Evolution of Programs in the Chemical Sciences at mid-Michigan Academic Institutions

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Delta College
University Center, MI
Two-year, Community College

• Founded as a result of increased enrollment during the mid-1950’s from the Bay City Junior College, housed at Bay City Central High School
• 1955: Community leaders from Bay, Midland, and Saginaw counties meet to discuss plans of a tri-county junior college
• 1955: The Tri-County Committee of 300 formed to study the needs of higher education in the Saginaw Valley area.
• 1956: The final report of the Committee of 300, outlining the need to establish and finance a new college, was received.
• 1957: Legislation was submitted to the State of Michigan Legislature to finance and establish a new institution of higher education.
Delta College
continued

• 1957: Voters of Bay, Saginaw, and Midland counties formed a community college district under Act 182 of the Public Acts of 1957 and authorized a levy of 1.5 mills to construct and operate a college.

• 1958: Bonds were sold to provide the financial structure for Delta College and campus construction began.

• 1959-61: Members of the faculty and staff of Bay City Junior College assisted in planning for the new college. Many of the Bay City Junior College faculty, students, and staff became part of the new college as Bay City Junior College operations were assimilated into Delta College.

• 1961: Delta College opened.
Alma College
Alma, Michigan
Four-year, liberal arts college

• Founded in 1886 by the Presbyterian Synod of Michigan
• Five faculty were engaged at the founding
• Ninety-six students enrolled the first year (1887)
• Curriculum included humanities, arts, sciences, and religion
  – No departments, no majors
  – All students took the same curriculum
  – Tuition was 50 cents per week
Alma College
continued

• 1887, Charles Davis, A.M., was appointed as the first professor of natural science, who taught:
  – Chemistry, Geology, and Biology
• 1901, Francis West, M.Sc., took over for Davis who moved to the University of Michigan to concentrate on research in botany
  – Taught until 1927
  – Responsible for developing the chemistry curriculum
  – Re-designed the original gymnasium as a chemistry laboratory and classroom building in 1922
  – Under his guidance chemistry became a separate discipline and department of chemistry was established
• Wilford Kaufman, Ph. D., 1927-1948
  – Organic Chemist
  – Actively stimulated students to pursue research
  – Influenced a large number of students to pursue graduate studies in chemistry
  – Close relationship with Dow Chemical
    • Summer appointments; sent students to Dow as employees
  – Influenced other departments to involve students in research
  – Extremely influential on the development of the chemistry program at Alma; left to take a faculty position at Carleton College in 1948
Alma College
continued

- 1946 Two faculty added
  - Howard Potter, Ph.D.
  - Charles Skinner, A.M.
- 1950’s Third faculty member added
  Jacob DeYoung
- 1960’s Fourth faculty member added
  Paul Splitstone
- 1959 Dow Foundation provided funding for a new science building (largely due to the Kaufman legacy)
Alma College
continued

- Alma and the University of Michigan were the first two colleges in the state to receive ACS approval for the chemistry curriculum (1920’s)
  - Kaufman was known to the chair of the ACS-CPT
- Alma certification was revoked after two years. Restored in 1963 after a fourth faculty member was hired.
Alma College
Chemistry Today

• Chemistry Department
  – Five faculty members
• Biochemistry Department
  – 1 faculty member
• ACS certified degrees in both chemistry and biochemistry
Alma College
Chemistry Today, continued

• Curriculum
  – 1st Year
    • Fall term, Basic Principles
    • Winter term, Organic Chemistry
  – 2nd Year
    • Fall term, Organic Chemistry
    • Winter term, Inorganic Chemistry
  – 3rd and 4th Year
    • Upper-level courses
Undergraduate research is an integral part of training

- Students present work at regional and national ACS meetings
- 8-10 majors graduate each year
- Current tuition: $22,170/year
- Tuition plus room and board is $30,454 per year.
Saginaw Valley State University
University Center, MI
Four-year, comprehensive University

• Founded in 1963 as Saginaw Valley College, a private, four-year liberal arts institution
• 1965 Became a part of Michigan’s system of state-supported colleges
• 1975 Saginaw Valley State University; youngest of Michigan’s 15 State Universities
Chemistry at SVSU

- Department was established with one laboratory and two faculty members
  - Berner Gorden
  - Bert Plaush
- 1969  Department moved into new facilities, with a doubling of space, in Wickes Hall
  - Two new faculty added
    - George Estland
    - Peter Moehs
- 1973  Department received ACS approval for curriculum. Student affiliate chapter formed (Professor Gordon, advisor)
- 1977  First student affiliate outstanding chapter award (Professor Moehs, advisor)
• 1986  Department moved into new and expanded facilities

• 1993  Chemistry Club recognized for having been ranked in the top 25 of approximately 500 such clubs in the country for six consecutive years

• 1996 First SVSU department to receive an endowed chair:
  – Herbert H. Dow Chair in Chemistry
  – Dr. David Swenson

  • Allen Foundation donated one million dollars to create the “Allen Foundation Research Fund.”
• The Department currently offers BS degrees in:
  – Chemistry
  – Biochemistry
  – Business Chemistry
  – Chemical Physics
  – Chemistry/Teacher Certification
  – And an emphasis in Environmental Chemistry
Current Faculty (in addition to Professor Swenson):
- Art Andrews, Biochemistry
- Andrew Chubb, Organic Chemistry
- George Eastland, Inorganic Chemistry
- Deborah Huntley, Physical Chemistry
- Dave Karpovich, Analytical Chemistry
- Steve Lawrence, Analytical Chemistry
- Bert Plaush, Physical Chemistry
Saginaw Valley State University

Dr. Pete Moehs

Dr. Dave Swenson
Dr. Bert Plaush, Dean Kullgren, and Dr. Pete Moehs, with student (seated), circa 1986

Dr. Deb Huntley (center) with students at XPS unit
Dr. George Eastland
Central Michigan University
Mt. Pleasant, Michigan

• Doctoral, research intensive university
• Enrollment of 20,000 on the main campus
  8,000 at several external locations
• More than 200 degree programs at all levels-bachelor’s, master’s, specialist’s and doctoral
• Increasing emphasis on research to respond to societal needs
  – Science of Materials
  – Neuroscience
Park Library Addition
2001
Herbert H. and Grace A. Dow Health Professions Building, 2004
Central Michigan University
Dow Science Complex
Funding from External Grants and Contracts Has Been Low But Is Growing

- Proportion of Federal Funding to CMU as a Total of All Grants and Contracts for Nine Years, Excluding In-Kind Contributions (Three Year Averages)
### Faculty Inventions at CMU Have Been Increasing

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*11* (Ford Patents Donated)
*Jensen-Tethered bucky balls*
Central Michigan University

Beginnings

- 1892 Founded, Central Michigan Normal School
- September 13, 1892: Opened with 31 students in a rented building in downtown Mt. Pleasant
- 1918 Four year public college, 450 students, five buildings on 25 acres
- December 7, 1925 Fire destroyed the school’s main building and library
Central Michigan University
Twenties to today

- 1927 Central State Teacher’s College
- 1941 Central Michigan College of Education
- 1955 Central Michigan College
- 1959 Central Michigan University

- 2000 Central Michigan University Research Corporation (CMURC)
- 2002 Classified doctoral research intensive by Carnegie
Old and New at CMU
Chemistry at CMU

- 1900  Department of Science
- 1910  Department of Physical Science and Agriculture
- 1911  Department of Physical Science
- 1912  Department of Physics and Chemistry
- 1953  Malcom Filson became chair
There are two points of general information:

The orientation program begins September 8 at 4:30 p.m. Members of the faculty who have been assigned definite responsibilities for the orientation program should report at the time set in the program.

The general faculty meetings are scheduled in Keeler Union Ballroom for Wednesday, September 9 at 1:30 p.m. and Friday, September 11, at 9:00 a.m. It is important that all faculty members be present at these meetings.

I know you will be glad to have the following information relative to your position for the year 1953-54:

Position: Head, Department of Physics and Chemistry

Tenure: Three years – 1953-56

Salary rate for academic year, 1953-54: $7475
Rate for 1952-53: $6975
Merit increment: 200
*Cost of living adjustment: 300

Cordially yours,

Charles L. Anspaeh
President

CLA: c/d
July 1, 1953
Chemistry at CMU

• 1964 Department of Chemistry established as an independent unit
  – Malcom Filson, Chair, (Organic, Inorganic Analytical)
  – Ted Cook, Analytical
  – Herb Virter, Organic
  – Fred Kabbe, Organic
  – Ken Uglum, Analytical
  – Mike Carson, Physical
  – Karl Lindfors, Physical
Four administrative, faculty members retire

Four veteran Central Michigan University administrators and faculty members will sever their longtime association with the University as the year comes to an end. They are completing their teaching careers after contributing a total of 119 years of service.

Dr. Helen Lohr, former chairman of Home Economics, Family Life and Consumer Education Department, came to CMU in 1957 from the University of Kansas where she had taught for 12 years. She joined the department as chairman, a position she filled until 1967 when she resigned as chairman but continued as professor.

Dr. Malcolm H. Filson began his teaching career in 1935 as an assistant professor in the Department of Chemistry. He attained full professor rank in 1942 and became department chairman in 1954. After 16 years in that position, he decided to devote full time to teaching and resigned as head of the department in 1970.

Dan Rose, prominent in CMU’s athletic program for 35 years has been a member of the athletic staff since 1937 and director of intercollegiate athletics since 1942. He came to the University as varsity basketball and baseball coach. He has the distinction of having the longest tenure of any athletic director at any state university.

Irwin Campbell, the fourth retiree, closes his office in the Department of Journalism after spending the past six years of his association with CMU as a teacher of journalism. Prior to that he was director of the University Press and for six years, in addition to his other duties, served 6 years as editor of “Field Campus News,” the forerunner of the present “Off Campus News.” He began his association with the University in 1940, coming from Andrews University.
Chemistry at CMU

• 1960s Period of Rapid Growth
  – From approximately 6,000 to 16,000 students
  – 12 faculty by 1969
  – 14 faculty by 1976
Chemistry at CMU

- 1964 Moved to new facilities in Brooks Hall (from the basement of Grawn Hall)
- 1966 ACS certification for B.S. degree program
- 1974 Graduate core courses developed in two tracks
  - Track A (more theoretical)
  - Track B (more practical)

In a given year one track offered in Mt. Pleasant and the other in Midland. The following year locations reversed.
Chemistry at CMU

• 1974 Program designed to allow Midland technical employees to receive M.S. degrees with all work in Midland

  – Research at
    • Dow Chemical
    • Dow Corning
    • Michigan Molecular Institute

• 1974 Co-op program for undergraduates initiated
  • Dow Chemical
  • Dow Corning

Classes 20 hours/week; work in an industrial laboratory 20 hours/week
Co-op program gives on-the-job experience

By DOUG WINGER
Daily News writer

Forty years ago, one student from Midland High School was the start of Dow Corning Corp.’s co-op program.

Today more than 120 students are enrolled in one of four co-op programs — high school, college, Summer Professional Development Program or Alternating Work-Study Program.

Degree program at a United States university may apply to the Summer Professional Development Program or the Alternating Work-Study Program.

There are 30 students enrolled in the Professional Development Program. Approximately 50 percent go into engineering and the balance is divided between marketing, data processing, accounting and finance. There also are
Chemistry at CMU

- 1978  First ACS-Project SEED students at CMU
- 1985  CMU/Dow research internship agreement permitted M.S. students to carry out research in Dow facilities using Dow equipment
  - Required a problem that would allow a thesis to be written, publications to be generated, and that would provide information useful to the company.
  - Provided a stipend for the student

Philip Delassus
Patrick Smith
Duane Priddy
Doug Beyer

Later expanded (about 1990) to include undergraduates
Chemistry at CMU

• 1985 CMU-MMI Affiliation

• John Cantelon, CMU

• Robert Hefner, MMI
President Abel updated the Board of Trustees at its March 9 meeting on the progress toward a merger between CMU and the Michigan Molecular Institute. Abel stressed the benefits such a merger would provide both institutions. The merger would strengthen CMU's science and technology programs while possibly attracting high technology-oriented businesses to mid-Michigan. For MMI, the merger would give it degree-granting status at the doctoral level and assure the facility continued growth.

Abel told the board the administration is presently working in three major areas of concern:

* Political. Administrators have been in close contact with Lansing, Abel said. Administration officials recently met with Senate Majority Leader John Engler (R-Mt. Pleasant) to discuss the proposed merger.

* Legal. Abel informed the Board the administration is trying to work out a constitutional procedure which will allow for maximum autonomy for MMI while giving the CMU Board ultimate control.

* Financial. Abel said efforts have begun to attract alternate sources of funding for MMI. Lobbying efforts will continue with the state, he said. In addition, administrators are contacting organizations and individuals which have been financially helpful to CMU in the past, informing them of the proposed merger. The institute has an annual operating budget of $1.7 million. The bulk of those funds come from three private foundations.
CENTRAL MICHIGAN UNIVERSITY
SCHOOL OF GRADUATE STUDIES

April 9, 1984

Dr. John Cantelon, Provost
WA 112
Central Michigan University
Mt. Pleasant, MI 48859

Dear John:

As you know, we have expressed our enthusiasm over the possible CMU-MMI merger and your specific consultations with MMI administrators in both private and public meetings. Both you and President Abel have shown commitments to University development in the contemporary areas of the CMU-MMI merger, MMPI program and grant opportunities and the IET building. We believe your recent directive to create an advisory Group, coordinated by Dean Friedrich, with the objective of producing curricular models for the possible Polymer Science degree associated with a CMU-MMI merger is timely. It is our intent to work with you and President Abel for successful products of the specific University developments mentioned above, as well as meeting crucial space and equipment needs.

Dean of Graduate Studies
Associate Vice Provost for Research

Dean, School of Business Administration

Director, University Libraries

Dean, College of Arts and Sciences

Dean, School of Education, Health and Human Services

Dean, School of Extended Learning
Chemistry at CMU

• 1986 Michigan Polymer Consortium
  – Cooperative Graduate Program in Polymer Science
  • CMU, Jon Cantelon, David Murphy
  • MTU, Edward Fisher
  • MMI, Robert Hefner, John D. Hoffman

  – Later expanded to include
  • MSU
  • Wayne State
The following is a list of the faculty who have primary involvement in the consortium graduate program:

<table>
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<tr>
<th>Name</th>
<th>Institution</th>
<th>Research Areas</th>
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<tr>
<td>Boyer, Raymond F.</td>
<td>MMI</td>
<td>Amorphous Polymers, Transformation, Relaxation</td>
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<tr>
<td>Caneba, Gerard T.</td>
<td>MTU</td>
<td>Poly Solns, Sol-gel Transitions, Membranes, Simulation</td>
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<td>Cornilsen, Bahne C.</td>
<td>MTU</td>
<td>Laser Raman Spectroscopy, Solid State Chemistry</td>
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<td>Cratin, Paul D.</td>
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<td>Thermodynamics, Surface Chemistry</td>
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<td>Dave, Raju</td>
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<td>Dreyfuss, M. Peter</td>
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<td>Dreyfuss, Patricia M.</td>
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<td>Polymer Synthesis &amp; Prop, Characterization, Adhesion</td>
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<td>Hansen, Marion G.</td>
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<td>Polymer Precessing, Wood Composites, Rheology</td>
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<td>Hoffman, John D.</td>
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<td>Howell, Bob A.</td>
<td>CMU</td>
<td>Reaction Mechanisms, Polymer Degradation</td>
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<td>Huang, Yung-Hsiang</td>
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<td>Composite Materials, Rheology</td>
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<td>Lindfors, Karl R.</td>
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<td>Multi-dimensional NMR, Polymer Structure, Phys Chem</td>
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<td>Mansfield, Marc L.</td>
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<td>Polymer Physics, Chemical Physics, Theory</td>
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<td>Meier, Dale J.</td>
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<td>Mendenhall G. David</td>
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<td>Polymer Degradation, Organic Mechanisms</td>
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<td>Miller, Robert L.</td>
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<td>Polymer Composites, Structure, Deformation, Failure</td>
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<td>Polymer Reactor Design, Polymerization Kinetics</td>
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<td>Williams, Fredrick D.</td>
<td>MTU</td>
<td>Polymerization Reactions, Adhesives</td>
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Chemistry at CMU

• 1989 Center for Applications in Polymer Science
  – Established with $300,000 from the Michigan Research Excellence Fund
  – Leveraged to purchase about $1M in equipment
Chemistry at CMU

• 1994 Moved into new facilities in Dow Science building
Chemistry at CMU

• 2002 CMU/Dendritic Nanotechnologies Collaboration
  – Applications of dendritic polymers
  – Army focus
  – Faculty/scientists from
    • Department of Chemistry
    • Department of Physics
    • Applied Mathematics
    • DNT
Dendrimer Catalyzed Synthesis of Carbon Fibers and Room Temperature

Room-Temperature Growth of Carbon Nanofibers From Iron-Encapsulated Dendritic Catalysts**

Jason K. Vohs,¹ Jeffery E. Raymond,¹ Jonathan J. Brege,¹ Steven Rozeveld,³ Dale J. LeCaptain,¹ Geoffrey L. Williams,² and Bradley D. Fahlman¹*

Departments of Chemistry¹ and Biology,² Central Michigan University,
Mount Pleasant, MI 48859
³ Dow Chemical Company, Midland, MI 48667

Abstract

25 °C, 1 atm
Patented work of Anton Jensen

- Fullerene attachment and catalysis/detoxification

![Diagram showing fullerene attachment and catalysis/detoxification process]

- PL-AMS Resin (available from Aldrich)

- C_{60}

- Expanded interior portion of PAMAM core [each PAMAM branch is a (CH_2)_2CONH(CH_2)_2N< group]
Dendrimer stabilized distribution of gold nano-particles (V. Petkov)

**Figure 1.** Model of a 2 nm Au nanoparticle in water. The nanoparticle is built of approx. 600 atoms (circles in red) and is surrounded by approximately 1,000 water molecules (in blue).
Chemistry at CMU

- 2003 Planning for a Ph. D. program in the science of advanced materials (SAM)
- 2005 B.S. degree program in biochemistry approved
- 2006 SAM approved by the Academic Planning Council
Chemistry at CMU Today

- Seventeen regular faculty (most have active programs of research)
- Six temporary faculty
- Several adjunct faculty (external members of thesis committees)
- Six postdoctoral associates
David Ash, Chair

Robert Kohrman, Dean CST

James Hageman, Vice Provost for Research and Dean Graduate College
Chemistry at CMU Today

• About 20 chemistry majors per year
  – All are required to do undergraduate research and generate a B.S. thesis
  – Most present papers at regional or national meetings
    • ACS
    • NATAS
    • Posters on the Hill
    • Posters at the Capitol
  – Summer scholars program
Chemistry at CMU Today

• 16-20 M.S. Students
  – M.S. degree is a research degree
  – Two-year program; about half the time is spent on research
  – Theses are expected to contain publishable results
  – Students are coauthors on most research publications
  – Students present results at national and international meetings
Chemistry at CMU Today

• 3 Ph.D. Students
  – CMU/MTU Cooperative Program

• New B.S. degree program in biochemistry

• Ph.D. program in the science of advanced materials
CONCLUSIONS

• Strong chemistry programs at each of the academic institutions in the Midland Section-ACS areas
• The program is unique to the mission of the particular institution
• Delta college Two-year, community college
• Alma College Four-year, liberal arts college
• Saginaw Valley State University Four-year, comprehensive university
• Central Michigan University Four-year university; significant graduate programs; doctoral, research intensive
ACKNOWLEDGEMENTS

- Frank Boles
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- James Hageman
- Peggy and Scott Hill
- George Eastland
- Ron Sharp