Journal of Tau Alpha Pi

Volume VIII, 1984

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Journal of Tau Alpha PI

Executive Director/Secretary
Editor FrederickJ. 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

The Journal is an annual publication sent to all Tau Alpha Pi chapters so that they may receive timely scholarly information, news of chapter activities, and other items of interest to engineering technology. As in the past, I take pride in serving as the editor of the *Journal*

Since Tau Alpha Pi chapters are autonomous, communication through the *Journal* is essential. Clearly, if the *journal* is to be as thorough and useful as possible, chapters have to forward appropriate information. All correspondence should be addressed to me at P.O. Box 266, Riverdale, New York 10471. Particular activities, dates of events, and names of officers should be included in chapter news, as well as planned projects. Requests for certificates, keys, and organizational information should be sent sufficiently in advance so that I may have at least two weeks to prepare and forward materials. Chapter news and scholarly and professional articles should reach me by April 1 5 in order to be considered for publication. Every item submitted is editorially reviewed. Essays should be relevant to engineering technology.

Tau Alpha Pi, as we know, is the honor society for the engineering technologies. It extends recognition and honor to deserving engineering-technology students. It, in turn, is nationally recognized as the highest honor that can be bestowed on engineering-technology students. Its requirements are rigorous, and a maximum of 4% (exclusive of existing members) of the total engineering-technology enrollment may be elected. Tau Alpha Pi is an honor society, not a club, and college catalogues should be checked to ensure that it is listed correctly as an honor society.

Unlike the two other national honor societies—Phi Beta Kappa (for upper-division liberal arts) and Tau Beta Pi (for upper-division engineering science)—Tau Alpha Pi (for both associate and baccalaureate candidates) is not centralized, and there are no dues or monetary contributions solicited bythe national society. Each chapter of Tau Alpha Pi is autonomous, within the Tau Alpha Pi constitutional framework This structural arrangement makes it all the more necessary for each chapter to maintain an updated roster of names, addresses, and phone numbers of members and alumni. Keeping in touch with and inviting alumni to Tau Alpha Pi functions are desirable procedures for several reasons. Alumni should be encouraged to remain loyal to their chapters and schools, and the schools, also, can benefit from alumni contributions and feedback concerning job opportunities and industrial requirements.

Tau Alpha Pi does not advertise or solicit for the establishment of chapters. Existing chapters should inform colleges that do not have chapters so that their deserving students may be honored. The opportunity for

membership. Several letters arrive periodically that address this very issue. A department head seeking to establish a chapter wrote that he would like to "initiate a chapter of Tau Alpha Pi Honor Society." He continued: "Some twenty years ago I was a member of this organization [Gamma Beta] and it meant so much to me."

On each campus that does have a chapter, every opportunity should be taken to make Tau Alpha Pi more visible and, by so doing, encourage and inspire scholarly achievement among students. One way to do this is to cast and erect a large replica of the Tau Alpha Pi key in front of the technology building. The key with its gear and compass contains the very essence of engineering technology, and it adds an attractive dimension to a college campus.

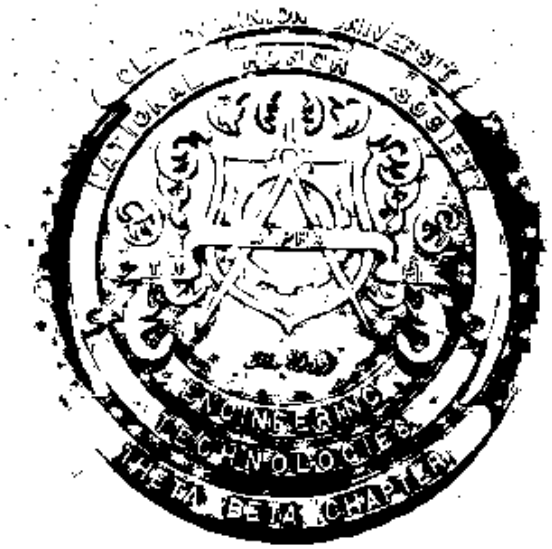
Another way to promote visibility is for the four initiating officers to wear the pendant during induction ceremonies. The pendants may now be ordered from the executive director. The pendants are to remain the property of the chapter for use in subsequent initiations. Individual members may purchase a pendant for wearing over academic attire, for example, at commencement such purchases are to be made through the chapter. When these pendants are forwarded to a chapter, a copy of the revised initiation ritual procedures will be enclosed. Numerous letters from chapters attest to the fact that the pendants add to the ceremonial quality and dignity of the initiation. Any chapter that has not yet placed its order should please do so.

The year 1983-1984 witnessed the chartering of eight new chapters: Alpha Oregon(Oregon Institute of Technology), Alpha Epsilon(Fort Valley State College), Beta Alabama (Alabama Agricultural and Mechanical University), Beta Xl (Alfred State College, SUNY), Delta Gamma (Franklin Institute of Boston), Delta Delta (Southern Massachusetts University),

Lambda Delta (Greater New Haven State Technical College), and Mu Delta (Florence Darlington Technical College).

I am pleased to welcome these new chapters into the Tau Alpha Pi society. I wish to thank these chapters for inviting me to attend and participate in their chartering ceremonies. Where I could not attend because of conflict in schedule, I was most ably represented. I want to thank especially Professor Fereydun Jalali of Alpha Epsilon chapter and Professor Richard H. Zbinden of Alpha Oregon chapter for their excellent handling of the chartering ceremonies at their respective colleges.
During the year I had the distinct pleasure and privilege to attend four additional induction ceremonies and deliver keynote talks: Beta Delta (Bronx Community College), Beta Gamma(Queensborough Community College), Kappa Beta (Anne Arundel Community College), and Theta Beta (Old Dominion University).
On the occasion of my visit to Theta Beta chapter I was most privileged to participate in the mounting of a plaque of the Tau Alpha Pi emblem measuring 4.14 inches in diameter. The plaque now adorns the engineering technology building, front lobby, Kaufman Hall. In recognition of the con-

to he mounted, I bestowed awards of meritorious service on Professor L. A. Hobbs, sponsor of Theta Beta chapter and for twenty years its adviser; Professor J. H. Lederle, the designer of the plaque; and chapter presidents Albert Bowers (1984) and David Norman (1983), who planned and completed this project
From time to time, I have the opportunity to bestow such meritorious service awards on individuals who have made significant contributions to Tau Alpha P1. In addition to the four cited above, I granted an award to Dr. Leonard Spiegel, Beta Epsilon (Hudson Valley Community College), for ten years of outstanding service as sponsor and adviser. During his term of office, Beta Epsilon grew in membership and became a dynamic chapter of Tau Alpha Pi. Dr. Spiegel rendered exceptional leadership of which we express appreciation, and we wish him well in his future endeavors.



Bronze casting of Tau Alpha Pi emblem, Old Dominion University.

There comes a time when faculty advisers leave their position as advisers. To these faculty who have served devotedly in the past, I express thanks and gratitude: Professor Robert McGrath,Jr. (Beta Iota); Professor Richard W.Miller (Beta Mu); Professor Borak Kreimer (Delta Beta); Professor RichardT. Stevens and Professor Martin Geer(Epsilon Beta); Dr. David H. Robinson (Zeta Beta); Professor Jerry Zazvorka, Jr. (Zeta Epsilon); Mr. Raymond F. Lunny (Iota Beta, Beaver Campus); Professor David V. Hutton and Professor Ronald Kopozyk (Mu Beta); Dr. C. Lee Rogers (Nu Beta); Professor Fred Eynshousen (Pi Alpha); Dr. John F. Dalphin(Pi Gamma); Dr. William Byers (Alpha Alabama); Professor James G. Weatherly (Alpha Kentucky); Professor Charles Donovan (Alpha Washington).
To those faculty who are so dedicated as to assume the role of faculty adviser, I extend a welcome and a word of thanks: Professor Fereydun

jalali (Alpha Epsilon); Dr. John Nagi (Beta Epsilon); Professors Dave Krispinsky and Dick Hultin (Beta iota); Professor Wayne Ratouski (Beta Mu); Dean Gary T. Fraser and Drs. George DeSain and William Bruce and Professor Philip F. Alesso (Beta XI); Drs. Michael C. Mazzola, Richard P. D'Onofrio, and Murray Shapiro and Professor Carol F. Liebman (Delta Gamma); Dr. Tom Hulbert and Mrs. Kordi Heidel(Delta Beta); Dr. Dean). Schmidlin and ProfessorAlden W. Counsell(Delta Delta); Dr. Tom Kanneman (Upsilon Beta); Professor George B. Wright (Zeta Gamma); Professors M.E. Mauer, H. Holloway, Larry L Money, and Harold L Teel, Jr. (Zeta Epsilon); Professor Alfred D. TaIvola (Iota Beta, Beaver Campus); Professor Ross A Kester(lota Beta, Dubois Campus); Dr. Norman Marcus (Lambda Alpha); Dr. Edmund L Sobolewski and Professor Donald A. Lostritto(Lambda Delta); Professors Larry Grulick, Cecil N. Ridgill, and Albert Beige (Mu Delta); Professor Mark Pagano (Nu Beta); Professor Ted G. Graves (Xl Delta); Professor Thomas K Prendergast (Xl Gamma); Professor Judith 0. Silence (Pi Beta); Dr. Charles A. Stevens (Pi Delta); Dr. John Dalphin (Chi Beta); Dr. James L Keating (Alpha Alabama); Drs. Joseph R. Jenkins, George Jones, and Goang-Shin Liaw and ProfessorsJ.B. Turner and Getachew Gabre (Beta Alabama); Dr. William S. Byers (Alpha Kentucky); Professor John G. Hanks (Gamma Louisiana); Dr. Craig B. Robison (Alpha Oklahoma); Professor Richard H. Zbinden (Alpha Oregon); Professors Gene A Burns and Frank M. Rafchiek (Alpha Washington).

The leadership role of faculty advisers cannot be overemphasized. Wherever possible, I suggest that each chapter have faculty advisers from each of the engineering-technology curricula. In this way, prospective members can be known to faculty and screened by them. In this way, too, continuity can be maintained even when student members are graduated, and in the event of insufficient student members the advisers can assist in the initiation procedure.

To the many advisers who continue to serve, I extend my appreciation of their dedication.

And I express a special word of thanks to Dr. Lillian Gottesman (Beta Delta) for ably assisting in the preparation of this *Journal.*

Although much has been said about the ceremonial aspect of Tau Alpha Pi, I should like to emphasize that the purposes and objectives of this honor society are serious and sublime. Tau Alpha Pi seeks to promote and recognize superior scholarship, character, and leadership traits. There can be no doubt that we live in an age of technology, atechnology that can serve mankind or become its master and even its destroyer. There can be no doubt that we live in tryingtimes when our country must fight in a variety of ways for our democratic way of life and must compete forcefully for technological leadership. Tau Alpha Pi, as the honor society for engineering technology, must rise to the demands of the times by inspiring, identifying, and recognizing those whose outstanding potential enables them to achieve and lead.

Frederick
Berger

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 1983-84. 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 top4% 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

ALPHA OREGON CHAPTER
Chartered June 5, 1984, Oregon Institute of Technology~ Prof. Richard H. Zbinden, Sponsor.
Charter Members

Pat Creedican Howard Brenner James C. Caddock
Ronald R. Hylton Darryl J. Anderson John Keith
Ronald H. Silva Michael W. Dickinson Kathleen Sartorius

ALPHA EPSILON CHAPTER
Chartered May 18, 1984, Fort Valley State College: Prof. Fereydun Jalali, Sponsor.
Charter Members

Kirk G. Huggins Alan L Reagan
Eric Hughey Josephus S. Walker III

BETA ALABAMA CHAPTER
Chartered February 17, 1984, Alabama Agricultural and Mechanical University School of Technology: Dr. Joseph R. Jenkins, Sponsor; ProfessorsJ. B. Turner, Getachew Gabre, Dr. George Jones, Dr. Goang-Shin Liaw, Advisors.
Charter Members

Nathaniel D. Cooley Gerard Mark Perera Michael Miller
Oseghale 0. Stephen Carl Spangler
Lizette M. Williams Ada B. Brown

BETA XI CHAPTER
Chartered April 13, 1984, Alfred State College, State University of New York Agricultural and Technical College: Dr. Gary T. Fraser, Sponsor; Dr. George DeSain, Dr. William Bruce, Professor Philip F. Alesso, Advisors. Charter Members
Richard E. Muench
Steven D. Sherwood

DELTA GAMMA CHAPTER
Chartered April 1, 1984, Franklin Institute of Boston: Dr. Murray Shapiro, Sponsor; Dr. Michael C. Mazzola, Dr. Richard P. D'Onofrio, Professor Carol F. Liebman, Advisors.
Charter Members
Louis J. Casey
Barry J. Davignon
Douglas Dugas
Philip D. Harris

DELTA DELTA CHAPTER
Chartered February 3, 1984, Southeastern Massachusetts University: Professor Alden W. Counsell, Sponsor; Dr. Dean J. Schmidlin, Advisor.
Charter Members
Ann Louise Ziki
Douglas W. Fraser Bradley A. Artlip
Deborah Heagney
David B. Kutz
James Marquedant

Donald N. McMahon
Ying K. Ng
John R. O'Rourke
Joanne C. Cusson Michael P. Fredericksen
Timothy J. Rezendes Ernest W. Sennett Jr.
Robert E. Tavares

MU DELTA CHAPTER

Chartered May 12, 1 984, Florence Darlington Technical College: Professor Larry Grulick, Sponsor; Professor Cecil N. Ridgill, Advisor.

Charter Members

Charter Alumni Members

Maxie T. Springs
John D. Lowe
Delbert Wayne Driggers
Margaret R. Norwood
Joseph Clifton Keith
F. Gil Atkinson
Robert A Ellis
Michael L. Gregg
Kelvin Brown
Scott Cagle
David Fouchey
Herman Funderburk
Sheldon Filyaw
Eugene Gardner
Chris Gibbons
Ed Gregory
Audie Harrelson
Danny Humphries
Dorothy L Joe
Tracy Larrymore
Leon Thomas
William Vuicich
Ted Adams
Wayne Bladon
Richard Brewer
William Windham
Melinda Layfield
Tim Lee
Robert Lynch
James McFarland
Garland McLamh
Mark Montgomery
Luanne Nobles
Eric Outlaw
Earl Quick
Mark Robandt
David Saverance
Jimmy Smith
Bobby Tyson
Stephen Page
Anthony Atkinson
Victor Barefoot

Mike Boatwright
Mike Spease
Bruce Marshall
Honorary Member Curtis Whaley

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LAMBDA DELTA CHAPTER
Chartered April24, 1984, Greater New Haven State Technical College: Dean Edmund L Sobolewski, Sponsor; Professor Donald A Lostritto, Advisor.
Charter Members

Michael A. Cannella Steve Chen Katherine E. Dellisola
Michelina B. Doria Dale L HowellThomas'F. Palmatier
Michael A. Pawlyk James J. Principi David H. Roden
Christopher E. Romanoff Stephen P. Schwink Brian H. Spencer
NancyJ. Schober Turnier Stephen P. Wolensky

NATIONAL HONORS FOR ENGINEERING TECHNOLOGY STUDENTS

Tau Alpha Pi National Honor Society has affiliate chapters on the campuses of many of the country's leading technical colleges and universities. The Society is intended to be for the engineering technology student what Phi Beta Kappa is for the arts and sciences student and what Tau Beta Pi is for the engineering science student.

The Society was founded in 1953 to provide recognition for high standards of scholarship among students in technical colleges and universities and to engender desirable qualities of personality, intellect, and character among engineering technology students by offering membership in the Society to those with outstanding records.

Membership is restricted to students with averages in the top four percent in engineering technology programs. Both associate and baccalaureate degree students are eligible. Membership in Tau Alpha Pi does not conflict with membership in any local honor society.

Realizing student achievement is an important aspect of every educational institution, Tau Alpha Pi will serve as a further recognition of academic excellence, and it welcomes new chapters. If you are interested in establishing a chapter at your institution or in obtaining additional information, please communicate with Prolessor Frederick J. Berger, Executive Director, Taii Alpha Pi, P.O. Box 266, Riverdale, New York 10471, or Telephone: 212—884-4162.

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Engineering Technology Degree and Enrollment Update

This report is a summary of the latest data on engineering-technology programs in the U.S. which resulted

from Engineering Manpower Commission (EMC) surveys of colleges. The EMC conducts annual surveys to determine the numbers of degrees awarded and enrollments in engineering and engineering-technology programs.

There are thought to be approximately 700 U.S. colleges which offer engineering-technology programs and of these almost 200 are currently listed by the Accreditation Board for Engineering and Technology (ABET) as havingat leastone such program which is accredited bytheTechnology Accreditation Commission (TAC) of ABET. Information regarding TAC/ ABET-accredited programs is available from: Accreditation Director, ABET, 345 East 47th Street, New York, N.Y. 10017.

Over the years, the majority of colleges responding to these surveys have been those with TAC/ABET-accredited programs and relatively few of those not on the ABET list have provided consistent annual data. As a result, the EMC no longer attempts to survey all 700 colleges, but instead has selected a group of about 300 colleges to survey, including all of those on theABETlist Forthese reasons, the totals in the degree and enrollment tables cannot be considered as national totals. Furthermore, if a ~articular college of interest to the reader does not happen to be represented in these tables, that only means that it may not have responded to the EMC surveys and more specific information should be sought directlyfrom that institution.

Degrees

Table 1 summarizes engineering-technology degrees awarded by the 231 responding colleges in 1983. These include over 19,000 associate degrees (AET) reported by 1 80 institutions and over 9,000 bachelor degrees (BET) awarded by 105 colleges. Fifty-four colleges awarded both AET and BET degrees.

The largest number of AET degrees continues to be in the areas of Electrical and Electronic EngineeringTechnology with more than 7,500. Mechanical Engineering Technology was second largest with over 3,000 while Civil and Construction Engineering Technology (more than 1,600) and Computer Engineering Technology(more than 1,200) were the third and fourth largest AET degree areas.

The three largest areas for BET degrees were the same as for the AET with approximately 3,800, 1,800, and 1,300 degrees, respectively. The fourth largest number of BET degrees (700) was reported in Manufacturing and Industrial Engineering Technology.

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TABLE1 — ENGINEERING TECHNOLOGY DEGREES BYCURRICULUM & DEGREE LEVEL— 1983

CURRICULUM AREA	CERT	ASET	BSET	MSET
Air Conditioning ET	13	350	0	0
Aeronautical FT & Belated	200	381	49	0
ArChitectural ET	22	909	131	0
Automotive FT	41	349	0	0
Chemical FT	0	257	20	0
Civil ET, Surveying FT	22	1271	737	0
Construction ET	0	368	561	0
Computer FT	12	1215	139	0
Drafting, Design,Graphics ET	20	685	193	0
Electrical FT	0	3241	1753	0
Electromechanical FT	0	371	121	0
Electronic FT	112	4323	2050	0
General ET	0	185	525	14
Industrial ET, Manufacturing FT	3	859	708	27
Marire ET	0	7	55	0
Mechanical FT	59	3018	1803	0
Mining, Minerals, Petroleum ET	0	271	173	0
Materials, Metallurgical FT	0	0	0	0
Nuclear FT	0	37	0	0

Other	22	1232	204	2
TOTAL	526	19329	9222	43
Number of Colleges Reporting	10	180	105	4

These figures are for a selected group of colleges that responded to the EMC survey. They do not represent national totals and therefore cannot be compared to past years' data.

technology graduates were New York(3771), Ohio (2004), Pennsylvania (1677), Massachusetts (991), Tennessee (772), Indiana (720), NewJersey (694), North Carolina (690), Florida (674), and Connecticut (668).
The states showing the largest numbers of Bachelor of Engineering Technology graduates were Ohio (800), New York (723), Pennsylvania (676), Texas (598), Illinois (596), Indiana (51 2), Georgia (495), Arizona (395), Massachusetts (383), and California (377).

Enrollments

TabIe2 shows Fall 1982 enrollments in engineering technology arrayed by program area, year, and degree - level, totaled for all 320 responding colleges. Associate-degree program enrollments were reported by 241 colleges, and bachelor program enrollments by 11 5 colleges, while 36 institutions had both AETand BET enrollments. There were almost 127,000 associate degree engineering-technology students, almost 65 percent of whom were attending full-time. AImost49,000 were bachelor of engineering technology students, 78 percent of whom were attending full-time. It might be noted that the third and fourth years of the BET each enrolled about 11,500 full-time students, while the first and second years of the

TABLE 2— ENROLLMENTS IN ENGINEERING TECHNOLOGY BY PROGRAM, YEAR & LEVEL — FALL 1982

PROGRAMS — ALL COLLEGES	ASSOCIATE DEGREE PROGRAMS					BACHELOR OF TECHNOLOGY PROGRAMS						
	1st Year	2nd Year	Other Years	Full-Time	Part-Time	1st Year	2nd Year	3rd Year	4th Year	Full-Time	Post-Bacc	Part-Time
Aerospace Engineering Technology	1494	866	14	2374	481	134	120	92	152	498	1	58
Agricultural Engineering Technology	76	70	0	146	0	0	0	0	0	0	0	0
Air Conditioning Engineering Technology	895	542	0	1437	1132	0	0	0	0	0	0	0
Architectural Engineering Technology	2048	1370	0	3418	1256	174	136	213	194	717	0	73
Automotive Engineering Technology	1052	535	14	1601	1456	28	36	21	67	152	0	22
Bio-Medical Engineering Technology	7	2	0	9	11	0	0	0	0	0	0	0
Ceramic Engineering Technology	36	36	0	72	0	0	0	0	0	0	0	0
Chemical Engineering Technology	582	347	2	931	401	15	21	20	17	73	0	6
Civil Engineering Technology	2061	1578	49	3688	1673	360	278	627	777	2042	33	462
Computer Engineering Technology	4511	2152	75	6738	5445	253	139	252	250	894	1	499
Construction Engineering Technology	1046	766	37	1849	784	345	330	568	675	1918	0	456
Drafting & Design Engineering Technology	3031	1590	25	4646	2197	315	343	393	408	1459	0	266
Electrical Engineering Technology	3119	2032	15	5166	2639	843	726	1850	1701	5120	73	1743
Electromechanical Engineering Technology	988	530	4	1522	751	0	0	251	161	412	0	150
Electronic Engineering Technology	15690	8133	397	24220	12543	2624	3078	2664	2443	10809	83	2556
General Engineering Technology	973	404	4	1381	1233	335	368	785	1053	2541	33	436
Industrial Engrg T & Manufacturing Engrg T	1792	1258	22	3072	3058	420	481	1073	1036	3010	64	1182
Marine Engineering Technology	26	6	0	32	1	76	51	51	57	235	0	0
Mechanical Engineering Technology	4466	3285	63	7814	4735	1060	998	2124	2126	6308	78	2242
Metallurgical Engineering Technology	230	118	0	348	175	6	6	28	36	76	4	8
Mining Engineering Technology	595	413	10	1018	759	48	24	51	68	191	0	5
Nuclear Engineering Technology	188	119	0	307	68	0	0	0	0	0	0	0
Petroleum Engineering Technology	112	55	23	190	19	0	0	0	0	0	0	0
Other	6495	3231	43	9769	4278	790	234	356	383	1763	6	532
TOTAL UNITED STATES	51513	29438	797	81748	45095	7826	7369	11419	11604	38218	376	10696
Programs Accredited By TAC/ABET	10822	7634	221	18677	9303	3301	3871	5603	5746	18521	196	4139
Programs Not Accredited By TAC/ABET	40691	21804	576	63071	35792	4525	3498	5816	5858	19697	180	6557
College On TAC/ABET List	28828	17342	736	46906	25289	6368	6070	9260	9630	31328	353	8850
College Not On TAC/ABET List	22685	12096	61	34842	19806	1458	1299	2159	1974	6890	23	1846

BET each totaled about 7,500 full-time students. This indicates that many of those proceeding to the BET appear to do so after completing a corresponding AET degree and transferring to the junior year of the BET. Enrollments in the three most popular curricular areas (Civil and Construction ET, Electrical and Electronic ET, and Mechanical ET) comprise more than 56 percent of the total enrollments reported, with almost 69 percent of the BET enrollments and over 51 percent of the AET enrollments in these three areas. The fact that most of enrollments reported were in colleges on the ABET list is shown by the totals at the bottom of Table 2, where 57 percent of the AET students and 82 percent of the BET students were attending colleges which have at least one TAC/ABET-accredited program.

Table 3 shows the numbers of women and minority group members reported being enrolled in engineering-technology programs in Fall 1982. According to these reports, women were approximately12

percentofthe AET enrollments and 7 percent of the BET students. Similarly, the percentages of Blacks and Hispanics were 7.3 percent and 3 percent of AET students and 6.5 percent and 2.7 percent of BET enrollments. The Asian/ Pacific students comprised 1.7 percent of the AET and 2.4 percent of the BET registers, whileAmerican Indians represented fewerthan0.5 percent in each degree category.

Table 4 shows an historical summary of engineering-technology enrollments as related to TAC/ABET accreditation. The data through Fall 1978 represent enrollments in all engineering technology programs, whether specifically accredited or not, in institutions which had at least one TAC/ ABET-accredited program. Starting with Fall 1979, the data are restricted to programs which are specifically TAC/ABET accredited. The percentage of colleges respondingwith this information compared tothetotal number of colleges with TAC/ABET-accredited programs has been declining in recent years from90 percent in Fall 1979 to80 percent in Fall **1982.** Since this report shows about 50,000 students enrolled in accredited programs in 1982, we can estimate that the national total of such students was probably well over 60,000.

Detailed listings of engineering-technology degrees and enrollments by college and degree-level are in Table 5. A total of 351 colleges is included in this table of which 200 responded to both the degree and enrollment surveys, 120 answered only the enrollment survey, and 31 returned only the degree survey.

S. M. Brodsky, Ph.D., P. E.

Prof., Mechanical Engineering Technology New York City Technical College

of the City University of New York

TABLE 3— ENGINEERING TECHNOLOGY ENROLLMENTS, WOMEN & MINORITY GROUPS — FALL 1982

Classification	First Year	Total Full-Time	Total Part-Time	Total Full-Time	Total Part-Time	TOTAL
Women	6472	10020	5389	2970	599	29
Blacks	4567	6384	2922	2737	483	7
Hispanics	2015	2864	1073	885	400	8
American Indians	245	367	102	122	30	0
Asian/Pacific	1048	1623	500	972	236	23

TABLE 4 — HISTORICAL SUMMARY OF ENROLLMENTS IN ENGINEERING TECHNOLOGY PROGRAMS ACCREDITED BY TAC/ABET

	Enrollments In All ET Programs In College With At Least One ET Program Accredited By TAC/ABET							Enrollments In ET Programs Specifically Accredited By TAC/ABET			
STUDENT CATEGORY	Fall 1972	Fall 1973	Fall 1974	Fall 1975	Fall 1976	Fall 1977	Fall 1978	Fall 1979	Fall 1980	Fall 1981	Fall 1982
First Year AET & BET — Full-Time	22867	22412	23348	27315	28384	31558	30757	18102	22127	21483	14123
Second Year AET & BET	13678	13546	13232	15945	18235	19566	18254	10985	13302	14434	11505
Other AET Students — Full-Time	896	491	1029	811	896	928	515	455	784	541	221
Third & Later Years BET — Full-Time	5129	6526	6868	9121	10487	12490	13063	8805	11542	12389	11349
TOTAL FULL-TIME STUDENTS	42570	42975	44477	53192	58002	64542	62589	38347	47755	48847	37198
TOTAL PART-TIME STUDENTS	13285	12506	14180	21476	19429	14079	16949	15271	17395	16639	13442
Colleges With 1 or More Programs Accredited By TAC/ABET Which Responded To EMC Survey	84	91	96	112	119	135	133	150	166	161	154

TABLE 5 — ENGINEERING TECHNOLOGY DEGREES (1983) & ENROLLMENTS (FALL) 1982

	Degrees Awarded 1983			Total Enrollments Fall 1982		
STATE & COLLEGE	AET	BET	MSET	AET	BET	Post-Bacc
Alabama						
U of Alabama	0	34	0	0	200	0
Alabama A&M U	0	31	0	0	276	0
Jefferson JC	55	0	0	582	0	0
State Total	55	65	0	582	476	0
Arizona						
Arizona State U	0	88	0	0	560	19
DeVry I of T-Phoenix	333	264	0	1379	182	0
Glendale CC	24	0	0	2148	0	0
Northern Arizona U	0	43	0	0	300	2
Phoenix Coll	34	0	0	300	0	0
State Total	391	395	0	3827	1042	21
Arkansas						
U of Arkansas-Little Rock	14	18	0	--	--	--
Southern Arkansas U	--	--	--	175	0	0
State Total	14	18	0	175	0	0
California						
Cal Poly St U-St Luis Obispo	0	112	0	0	404	0
Cal St Poly U-Pomona	0	135	0	0	853	0
Cal St U-Sacramento	0	49	0	0	225	0
Cal Maritime Academy	0	55	0	0	234	0
Cerritos Coll	--	--	--	85	0	0
City Coll of San Francisco	52	0	0	341	0	0
Cogswell Coll	13	26	0	0	450	0
State Total	65	377	0	426	2166	0
Colorado						
Colorado Tech Coll	117	41	0	0	580	0
Mesa Coll	--	--	--	89	0	0
Metropolitan St Coll	2	67	0	0	883	130
U of Southern Colorado	31	133	0	369	332	11
Trinidad JC	--	--	--	143	0	0
State Total	150	241	0	601	1795	141
Connecticut						
Central Conn St Coll	--	--	--	0	583	10
U of Connecticut	0	11	0	0	22	0
Hartford St Tech Coll	218	0	0	740	0	0
U of Hartford-Ward Tech Coll	63	24	0	0	443	0
Norwalk St Tech Coll	94	0	0	--	--	--
Thames Valley St Tech Coll	167	0	0	1685	0	0
Waterbury St Tech Coll	126	0	0	--	--	--
State Total	668	35	0	2425	1048	10
Delaware						
Delaware Tech & CC-Dover	--	--	--	229	0	0
Delaware Tech & CC-Newark	169	0	0	289	0	0
State Total	169	0	0	518	0	0
District of Columbia						
U of District of Columbia	137	18	0	562	58	0
State Total	137	18	0	562	58	0
Florida						
Brevard CC	158	0	0	2177	0	0
Broward CC	303	0	0	1591	0	0
U of Central Florida	0	105	0	0	423	0
Embry Riddle Aero U	0	21	0	0	175	0
Florida International U	0	134	0	0	424	0
U of Florida	--	--	--	0	1	0
Florida A&M U	0	47	0	--	--	--
Florida JC-Jacksonville	--	--	--	575	0	0

(Continued)

STATE & COLLEGE	Degrees Awarded 1983 AET	BET	MSET	Total Enrollments Fall 1982 AET	BET	Post-Bacc
Florida *(Continued)*						
Gulf Coast JC	--	--	--	371	0	0
Hillsborough CC	16	0	0	93	0	0
Lake Sumter CC	--	--	--	21	0	0
Miami-Dade CC-North	--	--	--	275	0	0
Okaloosa-Walton JC	36	0	0	472	0	0
Palm Beach JC	--	--	--	1078	0	0
Pensacola JC	--	--	--	389	0	0
U of South Florida	0	46	0	0	227	0
St Petersburg JC	161	0	0	533	0	0
State Total	674	353	0	7575	1250	0
Georgia						
DeKalb CC	--	--	--	199	0	0
DeVry I of T-Atlanta	114	72	0	0	696	0
Fort Valley St Coll	1	6	0	0	145	0
Georgia Southern Coll	0	68	0	0	279	2
Savannah St Coll	33	0	0	0	175	0
South Georgia Coll	--	--	--	59	0	0
Southern Tech Inst	106	349	0	2103	1094	0
Walker Tech School	--	--	--	189	0	0
State Total	254	495	0	2550	2389	2
Idaho						
Ricks Coll	62	0	0	163	0	0
State Total	62	0	0	163	0	0
Illinois						
Belleville Area Coll	15	0	0	631	0	0
Bradley U	0	142	0	0	379	0
DeVry I of T-Chicago	193	270	0	0	1196	0
Coll of Dupage	--	--	--	2213	0	0
Eastern Illinois U	--	--	--	480	0	0
Lake Land Coll	--	--	--	175	0	0
Lincoln Land Coll	--	--	--	303	0	0
Morrison I of T	70	0	0	234	0	0
Oakton CC	--	--	--	490	0	0
Parkland Coll	11	0	0	63	0	0
Parks Coll of St Louis U	40	0	0	41	0	0
Rock Valley Coll	167	0	0	1192	0	0
Illinois (Continued)						
Southern Ill U-Carbondale	0	100	0	0	448	1
Spoon River Coll	--	--	--	164	0	0
Thornton CC	--	--	--	206	0	0
Triton Coll	69	0	0	450	0	0
Wabash Valley Coll	--	--	--	1367	0	0
Western Illinois U	0	84	9	0	333	13
State Total	565	596	9	8009	2356	14
Indiana						
Indiana St U-Evansville	9	27	0	87	230	0
Indiana St U-Terre Haute	--	--	--	0	940	0
Purdue U-W Lafayette	308	245	0	607	487	0
Purdue U-Calumet	91	106	0	656	277	0
Purdue U-Ft Wayne	141	39	0	633	186	0
Purdue U-Indianapolis	171	95	0	770	259	0
State Total	720	512	0	2753	2379	0
Iowa						
Clinton CC	--	--	--	68	0	0
Hawkeye I of T	75	0	0	189	0	0
Kirkwood CC	30	0	0	150	0	0
Southwestern CC	--	--	--	38	0	0
Western Tech CC	85	0	0	134	0	0
State Total	190	0	0	579	0	0

STATE & COLLEGE	Degrees Awarded 1983 AET	BET	MSET	Total Enrollments Fall 1982 AET	BET	Post-Bacc
Kansas						
Barton County JC	--	--	--	14	0	0
Hutchinson Community JC	--	--	--	60	0	0
Kansas St U	0	69	0	0	316	0
Kansas Tech Inst	90	0	0	474	0	0
Pittsburg St U	0	49	0	0	216	0
Schweiter Tech School	28	0	0	143	0	0
Wichita St U	0	26	0	0	133	0
State Total	118	144	0	691	665	0
Kentucky						
U of Louisville	65	0	0	169	226	0
Morehead St U	11	0	0	98	0	0
Murray St U	10	53	11	--	--	--
Western Kentucky U	0	46	0	0	378	0
State Total	86	99	11	267	604	0
Louisiana						
Louisiana Tech U	74	47	0	173	247	1
Louisiana St U-Baton Rouge	0	23	0	0	149	0
Louisiana St U-Eunice	--	--	--	66	0	0
Southern U	2	64	0	0	198	0
State Total	76	134	0	239	594	1
Maine						
Eastern Maine Voc-Tech Inst	112	0	0	147	0	0
U of Maine-Orono	79	45	0	262	398	0
State Total	191	45	0	409	398	0
Maryland						
Anne Arundel CC	--	--	--	766	0	0
Capitol I of T	52	98	0	489	223	0
Essex CC	--	--	--	587	0	0
U of Maryland	--	--	--	0	166	0
Montgomery Coll	37	0	0	--	--	--
Prince Georges CC	43	0	0	578	0	0
State Total	132	98	0	2420	389	0
Massachusetts						
Berkshire CC	--	--	--	207	0	0
Blue Hills Tech Inst	--	--	--	280	0	0
Cape Cod CC	--	--	--	24	0	0
Central New England C of T	--	--	--	535	200	0
Fitchburg St Coll	--	--	--	0	165	0
Franklin Inst of Boston	96	0	0	198	0	0
Holyoke CC	--	--	--	4	0	0
U of Lowell	34	42	0	605	599	0
Massasoit CC	--	--	--	219	0	0
Northeastern U-Lincoln Coll	94	146	0	0	1376	118
Northern Essex CC	--	--	--	516	0	0
North Shore CC	17	0	0	422	0	0
Roxbury CC	--	--	--	95	0	0
Southeastern Mass U	0	54	0	0	374	0
Springfield Tech CC	--	--	--	777	0	0
Wentworth I of T	750	141	0	2488	738	0
State Total	991	383	0	6370	3452	118
Michigan						
Bay De Noc CC	--	--	--	111	0	0
Gogebic CC	--	--	--	105	0	0
Delta Coll	79	0	0	--	--	--
Kellogg Coll	53	0	0	--	--	--
Kirkland CC	--	--	--	118	0	0
Lake Superior St Coll	61	57	0	132	312	0
Lawrence I of T	74	0	0	507	0	0
Macomb County CC-South	--	--	--	512	0	0
Michigan Technological U	172	0	0	357	0	0
Mott CC	--	--	--	961	0	0

STATE & COLLEGE	Degrees Awarded 1983 AET	BET	MSET	Total Enrollments Fall 1982 AET	BET	Post-Bacc
Michigan *(Continued)*						
Northwestern Mich Coll	37	0	0	96	0	0
Oakland CC	--	--	--	1667	0	0
Saginaw Valley St Coll	--	--	--	0	154	0
Schoolcraft Coll	--	--	--	369	0	0
Southwestern Mich Coll	--	--	--	633	0	0
Wayne St U	0	69	0	0	418	0
State Total	476	126	0	5568	884	0
Minnesota						
Anoka-Ramsey CC	12	0	0	74	0	0
Rochester CC	32	0	0	189	0	0
Southwest St U	5	22	0	--	--	--
State Total	49	22	0	263	0	0
Mississippi						
Hinds JC	--	--	--	234	0	0
Holmes JC	--	--	--	35	0	0
Jackson St U	0	33	0	0	323	0
Jones County JC	--	--	--	122	0	0
Mississippi St U	--	--	--	0	51	0
Northwest Miss JC	12	0	0	101	0	0
U of Southern Miss	0	64	0	0	529	0
State Total	12	97	0	492	903	0
Missouri						
Jefferson Coll	50	0	0	--	--	--
Longview CC	21	0	0	147	0	0
Missouri I of T	135	149	0	0	645	0
Missouri Western St Coll	2	17	0	11	60	0
St Louis CC-Florisnt Valley	113	0	0	2158	0	0
St Louis CC-Forest Park	35	0	0	162	0	0
State Total	356	166	0	2478	705	0
Montana						
Montana St U	0	71	0	0	562	0
State Total	0	71	0	0	562	0
Nebraska						
Kearney St Coll	--	--	--	0	98	0
U of Nebraska-Curtis	--	--	--	14	0	0
U of Nebraska-Omaha	22	43	0	553	333	0
State Total	22	43	0	567	431	0
Nevada						
U of Nevada	32	0	0	117	0	0
State Total	32	0	0	117	0	0
New Hampshire						
U of New Hampshire	0	32	0	--	--	--
New Hampshire Tech Inst	79	0	0	233	0	0
New Hampshire Voc Tech Coll	--	--	--	961	0	0
State Total	79	32	0	1194	0	0
New Jersey						
Atlantic CC	5	0	0	123	0	0
County Coll of Morris	197	0	0	1622	0	0
Cumberland County Coll	--	--	--	42	0	0
Gloucester County Coll	--	--	--	105	0	0
Mercer County CC	68	0	0	377	0	0
Middlesex County Coll	279	0	0	857	0	0
New Jersey I of T	0	151	0	0	1110	0
Ocean County Coll	48	0	0	111	0	0
Trenton St Coll	0	70	0	0	716	0
Union Coll	97	0	0	721	0	0
State Total	694	221	0	3958	1826	0

STATE & COLLEGE	Degrees Awarded 1983 AET	BET	MSET	Total Enrollments Fall 1982 AET	BET	Post-Bacc
New Mexico						
Eastern New Mexico U	--	--	--	58	0	0
U of New Mexico	--	--	--	90	0	0
New Mexico St U	45	65	0	510	229	0
State Total	45	65	0	658	229	0
New York						
Academy of Aero	173	0	0	1737	0	0
Bronx CC	53	0	0	627	0	0
Broome CC	171	0	0	844	0	0
City College of CUNY	0	34	0	0	181	0
Corning CC	104	0	0	470	0	0
Dutchess County CC	--	--	--	606	0	0
Erie CC	212	0	0	1102	0	0
Hudson Valley CC	420	0	0	342	0	0
Jamestown CC	--	--	--	360	0	0
Mohawk Valley CC	238	0	0	774	0	0
Monroe CC	321	0	0	1252	0	0
Nassau CC	107	0	0	810	0	0
Niagara County CC	78	0	0	--	--	--
New York I of T-Metro	4	41	0	0	576	0
New York I of T-Old Westbury	3	85	0	0	382	0
New York City Tech Coll	279	0	0	1840	0	0
Orange County CC	48	0	0	518	0	0
Queensborough CC	268	0	0	2181	0	0
Rochester I of T	42	227	0	295	1031	0
Schenectady CC	--	--	--	297	0	0
SUNY A&T Coll-Alfred	329	0	0	1099	0	0
SUNY A&T Coll-Canton	225	0	0	582	0	0
SUNY A&T Coll-Cobleskill	--	--	--	102	0	0
SUNY A&T Coll-Farmingdale	294	0	0	1110	0	0
SUNY A&T Coll-Morrisville	181	0	0	--	--	--
SUNY Binghamton	0	49	0	0	230	0
SUNY Coll-Buffalo	0	72	0	0	250	0
SUNY Coll of Tech-Utica	0	215	0	0	1594	0
Tech Career Insts	83	0	0	1841	0	0
Tomkins-Cortland CC	--	--	--	267	0	0
Ulster County CC	--	--	--	72	0	0
Westchester CC	138	0	0	1066	0	0
State Total	3771	723	0	20194	4244	0
North Carolina						
Tech Coll of Alamance	30	0	0	100	0	0
Anson Tech Coll	--	--	--	24	0	0
Asheville-Buncombe Tech Coll	46	0	0	--	--	--
Beaufort County CC	--	--	--	30	0	0
Blue Ridge Tech Coll	--	--	--	184	0	0
Cape Fear Tech Inst	106	0	0	396	0	0
Catawba Valley Tech Coll	71	0	0	307	0	0
Central Piedmont CC	114	0	0	1258	0	0
Central Carolina Tech Coll	45	0	0	182	0	0
Coastal Carolina CC	--	--	--	67	0	0
Davidson County CC	--	--	--	64	0	0
Durham Tech Inst	--	--	--	150	0	0
Edgecomb Tech Coll	--	--	--	12	0	0
Fayetteville Tech Inst	34	0	0	208	0	0
Forsyth Tech Inst	--	--	--	236	0	0
Gaston Coll	56	0	0	227	0	0
Guilford Tech Inst	61	0	0	217	0	0
Johnston Tech Inst	--	--	--	100	0	0
Lenoir CC	--	--	--	153	0	0
U of No Car-Charlotte	0	76	0	0	309	0
Pitt Tech Coll	15	0	0	76	0	0
Richmond Tech Inst	--	--	--	99	0	0
Rowan Tech Coll	--	--	--	257	0	0
Sandhills CC	18	0	0	99	0	0
Wake Tech Coll	94	0	0	663	0	0
Wayne CC	--	--	--	122	0	0
Wilkes CC	--	--	--	171	0	0
Wilson County Tech Inst	--	--	--	77	0	0
State Total	690	76	0	5470	309	0

STATE & COLLEGE	Degrees Awarded 1983 AET	BET	MSET	Total Enrollments Fall 1982 AET	BET	Post-Bacc
North Dakota						
Dickinson St Coll	--	--	--	19	0	0
Lake Region JC	--	--	--	16	0	0
North Dakota St Sch of Sci	346	0	0	789	0	0
State Total	346	0	0	824	0	0
Ohio						
U of Akron-C & T Coll	167	115	0	1111	218	0
Bowling Green St U	--	--	--	0	654	0
Cincinnati Tech Coll	306	0	0	732	0	0
U of Cincinnati-OCAS	149	85	0	788	263	0
Clark Tech Coll	62	0	0	--	--	--
Cleveland St U	0	54	0	0	219	0
Columbus Tech Inst	245	0	0	2224	0	0
Cuyahoga CC	--	--	--	1735	0	0
U of Dayton	0	129	0	0	599	0
Edison St CC	--	--	--	261	0	0
Franklin U	32	20	0	139	381	0
Hocking Tech Inst	--	--	--	485	0	0
Kent St U-Tuscarawas	28	0	0	--	--	--
Lima Tech Coll	67	0	0	--	--	--
Muskingum Area Tech Inst	--	--	--	536	0	0
Ohio I of T	292	247	0	0	1503	0
Owens Tech Coll	80	0	0	1135	0	0
Shawnee St Gen & Tech Coll	--	--	--	405	0	0
Sinclair CC	136	0	0	2141	0	0
Stark Tech Coll	128	0	0	933	0	0
Terra Tech Coll	--	--	--	990	0	0
U of Toledo-C & T Coll	154	72	0	798	245	0
Washington Tech Coll	34	0	0	--	--	--
Youngstown St U	124	78	0	1223	892	0
State Total	2004	800	0	15636	4974	0
Oklahoma						
Okla St Tech Coll-Okmulgee	341	0	0	1219	0	0
Oklahoma St U	120	315	0	--	--	--
Okla St U Tech Inst	81	0	0	--	--	--
State Total	542	315	0	1219	0	0
Oregon						
Blue Mountain CC	49	0	0	85	0	0
Mt Hood CC	46	0	0	--	--	--
Oregon I of T	202	142	0	865	303	0
Portland CC	--	--	--	291	0	0
State Total	297	142	0	1241	303	0
Pennsylvania						
Behrend Coll	51	0	0	--	--	--
Gannon U-Erie	0	32	0	0	125	0
Harrisburg CC	34	0	0	354	0	0
Lincoln Tech Inst	--	--	--	872	0	0
Penn St U-University Park	1250	0	0	3056	0	0
Penn St U-Capitol	0	237	0	0	691	0
Penn St U-Dubois	31	0	0	--	--	--
Penn St U-Mont Alto	9	0	0	--	--	--
Penn St U-Schylkill	37	0	0	--	--	--
Penn St U-Shenango Valley	61	0	0	--	--	--
Penn St U-Wilkes Barre	153	0	0	--	--	--
U of Pittsburg-Johnstown	0	121	0	0	565	0
U of Scranton	--	--	--	0	74	0
Spring Garden Coll	35	93	0	0	710	0
Temple U	16	193	0	160	755	0
State Total	1677	676	0	4442	2920	0
Rhode Island						
Rhode Island JC	--	--	--	0	177	0
Roger Williams Coll	0	36	0	0	906	0
State Total	0	36	0	0	1083	0

STATE & COLLEGE	Degrees Awarded 1983 AET	BET	MSET	Total Enrollments Fall 1982 AET	BET	Post-Bacc
South Carolina						
Aiken Tech Coll	--	--	--	228	0	0
Clemson U	0	48	0	0	240	1
Denmark Tech Coll	--	--	--	79	0	0
Flor-Darlington Tech Coll	37	0	0	198	0	0
Francis Marion Coll	--	--	--	0	49	0
Greenville Tech Coll	74	0	0	647	0	0
Midlands Tech Coll	114	0	0	623	0	0
Piedmont Tech Coll	26	0	0	397	0	0
Spartanburg Tech Coll	28	0	0	252	0	0
Tri-County Tech Coll	43	0	0	321	0	0
Trident Tech Coll	75	0	0	414	0	0
York Tech Coll	48	0	0	--	--	--
State Total	445	48	0	3159	289	1
South Dakota						
Mitchell Area Voc Tech Sch	--	--	--	405	0	0
U of So Dakota-Springfield	106	38	0	171	47	0
South Dakota St U	--	--	--	30	0	0
State Total	106	38	0	606	47	0
Tennessee						
Chattanooga St Tech CC	163	0	0	461	0	0
Cleveland St CC	--	--	--	1619	0	0
Columbia St CC	--	--	--	364	0	0
East Tennessee St U	19	76	14	0	420	32
Knoxville St Tech Inst	119	0	0	664	0	0
Memphis St U	0	67	0	--	--	--
Middle Tennessee St U	--	--	--	0	100	0
Motlow St CC	--	--	--	199	0	0
Nashville St Tech Inst	194	0	0	1033	0	0
Roane St CC	53	0	0	199	0	0
St Tech Inst at Memphis	224	0	0	3698	0	0
U of Tennessee-Martin	0	33	0	0	188	0
Tri-Cities St Tech Inst	--	--	--	445	0	0
State Total	772	176	14	8682	708	32
Texas						
Bee County Coll	--	--	--	57	0	0
Dallas County CC	35	0	0	--	--	--
Del Mar Coll	21	0	0	197	0	0
DeVry I of T-Irving	76	78	0	0	612	0
U of Houston	0	179	0	0	1451	0
U of Houston-Downtown	0	21	0	0	465	0
Le Tourneau Coll	37	62	0	73	349	0
San Antonio Coll	--	--	--	765	0	0
Texas A&M U	0	163	0	0	669	0
Texas Tech U	0	95	0	0	529	0
State Total	169	598	0	1092	4075	0
Utah						
Brigham Young U	3	175	9	72	838	33
Weber St Coll	13	82	0	717	421	3
State Total	16	257	9	789	1259	36
Vermont						
Norwich U	0	13	0	0	73	0
Vermont Tech Coll	195	0	0	666	0	0
State Total	195	13	0	666	73	0
Virginia						
Blue Ridge CC	--	--	--	103	0	0
John Tyler CC	--	--	--	395	0	0
Old Dominion U	0	142	0	0	628	0
Rappahannock CC	--	--	--	69	0	0
Southside Virginia CC	--	--	--	63	0	0

(Continued)

STATE & COLLEGE	Degrees Awarded 1983 AET	BET	MSET	Total Enrollments Fall 1982 AET	BET	Post-Bacc
Virginia *(Continued)*						
Southwest Virginia CC	79	0	0	257	0	0
Thomas Nelson CC	--	--	--	893	0	0
Virginia Western CC	--	--	--	575	0	0
Virginia Highlands CC	--	--	--	22	0	0
Wytheville CC	--	--	--	144	0	0
State Total	79	142	0	2521	628	0
Washington						
Highline CC	--	--	--	118	0	0
State Total	0	0	0	118	0	0
West Virginia						
Bluefield St Coll	74	41	0	255	147	0
Fairmont St Coll	65	91	0	217	434	0
West Virginia I of T	100	53	0	264	54	0
State Total	239	185	0	736	635	0
Wisconsin						
Milwaukee Sch of Engrg	276	146	0	808	539	0
Milwaukee Area Tech Coll	119	0	0	1838	0	0
North Central Tech Inst	113	0	0	--	--	--
U of Wisconsin-Parkside	--	--	--	0	227	0
State Total	508	146	0	2646	766	0
Wyoming						
Casper Coll	--	--	--	357	0	0
State Total	0	0	0	357	0	0
GRAND TOTAL	19329	9222	43	126843	48914	376

Notes: 1. This table combines the results of two different Engineering Manpower Commission surveys. Colleges listed above which did not respond to both the degree and the enrollment surveys are shown with "--" in the columns for the survey not answered.

2. Enrollments shown are totals which include both full-time and part-time students.

3. The data in this table should not be viewed as national totals since only 231 colleges responded to the degree survey and 320 responded to the enrollment survey of an estimated total of 700 colleges with engineering-technology programs.

So You Want To Be a Robotics Technician

Before making a career decision to become a robotics technician, it is necessary first to examine one's motives and level of under standing about the career. The following discussion of robotics and the career will assist in self examination and a career in robotics. Let us begin by building a framework for today's robotics technician.

Robotics is not new, but the applications of robots are new and the technical evolution of robotics is now highly sophisticated. The integration of a computer-based systems approach to automation has established new environments for robot applications. This, coupled with foreign competition, higher productivity demands, and new workforce compositions, has resulted in a highlighting of robots and robotics.

This accelerated evolutionary appearance of robotics has caught industry and the public off guard. For example, the definition of a robot is highly disputed. The generally accepted United States definition when applied to Japan excludes about two-thirds of alltheir robots as being classified as robots. This seems to be a

trivial and petty debate until we think about being a robot manufacturer or technician. There is no nationally adopted job description for a robotics technician, and, furthermore, most companies do not have ajob description. The United States S.M. E. (Society of Mechanical Engineers) definition of a robot and of an automated equipment technician in robotics is as follows:

A robot is a programmable, multifunctional manipulator designed
to move materials, parts, tools or other specialized devices
through variable programmed motions for the performance of
a variety of tasks.

The *Dictionary of Occupational Titles* has defined the robotics technician as a specialty of the automated equipment technician:

The Automated Equipment Technician in Robotics assembles, installs, and maintains electrical and electronic, electromechanical, pneumatic, and hydraulic components on computer assisted multi-purpose machinery and equipment, using hand tools, electronic listing instruments, diagrams, and prints.

Because of this lack of speciality, a look at where robot evolution is going will affirm the dynamic nature of robotics and the technician's role. The technological changes of robotics are fast and diverse, so much so that today's decisions about training are tomorrow's forgotten history. Plans and decisions must be designed to keep pace with these changes. For example, in June of 1982, vision systems were considered technology in the research/development phase. Now, in 1984, vision systems are a recognized part of robotics and training. Some 50,000 vision systems are

projected for 1992. The following chart illustrates where we are~today in light of tomorrow's technical changes.

Robotics Technology Development
Artificially Intelligent

- c Decision Making
- ~ Feedback Alternatives
- ~ Voice Control
- ~ Non-Binary Vision
- ~ Multiarm Robot
- ~ Multisensoring
  End Effector Design

Robotics Technology Today

C

- ~ Basic Robot
- ~ Robotic Components .9,~ Decreasing Tolerance
- ~ Special Tooling Support

Pick n' Place

The range of features and changes extends from the" low technology" nonservo bang bang robot to the artificially intelligent robot at the upper end. Todaywe are somewhere in the lower half of the evolution. Note that movement toward the low end, pick and place, is the reliance upon job simplification for the robot

and worker. While development in the direction of artificial intelligence is job sophistication for the robot and worker, the components of robots reflect this changing technology, i.e., there are literally hundreds of off-the-shelf robot and effectors ("hands") in use today, and many more are custom made for the myriad of applications. Multisensory systems involving conductive rubber, contact sensors, tactile sensors encoders, force sensors, frame buffer, binary and nonbinary vision, potentiometer, proximity sensors, resolvers, straingage, chemical sensors, etc. are fast developing. The first multiarm robot was announced in early 1983. While binary vision systems have just made their debut in robotics, nonbinary systems of a new technology are being announced and are soon to be available. With more sensory capabilities and larger computer capacities comes the introduction of robot feedback alternatives and robot choices or decision-making. The climax of this evolution is precisely accurate equipment(+/—0.005") operating at very high speeds (doing superhuman work) with artificially intelligent control. A recent advertisement summed up this evolution by saying/'A robot can assemble your switches today and make your microprocessors tomorrow."

This evolution of robotics suggests an equal evolution of their uses. Let us consider the application of robots. The first applications of robots were to existing tasks, primarily hazardous tasks performed by man such as handling nuclear, toxic, or other dangerous materials. Later uses were in areas where more speed or repeatability than man could provide (such as assembly) was required. Today, robots are replacing tasks previously done by machines and man combined. While robots have previously been identified with manufacturing, we nowfind robots waitingtables in a fastfood restaurant which carry fourtrays and serve nine tables in seventy-two seconds. Voice synthesized robots read Braille to the blind with 99.8% accuracy. Robots deliver mail in office complexes. Robots with four or six legs fight forest fires. Robots shear wool from sheep in Australia Domestic robots are taught to do household chores. Robots installtires on automobiles. These examples represent the exotic applications, but also indicate that robots are finding their way into all sections of work and into private and recreational lives. Some of the more commonly identified applications of robots are welding, painting, deburring, tool-handling, material-handling, inspection, assembly, machine-loading, die-casting, forging, plastics-moldings, and machining. The identification and design of these applications have justified both the classification and training of "Robot Application Technicians."

While the exotic applications of robots tend to get the attention in the press and literature, there are significantly differing views as to what robots and which applications have to offer the United States industries (particularly manufacturing) and the economy. One view (the dominant) presents the"high-technology robot and job sophistication" as the more useful and important. The other view reports job simplification and the low-technology pick and place group. The latter maintains that a given task, say assembly of a kitchen water faucet, can be divided into single-motion steps. A robot is applied to each step and by one computer or controller all robots are coordinated with the balance of the process. The results are low cost, high dependability, low maintenance, and fast production with minimal technical requirements. The high-job sophistication approach would apply one or a few robots to the same task, each doing multiple steps in the process; the results, fewer robots, higher capital investment, higher technical maintenance. A look at manufacturing and assembly in the United States reveals the general conclusion that more opportunity exists in the job simplification approach.

Some maintain that 70% of all tasks or jobs can be done by low-technology pick and place and 30% jobs require high-technology robots. The pattern and dominance of various robots will tell us much about training requirements in the future. It is held by most authorities that companies with large capital will dominate total automation and high-technology robots while small companies will dominate low-technology robot applications.

No consideration of a career in robotics can be complete without examination of supply and demand for the technician. The actual supply! demand for robotics technicians is difficult to specify. However, the

reader is directed to the University of Michigan Delphi Study for comprehensive information. The following factors should be considered.

1. For every two to six servo" high-technology" type robots, one robotics technician is required. The range is wide because of the current varied applications and organization of engineers and technicians assigned to robot cells. However, a widely published figure reflectingoptimum use of the robotics technician is twotothree robots per technician. A robot has uptime performance of about 98%. The more frequently application changes are made and the more varied the applications, the more support from the technician is required.
2. For every twelve to twenty nonservo "low-technology" pick and place type robots, one robotics technician is required. Again, the range is influenced by frequency and type of application changes.
3. The life span of a typical robot is twenty-four hours per day for five years.
4. There is no standard industry-accepted job description fora robotics technician.
5. The competent robotics technician would also be able to service the bulk of the automated line. Thus the technician may likely have other system-related duties.
6. Robotics technicians are employed in three types of companies: the robot manufacturing company, the company using robots, and the robot vendor or service/consultant company. Robot application technicians are almost exclusively with the vendor/consultant company.
7. Persons with the designation of a robotics technician today are highly skilled technicians with extensive experience who have been cross-trained by robot manufacture/vendor schools.
8. Two-year robot degree training programs are offered in six states and twelve schools. Four-year degree programs are offered in seven states and eight schools. Graduate-degree programs are in six states and seven schools. Robotic courses are offered in numerous institutions across the United States.

The last key factor, but not the least, is that of job displacement and job creation by robotics. Currently, implementation of one robot displaces about three jobs and creates one technician job, not including new jobs at the manufacturing site of the robot. The range of job displacement between 1981 and 1995 is a projected 500,000 to 1,000,000 by" high technology" robots and potentially three to eight million jobs by "low technology" robots. Byl 990 the projection in manufacturing is for2o% of all welding jobs and 40% spray- painting jobs to be displaced. In Michigan the direct number of jobs created as a result of robotics is from 5,100 to 17,700 in 1990. Well over **35%** of those jobs will be robotics technicians.

A pertinent observation relative to technical/vocational planning is recognition that implementation of "high technology" such as flexible

manufacturing brings dramatic shifts in the total number of persons employed and the composition of jobs. Movement from non-automated to automated manufacturing reduces the overall job or position needs by 30%-55% of the original workforce. Of the new workforce 35%-40% are technicians; 12%-i 8%, engineers; 1 2%-20%, skill trades, with semiskilled, managerial, and clerical making up the balance of the plant

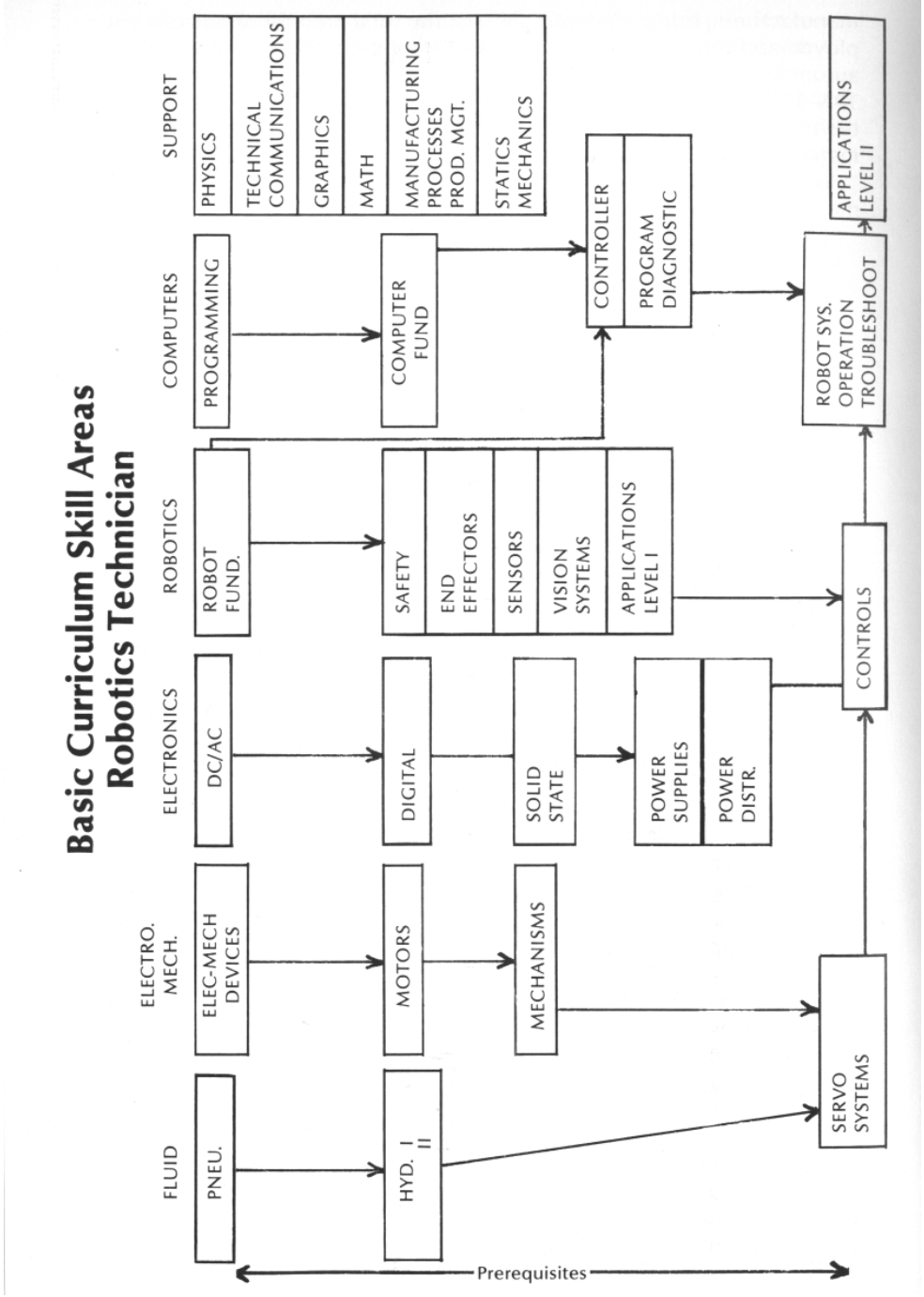
Let us consider now the characteristics of a robotics technician and measure ourselves against them:

1. Technically competent in multiple disciplines (pneumatics, hydraulics, electronics, computers, and mechanics).
2. Systems-oriented in techniques of troubleshooting and set-up work.
3. Able and willing to work as a team member in almost all we do. The day of the only relationship being the equipment-technician-supervisor is gone.
4. Capable of oral and written high-quality communication skills.
5. Able to clearly relate job or role to the balance of the plant or company operation and structure, for there is a close and interdependent relationship.
6. Willing to perform a variety of assignments involving automated equipment other than robots.
7. Willing to continue training and applied education by taking part in company training programs, vendor training schools, personal higher education, etc.
8. Willing to work overtime and odd hours particularly during robot or system "crashes" and new

application set-u p times.
9. Able to acquire a high degree of computer literacy in addition to basic skills recommended in the task inventory of the project

The successful robotics technician will find a career ladder awaiting him which may take different forms and titles in various companies. However, the following may be found in the plant or company using robots. It is robotics maintenance technician to robotics application technician (if it exists) to maintenance supervisor to production~ engineer." The robotics technician working for the vendor becomes a field service representative to production systems analyst to applications "engineer."
It should be apparent by now that one needs considerable training to succeed in robotics. The chart on the following page gives the basic curriculum skill areas and their relationship necessary for training, The training can be expected to take two and a half to three years. Having completed all of this training, one is a robotics technician.

Clay G. Johnson, Ph.D.
Vice-President for Instruction
Texas State Technical Institute
Waco, Texas 76705

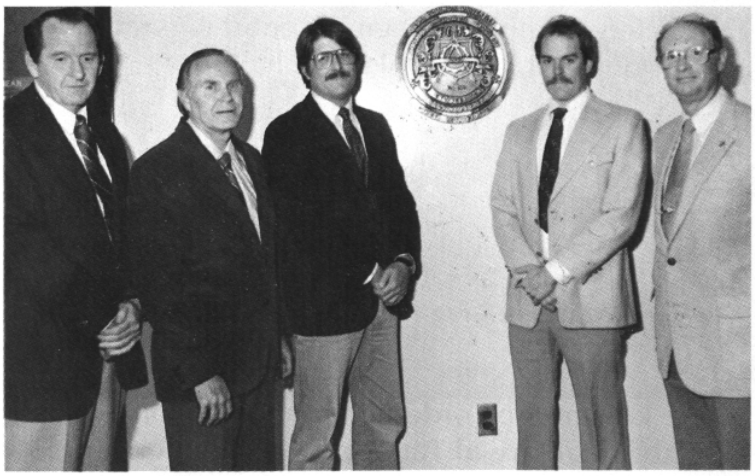

Basic Curriculum Skill Areas
Robotics Technician
FLUID
ELECTRO. MECH.
ELECTRONICS
ROBOTICS
COMPUTERS
SUPPORT
PNEU.
HYD. I II
ELEC-MECH DEVICES
MOTORS
MECHANISMS
SERVO SYSTEMS
DC/AC
DIGITAL
SOLID STATE
POWER SUPPLIES
POWER DISTR.
CONTROLS
ROBOT FUND.
SAFETY
END EFFECTORS
SENSORS
VISION SYSTEMS
APPLICATIONS LEVEL I
PROGRAMMING
COMPUTER FUND
CONTROLLER
PROGRAM DIAGNOSTIC
ROBOT SYS. OPERATION TROUBLESHOOT
APPLICATIONS LEVEL II
PHYSICS
TECHNICAL COMMUNICATIONS
GRAPHICS
MATH
MANUFACTURING PROCESSES PROD. MGT.
STATICS MECHANICS
Prerequisites

THE TAU ALPHA PI MERITORIOUS AWARD

Recipients of the Tau Alpha Pi Meritorious Award bestowed in gratitude for service rendered in furthering the goals of Tau Alpha Pi and in appreciation of the effort to upgrade the professional status of the technology students, 1983-1984:

THETA BETA CHAPTER
Old Dominion University
November 10, 1983

LEONARD A. HOBBS, Professor
J. HIRST LEDERLE, Professor
ALBERT J. BOWERS
DAVID NORMAN



Recipients cited above shown left to right.

DR. LEONARD SPIEGEL, Chairman
Civil and Construction Technologies
Hudson Valley Community College
September 7, 1984

The Tau Alpha Pi key may be called an essential working tool of the society. Consisting of the Greek letters TAΠ and the gear and compass, it is symbolic in its significance and appropriate to an engineering technologies honor society. The letters TAΠ embody the society's motto that lists the qualities—personal and intellectual—that the society was founded to recognize, engender, and foster in its members.

On the adjacent page are shown chapter officers wearing the key designed as a ceremonial pendant on a gold and green ribbon. The colors gold and green, also, are part of the society's emblem that in its entirety symbolizes the philosophy and ideals of Tau Alpha Pi.

It is, therefore, fitting that the initiating officers of each chapter—the president, vice-president, secretary, and escort—wear this key during induction ceremonies to render the society and its key more visible and to reinforce the depth of meaning and responsibility of membership.

These keys may be ordered from the national executive director-secretary of Tau Alpha Pi. The pendants, once purchased, become the chapter's ceremonial property to be worn perpetually by the initiating officers.

THE KEY OF TAU ALPHA PI

NATIONAL HONOR SOCIETY ENGINEERING TECHNOLOGIES

Left to right: Margaret Norwood (Secretary), Eric Outlaw (President), Maxie Springs (Vice-President) of Mu Delta Chapter, Florence-Darlington Technical College.

CODE OF ETHICS OF ENGINEERS

THE FUNDAMENTAL PRINCIPLES

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

I. using their knowledge and skill for the enhancement of human welfare;

II. being honest and impartial, and serving with fidelity the public, their employers and clients;

III. striving to increase the competence and prestige of the engineering profession; and

IV. supporting the professional and technical societies of their disciplines.

THE FUNDAMENTAL CANONS

1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.

2. Engineers shall perform services only in the areas of their competence.

3. Engineers shall issue public statements only in an objective and truthful manner.

4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.

5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.

6. Engineers shall act in such a manner as to uphold and enhance the honor, integrity and dignity of the profession.

7. Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional development of those engineers under their supervision.

Approved by the ECPD Board of Directors, October 5, 1977

Engineering-Technology Challenges

Asjohn Naisbitt said in his best seller Megatrends, we are quickly shifting from a mass industrial society to an information society (to industries involved in the creating, processing, and distributing of information, e.g,, banks/financial institutions, insurance companies, consulting firms, planners, legal agencies, and educational institutions). In 1950, l7% of our jobs were in the information sector; today **55%** are; by the mid 1990's, 90% will be.Just last year, the number one occupation in the United States became clerk (a processor of information), replacing the laborer and the farmer before. Farmer, laborer, clerk—a capsule history of United States industry. What occupation will replace clerk? Probably technician. I say this because technology has made us a global society.

Not only is society changing, but we are seeing an unbelievable infusion of technology into our lives and our business. This is largely a result of productivity and quality improvements in our industries. The cost of computing has fallen dramatically in the last thirty years. We are part of the video generation. Last year, for example, young people dropped nearly ten billion quarters into video games. We take for granted extremely sophisticated high-tech equipment such as home computers (and half of us will own a computer by 1985), devices to provide access to national computer data bases from our home by connecting the computer to the phone, and wrist-watch T.V. Today's gadget catalogs include an inch and a half thick portable computerized word-processing typewriter, a robotic chess set, and even a chance to buy a ticket on the first passenger-carrying NASA space shuttle. Lasers (although rarely obvious or visible in our society) are transmitting phone calls over fiber optic links, burning away cancerous brain tumors, and performing delicate bloodless eye surgery. They punch the tiny hole in baby-bottle nipples, they play video discs with no physical needle contact, they scan and record supermarket purchases while managing inventory control, and they can even be used as weapons to disable satellites or missiles. Spy satellites can read license plate from 200 miles up. All of these constitute today's technology.

Tomorrow's technology may be even more staggering. Computer chips will be made by bacteria out of protein molecuFes. These chips will be one *million* times faster than today's best chips, and today's super computer can process 8,000,000 thirty-two bit instructions per second. A computer language Logo now allows three-and four-year olds to write simple computer programs. Our schools and colleges must be ready for this computer generation. Technical literacy will be required of all college graduates in the future. Yet at a time when we are in a more literacy intensive society, we are producing fewer technically literate people. In fact, less than 10% of all professionals in business and industry have technical backgrounds. Unlike Japan and Europe, the United States has no national policy of technical manpower creation.

A comparison with the accomplishments of other countries is noteworthy For example, the transistor was just several years out of Bell's research labs when Sony, in 1955, introduced the first commercial transistor radio. From the bullet train in 1964 to the Betamax in 1975, Japan has surprised us with technical accomplishments. Products in the United States average 7.4 years from invention to production; in Japan, 3.5 years. Japan has placed the highest national priority on leading the world in high technology. We are in a race now on producing the" super

computer." In 1968 Japan overtook us in steel production; in 1 980, in automobile production. Within ten years, 10% of Japan's gross national product will be produced by robots. What contributes to this lead? Japan produces *five times* the engineers as the United States, but only one-twentieth the lawyers and one-fifteenth the accountants. We produce 36,000 lawyers per year and only 9,000 electronics engineers.[1] In the 1980's, 50% of all new jobs will relate to high technology; yet we will turn out only one-fourth of the electronic and computer people needed. The Soviet Union, too, graduates *six times* the engineers with half the college enrollment as the United States. Seventy-five percent of graduate students are in science or engineering (20% of ours are). Six percent of our undergraduates are in engineering or technology compared to 40% in most other countries.

Despite the proliferation of electronic gadgets and video games, technical illiteracyabounds in America. Fourteen-year olds from nineteen countries were recently tested on science literacy. The United States ranked fifteenth. In the United States, only 15% of the high-school students take chemistry; 1O% take physics. One of six takes a junior/senior science course; half take math after the tenth grade. Only one-third of United States high schools offer trigonometry.[2] By contrast, the Russian student is required to take five years of physics and four years of chemistry.[3] For every United States student taking calculus, fifty Soviet students are.[4] There is a real shortage of high-school math/science teachers, often resulting in a bad first encounterwith a marginally qualified teacher. We are starting to turn this around. Technical literacy will be critical even for the non-technical people who lead our society.

Engineering-technology programs are growing so rapidly because our students are recognizing the value of a technical education in today's(and tomorrow's) worlds. Engineering-technology students get a solid technical education as well as a good general education, and their education leads to high-paying jobs. That is good since in a recent national survey, 80% of the college freshmen said their reason for going to college was "to get a better job." Placement nationally has been outstanding for engineering-technology graduates. The average starting salary for BET's is about the same as the national average starting salary for new Ph.D.'s in all fieIds.~ Nationally, last year only 8% of all college graduates were engineers or technologists; yet this group got 70% of all job offers.

How will ET education change in the future? Besides having to keep up with new technologies and having constantly to update the teaching of existing technologies, other changes may occur. Before looking at several

of them, let us consider the history of FT education briefly.

The ET profession had its beginnings in the technical institutes which have their roots in the early nineteenth-century mechanics institutes and trade schools. These schools, based upon European models, concentrated on producing skilled craftsmen. These skilled craftsmen, from machinists to electricians, were the backbone of the industrial revolution in America.

The land grant colleges in the 1860's were charged with teaching agriculture and the" mechanic arts" as their career programs. These mechanic arts programs, although renamed "engineering," remained "arts" until the 1940's with the goal of producing practitioners.

As a result of World War II, rapid scientific advances occurred and out of the science labs came a host of new weapons systems and new technologies. Radar, communications, and navigation electronics were introduced. Servicemen, trained in these new technologies, found that when they went to school after service, the trade schools and even engineering colleges lagged far

behind in technical currency and even relevance to the new technologies. Engineering colleges (somewhat embarrassed that the applied technologies of the war came from physics rather than engineering labs) began to become more theoretical, and they included more math/science in the curriculum at the expense of the arts.

Corresponding changes were also taking place in the technical and trade schools. A new breed, the technician, was evolving, and technical institutes refocused their activities to produce a more technically prepared graduate. Southern Tech, founded in 1948, was typical of this movement These technician programs were often ECPD (now ABET) accredited and usually offered the associate degree. The two-year technicians, although enjoying significant technical training, were viewed as well prepared and needed assistants to scientists and engineers and thus, paraprofessionals.

With Sputnik and the race to the moon several years later, a national thrust was made in the area of math and science education. Traditional engineering schools started to move away from the applied part of the technical spectrum historically called engineering and placed a stronger emphasis on theoretical and applied science. Since federal money was available in the sixties for university research, and since research requires a cadre of graduate students, a new emphasis occurred in engineering education during this decade with a decided shift in the direction of abstraction, theory, and engineering science. There was a resultant shift away from the teaching of the arts and practices of engineering, and far fewer graduates were produced who viewed the baccalaureate as a terminal degree leading to an industrial career.

The race to the moon and the resulting explosion of technology from vacuum tubes to microchips vindicated this emphasis. Yet, practitioners for the necessary but less glamorous production areas of engineering were not being produced in appropriate numbers. This void, which had become large by the middle 60's, began to be filled by a new breed of

technical specialists—the baccalaureate-level engineering technologist Most of the stronger ABET two-year colleges and technical institutes added a" plus 2" upper division curriculum to educate practitioners with much the same lab-oriented emphasis in that had been the backbone of engineering programs for so many years. Faculty in these programs were engineers from industry primarily, and the graduates from the beginning were viewed by most industries as fitting well. Since there were now two kinds of accredited baccalaureate-level specialists being prepared for careers within the broad engineering spectrum, confusion was inevitable.

Engineering, like other sciences, has its legitimate associate technologies called engineering technologies. A parallel is medicine having its associated medical technologies. It appears that in order for engineering technology truly to establish itself as a distinct and well understood profession, several key developments must occur.

First, the title" Engineering Technologist' must be accepted, understood, and utilized as an industrial title as it is in the educational world. In the first twenty years of ET education, the technologist title has been primarily one conceived by educators and for educators. It has received minimum acceptance by industry. The overwhelming majority of first-job titles for baccalaureate ET graduates is (adjective) engineer. Industry must be encouraged to use the" technologist" title and provide solid career paths for it.

Second, a body of knowledge and practice (which appears to exist) must be identified apart from engineering. Engineering technologists must become viewed as the preservers, expanders, and promulgators of this body of knowledge by all other technical professionals. Separate pro-

fessional publications, faculty trained as engineering technologists rather than as engineers, distinct professional societies, and distinct career paths in industry would all be hallmarks of this separate professional stature (as would separate professional credentialing as an alternative to the PE).

Third, graduate programs need to be established to prepare educators and industrial employees at more thorough and advanced levels in order to advance the profession and prepare new members of the profession. The profession, if it is distinct from engineering, has relied so far on members from another profession (engineering) to be its teachers, spokespersons, and developers. If the two are different professions, this is probably inappropriate.

Finally, industry has to set up solid professional career paths allowing the same kind of upward mobility as engineering graduates enjoy if engineering technologists are going to enjoy professional status and have access to the highest levels of company leadership. Their degree and education can in no way be viewed as second rate or sub-professional if the graduates who are four-year graduates are to have satisfying careers that match their expectations.

All segments of engineering-field leadership must agree upon the educational objectives. Although great progress has been made over the last twenty years in clarifying and implementing the engineering-technology function in industry, there are still unresolved issues that lead to confu-

-sion in the minds of many and that tend to segment the engineering profession. With the American society becoming increasingly and exponentially dependent upon technology to solve a myriad of problems, the unfortunate competition and segmenting are counterproductive to meeting the needs of our society. Professional societies such as the American Society for Engineering Education (ASEE), the various technical societies such as the Institute of Electrical and Electronics Engineers (IEEE), and other organizations like the Accrediting Board for Engineering and Technology(ABET) and the National Societyof Professional Engineers(NSPE) can play leadership roles in helping to clarify the issues.

It seems that the engineering spectrum needs to represent a unified, coordinated team with an agreed-upon education pattern and industrial role for each team member if we are to compete technologically with other nations and meet the challenges of the future.

S. R. Cheshier, Ph.D.
President, Southern Technical Institute
Marietta, Georgia 70060

Notes

1 Robert H. Page, “The Crisis in Engineering Education—an Opportunity,” Address to Control Data Corporation Executive Seminar, May 20, 1982.

[2]William S. Anderson, “The Technology Race: How America Could Lose,” NCR Corporation Publication (Dayton, Ohio, 1982).

[3]Jay Stuller, "The Great Science Slowdown," *Kiwanis Magazine* (September, 1982).
[4]lsaac Asimov, "Viewpoint," *Kiwanis Magazine* (September, 1982).
~*U. £ News and World Report* (December 6, 1982).

Chapter News

ALPHA ALPHA (Southern Technical Institute): During 1983 Alpha Alpha chapter held three initiation ceremonies and a dinner for new members attended by Harris T. Travis, the Vice-President of Southern Technical Institute. The chapter also published its third annual Southern Tech Resumé Book, which almost tripled in size over the previous year's publication. Future plans include issuing certificates each quarter to students who earn a grade point average of 4.0. Officers: Jack Braden (President); Can Pless(Vice-President); Tom S. Chae(Secretary); Catherine Harvill (Treasurer).

ALPHA BETA(DeVry Institute of Technology, Atlanta, Ceorgia): The chapter conducted initiation ceremonies on February 25, 1984. During the 1983-84 year, the chapter held two fund-raising bake sales and invested the profits in potted plants. Members of the chapter then presented these plants to special mothers on Mother's Day at the Briarwood Nursing Center. Officers: Tim Chute(President); Benal Owens(Vice-President); Donald Steele (Secretary-Treasurer); Ken Ponder (Sergeant-at-Arms).

BETA ALPHA (Academy of Aeronautics): Chapter members have continued to devote time to tutoring students in their engineering-technology studies. In addition, last fall, the chapter sponsored trips to C.A.M.P. Systems (Computerized Aircraft Maintenance Program) and to the Smithsonian National Air and Space Museum in Washington, D.C. to acquaint students with various industries. In the springofl 984 the chaptervisited Crumman Aerospace and Sikorsky Helicopters. Officers: Ceorge Samiou (President); Louisa Rizza (Vice-President); Joe Venusto (Secretary-Treasurer).
'I
From left to right: First row. George Samiou (President), Louisa Rizza (VicePresident), Joe Venusto (Secretary-Treasurer), Victor Gomez. Second row Erwin Joseph, Robert Babani, Jeffrey Perciavalle, Paul Melnyk, Byron Knibbs, Joseph Kucic. Third row: Kenneth DiLillo, Professor Joseph J. Scalise (Faculty Adviser), Brian Caslin, Joe Bogoviç Jerry P. Mahoney.

1984 Tau Alpha Pi Page 35

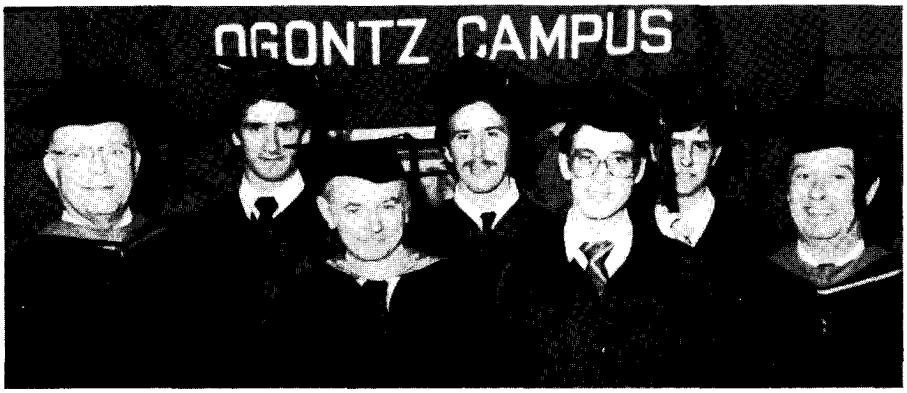
BETA GAMMA (Queensborough Community College): The chapter has begun its planned development of the Computer-Aided-Instruction-Program to assist the tutoring of students in computer, electrical, and mechanical technologies, design drafting, and pre-engineering. The chapter held initiation ceremonies last fall which were followed by a reception and dinner in honor of the new initiates and their guests with other members of the chapter. Cuests of honor in attendance were Professor Frederick
J. Berger (National Executive Director-Secretary of Tau Alpha Pi), who delivered an address, and Dr. Lillian Cottesman, the faculty adviser of Beta Delta chapterat Bronx Community College. Future plans callfor continued participation in the Computer-Aided-Instruction-Program, a field trip to an engineeringfacility or industrial laboratory. Further plans include setting up a display case in the lobby of the Technology building that will contain plaques with names of initiates, one plaque for each semester. In the planning stage, also, is the erection of a Tau Alpha Pi key in front of the Technology building. Officers(1 983): William R. Wong(President); Lee S. Fielding (Vice-President); Clive M. Hartt (Secretary); M. Douglas Archer (Treasurer). Officers (1 984): Thomas P. Kennedy(President); Paul B. Phillips (Vice-President); Catherine Conzalez (Secretary-Treasurer).

BETA DELTA(Bronx Community College): The chapter held its fall initiation on Decemberl, 1983 and its spring initiation on April26, 1984. Each initiation was followed by a luncheon in honor of the initiates. Among its activities, Beta Delta members continue to tutor and to serve as commencement ushers, and the chapter continues to bestow three meritorious commencement awards on deserving graduates. Future plans include the installation of the Tau Alpha P1 key on campus. Officers: Lawrence DeSouza (President); Karen Simmons (Secretary).

BETA EPSILON (Hudson Valley Community College): The chapter held initiation and continued to offer tutorial service on a college-wide basis. Among its plans forthefuture is the purchase of the banner and pendants. The chapter welcomes its new adviser Dr. John Nagi as of September'84 and expresses its appreciation and gratitude to the outgoing adviser Dr. Leonard Spiegel. Officers: Orlando Romero (President); Todd Kramm (Vice- President); Thomas Cannizzo (Secretary); John Principe (Public Relations).

BETA IOTA(Pennsylvania State University, Ogontz Campus): The chapter has promoted membership by inspiring and encouraging students to become outstanding achievers. On May 1 7, 1 984 those Beta Iota members who were graduated were given special recognition during the commencement exercises. Officers: Peter Recco (President); Jeff Patterson (Vice-President); Michael S. Kuneck (Secretary).

Left to right: Prof. Byron M. Robinson (Faculty Adviser), Michael S. Kuneck (Secretary), Prof. Charles E. SohI, Peter Recco(President), DennisJ. Ipri, Jeff Patterson (Vice-President), Prof. Harold W. Byerly.



BETA ZETA(College of Staten Island): The chapter sponsored guest speakers: Schaefer of Merrill- Lynch spoke on" Staten Island Teleport"; D. Lagrua of Raytheon, on"Signal Conditioning"; E. Addeo of Bell Labs, on"Where Have All the Ceniuses Cone?" F. Cunther of REL(Radio Electronics Laboratory), on "Mobile Radio"; F. Murphy of Crumman Corporation, on "Computer Software"; E. Ekanadham of IBM, on "Data Flow Architecture"; W. Blumberg of Bell Labs, on "Lead (Pb) Intoxication"; P. Zory of Optical Information Systems, on" Fibre Optics"; S. Anderson of Codenoll Technology, on" Fibre Optics"; J. White and C. Settens of EEV, on" Microwave Applications"; R. Smith of Duart Film Labs, on" Film Making"; and K. Kowald of Con Edison, on" Energy." The chapter, in addition, sponsored a tour of WCBS-TV studios. Officers: Kenneth Johnson (President); Elisha Petito (Vice President); Ettore Ciaffi (Secretary); John Dalessio (Treasurer).

BETA Xl (Alfred State College, SUNY, A and M Technical College): The chapter held chartering and initiation ceremonies on April 1 3, 1984. It elected to membership five students and, in recognition of outstanding contributions to the establishment of the chapter, extended membership to Dean CaryT. Fraser(Sponsor); and Dr. CeorgeW. DeSain, Dr. William B. Bruce, and Professor Philip A. Alesso (Advisers). The chapter expresses its gratitude to executive director Frederick J. Berger, who installed the officers and delivered the keynote address. Additional guest speakers were Vice President John K. Fisher and Dean Cary T. Fraser. Future plans include identifying and electing alumni members who, it is hoped, can assist as resource people. The chapter plans to purchase a banner and prepare a large Tau Alpha Pi key to be placed in front of the technology building. Officers: Steven D. Sherwood (President); Douglas W. Fraser (VicePresident); Ann Louise Ziki (Secretary).

From left to right: Steven D. Sherwood (President), Ann Louise Ziki (Secretary), Douglas W. Fraser (Vice-President).

GAMMA EPSILON(DeVry Institute of Technology, Columbus, Ohio): The chapter held its fall '83 initiation and dinner on September 30, 1983. It held its spring'83 initiation and banquet on February 3, 1984 and had as guest speakers the academic dean Mr. James Bryant and the two faculty advisers Professors Barry Brey and Ira Scheer. Officers (Spring 1983):
Mark R. Stein (President); Joseph Morgan (Vice-President); Doug Libra (Secretary); Frank Ditri (Treasurer). Officers (Fall 1983): Mark R. Stein (President); David M. Lockhart (Vice - President); Doug Libra (Secretary); Michael D. Morton (Treasurer).. Officers (Spring 1984): Jeffrey L Anderson (President); Dale C. Rinke (Vice-President); Cregory S. Wilcox (Secretary); Douglas E. Siesel (Treasurer).

GAMMA UPSILON (Cuyahoga Community College): In the four years since the chapter's charteringonJune6, 1980, Camma Upsilon has grown to 107 active members. It also extended recognition of noteworthy achievement to three members of the industrial community: Al Sanchez, Ceneral Manager of Turner Construction Company; and Robert P. and Julian C. Madison of Madison and Madison International, Architects, Engineers, and Planners. The chapter held its spring induction of new members on May 1 8, 1984. Among future activities will be the promoting of engineering technology during National Engineers Week and the purchasing of a Tau Alpha Pi banner, the American flag, and the college flag. Officers:
Linda Laulette(President); Jeffrey Kalosky(Vice- President); Bill Sindelar (Secretary-Treasurer).

DELTA GAMMA (Franklin Institute of Boston): On April 1,1984 the chapter held chartering and induction ceremonies presided over by Executive Director FrederickJ. Berger. The alumni banquet followed, honoring the ~ductees and celebrating the nstitute's seventy-fifth anniversary Pres~

Richard **P.** D'Onofrio, alumni membership; and Dean of Students Murray **L.** Shapiro(Sponsor) and Professor Carol Liebman (Adviser) were extended membership in recognition of their

outstanding contributions to the chapter. Spring initiation took place at the close of the spring 1 984 semester. Officers: Barry J. Davignon (President); Douglas Dugas (Vice President); Davio B. Kutz (Secretary); Deborah Heagney (Treasurer).

From left to right: Front row~ Prof. Carol Liebman(FacultyAdviser); Deborah Heagney (Treasurer); Donald McMahon; Barry Davignon (President); Presi dent Michael Mazzola; Executive Director Frederick J. Berger. Back row: Louis Cabey; Vice-President Richard D'Onofrio; James Marquedant; David Kutz (Secretary); Douglas Dugas (Vice-President); Dean Murray Shapiro; Philip Harris.

DELTA DELTA (Southern Massachusetts University): Delta Delta held chartering ceremonies and a banquet on February 3, 1984. The chapter was privileged to have Professor FrederickJ. Berger, Executive Director-Secretary, to install the officers and deliver the keynote address. Future plans include preparing a banner and constructing a replica of the Tau Alpha Pi key to place in front of the Engineering building, fund-raising, sponsoring guest lectures and tours, researching alumni eligible for membership, and arranging to tutor seniors for the state E.I.T. examination.

Officers: Joanne C. Cusson (President); Michael P. Fredericksen (VicePresident); TimothyJ. Rezendes(Secretary); Robert E. Tavares (Treasurer).

From left to right: Front row Executive Director Frederick J. Berger, Joanne C Cusson (President); Timothy J. Rezendes (Secretary); Ernest W. Sennett, Jr., Prof. Alden W. Counsell (Faculty Adviser). Back row. Robert E. Tavares (Treasurer); Dr. Dean J. Schmidlin (Faculty Adviser).

EPSILON ALPHA (DeVry Insitute of Technology, Kansas City): The chapter held initiation ceremonies on May13, 1983, September30, 1983, and February 3, 1984. In recognition of his

many years of outstanding service to the students of DeVry Institute of Technology, Professor Frank Mannasmith was awarded honorary membership. The chapter is planning a publicity program to make Tau Alpha Pi more visible on campus and to familiarize students with its objectives. Officers (Fall 1983): Todd Bohling (President); Kenton Cahiness (Vice-President); Randall A. Rasa (Secretary); Larry Carder(Treasurer). Officers (Spring 1 984): Pat Meehan (President); Paul Kaiser(Vice- President); Larry HaIl(Secretary~ Curtis Linder(Treasurer).

EPSILON BETA (St. Louis Community College, Florissant Valley): The chapter initiated new members on April10, 1984. **A** banquet followed the initiation ceremonies. As **a** result of the chapter's continued publicity concerning the goals of Tau Alpha Pi, there has been increased realization of the great honor that membership in this society carries. Officers: Maury Seligman (President); Valerie Sharp(Vice- President and Student Covernment Rep); Dana Neely (Secretary and Student Covernment Rep); Dan Durbin (Treasurer).

ZETA ALPHA (University of Arizona): The chapter held summer and fall induction ceremonies. A banquet followed each induction, and the guest speakers were the Dean of the College of Technology (Dr. Lawrence J. Wolf) and the Chairman of Civil Technology. Spring 1984 initiation was held in April. Future plans are to conduct seminars and participate in the annual Technology Day exhibit Officers: Lisa M. Law (President); Paul Stepan (Vice-President); Linda A. Hooker (Secretary); John A. May (Treasurer).

ZETA GAMMA (Texas A and M University): The chapter's major project is the installation of a large casting of the Tau Alpha Pi emblem. The pattern has been completed, and the casting will be done in the laboratories of the Engineering Technology department. The design and casting of a paperweight-size key for use by Zeta Camma chapter members have been completed. Officers: Patrick Hensley(President); Joe Bengfort(VicePresident); Clenn Dubcak (Secretary); Douglas McPherson (Treasurer).

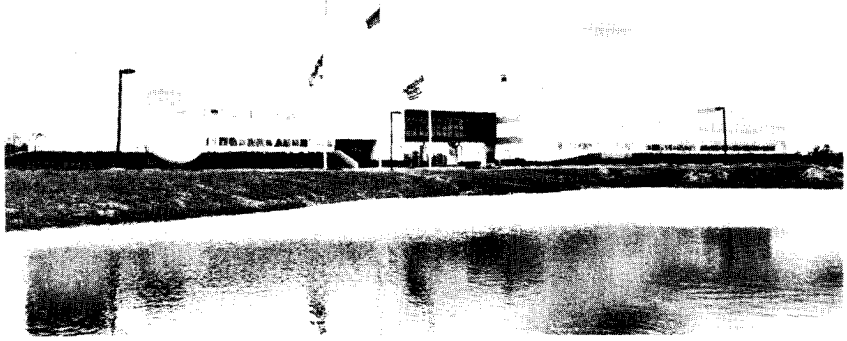
ZETA DELTA (Texas Tech University): The chapter conducted initiation ceremonies on November 22, 1983. Recognition was given to the new members at the Texas Tech Engineering Honors Banquet that followed. The chapter held regular meetings and a social function in the spring of 1984. Officers: Craig Mathewson (President); Bobby Sledge (Vice President); W. Bret McDougal (Secretary-Treasurer).

ZETA EPSIION (Del Mar College): On April 5, 1984 the chapter held initiation ceremonies and inducted also faculty members Larry Money and Harold L. Teel, Jr. as advisers. Professor Teel was the speaker at the initiation banquet. Officers: Mark Schupsky(President); Sabine Borngnet-Harris (Vice- President); Carlos Vallbona (Secretary-Treasurer).

THETA BETA (Old Dominion University): The chapter held its initiation and banquet on November10, 1 983. On this occasion, the chapter mounted a plaque of the Tau Alpha Pi

emblem in the front lobby of Kaufman Hall. The executive director FrederickJ. Berger attended, delivered the keynote address, and presented meritorious awards to Professor Leonard Hobbs (adviser since 1964); ProfessorJ. Hirst Lederle(designer of plaque); chapter presidents David Norman (1982-1983) and Albert J. Bowers (1983-1984); and to Theta Beta Chapter. As future activities, the chapter plans to continue sponsoring outstanding faculty awards and fund-raising functions and to prepare a large replica of the Tau Alpha P1 key to be placed in front of the Technology building. Officers: AlbertJ. Bowers (President); Michael S. Cisewski (Vice-President); David A. Schienbein (Secretary); Sandra C. Nolan (S.E.C. Representative).

KAPPA ALPHA (Capitol Tech., College of Engineering Technology): The chapter participated in the ceremonies celebrating Capitol Tech's move to its new campus in Laurel, Maryland. Kappa Alpha offered a dedication display of a working fiber optic communications link. The ceremonies were held on November 19,1983. Capitol Tech is Maryland's first college of engineering technology. It moved its entire college campus from Kensington to Laurel. It should be noted that Capitol Tech's President C. William Troxler is a member of Tau Alpha P1, having been elected to membership during his undergraduate days. During his leadership, Capitol Tech continued to grow and expand. Officers: Mark Yembrick (President); Kathy Feldmann (Vice-President); Phousomprasong Phommachanh (Secretary).



Capitol Tech., College of Engineering Technology, Laurel, Md. New Campus

KAPPA BETA (Anne Arundel Community College, Arnold, Maryland): The chapter held initiation ceremonies on Aprill 6,1983, inducting ten members. On December10, 1983, it initiated seven members. Over fifty persons attended the December function. Professor Frederick J. Berger, Executive Director-Secretary of Tau Alpha Pi, delivered the keynote address. Officers: John P. Witkoski, Jr. (President); Andrew K. Haines (Vice- President); Robert P. Rubilotta (Secretary-Treasurer).

From left to right Front Row: Ronald Middleton, James L Scott, John P. Witkosk~ Jr. (President), Executive Director Frederick I. **Berger, Eva D'Ambrosio, Andrew K. Haines (Vice-President), Eugene J. Nash, Jr., Steven Beutelspacher. Back row Edward C Prettyman, Robert P. Rubilotta (Secretary), Professor Willard R. Mumford (Faculty Adviser), Robert E. Lilly.**

LAMBDA ALPHA(NorwalkState Technical College): The chapter initiated new members and held its annual dinner on April 19, 1984. The guest speaker was Bernard Luskin, President of Bolt Technology Corporation. The chapter continues to offer tutoring service. Officers: Domenico Rauccio (President); Cregory Procaccini (Vice- President); Daniel Rusin (Secretary); Michael Wardell (Treasurer).

LAMBDA BETA (Thomas Valley State Technical College): The chapter held initiation ceremonies in thefall ofl 983 and springofl984. It plans a year-end chapter picnic. Officers: Betsy Shafer(President); Laurie Langlois (Vice-President); Sally Exley (Secretary).

LAMBDA DELTA(Creater New Haven State Technical College): The chapter conducted its chartering and initiation ceremonies on April 24, 1984. Sixteen members were inducted, including faculty adviser Professor Donald A. Lostritto and sponsor Dean Edmund L. Sobolewski. A banquet for members and guests followed. The chapter thanks Executive Director Frederick J. Berger, who delivered the keynote address. Officers: MichaelA Cannella (President); Thomas F. Palmatier(Vice-President); Stephen P. Wolensky (Secretary); Michael A Pawlyk (Treasurer).

LAMBDA DELTA
From left to right: Front row Stephen P. Wolensky, (Secretary); Michael A. Cannella (President); Thomas F. Palmatier (Vice- President); Michael A. Pawlyk (Treasurer). Middle row,: Michelina B. Doria, Nancy J. Schober Turnier, Katherine E. Dellisola, Christopher E. Romanoff, Steve Chen, Dr. Lillian Gottesman, Prof. Donald A. Lostritto (Faculty Adviser). Back row Dean Edmund L. Sobolewski, (Sponsor); Stephen P. Schwink, Brian H. Spencer, Dale L Howell, James J. Principi, David H. Roden, Dr. Frederick J. Berger.

MU DELTA (Florence- Darlington Technical College): The chapter held chartering ceremonies on May 12, 1984 and inducted over forty members, including Dean Larry Grulick (Sponsor) and Professor Cecil Ridgill (Faculty Adviser). Dr. Frederick J. Berger, the Executive Director of Tau Alpha Pi, and ProfessorJ. E. Cox, Chairman of the Engineering Technology division, were guest speakers. The chapter expresses its thanks to Dr. Berger for taking time out of his busy schedule to come to FlorenceDarlington Technical College especially to initiate the first members of Mu Delta chapter. His presence"dignified the event and made it a complete success." The chapter plans to cast the enlarged Tau Alpha Pi key to be mounted on the exterior of the new Technology building that is scheduled forcompletion in the fall ofl 986. Students in the Engineering Graphics department are planning to produce a full-scale detailed drawing of the enlarged key and emblem to be utilized at induction ceremonies. Officers:
Eric Outlaw (President); Maxie Springs (Vice-President); Margaret Nor-wood (Secretary).

NU BETA(Southern Illinois University at Carbondale): During its falll 983 and spring 1984 initiations, the chapter used the ceremonial Tau Alpha Pi pendants. The membership was pleased and felt that these pendants added to the dignity of the ceremony. A banquet followed each initiation. Among the chapter's 1 983-1 984 activities were a blood drive, tutoring service fortechnology students, and fund raising. Nu Beta also sponsored afall bikeand picnicand atriponApril26, 1984 to IBM in St Louistoseea demonstration of the newest computing equipment available. The chap*ter'c* former oresidentAnne Gaylord was selected forthe Lincoln Laureate

Award, which was bestowed upon her on November19, 1983 by CovernorJames R. Thompson.

She earned her B.S. in civil engineering technology in May, 1984. In the near future the chapter plans to display a large Tau Alpha Pi key outside the Technology building. Officers: Minh Khuc (President); James Haig (Vice-President); Eden Dee Thotne (Secretary); Kyle Webb (Treasurer); Dean Engleman (Engineering Joint Council Representative).

From left to right, sitting Minh Duy Khuc (President), Anne Gaylord, Eden Dee Thorne (Secretary). Standing Bill Eichfeld, Kyle Webb (Treasurer), Bill Crocker, Ed Chalupa, Dean Engelman(E.J.C Representative), Ching-Yu Chang Mark Pagano.

Xl BETA (Northrop University): The chapter participated in the evaluation of the technology faculty. Members took part also in a joint Tau Alpha Pi and Society of Engineering Technologists (SET) dinner- meeting. Officers:
CharlesTaylor(President); Paul Muller(Vice- President); Robert M. Blechen (Secretary); Edward M. Lee Ah Yen (Treasurer).

OMICRON EPSILON (Middlesex County College): The chapter initiated seven members in the spring of 1 984. Chapter members visited an upper-division college to discuss the various fields of engineering and technology education and an engineering company to see a C.A. D. system. Officers:
Edwin A. Jukniewicz(President); John Podsiadlo(Vice- President); Sharon Chiu Kent (Secretary-Treasurer).

OMICRON DELTA (Hudson County Community College): The chapter held initiation of several new members on October 11, 1983. The ceremony was conducted under the guidance of faculty adviser Professor Joseph M. DeGuilmo and the chairman of the Technology Division Professor Robert W. Svarrer. A reception followed, and the president of the college Joseph F. Scott delivered the keynote address. Officers: George Michael Raskuliner(President); Nicholas P. Rivera (Secretary-Treasurer).

OMICRON DELTA
Professor and chairman of the Technology Division Robert W. Svarrer congratulates William G. Raphael, an inductee, as President Joseph F. Scott (right) and Professor Joseph

M. DeGuilmo look on.

P1 ALPHA (Purdue University): The chapter held initiation of new members in March, 1984. Among the chapter's activities are the resumé books that Pi Alpha publishes and sends to various companies. The resumé books are so successful that the chapter plans to continue them. In addition, the chapter plans to install a bronze Tau Alpha Pi key in front of the new Technology building that was completed in May, 1984. Officers: Jeff Egloff (President); Rob Brunke (Vice-President); Bob Frey (Secretary-Treasurer).

From left to right Front row (seated): Washington Henderson, Robert Frey (Secretary-Treasurer), Jeff Egloff (President), Gene Nix (Faculty Adviser), Robert Brunke (Vice-President), Mary Anne Wright (Faculty Adviser). Second row Gary Giclç Tracy Chandler, Greg Dreske, Steve Kuhn, Jim Baar, Robert M. Petri, Mark Heaps. Third row~ Tim Ridgely, Donald Needler, Steve Keller, Peter Sanders, Tim Silver, John Eachman, Jim Clark Fourth row. Ron Habenicht, Andrew Berger, David Jubinsky, Paul Love, Michael Kirk

RHO BETA (University of Southern Colorado): The chapter initiated thirteen members on April 28, 1983 and then heard an address on patents and inventions. Among its activities the chapter participated in raising funds through the weekly sale of coffee and donuts. Future plans include

erecting the Tau Alpha Pi key in front of the Applied Science and Engineering Building. Officers: Deborah Hurrell (President); Randall Donnelly (Vice- President); Matt Davison (Secretary-Treasurer).

RHO GAMMA (Metropolitan State College): Last fall (1983) the chapter sponsored a social evening for members and their guests, and on May4, 1984 it held its annual banquet The chapter plans to buy metal plaques and engrave the names of past and present members. Each year the names of new members will be added. The plaques will not only further honor the members, but also promote the visibility of Tau Alpha Pi. There will be three plaques, one in each of the three offices of Electronic Engineering Technology, Mechanical Engineering Technology, and Civil Engineering Technology. Officers: Russel I. Jent (President); Marilyn F. Eisele (Vice-President); John A Gerwig (Secretary-Treasurer).

SIGMA GAMMA (St Petersburg Junior College): The chapter initiated five members in the winter of 1 983-1 984. It maintained an on-going tutoring program. It plans the construction of a lighted enclosed bulletin board featuring Tau Alpha Pi for use of engineering-technology notices and also a fund-raiser through the sale of seats on a rented bus for a trip to Kennedy Space Center to view the shuttle launching. Officers: Greg LaChance(President); Boghos Dirmirdjian (Vice-President); Gary ~ (Secretary-Treasurer).

UPSILON ALPHA(Northern Arizona University): The chapter held initiation on March 14, 1984. A banquet followed. The chapter plans to continue field trips and tutoring services to help students become better academic achievers. The members extend appreciation to the executive director Frederick J. Berger of his special efforts in behalf of the chapter. Officers: Stephen M. Becker(President); Joe Provenzola(Vice- President); Charles Weddle (Secretary-Treasurer).

UPSILON BETA (Arizona State University): The chapter held its initiation and banquet on April 28, 1984. During the 1983-1984 year the chapter established a scholarship program designed to offer two $500 scholarships per semesteron an on-going basis. Applicants for this scholarship must be full-time ASU students with at least twelve hours completed and acumulative index ofat least3.2. The selection of recipients will be based also on evaluation of need and communication ability as evidenced in a written essay. Officers: Harry A Livermore (President); Kent Home (Vice-President); Laurie Fults (Secretary-Treasurer).

CHI ALPHA (Vermont Technical College): The chapter had its spring induction and banquet on March 1, 1 984. Four students were initiated along with Professor RudolphJ. Keicherwho was made an honorary member. The chapter plans to mount a plaque in the administration building displaying the Tau Alpha Pi emblem. Officers: John Parker (President); Marty Becktell (Vice-President); Scott Parker (Secretary-Treasurer).

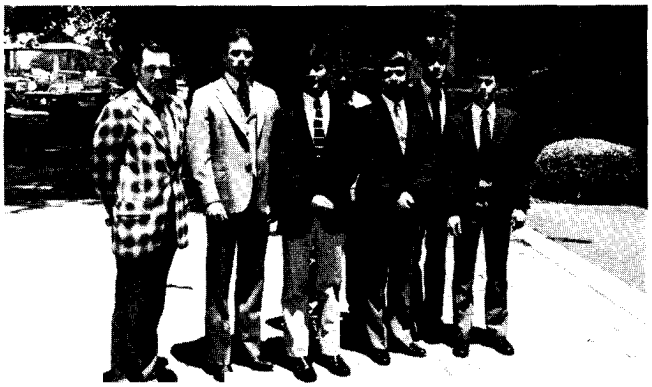
CHI BETA (Norwich University): The chapter held its initiation on April 3, 1 984. As part of its activities, the chapter is preparing a hallway display of theTau Alpha Pi emblem and rosterof past and present members. Officers: James Bothwell (President); Thomas McDonough (Vice President); Gregg Sponburgh (Secretary).

PSI DELTA (State Technical Institute, Knoxville): The chapter held initiation ceremonies on February 10, 1984. Members participated in Career Day and High School Tour Day. Plans

include tutoring, assisting in registration activities, and helping instructors in the laboratories. Officers: Steve Goddard (President); B. J. Wilson (Vice-President).

ALPHA ALABAMA (University of Alabama): In May 1984 the chapter inducted members and elected officers. Plans for 1984-1985 include fund- raising activities. The money raised will be used to finance induction apparel, community and student services, and social events. Officer(1 984-1985): Brian Ashby (President); Ronald Steelman (Vice- President); Jerry Hall (Secretary); Stephen Hendricks (Treasurer).

From left to right: Front row: Prof. Jim Keating(FacultyAdviser); BrianAshby President); Edward Palmer, Ronald Steelman (Vice-President); and Jerry Hall (Secretary). Back row Anthony Winters and Robert Burbank



ALPHA D.C (University of the District of Columbia): The chapter held initiation on November 18, 1983. It was pleased to report that it would receive some funding for its activities from the universit'V s administration. The chapter plans to hold an open house for recruiting hig~ school graduates.
Officers: Kenneth D. Brown(President); Daniel R. Gaggioli(Vice-President); Gerald R. Dean (Secretary); Hung Chi Ha (Treasurer).

ALPHA DELAWARE (Delaware Technical and Community College, Terry Campus): The chapter organized and hosted the first engineering cluster banquet and also introduced a peer tutoring service for engineeringtechnology students. It plans to continue these activities.
Officers: Mark Wiltchire (President): Ronald A Raab- Long (Vice-President).
3

ALPHA DELAWARE

From left to right Front row: Ayesba Sammader, Barabara Willis, Thomas Figary. Second row: Kathleen Enright, Ada Carter Field, Ronald Raab-Long (Vice-President). Third row Mark Wiltshire (President); Charlyn Jacoway.

BETA ALABAMA (Alabama A and M University): The chapter held its chartering-initiation ceremonies on February 1, 1984. A banquet followed. Executive Director Frederick J. Berger assisted in the ceremonies and delivered the keynote address, including a brief history of Tau Alpha Pi. Future plans include helping to locate technology graduates, providing tutoring services to technology students, and assisting in student recruitment Officers: Gerard Perera (President); Ada Brown (Vice-President); Nathaniel Cooley (Secretary); Carl Spangler(Treasurer), Lizette Williams (Public Relations).
From left to right: Front row: Dr. Joseph R. Jenkins (Faculty Adviser); Carl Spangler (Treasurer); Nathaniel Cooley (Secretary); Gerard Perera (President); Ada Brown (Vice-President); Lizette Williams (Public Relations); Professor Frederick J. Berger (Executive Diredor). Second row. Oseghale Stepher~ Michael Miller, Dr. Goang Liaw (Faculty Adviser); Dr. George Jones (Faculty Adviser); Mr. Getachew Gabre (Faculty Adviser); Mr. J. B. Turner (Faculty Adviser).

BETA LOUISIANA (Nicholls State University): The chapter held its initiation and banqet on

December 1, 1983. Future plans include increasing membership by inspiring and helping students to be better achievers academically. Officers: Keith J. Picou (President); Michael P. Cavalier (Vice-President); Elliot J. Perret, Jr. (Treasurer); Jeffrey J. Quebedeaux (Secretary).

GAMMA LOUISIANA (Southern University): The chapter held initiation on March 16,1984, inducting eight students, one adviser(Prof. John C. Hanks), and honorary member(Dean Montrust Q. Burrell). Future plans call for expanding tutorial service through the use of computer programs that assist in robotic programming and for sponsoring jointly with the M. E.T. Club a grammar workshop for technology students. Officers: Paul Bridgewater (President); Waldron A. Mosby(Vice- President); Gerardo R. Blanquiz (Secretary); Michael S. Williams (Treasurer).

ALPHA OKLAHOMA (Oklahoma State University): The chapter held its fall 1983 initiation and banquet on October27, 1983, inducting seventeen members. Chapter officers designed a Tau Alpha Pi display case as a tribute to Tau Alpha Pi members and as a source of inspiration to other engineering-technology students to strive for membership. Officers:
(1984): Bryan Olmstead (Presidenl~ Gary Prophet(Secretary); LeeJackson (Publicity Chairman); Marvin Sweetin (Membership Chairman).

—I 4

OUTSTANDING FACULTY MEMBER — At left, James K. Shelton, Jr., an Oklahoma State University associate professor of electrical power technology, receives congratulations from Dr. James E. Bose, right, professor and director of OS U's Division of Engineering Technology, for his selection by Tau Alpha Pi as the Outstanding Faculty Member of the Year. Shelton has hD~fl i m~mhør nf fIi~ ()SIJ f~'iciiltv cinre ~

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

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

BETA ZETA CHAPTER
College of Staten Island
of the City University of N.Y.
715 Ocean Terrace
Staten Island, N.Y. 10301
Prof. Sol Lapatine

BETA THETA CHAPTER
Broome Community College
Binghamton, N.Y. 13902
Prof. Robert L Reid

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

BETA KAPPA CHAPTER
State University of New York
College of Technology
811 Court Street
Utica, New York 13502
Dr. Louis J. Galbiati, Jr.
Prof. James F. Vize

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

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

ALPHA BETA CHAPTER
DeVry Institute of Technology
2858 Woodcock Blvd.
Atlanta, Georgia 30341
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 Airport
Flushing, New York 11371
Prof. Joseph J. Scalise

BETA GAMMA CHAPTER
Queensborough Community College
of the City University of N.Y.
Bayside, New York 11364
Dr. Nathan Chao
Prof. John Hennings
Prof. Bernard E. Mohr

BETA DELTA CHAPTER
Bronx Community College
of the City University of N.Y.

West 181 St and University Ave.
Bronx, New York 10453
Dr. Lillian Gottesman

BETA MU CHAPTER
State University of New York
Agricultural & Technical College
Canton, New York 13617
Prof. Arthur Hulburt
Prof. Wayne Ratouski

BETA NU CHAPTER
New York Institute of Technology
Wheatley Road
P.O. Box 170
Old Westbury, Long Island
New York 11568
Dr. Edward Kafrissen

BETA XI CHAPTER
State University of New York
Agricultural and Technical College
Alfred, New York 14802-1196
Dr. George DeSain
Prof. Philip F. Alesso
Dr. William B. Bruce
Dr. Gary T. Fraser

GAMMA ALPHA CHAPTER
University of Cincinnati
OMI College of Applied Science
100 East Central Parkway
Cincinnati, Ohio 45210
Dr. Cheryll Dunn
Prof. David Wells

GAMMA BETA CHAPTER
University of Dayton
Dayton, Ohio 45469
Prof. Albert E. Staub
Prof. Robert L Mott

GAMMA DELTA CHAPTER

Franklin University
201 5. Grant Ave.
Columbus, Ohio43215
Dr. James D. McBrayer
Prof. Donald Paul Moore

GAMMA EPSILON CHAPTER
DeVry Institute of Technology
1350 Alum Creek Drive
Columbus, Ohio 43209
Prof. Ira Jay Scheer
TauAlphaPi 1984

GAMMA UPSILON CHAPTER
Cuyahoga Community College
Metropolitan Campus
2900 Community College Ave.
Cleveland, Ohio 441 1 5 Dr. Lorin V. Waitkus

DELTA ALPHA CHAPTER
Wentworth Institute
550 Huntington Avenue
Boston, Massachusetts 02115 Prof. Alan Hadad

DELTA BETA CHAPTER
Lincoln College
Northeastern University
Boston, Massachusetts 0211 5
Dr. Tom Hulbert Ms. Kordi Heidel

DELTA GAMMA CHAPTER
Franklin Institute of Boston
41 Berkeley Street
Boston, Massachusetts 02116
Dr. Michael C. Mazzola
Dr. Richard P. D'Onofrio
Dr. Murray Shapiro
Prof. Carol F. Liebman

DELTA DELTA CHAPTER
Southeastern Mass. University North Dartmouth, MA 02747
Prof. Alden W. Counsell Dr. Dean J. Schmidlin

EPSILON ALPHA CHAPTER

DeVry Institute of Technology
11224 Holmes Road
Kansas City, Missouri 64131
Prof. Richard A Bain Dr. Leslie Thede

EPSILON BETA CHAPTER
St. Louis Community College
at Florissant Valley
3400 Pershall Road
St Louis, Missouri 63135
Prof. Robert Ward Prof. Carl H. Dietz
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ZETA ALPHA CHAPTER
University of Houston
4800 Culhoun Boulevard
Houston, Texas 77004
Dr. Kuan-Chong Ting

ZETA BETA CHAPTER
DeVry Institute of Technology
4250 North Beltline Road
Irving, Texas 75062
Prof. J. E. Turner
Prof. Allan Escher

ZETA GAMMA CHAPTER
Texas A and M University
College Station, Texas 77842
Prof. George B. Wright
Dr. Russell F. Puckett

ZETA DELTA CHAPTER
Texas Tech. University
P.O. Box 4360
Lubbock, Texas 79409
Prof. Robert L Mason
Dr. Fred P. Wagner, Jr.

ZETA EPSILON CHAPTER
Del Mar College
P.O. Box 6027

Corpus Christi, Texas 7841 1
Dr. Ronald J. Williams
Prof. M. E. Mauer
Prof. Larry L Money
Prof. Harold L Tell, Jr.
Prof. H. Holloway

ETA BETA CHAPTER
University of North Carolina
UNCC Station
Charlotte, North Carolina 28223
Prof. Pao Lien Wang
Prof. Edward M. Willis

THETA ALPHA CHAPTER
Virginia Western Community College
P.O. Box 4195
3095 Colonial Ave. S.W.
Roanoke, Virginia 24015
Dr. Martin Levine

THETA BETA CHAPTER
Old Dominion University
P.O. Box 61 73
Norfolk, Virginia 23508
Prof. Leonard A Hobbs

IOTA BETA CHAPTER (17 Chapters)
of the Commonwealth Campuses of Pennsylvania State University Worthington Scranton Campus 120 Ridge View Drive Dunmore, Pennsylvania 18512 Prof. Frank Yatsko (Coordinator)

Altoona Campus
Altoona, PA 16603
Prof. Mervin H. Hostetler

Beaver Campus
Monaca, PA 15061
Prof. Alfred D. Talvola

Behrend Campus
Wesleyville, PA 16510
Prof. Howard 1. Wilson

Berks Campus
Reading, PA 19608

Prof. Arthur P. Hill

Delaware County Campus
Media, PA 19603
Prof. John Sidoriak

Dubois Campus
Dubois, PA 15801
Prof. Gilbert Hutchinson
Prof. Ross A. Kester

Fayette Campus
Uniontown, PA 15401
Prof. Henry M. Starkey

Hazelton Campus
Hazleton, PA 18201
Prof. Elliot R. Eisenberg

McKeesport Campus
McKeesport, PA 15132
Prof. Merwin L Weed

Monte Alto Campus
Monte Alto, PA 17237
Prof. T. D. Wilkinson
TauAlphaPi 1984

LAMBDA ALPHA CHAPTER
Norwalk State Technical College
181 Richards Avenue
Norwalk, Connecticut 06854
Prof. James Lagomarsino
Prof. James McNeil
Prof. Elizabeth Resta
Dr. Norman Marcus

LAMBDA BETA CHAPTER
Thames Valley State
Technical College
574 New London TLlrnpike
Norwich, Connecticut 06360
Prof. Robert S. Golart

LAMBDA GAMMA CHAPTER

Hartford State Technical College
401 Flatbush Avenue
Hartford, Connecticut 06106
Prof. Bryant Boyd
Dr. Ralph L Boyers

LAMBDA DELTA CHAPTER
Greater New Haven State
Technical College
222 Maple Ave.
North Haven, Connecticut 06473
Prof. Edmund L Soholewski
Prof. Donald A Lostritto

MU BETA CHAPTER
Clemson University
Clemson, South Carolina 29631
Dr. Richard Roherds

MU DELTA CHAPTER
Florence-Darlington Technical
College
Post Office Drawer F-8000
Florence, South Carolina 29501
Prof. Larry Grulick
Prof. Cecil M. Ridgill

NU **ALPHA CHAPTER**
Lake Land College
Mattoon, Illinois 61938-8001
Prof. Larry J. Hymes
Prof. Carrol Livesay

New Kensington Campus
New Kensington, PA 15068 Prof. Bernard L Cuss

Ogontz Campus
Abington, PA 19001
Prof. Byron M. Robinson

Schuylkill Campus
Schuylkill Haven, PA 17972 Prof. Glen Gerhard

Shenango Valley Campus
Sharon, PA 16146
Prof. Merlin F. Jenkins

Wilkes - Barre Campus
Wilkes- Barre, PA 18708
Prof. Lee Sweinberg

Worthington Scranton Campus
Dunmore, PA 18512
Prof. Frank Yatsko

York Campus
York, PA 17403
Prof. P. Karapin
Prof. James M. Huddleston

IOTA GAMMA CHAPTER
Spring Garden College
102 East Mermaid Lane
Chestnut Hill, PA 19118
Prof. Howard T. Medoff

KAPPA ALPHA CHAPTER
Capitol Tech College of
Engineering Technology
11301 Springfield Road
Laurel, Maryland 20708
Prof. John Tridico

KAPPA BETA CHAPTER
Anne Arundel Community College
101 College Parkway
Arnold, Maryland 21012
Prof. Willard R. Mumford

OMICRON BETA CHAPTER
Union County Technical Institute
1776 Raritan Road
Scotch Plains, N.J. 07076
Prof. Robert B. Schultz
Prof. Jerry A. Nathanson

OMICRON DELTA CHAPTER
Hudson County Community College
299 Sip Ave.
Jersey City, N.J. 07306
Prof. Joseph DeGuilmo

OMICRON EPSILON CHAPTER
Middlesex County College
Woodridge Ave.
Edison, N.J. 08818
Prof. Thomas M. Handler

P1 ALPHA CHAPTER
Purdue University at West Lafayette
West Lafayette, Indiana 47907
Prof. Mary Anne Wright
Prof. R. Eugene Nix

P1 BETA CHAPTER
Indiana University
Purdue University at Indianapolis
799 West Michigan Street
Indianapolis, Indiana 46202
Dr. David Bostwick
Prof. Gerald L Arffa
Prof. Michael P. Maxwell
Prof. William L Seibert
Prof. Judith 0. Silence

P1 GAMMA CHAPTER
Indiana University-Purdue University
at Fort Wayne
2101 Coliseum Boulevard East
Fort Wayne, Indiana 46805
Prof. Ron Emery
Prof. Lloyd Smith
Ms. Dianne Bezdon

P1 DELTA CHAPTER
Purdue University
Calumet Campus
2233-171 Street
Hammond, indiana 46323
Prof. T. M. Yackish
Prof. Charles A Stevens

NU BETA CHAPTER
Southern Illinois University
at Carbondale
Carbondale, Illinois 62901
Dr. Jefferson F. Lindsey
Prof. William F. Fichfeld

NU DELTA CHAPTER
DeVry Institute of Technology
3300 N. Campbell Ave.
Chicago, Illinois 60618
Dr. Clyde H. Hoffman
Dr. Dimitrios Kyriazopoulos
Dr. Richard J. Revor

XI ALPHA CHAPTER
California State Polytech University
3801 West Temple Ave.
Pomona, California 91 768
Prof. Earl E. Schoenwetter
Prof. Donald C. Curren
Prof. Richard C. Camp, Jr.

XI BETA CHAPTER
Northrop University
11 55 W. Arbor Vitae Street
Inglewood, California 90306
Dr. Robert C. Thornton
Prof. Rene Mulders

XI GAMMA CHAPTER
Cogswell College
600 Stockton Street
San Francisco, California 94108
Prof. David Smith

Prof. Thomas K. Prendergast

XI DELTA CHAPTER
California Polytech State University
San Luis Obispo, California 93407
Prof. Franklin P. Abshire
Prof. Ted G. Graves

OMICRON ALPHA CHAPTER
New Jersey Institute of Technology
323 High Street
Newark, N.J. 07102
Dr. Joseph E. Kopf

UPSILON ALPHA CHAPTER
Northern Arizona University
Box 15600
Flagstaff, Arizona 86011 Prof. Richard C. Neville

UPSILON BETA CHAPTER
Arizona State University
Tempe, Arizona 85281
Prof. T.K. Grady
Dr. Roland S. Strawn
Prof. Don Bender Dr. Tom Kanneman

UPSILON DELTA CHAPTER
DeVry Institute of Technology
4702 North 24th Street
Phoenix, Arizona 85016
Prof. Joseph O'Connell Dr. Patton Hedrick

PHI ALPHA CHAPTER
University of Nebraska 60th and Dodge Street Omaha, Nebraska 68182-0181
Prof. Kenneth C. Merkel

CHI ALPHA CHAPTER
Vermont Technical College Randolph Center, Vermont 05061
Prof. W. Robert Wonkka

CHI BETA CHAPTER
Norwich University
Northfield, Vermont 05663
Prof. Eugene A. Sevi
Prof. Gregory D. Wight Dr. John Dalphin

PSI ALPHA CHAPTER
Memphis State University
Memphis, Tennessee 38152
Prof. Margaret Sentif
Dr. Weston 1. Brooks Prof. James R. Driver

PSI BETA CHAPTER
Nashville State Technical Institute 120 White Bridge Road Nashville, Tennessee 37209
fl....L ~

P1 EPSILON CHAPTER
Indiana State University
at Evensville
8600 University Boulevard
Fvensville, Indiana 47712
Prof. Paul F. Bennett

RHO ALPHA CHAPTER
Colorado Technical College
655 Elkton Drive
Colorado Springs, Colorado 80907
Prof. Wanda L Gamer

RHO BETA CHAPTER
University of Southern Colorado
Southern Colorado State College
2200 North Bonforte Blvd.
Pueblo, Colorado 81001
Dr. Don E. Cottrell
Prof. Dale E. Warfield
Prof. Larry 0. Womack

RHO GAMMA CHAPTER
Metropolitan State College
1006- 11th Street
Denver, Colorado 80204
Prof. H. J. Bestervelt
Prof. Howard Paynter

Prof. Larry G. Keating

SIGMA ALPHA CHAPTER
Florida International University
Tamiami Trail
Miami, Florida 33199
Prof. Ralph Johnson

SIGMA BETA CHAPTER
University of Central Florida
P.O. Box 26259
Orlando, Florida 32816
Dr. Richard C. Denning
Dr. Clarence M. Head
Prof. Gerald Lewis
Prof. Thomas F. Wells

SIGMA GAMMA CHAPTER
St Petersburgh Junior College
P.O. Box 13489
St Petersburgh, Florida 33733

PSI DELTA CHAPTER
State Technical Institute
at Knoxville
3435 Division Street
P.O. Box 19802
Knoxville, Tennessee 37919
Dr. Jan R. Sonner

OMEGA ALPHA CHAPTER
New Mexico State University
Box 1902
Las Cruces, New Mexico 88003
Prof. Myron E. Cherry
Prof. Louis Kleine
Prof. George Alexander
Dr. Quentin C. Ford

ALPHA ALABAMA CHAPTER
University of Alabama
P.O. Box 1941
University, Alabama 35486
Prof. James L Keating

BETA ALABAMA CHAPTER
Alabama A and M University
School of Technology
P.O. Box 304
Normal, Alabama 35762
Dr. Joseph R. Jenkins

ALPHA DIST. OF COLUMBIA CHAP.
University of the District of Columbia
Van Ness Campus
4200 Connecticut Ave. N.W.
Washington, D.C. 20008
Prof. B. P. Shah

ALPHA DELAWARE CHAPTER
Delaware Technical College
Terry Campus
1832 North Dupont Parkway
Dover, Delaware 19901
Prof. Reuben Salters
Prof. Samuel A Guccione

ALPHA KANSAS **CHAPTER**
Kansas State University
Seaton Court
Manhattan, Kansas 66506
Dr. John C. Lindholm

ALPHA KENTUCKY CHAPTER
Murray State University
Murray, Kentucky 42071
Prof. John D. McLaren
Prof. Andrew C. Kellie
Dr. William S. Byers

ALPHA LOUISIANA CHAPTER
Louisiana Tech. University
Ruston, Louisiana 71272
Dr. David H. Cowling

BETA LOUISIANA CHAPTER
Nicholls State University
Thibodaux, Louisiana 70301

Prof. Charles J. Monier

GAMMA LOUISIANA CHAPTER
Southern University and
A and M College
P.O. Box 9247
Baton Rouge, Louisiana 70813
Dr. Eddie Hildreth, Jr.
Dr. Manjit Singh
Prof. Gadson 0. Chukwuma
Prof. John R. Rachal
Prof. John C. Hanks

ALPHA MISSISSIPPI CHAPTER
University of Southern Mississippi
Southern Station Box 5172
Hattiesburg, Mississippi 39406
Dr. C. Howard Heiden
Prof. Charles Sterling

ALPHA OKLAHOMA CHAPTER
Oklahoma State University
Stillwater, Oklahoma 74078
Dr. Raymond F. Neathery
Dr. Craig B. Robison

ALPHA OREGON CHAPTER
Oregon Institute of Technology
Oretech Branch Post Office
Klamath Falls, Oregon 97601
Prof. Richard H. Zbinden

ALPHA WASHINGTON CHAPTER
Cogswell College North
10626 N.E. 37 Circle
Kirkland, Washington 98033
Prof. Frank M. Rafchiek
Prof. Gene A. Burns

ALPHA WISCONSIN CHAPTER

Milwaukee School of Engineering
1025 North Milwaukee Street
Milwaukee, Wisconsin 53201
Prof. RayW. Palmer
Dr. Vincent R. Canino
Prof. Pepe Rodriguez
Prof. Thomas W. Davis
Prof. Marvin Heifetz

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Future Plans of Chapter
Add an additional sheet if you wish.