – now the Council on Postsecondary Accreditation) as the sole accrediting agency for engineering technology. Engineering Technology had finally come of age within the engineering community and ECPD.

More changes followed in rapid order. Under pressure from NCA, the ET Committee in 1965 changed its policy to require that institutions be regionally accredited except for specialized schools that were then ineligible for such accreditation, and started to develop the "due process" procedure of allowing institutions to review and respond to a preliminary visitation report. At the request of the U.S. Office of Education the Committee established "candidate for accreditation" status to allow the release of government funds to recognized institutions. (In 1967 a second category of early recognition was established: "reasonable assurance" for programs in the planning stage, reserving "candidate for accreditation" status for programs underway but lacking graduates. The two categories were combined in 1978 and dropped in 1981 when their usefulness had ended.)

Also in 1965 the Committee initiated a study of four-year technology programs, 60 of which were reported to be already in existence, under Dean Hugh McCallick of the University of Houston. A year later an ECPD committee headed by M.R. "Pete" Lohmann recommended, and the Board of Directors authorized, the accreditation of bachelor's degree programs that met the existing criteria for two-year programs. In 1967 the first two four-year programs were accredited, and ECPD formally recommended the use of the terms "engineering technician" and "engineering technologist" to distinguish the graduates of the two kinds of programs.
In 1968 the "due process" procedure was put into effect (it was not implemented

for engineering programs until 1974) and ABET finally received NCA's recognition for engineering technology accreditation at the associate-degree level. At the same time the ET Committee began to develop differential criteria for baccalaureate programs. In 1970 the McCallick report was updated and an interim set of criteria was adopted, prescribing 3/4 year (22 semester hours) of mathematics and science, 1½ years (48 semester hours) of technical subjects, and 3/4 year of communications, humanities, and social sciences. (Overall minimums of 60 credit hours for the associate degree and 120 for the bachelor's degree were not adopted until 1973; individual curricular components remained expressed as fractions of a year until 1979.) In 1972 a subcommittee under W.D. Purvine completely revised the criteria on the basis of the ASEE study; at this time the full committee voted not to adopt special criteria for co-op programs. The new criteria were published in 1973, along with supplemental criteria for the new area of Computer Technology. That same year NCA extended its recognition of ECPD to the four-year engineering technology level, and the accreditation of bachelor's degrees in engineering technology was finally on a formal basis.

The current era in the history of engineering-technology accreditation had its beginnings in 1978 when President Paul Alimendinger appointed a special task force to overhaul the organization and committee structure of ECPD. The major engineering societies were in the process of reorganizing Engineers Joint Council into the Association of American Engineering Societies (AAES).

Some misunderstanding has arisen because of the coincident nature of the above developments. In relation to AAES, ECPD preserved its complete independence, which was essential to maintain its integrity as an accrediting agency, but agreed to transfer its other professional development functions to appropriate Councils of AAES in the interest of promoting engineering unity. In recognition of its central purpose, ECPD changed its name to the Accreditation Board for Engineering and Technology (ABET) as of January 1, 1980. The internal reorganization of ECPD/ABET was entirely separate and would have taken place regardless of the external changes.

The major step was to rename the former Engineering Education and Accreditation Committee and Engineering Technology Committee as the Engineering and Technology Accreditation Commissions and to give them full authority for all accreditation actions (which until then had to be taken by the ECPD Board of Directors) except appeals.

were raised to 64 for the associate degree and 124 for the baccalaureate, and the individual categories were strengthened accordingly. Numerous other refinements or clarifications of criteria provisions have been made or are in process. Under current ABET policy, substantive changes have

to be published for comment before being placed in effect. Also effective this year is a change in the standard periods of accreditation from two, four, or six years to three or six years, except for programs on "show cause," which will remain at two years.

The basic method of evaluating programs for accreditation has not changed since its inception. Essentially, it starts with an institution's request in January to have a program or programs evaluated, since accreditation is voluntary on the part of the school. The ABET office sends the school a set of material including the criteria in effect for that year. The institution fills out a detailed self-study questionnaire and prepares for the evaluation by collecting the curricular material, examples of student work, and other information prescribed by the ABET criteria.

During the summer, the TAC (Technology Accreditation Commission) assigns one of its members to head a team to visit the institution. The team chairperson selects an e'valuator for each program from a list of individuals provided by the cognizant Participating Body (enginering society) of ABET, clears these with the school to be visited to assure that no perception of conflict of interest exists, sets up a date for the visit, and distributes sets of forms and instructions to the members of the team. The school sends each team member a copy of the self-study questionnaire at least 30 days before the visit date.

The team assembles at the location of the school the evening before the visit, and the chairperson briefs the evaluators on their duties for the next two days. These are devoted to a concentrated evaluation of the qualitative factors set forth in the criteria for accreditation as well as verification of the quantitative or factual information provided by the institution in the self-study questionnaire. Most of the administrators and faculty members plus a representative group of students are interviewed, and the team assembles several times to report progress, compare notes, and complete paper work. This usually goes on until late in the evening of the first day. On the afternoon of the second day the team meets with the top administrators of the institution for an "exit interview" at which the team's findings and impressions are summarized in an informal and unofficial manner, without disclosing its recommendations for or against accreditation.

Immediately following the visit the team chairperson assembles the program evaluators' reports and writes a Preliminary Visitation Report. This is edited by a senior officer of TAC, then by the TAC chairperson, and typed by the ABET staff. The smooth report, still in draft form, goes to the school for its review and comment in what is called the "due process" procedure. The school has 30 days to point out any errors, misimpressions, or factual information bearing on the matters discussed in the report. Its response is reviewed by the same persons who handled the original draft and is corrected or updated as necessary.

When all reports for a given year have been processed, the ABET staff has them assembled and duplicated in "blue books" for review by the full TAC at its annual meeting in July. There each team chairperson summarizes the team's findings and moves the recommended accreditation action. This is discussed by those present, often debated in considerable detail, and finally voted upon. As soon as possible after the conclusion of the meeting, the institution is notified of the TAC's action by a letter from the President of ABET accompanied by a Final Visitation Report.

The TAC is authorized to accredit programs for periods up to six years. Shorter terms (normally two or three years) are granted when there is question as to the future accreditability of a program. If it appears that a program has fallen below some requirements of the ABET criteria, the action is to "show cause" within two years why accreditation should not be terminated. In the great majority of cases, the institution brings the program into compliance within that time.

accomplished by a "progress report" from the institution confirming that action has been taken in the areas previously cited by the TAC. Other kinds of questions can only be resolved by a revisit. In order to adhere to the ABET policy that all programs and their supporting elements be reviewed comprehensively at least every six years, the term of accreditation is frequently limited for that reason alone.

The large decrease in the percentage of six-year accreditations in 1984 and 1985 is attributed largely to the general problems of faculty overload, deteriorating laboratories,and inadequate funding commonly referred to as the "crisis in engineering education." These problems have tended to make the future of many programs look precarious, thus warranting more frequent surveillance by the TAC. To some extent they are also reflected in higher incidences of "show cause" actions. The great majority of "not to accredit" actions involve programs submitted for initial evaluation, frequently as the institution's first approach to TAC/ABET accreditation.

From all indications, the workload of the Technology Accreditation Commission will continue to grow as new institutions apply for initial accreditation and established institutions present new programs. Several statewide systems are known to be promoting TAC/ABET accreditation among the institutions within their jurisdiction. Throughout the country new programs are being developed in areas related to manufacturing and in computer-aided drafting and design. Based on the number of inquiries by ABET, the number of accredited programs should increase annually for the foreseeable future, with perhaps greater growth in the baccalaureate than the associate-degree
area.

There would appear to be great potential for growth in many specialties where the number of currently accredited programs is small. However, ABET's long-term experience would indicate that the three areas of electrical/electronic, mechanical, and civil engineering technology will continue to overshadow all other fields. This implies that industry prefers to employ technicians and technologists with sound basic education, leaving much specialization to take place on the job.

I believe criteria changes for the next few years will be aimed mainly at clarifying and consolidating the major new provisions that were introduced between 1983 and 1985, most prominently the adoption of program criteria and the general increase in credit hour minimums. Adjustments in these areas will have to be made as the Commission and schools gain experience. Areas where some further tightening of the criteria can be anticipated include faculty qualifications, the control of transfer credit, limitations on credit for work experience and other nontraditional modes of learning, and the general area of institutional support. The traditional emphasis on practical applications, hands-on laboratory experience, industrial advisory committees, and feedback from employers and graduates will not diminish.

In terms of curricular content, it is my personal opinion that there isn't much room for further upgrading of the criteria short of impinging upon the present ABET requirements for engineering programs. There are signs that the engineering community may be ready for serious consideration of a five-year or even six-year master's degree as the appropriate educational preparation for advanced engineering practice. At the same time, industry's technical manpower needs should continue to be stronger at the two-and four-year levels. This leads me to speculate that, with a little more enrichment, the bachelor of engineering technology curriculum could become the primary source of the kind of graduates needed to fill many of the jobs now being done by engineers – those not involving higher mathematics, advanced science, or conceptual system design. Industry has already demonstrated its acceptance of this concept in its hiring and utilization of graduates from both types of four-year programs.

In order for such a transition to take place, I believe it will be necessary that the bachelor's degree graduate in either engineering or engineering technology not be viewed as a second-class citizen or subprofessional. Accreditation, state registration, and professional recognition will have to operate at dual levels, recognizing both the bachelor's and master's degrees as valid level of preparation for entry into the broadly-defined engineering profession. It is my personal hope that the engineering community will prove ready to recognize both the practical engineering technologist and the master engineer as interdependent and mutually supportive members of a single profession.

John D. Alden
Accreditation Director

THREE DIMENSIONAL QUALITY

THE FACTORY OF THE FUTURE?

Introduction

Over the past 100 years the process of developing the quality of manufactured products has evolved parallel to the manufacturing industry. Quality, once the sole concern of the self-employed craftsman who designed, manufactured, and marketed his own product has expanded with the complexity of the factories which now employ departments of personnel. Where "fitness for use" was once the primary criterion for rejection by the craftsman, conformance to a multitude of specifications which may or may not be fit for customer use is now the order of the day.

Traditionally the Quality Control (QC) function has consisted of manual inspection methods and statistical sampling procedures. Manual inspection is generally a time-consuming procedure, a percentage of which results in misreadings and unreliable data collection. Much of the routine inspection can also result in delayed production schedules and bottlenecks in the manufacturing process. At the same time the use of statistical sampling acknowledges the probability that some defective parts will, in fact, slip through. Even so, the QC inspection process typically occurs after the fact which means that even if a lot is rejected, the defective parts must be reworked or scrapped.

In addition to those problem factors which conventional quality methods encounter on a production basis, there are also economic, social, and technological factors to consider. Economically the high cost of the inspection process as it is currently done adds to costly delay in production. Increasing demand by customers for near perfection in quality of manufactured items, the growing number of expensive product-liability legal cases, and government regulations requiring firms to maintain extensive production and quality records are all social factors affecting the quality function (Groover, 1984). Finally, the ultimate shortcoming of traditional quality methods is observed in its increasing inability to keep pace with the extensive application of computerized technology to manufacturing processes.

In an age of ripening factory integration and computer-aided everything, quality must be recognized as an integral part of manufacturing and the foundation of all design. As the factory of the future is fast becoming a reality, quality has the potential of being monitored and controlled far beyond the present scope of manual techniques.

Three Dimensional Quality

Though the quality function has historically expanded to keep pace with manufacturing, one can hardly deny the challenges current technologies present. With the tremendous advancements in industrial applications of

microprocessors, manual inspection methods are hardly capable of tracking quality before the product is out the door. The days of monitoring quality as an after the fact function are numbered since today's computer integrated factories have gone beyond the realm of rework. The "factory of the future" is rapidly becoming reality. It's introducing automated processes whereby production will not only be faster, but also more precise and more flexible, while producing better quality products. Along with CAD, CAM, and CAE, it is no surprise that the quality function has adapted to the computer-aided industry in the form of CAQC or Computer Aided Quality Control.

Computer Aided Quality Assurance Systems (CAQAS)

Just as manufacturing has an associated vocabulary of acronyms for its operation (CAPP, FMS, MRP, etc.), CAQAS has its supporting abbreviations as well. With CAQAS used for the all encompassing quality assurance

Within CAQC there are the subsets of CAl (Computer Aided Inspection) and CAT (Computer Aided Testing). All are computerized extensions of their conventional counterparts. For example, testing is generally applied to determining the functional performance of a final product. This may be done on an automated basis through the application of the computer. Manual testing consists of a sampling based upon destructive and/or non-destructive testing of units. There is now the capacity directly to interface automated test cells with the production assembly line. During operation, a product is transferred by the handling system to a series of testing stations before final packing. Computer monitoring of the testing automatically analyzes the data, passes or fails the product, diagnoses any problems encountered in the product, and either passes it to shipping or rejects the product and transfers it to an appropriate station for further processing. Advantages of such computer aided cells include higher inspection rates, greater consistency, and less floor space (Groover,1984).

Similarly, CAl involves automation of inspection methods conventionally performed by QC inspectors at various points in the production process. Technology applied to this area can achieve high degrees of complexity as contact and non-contact methods of inspection are employed. Robotics, probes, coordinate measuring machines (CMM), machine vision, scanning laser beams, and photogrammetry are just a few approaches to CAT methods. Advantages of CAl include increased speeds of inspection often allowing for 100% inspection, consistency in the inspection process, reduction in production delays due to inspection, and reduced potential danger to both product and personnel.

Along with CAQC, another essential ingredient in any CAQAS is QIS or Quality Information System. QIS is implemented as an integral part of the overall MIS (Management Information System) to manage the pertinent quality data and provide the necessary management support for decision making resulting from analysis of data collected (Atluri, 1983). Such a system will provide the

necessary quality **feedback in the overall CAD/CAM communication network** to facilitate manufacturing responsiveness in the form of corrective action. This will result in reduced failures, will improve system productivity, and, therefore, achieve a better quality of conformance of the product/services provided.

One specific example of a working QIC is illustrated by what Xerox Corporation, Webster, New York, is calling 3M&QS, or Machine Manufacturing Management and Quality System. 3M&QS, is a generic, modular computer aided assembly, inspection, and test system which also provides quick corrective action feedback in a real-time mode. The system incorporates interfaces to automatic gauging systems, test systems, multi-level continuous sampling, and on-line and management reporting. It provides the right information to the right place at the right time (Reilich, 1983). A QIS system pulls together all of the quality information that has been collected and analyzed and organizes into a working data base system with real-time applications.

CWQC and CAD/CAM

With computer aided QAS, QC, and QIS, where do computer aided design and manufacturing fit in? **What it all comes down to** is **that through combining** the advances in inspection and test equipment with the technology of the shop and of engineering, we will have the ability to maintain and enhance quality (Klein, 1983). However, this can only be achieved if quality and engineering are directly tied together to close the loop between design, manufacturing, and the rest of the corporate entity. The concept is called **CWQC (Corporate Wide** Quality Control) and the key is CAD/CAM. CWQC is considered the Japanese approach to the original Western QC system. While quality control in the U.S. focuses mainly on quality inspection, the Japanese do not believe that inspection alone can lead to good quality. They believe that quality inspection can only audit the quality others put into the product. Product quality is affected by each and every phase of the manufacturing process from planning, purchasing, personnel,and production to sales and services. To assure good product quality, a company-wide effort from top to bottom is required.

CAD/CAM is a critical ingredient in the success of the CWQC concept. It is through the use of an integrated CAD/CAM data base that both design and manufacturing find something common to both of them which they have

degree to which a product or its components conform to the standards specified by the designer, is often determined by the operation specified by the manufacturing engineer. If either the design or the specifications are not properly communicated, quality is never built into the product. Quality personnel usually get involved after all designs and processes are in place and can do little to correct either. Through design via CAD/CAM

data base, quality personnel now have access to designs and quality standards while still in the design phase. Likewise, manufacturing personnel can more closely link processes in the design phase which will have a positive effect **on overall quality of the product.**

The total effect of CAD/CAM on quality goes beyond the benefits of the design phase. An integrated CAD/CAM system can improve product quality in several ways. It allows the designer to visualize more precisely the geometry of the part. It facilitates the use of engineering analysis techniques to verify mathematically the design of the product and anticipate possible performance problems. It effectively communicates to appropriate personnel engineering changes and revisions in a real-time mode. It eliminates errors normally introduced when data must be entered into a computer system more than once. Furthermore, it is possible to program automated inspection machines to verify finished part dimensions.

CAD/CAM can act as a link between all manufacturing operations into an effective integrated system. By adopting an integrated approach, the full benefits of CAD/CAM technology are available in the form of shorter lead times for introducing new products, reduced manufacturing and engineering costs, and better product quality.

Quality Professionals

The dramatic emergence of automated manufacturing technology has not, as often is thought, replaced the need for the professional in industry, but has rather created a need for the retraining of the quality professional. The quality function is becoming a more integral part of the overall corporate entity and will undoubtedly become more persuasive within the corporation as quality is integrated into all aspects of quality life. The opportunity now exists to upgrade the quality inspection activity as CAT is put into place, by movement of the quality professional into more specialized and scientific areas. Quality professionals should realize the significance of these changes in industry and make the most of the opportunity to become a more active participant in the overall design/manufacturing process. However, this has not been observed to be the case. As cited by Sullivan (1984), when automated inspection is being introduced, manufacturing engineers are leading the way; quality professionals are frequently the antagonists. Quality personnel have been perceived as being problem-oriented and defensive, powerless, responsible for inspection and fail-lures, and not well respected; they are frequently seen as not being managerially focused on planning, prevention, or the importance of upstream decisions. Often language is a barrier as quality personnel have not established a forum for dialogue at higher levels in the organization or have not been overly concerned with using the common languages of both business and technology. Quality professionals must keep in mind the goal of company-wide quality, look to the resources of the factory of the future to be able to provide top quality products through CAQAS, and be prepared to meet this emerging technology head on.

Conclusion

There is little doubt that there are still high fences between product design, manufacturing engineering, and the quality function in industry. Yet we need not wait for the future to reap the benefits of improved communications in place today. Improvements in many areas will require long-term education and training on all parts and a thorough working knowledge of all the manufacturing and quality acronyms one can tolerate. Quality professionals can begin now to review designing materials and processes, but the ideal approach would consider real-time analysis and optimization ‗during design ‗of manufacturing, assembly, and inspection. CAD/CAM and quality can bring together

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Demo A. Stavros
Professor
Eastern Michigan University

1986

Tau Alpha Pi

THE STUDY OF ENGINEERING TECHNOLOGY IN WEST GERMANY

In West Germany there are two academic paths that one may take to become an engineer. One is through the university which resembles traditional engineering education in the United States and emphasizes theoretical studies. The other path is through the Fachhochschule which emphasizes practical engineering.

The closest equivalent in the United States to the curriculum of a Fachhochschule is the four-year engineering technology program leading to the bachelor’s degree.[1] Entering students are expected to have chosen their major field and to have completed their general education in high school. Courses (Fundamental Studies) consisting of mathematics, natural sciences, and basic engineering sciences are covered during the first three semesters. The next three semesters are devoted to more advanced scientific, mathematical, and technical subjects (Professional Studies). In some institutions the four semesters are devoted to Fundamental Studies and include some advanced material. There are no assigned texts. In most areas where there are sufficient industries, one semester (the fifth) is established as a so called Praktisches (practical) Semester during which the student works full time in industry under the supervision of faculty. For courses lasting two or more semesters, a comprehensive examination is given at the end of the fundamental or professional segment. Intermediate examinations after each semester are given also.Many courses include laboratories.

applied research assignment. The student is given a list of topics or projects from which to choose. This Diplomarbeit differs from the requirement at the university in that it applies the lower, rather than upper, level of scientific standards. In all, about 140 lecture-recitation and 26 lab hours devoted to mathematical, scientific, and technical subjects are required. Because the Fachhochschule is more practical than theoretical in its methodology, it employs a faculty with a more practical orientation than the faculty at the university. The faculty must have a terminal degree from a college of engineering, a Diplom-Ingenieur, and at least five years of relevant industrial experience.

The graduate of the Fachhochschule receives the degree of Diplom-Ingenieur (FH). He is considered qualified to work independently, including work in design, and as a project engineer, from project inception to application, and in research and development that do not involve theory primarily. Unlike the university graduate, he is not trained to become a senior manager, a

chief executive, or a systems engineer. If one examines the job want ads in a German newspaper, one finds that some positions are to be filled by only university graduates, some by only Fachhochschule graduates, and some by both. Among the jobs available to Fachhochschule graduates are Project Engineer, Technical Leader, Department Head, and Branch Leaders. Fachhochschule graduates outnumber university engineering graduates 3:1. The graduate of the Fachhochschule may continue his education at a university-level college of engineering.

Since 1971, for example, the Technische Universitaet Berlin (College of Engineering in Berlin) has accepted graduates of the Technische Fachhochschule Berlin (TFHB).These students usually have to make up two or three courses (approximately 12 semester hours) before being admitted to graduate studies.

The Technische Fachhochschule Berlin (TFHB) is of particular interest to us because we are in the process of establishing an exchange program between it and the EET department at the University of Nebraska at Lincoln. The TFHB is a College of Applied Engineering, and at the time of the writing of this article we have one exchange student at the TFHB who is completing his senior thesis. It is also possible to discuss some educational details from first-hand experience because Professor Thad Kulik, co-author of this article, taught at TFHB. The typical curriculum at the TFHB (exemplified by that of the Department of Control Engineering Technology and Computer Engineering Technology) consists of 115 lecture and problem section hours plus 35 lab hours and a Senior Thesis. The fundamental segment consists of four semesters; the professional segment of three semesters. In the fifth “practical” semester the student is required to complete about 600 hours of industry work. The courses consist of technical subjects, mathematics, science, and engineering science. There are virtually no humanities or general education courses since general education is expected to have been covered in the high school. On average, the student spends 30-38 hours a week in the classroom or laboratory. He has also to complete computer programs, lab reports, and other assignments. Attendance at lectures is not legally mandated, but is practically essential because the lectures and handouts covering the lectures form the material on which examinations are based.

The examinations related to the lectures are written. There is usually only one written test per class at the end of the semester. If a student missed or failed some tests and as a result his average grade in a course is deficient, he is entitled to one comprehensive make-up test at the beginning of the following semester. A student may twice repeat a class which he failed. After repeating and failing the second time, he is disenrolled from his major. Successful completion of lab work is required in order to pass. There are comprehensive exams in several subjects at the end of both the fundamental and professional segments.

Labs are very structured in organization, student enrollment, hours, equipment, and procedure. Lab technicians prepare the equipment and supplies needed. Experiments are closely related to the lectures. The student writes his lab report and is expected also to pass an oral test administered by the instructor.

In preparing the Senior Thesis, the student works independently, although he has a weekly meeting with an adviser. He may select his topic, and he usually works with another student. As a rule, he begins the Senior Thesis after the

It is noteworthy that studies in West German colleges are tuition-free. Furthermore, arrangements do exist for financial assistance for students with insufficient income. Interest-free loans are available; such loans have to be repaid in installments when the student is gainfully employed. Low-cost health insurance and low-cost public transportation passes are provided. Low-cost good meals are available in the college canteen. Lodging may cost about $140 a month for a large room and shared kitchen and bath facilities.

Most important, a faculty/student exchange between American engineering-technology programs and German Fachhochschule is an exciting project which is likely to have major impact on engineering technology. It should be remembered that only students from high quality ET programs which meet particular requirements, such as approximately ten hours of math beyond integral/differential calculus, calculus physics, and especially a senior project of significant scope, can be considered.

Thad Kulik
University of Nebraska, Lincoln

Paul Bennett
University of Southern Indiana

Notes:

1. L.P. Grayson, "Engineering Education Throughout the World: A Synoptic View," Proceedings of the IEEE. Vol. 66, No. 8 (August, 1978), p. 940.

COMMENCEMENT ADDRESS AT CAPITOL TECH

Chairman Puente, President Troxier, members of the class of 1986 of Capitol Tech, parents, family, and friends:

It is a great pleasure for me to be with you on this commencement day, June 21, 1986.

Because I like to give short speeches, I considered emulating the great trial lawyer Clarence Darrow, who gave the shortest commencement speech in history. It consisted of one word repeated three times. "Survive, survive, survive," he said and sat down.

That was good advice in Darrow's time and, indeed, it is good advice today in this complex and ever-changing world. But you are fortunate. Your education at this fine college has equipped you not only to survive in this technological world, but to play a vital role in it.

We now are living in an age of technology, but historically, mankind is just beginning to develop and benefit from technology. Virtually all of the technologies we use today – aircraft, T.V., computers – were developed within our lifespan. We can expect this pace of technological growth to continue.

As men and women who are technologically literate, you will be able to contribute in important ways to making the world a better, safer place. Through the use of technology, you will help to increase industrial and agricultural productivities. You will thereby contribute to the economic health and security of our nation, and you will assist the United States in maintaining its technological leadership.

Make no mistake. Today's world is technologically competitive. The technological preeminence we once took for

other countries great strides have been made in science, in technology, in basic industries, and in manufactured goods. They are enjoying success in trade and commerce in many parts of the world and even here in America. To maintain our competitive position in the world, we will have to give the best that is in us as individuals and as a society.

To meet this challenge we must do three things. First, we must strive to be winners. Remember that it is less important to be number one than to seek to be number one. Our quest should be not for dominance. It should be for excellence.

Second, we must *commit* to a major role for technology in maintaining

a strong economy. Technology spawns new ideas, new industries, new jobs, and new products. Clearly, technology is the mainstay of economic growth.

And third, we must use technology effectively to increase productivity and improve the quality of life in America. Only in this way can we ensure a solid future for our country, for ourselves, and for our children.

To me, nothing illustrates this nation's effective use of technology better than our space program. It embodies what is best about America – our pioneer spirit, our unending quest for knowledge, and our unique blend of vision and pragmatism. As an example, consider the Voyager-2 spacecraft encounter with the planet Uranus in January of this year.

Just think, a spacecraft launched eight and a half years ago flew within 50,000 miles of a planet 1.8 billion miles away. And it did so within a minute of its scheduled arrival time set five years earlier! This brilliant engineering achievement allowed us to unveil the secrets of a planet shrouded in mystery since its discovery two hundred years ago.

Then, only four days after this great triumph of science and engineering, came the explosion of the Space Shuttle Challenger. It was a devastating blow that stunned NASA and the nation. We mourned the loss of seven astronauts. We reviewed and reassessed our entire Shuttle program – our design, our manufacturing, our test procedures, our organization, and our operational standards. We have made many changes and will make more in the next few months.

Now we are determined to get the space program back on track and to push forward in our program of science and exploration. In the next few years we will launch the Hubble Space Telescope to peer to the edge of the universe, the Galileo mission to orbit the giant planet Jupiter, and Ulysses mission to explore the poles of the sun. We will build a manned space station, and we will continue to work with our international partners to accomplish our goals in space.

As you leave Capitol Tech to embark on your careers, I hope you will consider the aerospace industry. You might join one of the many high-tech, space-related industries thriving right here in the national capitol area or elsewhere throughout the country. If you do, you will have opportunities to use your abilities, initiative, and creativity to break through the barriers of the unknown, both in space and on the earth.

If you are like most graduates, in a few years you will be trying to remember who spoke at your commencement and what, if any, relevant advice was offered. The most relevant advice I can give you today is simply this: Do yp~ best. It sounds easy enough, but how do you really go about it?

First, you need to approach life with a positive attitude. Search for opportunities; the problems will find you. Make happiness a goal of your existence rather than just a fringe benefit. Try to maintain a balance between your

work lives and your private lives. Remember that good family and community relations are necessary to everyone's

work. Indeed, successful people do not simply work hard. They do their very best. Forty or fifty years from now when you look back at your lives and careers, I hope you will be able to say, "I gave my best effort." If you can say that, you will have been successful.

Always, then, strive to do your best. Live up to your full potential. I'm sure you have received this same advice from your parents and teachers many times before. And, if you think about it, isn't doing your best what has given you the most satisfaction in your academic careers? I can assure you it will give you great satisfaction in your professional careers as well. As Abraham Lincoln once said, "I do the very best I know how – the very best I can; and I mean to keep doing so until the end."

Thank you and good luck.

Burton I. Edelson
Associate Administrator
Space Science and Applications, NASA

Recipient, Honorary D. Sc.
1986

CHAPTER NEWS

ALPHA EPSILON (Fort Valley State College): The chapter inducted new members in May, 1986. It also co-sponsored a seminar in which three EET alumni (graduates of 1980-85 period) spoke about their experiences in industry on how to excel in the technological fields, and on preparing for careers in engineering and technology. Plans include providing tutorial service to engineering-technology students and assisting in recruitment. Officers: Alan Reagan (President); Kirk Huggins (Secretary-Treasurer).

Left to right: Dr. F. Jalali (Adviser), Kirk Huggins, Ngoc Nguyen, Ann M. Wright, Alen J. Gopp, Roland R. Albert, Deborah H. Naximiec, Glover Ingram, Jr., Alan Reagan (President).

BETA GAMMA (Queensborough Community College, CUNY): The chapter held
its initiation on January 10, 1986. Professor Franz Monssen delivered an inspirational keynote address. Following the initiation ceremony, a dinner was held at the Harp and Mandolin restaurant. Plans include erection of the bronze Tau Alpha Pi key on campus. To fund this project, the chapter is organizing the manufacture of a digital laboratory trainer in kit form, which it will sell to students. Officers: James
J. DiBlasi (President): Mohamed Abdel Naby (Vice-President); You Ren Liu (Secretary).

1986

BETA DELTA (Bronx Community College, CUNY): The chapter held induction ceremonies in November, 1985 and in April, 1986. Following each initiation was a luncheon offered in honor of the initiates. The chapter was honored to have present the executive director-secretary Professor Frederick J. Berger, who addressed the assembly and presented to the chapter's adviser Dr. Lillian Gottesman the certificate of meritorious service and the key-pendant. During the academic year, members of the chapter continued to serve as tutors and as ushers at commencement. Several of the graduating members received special awards: Dralle E. Fung (the Morris Meister Medallion); Minh X. Phan (the Meister Scholarship); Kheng C. Sur (the Frederick J. Berger Scholarship); Nuon Senn (the Belle Zeller Award). Officers:
Swatantrach Somar (President); Dralle E. Fung (Secretary-Treasurer).

Left to right: Chatter Ganesh, Senn Nuon, Dralle Fung, S. Somar, Jimmy Rosemin, Marc Apicello, and Christopher Bassett.

BETA GAMMA

Left to right, front row: Ronnie J. Cusmano, Neal Schleimer, Dr. Frank Scalzo (Adviser), Haskel Zupnick, You Ren Liu. Back row: Joseph DeZarlo, Mohamed Abdel Naby, James J. DiBlasi, Prof. Franz Monssen (Adviser).

BETA ZETA (College of Staten Island, CUNY): The chapter held initiation ceremonies on December 3, 1985. Prior to this date, on October 19, 1985, the chapter celebrated its tenth anniversary reunion with old and new members in attendance. The major activity of the chapter was the sponsorihg of speakers: W. Hunn of Leitz and Company spoke on “Instrumentation”; J. Bunting of Farrand Industries, “Precision Measurement”; J. Perritti of AT & T, “T.V. Broadcasting”;
T. Marks of Microwave Semiconductors, “Manufacturing Technologies”; H. Kaley of Mini-Circuit Labs, “Signal Processing”; M. Feller of Loral, “Electronic Countermeasures”; F. Kretowski of Amperite, “Relay Applications”; A. Tufano of CSI, “Roads and Bridges”; S. Lapatine of CSI, “Space Program”; H. Schanker of CSI, “Data Communications”; C. Buntscuk of Narda Microwave, “Microwave Applications”; F. Toich of Kepco, “Power Supplies”; J. Antonopolus of CSI, “Robotics”; A. Salzman of Grumman, “Electronic Software.” In addition, chapter members enjoyed a tour of Del Electronics and Grumman and a film offered by the Brooklyn Union Gas Company. Officers: P. Mareno (President); Michael Sera (Vice-President); E. Hannah (Secretary); S. Danniballe (Treasurer).

BETA IOTA (Rochester Institute of Technology): The chapter held its initiation of new members on May 13, 1986. On April29, 1986, the chapter sponsored a discussion on Professional Engineering licensing in New York and in other states. The discussion was organized by Susan Sawyer, a civil-technology student, and was attended by many technology students. Professor Robert McGrath addressed the group, and applications and requirements were presented to those in attendance. Officers (A-Block): Lincoln Markham (President); Robert Twitchell (Vice-President). Officers (B-Block): William Stack (President); Cheryl McBride (Vice-President).

Left to right, front row: Daniel Miller, Frank Pentz, Tom Alexander, Dan **Benulis,** Joe **Stagnitto, Mike Sciocchetti, Timothy Keefe, Prof. Richard** Hultin **(Adviser). Second Row: Ronald Stephens, Carlo Hume, Paul Rogers, Lincoln Markham,** Jason **Sango,** Robert **Snyder, Vadim Lubomirsky, Robert Twitchell, Mathew Asma.**

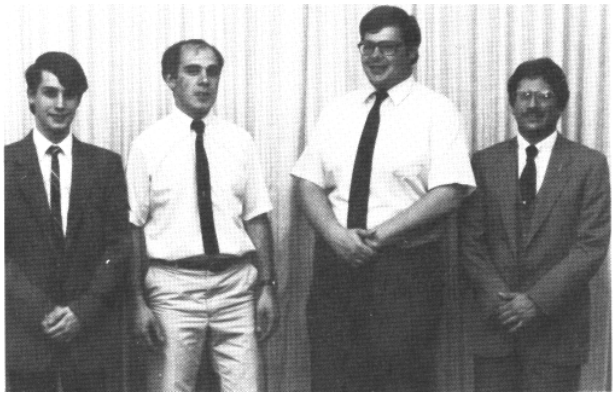
BETA MU (SUNY Agricultural and Technical College): The chapter held initiations in November, 1985 and in April, 1986. The April induction was followed by a dinner. In its efforts to promote the visibility of Tau Alpha Pi on campus, the chapter installed a display case with the Tau Alpha Pi emblem and a list of members and faculty advisers. Officers: Kevin Bush (President); James Healy (Vice-President); James Lewandowski (Secretary); Mark Lowell (Treasurer).

BETA XI (State University of New York Agricultural and Technical College): The chapter held its initiation and dinner on April 8, 1986. The guest speaker Mr. Gerald Tallinger (Omnicad .ATT) spoke about techniques of developing software for Computer Aided Drafting and how AT!' is marketing the system. Dean Fraser introduced a special guest, Mr. Fred Canova, Vice-President of Engineering of Turbodyne Corporation. Chapter members were privileged to hear also a talk given by Mr. George Johnson (East Coast General Manager, Rail Division of Morrison-Knudsen Corporation). The chapter is planning a tour of the Morrison-Knudsen plant and the further recognition of Tau Alpha Pi members at a college convocation.
Officers: Roy Bonham (President); Roy Pierce (Vice-President); Jamie Rodgers (Secretary); Steve Trimble (Treasurer).

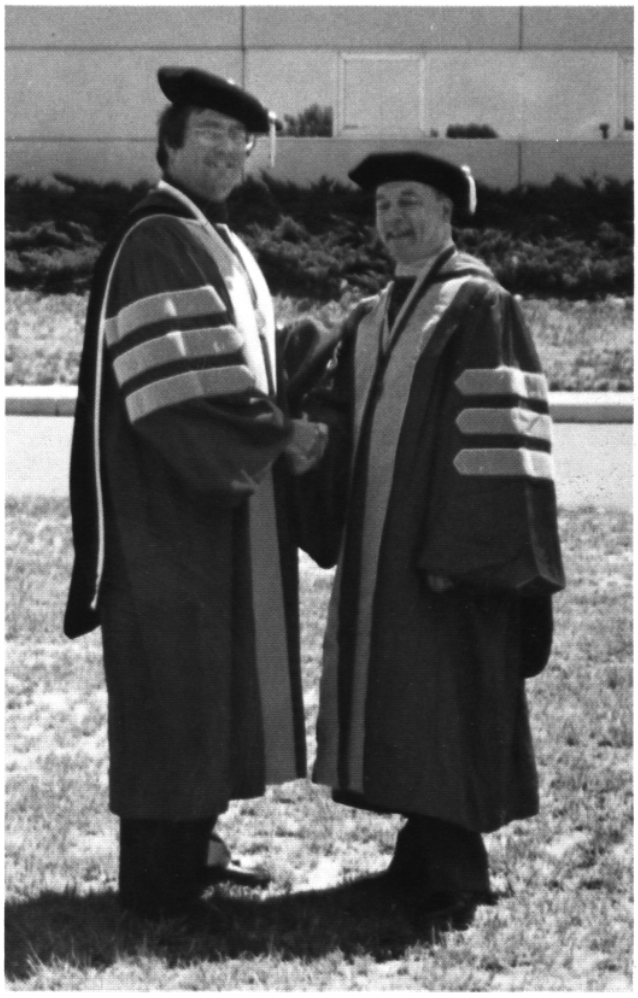
BETA P1 (Binghamton, State University of New York): The chapter held its chartering ceremony and dinner on June 6, 1986. Executive Director Frederick J. Berger presided over the initiation, delivered the keynote address, and presented the charter to Dean Lyle Feisel of the Thomas J. Watson School of Engineering, Applied Science, and Technology. Dean Feisel noted that the establishment of a Tau Alpha Pi chapter would further enhance the scholastic achievements of the student body for years to come. Several faculty advisers were selected to guide the chapter into becoming a dynamic member of Tau Alpha Pi and to provide continuity of leadership. Officers: Thomas L. Miller (President); Dwayne D. Handwerke (Vice-President); Michael J. Cassin (Secretary); Anthony J. Creo (Treasurer).

Left to right:
Michael J. Cassin,

Anthony J. Creo,
Thomas L. Miller, and
Dwayne D. Handwerke.

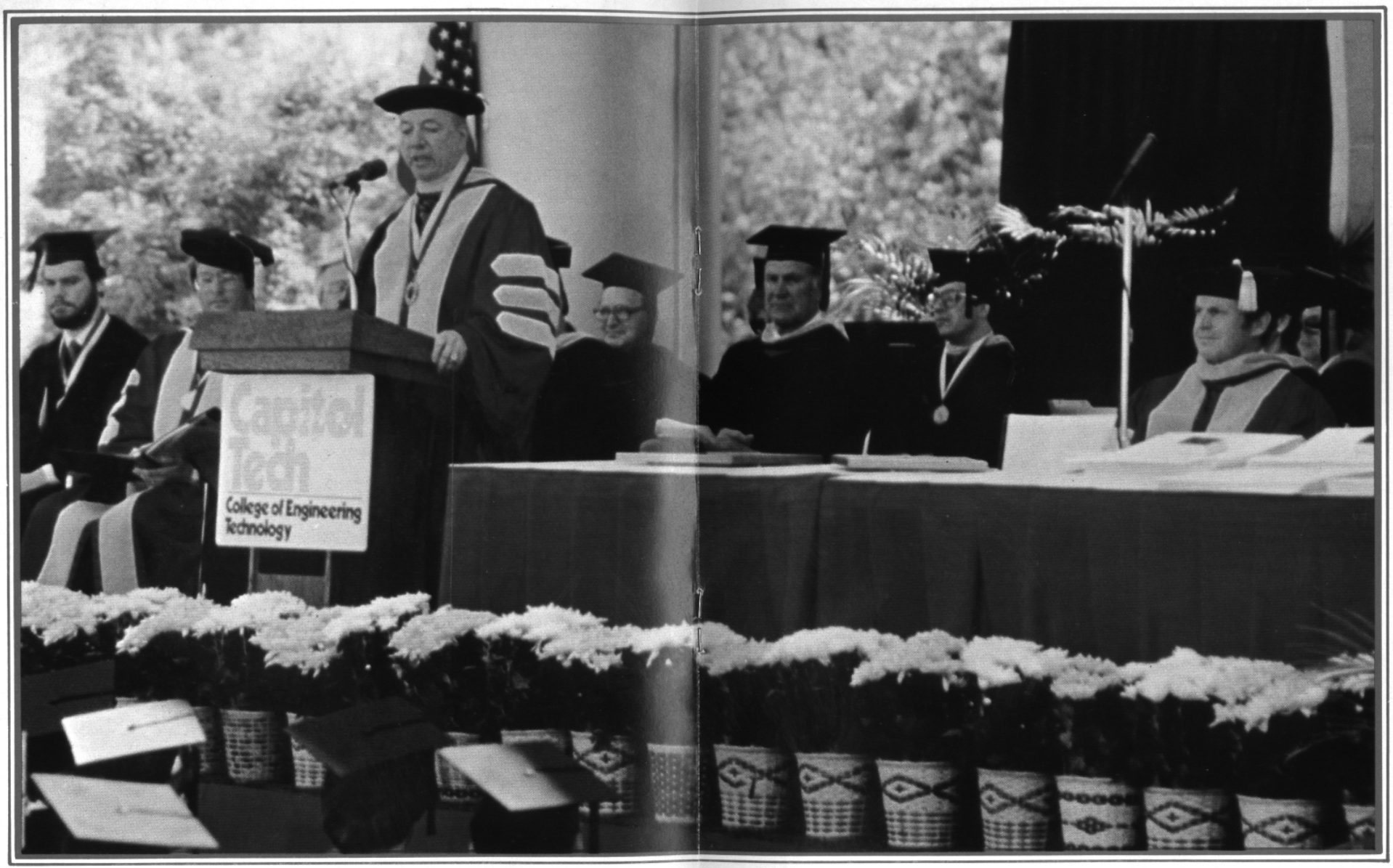


President Troxler Congratulates Executive Director Frederick J. Berger



Left to right: President Troxler, Frederick J. Berger.

Capitol Tech Honors Executive – Director Frederick J. Berger



Left to right: Timothy W. Collins (Avrum Gudelsky Scholar, 1986), Dr. G. William Troxler (President, Capitol Tech), Frederick J. Berger (Executive Director, Tau Alpha Pi), Richard J. Heiman, Esq. (Secretary of Trustees), Admiral Owen Siler, Ret. (Trustee), William O. Hider (Trustee), Dr. Burton I. Edelson (Assoc. Adm. of NASA), Harvey Weiss (Trustee).

ACCEPTANCE ADDRESS:
Executive Director Frederick J. Berger

Director Puentes, President Troxier – thank you for your kind words. I want to express my appreciation and thanks to you, to your Board of Trustees, and to your faculty for selecting me to be the recipient of the 1986 Honorary Doctor of Science degree from this prestigious and nationally recognized school of engineering technology.

Observing your graduating students while they are waiting to receive their baccalaureate degree for their hard work and scholastic achievements reminds me of my society, for this is what Tau Alpha Pi is all about.

Scholarship, character, and leadership are frequently referred to in Tau Alpha Pi. Excellence in scholarship, nobility in character, and leadership qualities are not only the prerequisites for election to membership in the National Honor Society for Engineering Technologies, but they remain the goal which members continuously aspire to attain and maintain. This is what we call nobility of ascent to becoming a better person and to making a better world.

Perhaps at no time has there been so much scholarship to master. Hardly ever, has there been such outcry for outstanding leadership. Never have civilization and humanity depended so much on the balanced blending of these elements.

There is no doubt that today we live in an era of technology, technology that can serve mankind or be its master or even its destroyer. There is no doubt that we also live in serious times when our government must fight in various ways for its democratic way of life and fight forcefully for its technological leadership.

Tau Alpha Pi must rise to the demand of the times, and it will continue to identify, recognize, and inspire all those whose utmost potential enables them to achieve and lead. Be assured that the members will be the intellectual leaders of tomorrow.

Therefore, Director Puentes and President Troxier, it is my pleasure and privilege to accept this high honor with humility and gratitude. This auspicious occasion will be remembered and forever cherished.
Thank you.
1986

BETA OMICRON CHAPTER (Westchester Community College, Valhalla, New **York): The** chapter held its chartering ceremonies and banquet on April 22, 1986 at Saloestrini's Ristorante. Executive Director Frederick J. Berger, presiding over the initiation ceremonies, was the keynote speaker, who also presented the charter to Art Hackett (Dean of the Technology Division), representing the Administration of Westchester Community College. The chapter inducted four honorary members and selected four faculty advisers to assist Professor Ernest Alfred Joerg, the sponsor of Beta Omicron Chapter, to assure continuity of the chapter, and to make the chapter a dynamic member of Tau Alpha Pi. The following honored guests were present:
Professor William Dunn, Professor Angelo Delgrasso, William Wells Terry (past Chairman of N.Y. Section of I.E.E.E.), and Art Hackett (Dean of Technology Division). Future plans include visits to the following industrial plants: Electro 1987 at Jacob Javits Convention Center, Central Hudson Gas and Electronic's Roseton Power Plant, Maressa Island Control Center, and Raytheon's Ocean Science Center. In addition, trips to four-year institutions are contemplated in order to acquaint the members with the upper-division universities. They are to include the following colleges and institutes: Pratt Institute, Stevens Institute of Technology, Rochester Polytechnic Institute, and Manhattan College. We appreciate Professor Berger's excellent delivery of his motivational speech to the initiates and guests. Officers: George J. Szarka (President); Robert I. Danuff (Vice-President); John H. Hearty (Secretary-Treasurer).

Left to right: Professor Ernest Alfred Joerg, **John H. Hearty,** George **J.** Szarka, Robert I. Danuff,
Executive Director Frederick J. Berger, Professor Kevin B. Slavin (Director, Student Affairs).

GAMMA **ALPHA** (OMI College of Applied Science, Cincinnati): Chapter members have donated time in the tutoring program and plan to continue doing so. Gamma Alpha has also continued the annual presentation of an academic achievement award to a member of the OCAS faculty. In June, 1986 Gamma Alpha participated in the ASEE convention in Cincinnati and invited Executive Director Frederick J. Berger to join the officers for lunch. Officers: Jeff Heyob (President); Craig T. Lippman (Vice-President); Alan J. Goforth (Secretary-Treasurer).

GAMMA ETA (University of Akron): The chapter held its charter ceremony and banquet on April 17, 1986, with Executive Director Professor Frederick J. Berger as guest and keynote speaker. Professor Berger presented the charter to Associate Provost Robert Weynck and installed officers. Although newly established, the chapter was able to assist the Electronics Club in a picnic held on the last day of classes for the Engineering and Science Division. Fund raising is on the fall agenda.

Officers: Nolan Cartner (President); Timothy Strouse (Vice-President); Michael Muchay (first-semester Secretary); Gregory Hussing (second-semester Secretary); Thomas Culp (Treasurer).

Left to right: Jeff Heyob, Executive Director Frederick J. Berger, Patty Backus, Craig T. Lippman, Alan J. Goforth.

GAMMA ETA

Left to right: Executive Director Frederick J. Berger, Janet Van Doren (Adviser), Tim Strouse, Greg Hussing, Tom CuIp, Nolan Cartner, David Robinson, Robert **Weyrick (Associate Provost).**

GAMMA EPSILON (DeVry Institute, Columbus, Ohio): At its initiation ceremony on September 26, 1985, the chapter awarded honorary membership to the Honorable Dana G. Rinehart, Mayor of Columbus. Through the mayor's efforts, many technological improvements were attained in Columbus. Among them are the efficient traffic control system, the 911 emergency phone network, an upgrated trash-burning power plant, a lower-cost telecommunications system, and a program that provides financial assistance to small technology-based businesses. Spring induction was held on May 19, 1986, followed by a banquet at the Jai Lai Restaurant. The chapter's plans include a fund-raiser and a picnic for its members. The next induction ceremony is planned for September 25, 1986. On this date the chapter will award honorary membership to Professor Frank Camstra and present him with a plaque bearing the Tau Alpha Pi emblem. Professor Camstra will be recognized for his outstanding dedication to students and to the engineering technologies. Officers (1985): Thomas Miller (President); Todd Berger (Vice-President); Craig Bjorndahl (Secretary); Dan Powell (Treasurer). Officers (Spring, 1986): Brad Tripp (President); Michael Fosco (Vice-President); Joseph Disharoon (Secretary); Dianne Terry (Treasurer). Officers (Summer, 1986): Patrick Kozlowski (President); Douglas N. Miller (Vice-President); Paul Williams (Secretary); Eric Devinney (Treasurer).

GAMMA EPSILON

DELTA DELTA (Southeastern Massachusetts University): The chapter held its initiation of new members on January 31, 1986 and, in addition, held regular meetings. Plans for the future include the designing of a banner with the Tau Alpha Pi emblem, a field trip, and fund-raising activity. Officers *(1985):* William Kane (President); Roy Arruda (Vice-President); David L. Laird (Secretary); John J. Locurto (Treasurer). Officers (1986): Roy Arruda (President); David L. Laird (Vice-President); John J. Locurto (Secretary-Treasurer).

EPSILON ALPHA (DeVry Institute of Technology, Kansas City): The chapter held its initiation of new members on May 16, 1986. As part of its 1987 program, the chapter is organizing a city-wide math and science competition event for high-school students to be held in the spring of 1987. Officers: Leslie Pingel (President); Dale Hinz (Vice-President); Stephen Olsen (Secretary); Brenda Weeks (Treasurer).

ZETA ALPHA (University of Houston): The chapter held its most recent initiation and banquet on May 4, 1986. During the 1985-1986 academic year, the chapter continued to participate in Honors Week, a campus-wide series of events designed to promote academic excellence. It received a second-place award for its exhibit in the annual Technology Day program, an event designed to acquaint students and leaders in business and industry with the technology programs of the college. Officers:

Robert M. Lowne (President); Dewey J. Dufour (Vice-President); Daniel M. Breaux (Secretary); Dale J. Cooper (Treasurer).

Left **to right, front row: Todd Berger, Mayor Rinehart, Dan Powell, John Graham. Back row: Thomas Miller, Craig Bjorndahl, Bruce Goodman, David** Harris, **Laura Caldwell.**

1986

Tau Alpha Pi

ZETA GAMMA (Texas A and M University): The chapter held its annual initiation and banquet on April 1, 1986. Dean C.E. Erdman was the guest speaker who spoke on the impact of engineering technology. He was awarded honorary membership. During the year members conducted tours of the university library's microcomputing facility. Future plans include the casting and mounting of a replica of the Tau Alpha Pi key in front of the Engineering Technology building. Plans are underway to pool various computer utility programs and make them available on disks through the IEEE parts store. The chapter plans, also, to make contact with graduates of two-year programs who want to pursue the bachelor's degree. Officers: Randall W. Wentworth (President); Thomas N. Thraen (Vice-President); Steven Felix (Secretary); Scott Shultz (Treasurer).

KAPPA ALPHA (Capitol Tech, Laurel, Maryland): The chapter held its initiation and dinner on February 12, 1986. On this occasion, Professor Frederick J. Berger, the national Executive Director of Tau Alpha Pi, presented to Dr. Tridico an engraved medallion and the Certificate of Meritorious Service Award for his years of dedication and service to Kappa Alpha chapter and for helping to upgrade the professional status of the engineering-technology students. The Certificate of Meritorious Service Award is Tau Alpha Pi's most prestigious award, and Dr. Tridico became one of only fifteen people in the country to be so recognized. Dr. Tridico retired, and Dr. Arjun Markhijani has become the chapter's faculty adviser. Officers: Timothy Senseney (President); Robert Whitman (Vice-President); Sammy Cole (Secretary).

Left to right, **front row: Capitol Tech President G.** William **Troxier, Timothy Senseney, Robert Whitman, Sammy Cole, Jeffrey Beeson, Dr.** Arjun Markhijani. **Back row: Vice-President for Academic** Affairs **Earl E.** Gottsman, **Timothy Collins, Roy Staben,** Brian **Droneberger,** and John Schultz.

KAPPA BETA (Anne Arundel Community College): The chapter held its initiation on November 23, 1985. **On December** 5, 1985 it elected new officers and also had a Christmas party in conjunction with JETS (Junior Engineering and Technologies Society). Kappa Beta is the official sponsor of the Anne Arundel Chapter of JETS, which includes nineteen charter members from six senior high schools. Kappa Beta also sponsored a lecture series open to the public. On September 19, 1985 Donald S. Friedman (Chief, Office of Commercial Programs, NASA) spoke on "Spin-offs from the Space Program." **On October** 17, V. Josephs Walters (Photographic Team, Goddard Space Flight Center) spoke on "Space Shuttle." On November 21, the topic "Construction in Space" was addressed by Dr. William W. Webster (Geophysics Branch, Goddard Space Flight Center). Officers: Frederick K. Zellinhofer (President); Angela M. Epperly (Vice-President); Jeffrey C. Radway (Secretary-Treasurer).

MU GAMMA (Spartanburg Technical College): The chartering of Mu Gamma was held on May 8, 1986. At a reception that followed the ceremony, Dr. James Chisman of Clemson University, who represented Executive Director Frederick J. Berger, presented the charter to Dr. Jack A. Powers, President of Spartanburg Technical College. In his acceptance speech, Dr. Powers noted that a national honor society promotes a school's stature and is indicative of excellence. Mu Gamma is the first national honor society at the college and the second Tau Alpha Pi chapter among sixteen technical colleges in the state system. Officers: Nathan J. McGaha (President); Chris L. Stack (Vice-President); Olin D. Lynch (Secretary-Treasurer).

Front row, left to right: **Dr. Jack A. Powers (President,** Spartanburg Technical **College), Dr.** James **A.** Chisman (Prof., **Industrial** Engineering, Clemson **University),** Jose Singh, **Donna M. Page,** Olin **D. Lynch. Second row: Steve Faulkner (Dean,** Engineering **Technology), Nathan J.** McGaha, **Christopher Stack, Sharon S. Jones, Terry L. Miller, Tom** Divver (Chairman, Technical **Sciences department).**

NU BETA (Southern Illinois University, Carbondale): The chapter held initiation on April 30, 1986. The chapter's major project over the last two years has been the preparation of the enlarged Tau Alpha Pi key. The key was completed and mounted on a wall inside the Technology building. In May, 1986 the completion of the key was celebrated at a picnic. One member – Robert M. Kellogg – received the E. Leon Dunning award for having achieved the highest index in technology during this past academic year. Officers: Chad Spalt (President); Steven Bowman (Vice-President); Dennis Hurley (Secretary); Bernard Englum (Treasurer).

NU GAMMA (DeVry Institute of Technology, Lombard, Ill.): The chapter held its most recent initiation on July 24, 1986. During the 1985-86 year, the chapter instituted an internal structuring consisting of committees with specific responsibilities. There are four committees, each with an elected chairperson:
1). Graduation Committee: responsible primarily for providing ushering service at commencement. 2). Social Committee: responsible for planning social events such as a banquet and a picnic-softball game. 3). Writing Committee: responsible for writing articles for the college paper concerning Nu Gamma. 4). Fund Raising Committee: responsible for arranging fund raisers. During the year this committee raised over $100 in a car wash and donut sale held at the college. Officers *(1985):* Clifford T. Riordan (President); Thomas C. Hever (Vice-President); Philip Arens (Secretary); Michael P. Zolad (Treasurer). Officers (1986): Philip Arens (President); Daniel L. Watson (Vice-President); Karl D. Zack (Secretary); Michael P. Zolad (Treasurer).

NU DELTA (DeVry Institute of Technology, Chicago): The chapter held initiation ceremonies and dinner-dance in June, 1986. Dr. Dimitrios Kyriazopoulos, faculty adviser, welcomed faculty and guests. Alumni John Sennett (President, 1984-85) and John Mulkey (Vice-President, 1984-85) assisted in the induction of new members. John Mulkey was guest speaker. He is an employee of Hewlett-Packard, and his talk provided insight into life after DeVry. Eight top scholastic graduating members were honored with plaques. During the year, the chapter held fund raisers and plans to continue doing so. It plans to continue keeping in touch with alumni. Officers:
George Yonker (President); Bimal Patel (Vice-President); Andrew Lui (Secretary); Angela Maczka (Treasurer).
Left to right: Dr. D. Kyriazopoulos, Mrs. Kyriazopoulos, **Andrew Lw, Angela Maczka,** George **Yonker, Mrs. Yonker,** and **Bimal Patel.**

XI ALPHA (California State Polytech University, Pomona): On November21, 1985 the chapter held a dinner to initiate and honor new members. The guest speakers were alumni and Tau Alpha Pi members Joe Brenner, Jack Dannenberg, Paul Stymelski, Steve Stingley, Bill Youngdahl, and Myron White. Officers: Victor Montijo (President); Matthew Sellers (Vice-President); Nicholas Scalero (Secretary); Ross Cuyler (Treasurer).

OMICRON BETA (Union County College, New Jersey). On May 8, 1986 an induction breakfast was held at the Scotch Plains Campus to initiate new members. Dr. Leonard T. Kreisman, Vice-President for Academic Affairs, presented the certificates and keys. Officers: David DeSimone (President), Thomas Mancuso (Vice-President).

NU EPSILON (Illinois Valley Community College): The chapter held initiation ceremonies and a banquet that featured guest speakers. Future plans include direct involvement with outside technical projects in conjunction with local industry. Officers: Jeff McKnight (President); Clinton Foster (Vice-President); Don Lukach (Secretary); Dan Wrobleski (Treasurer); Randy Eurich (Public Relations).
Left to right, front row: Randy Eurich (Public Relations), Don **Lukach (Secretary), Jeff McKnight**

(President). Back row: Prof. John Murphy (Adviser), Daniel Wrobleski (Treasurer), Clinton Foster (Vice-President).

1986

OMICRON EPSILON (Middlesex County College): The chapter held its initiation and luncheon on March 18, 1986. On March 27, 1986 chapter members visited **AT & T** in Middletown, New Jersey, and toured the plant and attended technical meetings. Officers: Richard Giglio (President); Peter Schmidt (Vice-President).

OMICRON ZETA (County College of Morris, New Jersey): The chapter held its chartering ceremonies and banquet on June 4, 1986, at Dc Maio's Restaurant. Executive Director Frederick J. Berger was the keynote speaker, who also presented the charter to Mr. James W. Souders, a trustee of the college. Mr. Souders represented the college administration. In appreciation of Mr. Souders' efforts in behalf of the college and its students, Omicron Zeta elected him to honorary membership. In his speech, Mr. Souders noted that having a Tau Alpha Pi chapter will encourage students to become better achievers. Officers: Edward Buckwald (President); David M. Selle (Vice-President); Jane Regan (Secretary); Joseph H. Philback (Treasurer); John B. Dudley (Escort).

Left to right, front row: Joseph Vailely, Ronald Cieplik, Xavier F. Gonzales, William Garner, James W. Souders, Steven Fogle. Middle row: Executive Director Frederick J. Berger, William Beyer, Jane Regan, James F. Kachler, Ronald J. Deibert, Joseph Camerlin, David M. Selie. Back row: Sheri Sperandino, James Rymaniak, Louis Candura, Edward Buckwald, John Dudley, Robert Aymar.

Pt ALPHA (Purdue University): The chapter held its initiation and banquet on March 23, 1986. Dr. Maurice Knoy, former President of the Purdue University Board of Trustees, was the guest speaker. The chapter recognized excellence in teaching by presenting awards to Professor Mike Jacob (Electrical Engineering Technology) and Professor William Dalton (Mechanical Engineering Technology). Included in future plans is a Tau Alpha Pi key to be erected outside the new technology building in order to make Pi Alpha chapter more visible. Officers: Jeff James (President), John Thibodeau (Vice-President); Reid Schaffer (Secretary-Treasurer).

P1 BETA (Purdue University School of Engineering and Technology, Indianapolis): The chapter held its initiation and banquet on April 17, 1986. In the future the chapter will conduct fund-raising events and will sponsor tours to local companies. Officers: Martin Hughes (President); Eugene Hunt (Vice-President); Paul Haupt (Secretary).

Left to right, seated: Lindsay Kiebenow, Kevin Furiya, Jim Clark. Standing: Prof. Eugene Nix (Adviser), Reid Schaffer, Steven Schreck, Rail Woods, Scott Alexander, Jeff James, Steven Coomer, Gregory Ferro, Bob Petri, Prof. Robert **English (Adviser).**

Left to right: Margie Normington (former President), Loretta Mahoney (former Vice-President), and **Prof. Richard** Pfile **(Adviser). Second row: Eugene Hunt (Vice-President), Martin Hughes (President),** and **Paul Haupt (Secretary).**

P1 EPSILON (University of Southern Indiana): The chapter held initiation on April *25,* 1986. Last fall, the chapter had a raffle. The prize was a microcomputer. The proceeds were used to pay for a wooden replica of the key and for the academic scholarship. The recipient of the scholarship was Loan Anh Le, who achieved the highest grade point average. Officers (1985-1986): Helen Whisnant (President); Jeffrey House (Vice-President); Martin Pate (Secretary). Officers (1986-1987): Alan Wahistrom (President); Brian Harder (Vice-President); Robert Sears (Secretary).

Left to right, front row: Jeffrey House, Helen Whisnant, and Martin Pate. Back row: David Wedcalf, Darryl Udhe, and Loan Anh Le.

Pt BETA

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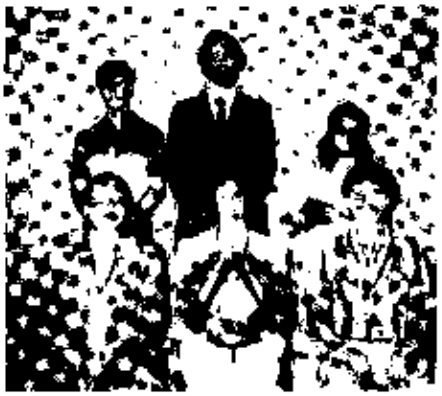

RHO BETA (University of Southern Colorado): The chapter held its annual initiation-banquet on April 4, 1986, at Mozart's restaurant. Colonel Al Rosa of the Air Force delivered a talk concerning technical education. Officers: William Bray (President); Jamie Wilkins (Vice-President); Joel Flanders (Secretary-Treasurer).
Kneeling front row: Jamie Wilkins, William Bray, Joel Flanders. Middle row: Steve Angelovich, Byron McCombs, Lisa Dillow, James LaFollette, Joe **Madrid,** Don **Reedy. Top row: Rodger Henderson, Larry Burns, Howard Freeman, Michael Burke, Michael Shephard, Brian Rowe. Seated, right: Mizuho Link, Randy Oles.**

RHO GAMMA (Metropolitan State College, Denver, Colorado): The chapter held its annual banquet on May 3, 1986. The speaker was Dr. George Gless, a retired professor of electrical engineering, University of Colorado, who talked about electric courses in the past, present, and future. One Tau Alpha Pi member –Barbara A. May – was graduated in May and received her B. S. degree summa cum laude with a perfect 4.0 index. She was the recipient of the prestigious Colorado Engineer's Council Award. Future plans of the chapter include giving Outstanding Faculty awards to faculty who most "challenged and inspired greater learning." The award will be a certificate issued to one faculty from each of the three engineering technology departments. Under consideration is the possibility of putting a large metal medallion of Tau Alpha Pi on campus. Officers: Timothy G. Pimentel (President); Laurie A. Evenson (Vice-President); Steve Doerfier (Secretary); Lee Retzkin (Treasurer).

UPSILON DELTA (DeVry Institute of Technology): The chapter held its initiation of new members on May 29, 1986. As part of its ongoing activities, the chapter established a guest-speaker program that is open to all students. The first guest speaker was Professor Ronald Bauer, who spoke on the topic of digital signal processing. The chapter also conducted a raffle, and the two winners received oscilloscopes that had been donated. Future plans include a trip to the Hughes facility in Tuscon, Arizona. Officers: Roger Miller (President); Jeff Aufderheide (Vice-President); David Greer (Secretary); Bart Bradley (Treasurer).

ALPHA ALABAMA (University of Alabama): The chapter held initiation and election of officers on May 1, 1986. Chapter members participated in various projects. One was a raffle to raise funds. Another was the selection of faculty members to receive the Outstanding Faculty Award. The 1985-86 recipients were Professors Alex Gerardo and Dwight Hollingsworth, both of engineering technology. The chapter's service extended to the community. Members Russ Moore and Richard Rhinehart and faculty adviser Jim Keating built a concrete ramp extension for Mrs. Callie Ellington, a double amputee who is in a wheelchair. Moore, Rhinehart, Keating, Tad Palmer, and Frank Martin rebuilt a portion of the roof on the house of Mrs. Barner, a resident of Tuscaloosa. Tad Palmer and Russ Moore were named Outstanding Senior in electrical technology and civil technology, respectively. Officers (1985-1986): Tad Palmer (President); Russ Moore (Vice-President); Frank Martin (Secretary-Treasurer). Officers (1986-1987): Frank Martin (President); Jay Cleveland (Vice-President); Daphne Owens (Secretary-Treasurer).

BETA ALABAMA (Alabama A and M University): The chapter held its spring initiation on May 1, 1986. Among its activities were the creation of a tutorial program for engineering-technology students, the promotion of an annual science fair in the School of Technology, the establishment of an annual scholarship to be awarded to a deserving student in the School of Technology, and the setting aside one week each year as Tau Alpha N week. Officers: Nathaniel D. Colley (President); Carl Spangler (Vice-President); Carol Yvonne McDonald (Secretary); Ezekiel 0. Ilumoka (Treasurer).

ALPHA MAINE (University of Maine at Orono): The newly established chapter held its chartering ceremonies and induction of charter members on April 28, 1986. This chapter is the first in the state of Maine. A banquet followed the ceremonies. Arthur Johnson, President of the University of Maine at Orono, was inducted as an honorary member. Professor Richard Hill, UMO professor of mechanical engineering and director of the Industrial Cooperation department, was guest speaker. Also speaking were Norman Smith, dean of UMO College of Engineering and Science, and President Johnson. Executive Director Frederick J. Berger inducted the officers and delivered an address. Future plans include the purchase of a Tau Alpha Pi monument or emblem, fund raising, and the establishment of a scholarship fund to honor outstanding students. Officers: Eric Huston (President); Ronald Verreault (Vice-President); Matthew Pelletier (Secretary); Mike Rice (Treasurer).

ALPHA MAINE

Left to right, front row (seated): Stuart Lambert, Michael Rice, Treas., Ronald Verreault, V.P., Eric Huston, Pres., Matthew Pelletier, Secy., Keith Hodgins. Back row (standing): Prof. Henry Metcalf, Sponsor, Frederick Berger, National **Executive Director, Prof. Keith Hamilton, Advisor,** Pres. Arthur **Johnson, Dir.** John **McDonough, Advisor, David Cook,** Robert **Reed, Michael Thibodeau, William Squiers, Warren Jennings, Prof. Howard Gray, Advisor, Prof. Russell Johnston, Advisor, Kurt Knowlton, Jeffrey Dutton, Peter Harmon, David Godbout.**

ALPHA OREGON (Oregon Institute of Technology): The chapter held its initiation and banquet on June 5, 1986. Dr. John Lund, Associate Dean of Engineering, was the guest speaker. Plans include providing a college with tutorial service. Officers: Hans
R. Simonsen (President); Cynthia L. Madsen (Vice-President); Michelle Hurula (Secretary); Clay K. Jordan (Treasurer).

ALPHA MICHIGAN (Lake Superior State College): The chapter held its most recent initiation on May 2, 1986. During the academic year, the chapter participated in campus activities and public aid projects such as the design and construction of a tongue-controlled, infrared switch to be used by the handicapped to communicate using a matrix of lights; and the construction of a table to fit a wheel chair and to hold a voice-synthesized keyboard. Future plans include continuing public-aid projects, tutoring, taking an educational field trip, and casting the Tau Alpha Pi plaque and key to be displayed on campus. Officers: James J. Piwowarski (President); Douglas Babcock (Vice-President); Timothy Jasina (Secretary); Douglas Chaplin (Treasurer).

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ALPHA MICHIGAN

Left to right, front row: Scott Weiss, Michael Tokarski, Janette Sipe, Robert Krauss, **Michael Filipiak.** Second **row: Prof. Dimitri** Diliani (Adviser), **Michael** Pulka, Douglas Babcock **(Vice-**President), James Piwowarski (President), Timothy Jasina (Secretary), Douglas Chaplin **(Treasurer), Ben Griffin.**

ALPHA OKLAHOMA (Oklahoma State University): The chapter held its initiation and banquet on April 17, 1986. Among the chapter's activities is the presentation of the Outstanding Faculty Award, which this year was bestowed upon Professor Samuel Kraemer, Associate Professor of Electronics Technology. In attendance at the banquet was Dean Karl Reid, who was the guest speaker. Another activity is the maintaining of a display case. Items on display are the names of Tau Alpha Pi members, requirements for membership, the chapter charter, and a picture-plaque of the current year's Outstanding Faculty Award recipient. Officers: Mark Bokorney (President); Lee Jackson (Secretary-Treasurer); Todd Humble (Publicity Chairman).

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Left to right: Mark Bokorney (President), Lee Jackson (Secretary-Treasurer), Todd Humble (Publicity Chairman).

HONOR ROLL

The officers and members of Tau Alpha Pi National Society hail and greet the following affiliate chapters newly elected during the year of 1986. We congratulate the institutions for having the foresight to initiate affiliate chapters of Tau Alpha Pi at their respective campuses. We congratulate these charter members and say to them that they should be proud of their designation, for Tau Alpha Pi National Honor Society for students in Engineering Technology is the most selective of all honor societies, accepting only the top 4% of all technical students enrolled at a college or university.

We hope that the charter members will establish a solid and firm foundation so that those who follow them will be able to build upon it. Our best wishes for success in the endeavors of Tau Alpha Pi.

Frederick J. Berger
Executive Director/Secretary
Tau Alpha Pi

BETA P1 CHAPTER

Chartered May 16, 1986. State University of New York at Binghamton: Associate Dean Richard S. Culver, Sponsor; Dr. Andrew J. Lavin, Frank M. Cardullo, Chittaranjan Sahay, James H. Constable (Chairman E.T.),

Advisors.

Charter Members
Vincent J. Canino
Michael J. Carnevale
Michael P. Cassin
Thomas L. Cogswell
Anthony J. Creo
Alfred M. Dodson
Michael D. Eastman
George E. Ernst
Mario F. Fabrizio
John E. Ferguson
Michael D. Givens
Brian 1. Gordon
Dwayne D. Handwerk
David S. Hesse
Steven P. Hildsdorf
Michael N. Hochdoerfer
Kevin M. Jones
Donald P. Kunkel
Thomas L. Miller
Elbert L. Mosher
Robert G. Raffensperger
Daniel W. Rider
Eugene C. Segar
Stephen K. Szulewski
James G. Tracy
Michael Wozniak
Paul R. Zamjohn

BETA OMICRON CHAPTER

Chartered April 22, 1986, Westchester Community College: Ernest Alfred Joerg, Kevin B. Slavin (Student Activities Coordinator), Sponsors; Emilio Escaladas, Jerome Mouldovan, John Olenik, Advisors.

Charter Members
Gabriel Argueta
Dawne Charters
Robert I. Danuff
John H. Hearty
John H. Kienle
Jonathan Douglas Lew
Emilio Escaladas

Honorary Members

William R. Dunn

Angelo L. Delgrosso
Arthur J. Hackett
William Wells Terry
Jerome Mouldovan
Maurice Musilli
Truc M. Nguyen
John J. Norris
John Olenik
Thomas Regan
Randoy Russo

Alumni Members

Thomas Anthony Gallo
Nat Anthony Polito
Ralph Sparks
James Sedgewick
Gail E. Stryker
Frank Solomon
George J. Szarka, Jr.
Paul James G. Thompson
William G. White
Robert Zahensky

GAMMA ETA CHAPTER

Chartered April 17, 1986, University of Akron: Janet B. VanDoren, Thomas P. Herbert (Chairman Engineering Technology), Sponsors; Minnie C. Pritchard, David J. Robinson, Advisors.

Charter Members
Elena Beder

Kevin Byckovski

Nolan Robert Cartner

Thomas D. Culp

Daniel J. Drongowski

Mary J. Fedor

Richard L. Gwynne
Gregory F. Hussing
James A. Liddle
Daniel J. Lucas
Jeffrey A. Mitcheltree
Michael P. Muchay
Dwayne J. Nicholson
Patrick J. Nudo
Denis M. Randall
Michele Lynn Seguin
Louis J. Serva
Timothy B. Strouse
Thomas E. Wehner
Jon R. Whitledge

MU GAMMA CHAPTER

Chartered May 1, 1986, Spartanburg Technical College: Steven W. Faulkner

(Dean), Sponsor; William T. Divver, Advisor.

Charter Members
José A. Singh
*Sharon S. Jones
*Terry L. Miller
*Donna M. Page

*Technical Scholars
Nathan J. McGaha
Christopher Stack
Olin D. Lynch

OMICRON ZETA CHAPTER

Chartered June 4, 1986, County College of Morris: Joe E. Vallely, Sponsor; William E. Barnes, Ronald J. Cieplik, Stephen G. Fogle, Xavier F. Gonzales, Advisors.

Charter Members
Joseph H. Philback
David M. Selle
Robert Aymar
Edward Buckwald
Joseph Camerlin
Jane Regan
James Rymaniak
Shari Sperandio
William W. Beyer
Lewis J. Candura
Ronald J. Deibert
John B. Dudley
James F. Kachier
Honorary Member

James W. Sounders (Trustee, County College of Morris).

ALPHA MAINE CHAPTER

Chartered April 28, 1986, University of Maine at Orono: Henry B. Metcalf, Sponsor; John J. McDonough (Director, Engineering Technology), Howard M. Gray, Keith E. Hamilton, Russell Z. Johnston, Jr., Advisors.

Charter Members
Michael L. Rice
Robert S. Reed
Michael J. Thibodeau
Warren J. Jennings
Stuart W. Lambert
Matthew J. Pelletier
Eric J. Huston
Ronald Verreault
Keith J. Hodgins
J. Holly Bixby
David W. Cook
William G. Squiers

Kurt Knowlton
Jeffrey C. Dutton
David A. Godbout
Joel W Lee
Peter A. Harmon
Honorary Member
Arthur M. Johnson (President, University of Maine at Orono).
1986

Collegiate Chapters of Tau Alpha Pi National Honor Society for Engineering Technology

ALPHA ALPHA CHAPTER
Southern Technical Institute
1112 Clay Street
Marietta, Georgia 30060
Prof. Paul Wojnowiak

ALPHA BETA CHAPTER
DeVry Institute of Technology
250 North Arcadia Avenue
Decatur, Georgia 30030
Prof. John Blankenship

ALPHA DELTA CHAPTER
Savannah State College
Savannah, Georgia 31404
Dr. Lester B. Johnson

ALPHA EPSILON CHAPTER
Fort Valley State College
Fort Valley, Georgia 31030
Prof. Fereydoun Jalali

BETA ALPHA CHAPTER
Academy of Aeronautics
LaGuardia Aiport
Flushing, New York 11371
Prof. Joseph J. Scalise

BETA GAMMA CHAPTER
Queensborough Community College
of the City University of N.Y.
56th St. & Springfield Blvd.
Bayside, N.Y. 11364
Prof. Frank Scalzo
Prof. Bernard E. Mohr
Prof. Franz Monssen

Prof. Gaetano A. Giudice
Prof. Russel K. Hotzler

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of the City University of N.Y.
Bronx, New York 10453
Prof. Stella Lawrence
Prof. Herb Tyson
Dr. Louis De Acetis

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Hudson Valley Community College
80 Vandenburgh Avenue
Troy, New York 12180
Dr. John Nagi

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College of Staten Island
of the City University of N,Y.
715 Ocean Terrace
Staten Island, N.Y. 10301
Prof. So! Lapatine

BETA THETA CHAPTER
Broome Community College
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Prof. Robert L. Reid
Prof. Alan C. Dixon

BETA IOTA CHAPTER
Rochester Institute of Technology
One Lomb Memorial Drive
Rochester, New York 14623
Prof. John A. Stratton
Prof. Dave Krispinski
Prof. Richard Hultin

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State University of New York
College of Technology
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Utica, New York 13502
Dr. Louis J. Galbiati, Jr.
Prof. James T. Vize

BETA LAMBDA CHAPTER
Technical Career Institutes
320 West 31 Street
New York, New York 10001
Dr. Samuel Steinman
Prof. Ben Zeines

BETA MU CHAPTER
State University of New York
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Prof. Wayne Ratowski

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Dr. William B. Bruce

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Prof. Kevin B. Slavin
Prof. Emilio Escaladas
Prof. Jerome Mouldovan
Prof. John Olenik

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Dr. Andre J. Lavin
Prof. Richard Culver
Prof. Frank M. Cardullo
Prof. Chittaranjan Sahay

Prof. James H. Constable

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Prof. David Wells

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Prof. Albert E. Staub

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Dr. Lorin V. Waitkus

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Prof. Minnie C. Pritchard
Prof. David J. Robinson

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Ms. Kordi Heidel
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Prof. Nonna Kliss Lehmkuhl

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Dr. Richard P. D'Onofrio
Dr. Murray Shapiro

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North Dartmouth, MA 02747
Prof. Alden W. Counsell
Dr. Dean J. Schmidlin
Prof. Lenine Consalves
Prof. Fryderyk E. Gorczyca

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11224 Holmes Road
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Prof. J. D. Davison

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Prof. Allan Eschser

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Prof. Larry L. Money

Prof. H. Holloway

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Prof. Pao-Lien Wang
Prof. Edward M. Willis

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