Centennial Celebration
August 12-14, 2005

# Wisconsin Chemical Engineering Faculty, Students, & Alumni 1905-2005


**W. Harmon Ray**

*Professor Emeritus*

**University of Wisconsin - Madison**

**Dept. of Chemical & Biological Engineering**

# 1905: View of Chemical Engineering Building from Lake in 1899 (Chemistry Bldg until 1905)

# 1905: First Name Change of Department:
# Applied Electrochemistry → Chemical Engineering

**Chemical Engineering Faculty**
Charles Burgess, Chairman
Oliver W. Brown
Oliver P. Watts (PhD)
Judson C. Dickerman

**Students in 1906-07**
Freshman - 20
Sophomores - 16
Juniors/Seniors - 12

**Graduating Class (1907)**
B.S. Degree - 5
*(164.5 credits required)*
ChE Degree - 2
*(later replaced by MS Degree)*
PhD Degree - 1 in 1905, 1 in 1910

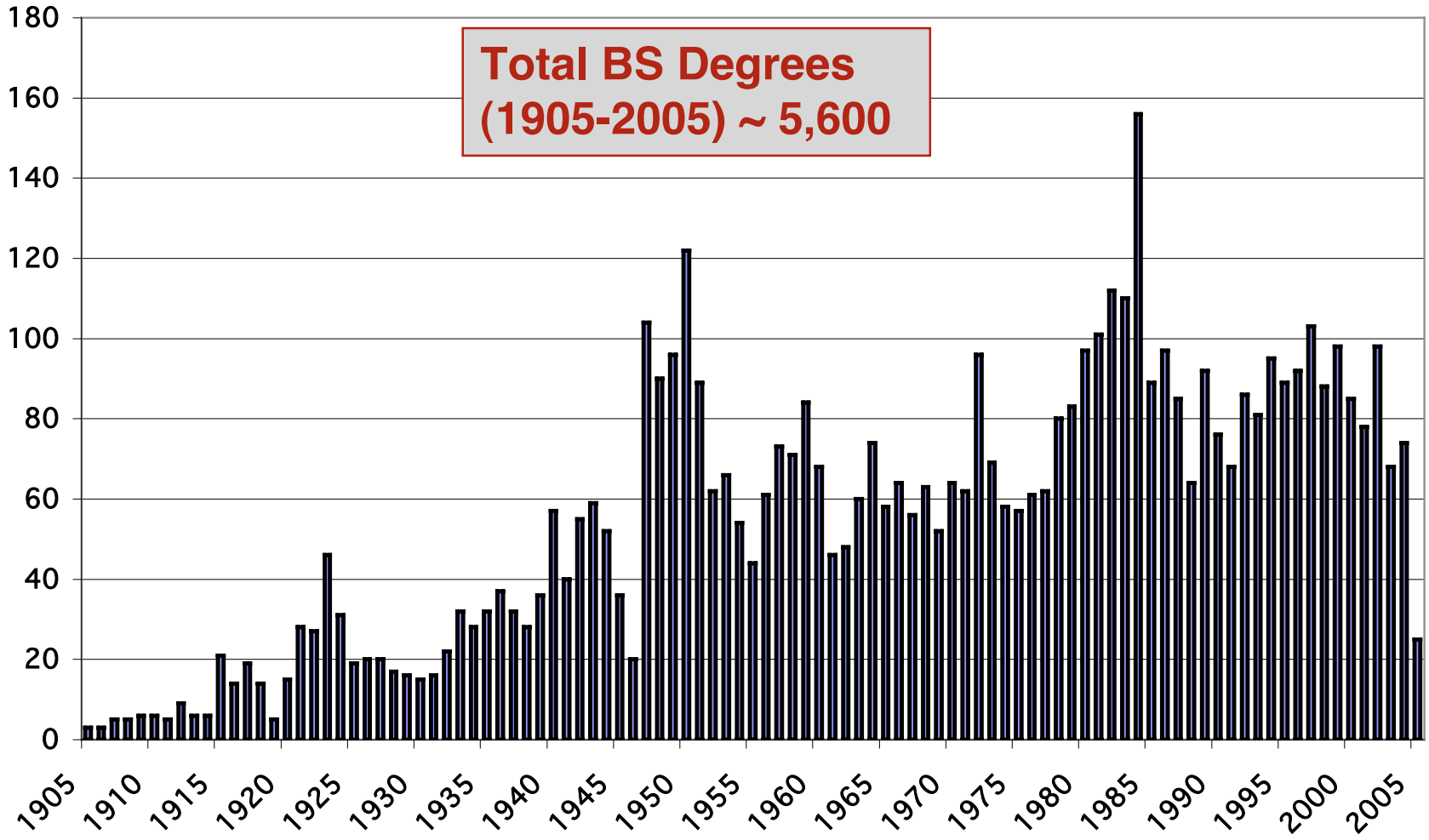
**Required ChE Undergrad Courses:**
- Chem. Machinery and Appliances
- Technical Fuel, Gas, and Oil Analysis
- Technology of Fuels
- Chemical Manufacture (Summer Lab)
- Industrial Chemistry

**Elective Courses:**
- Thermal Efficiencies
- Illumination and Photometry
- Gas Manufacture and Distribution
- Applied Electrochemistry
- Batteries

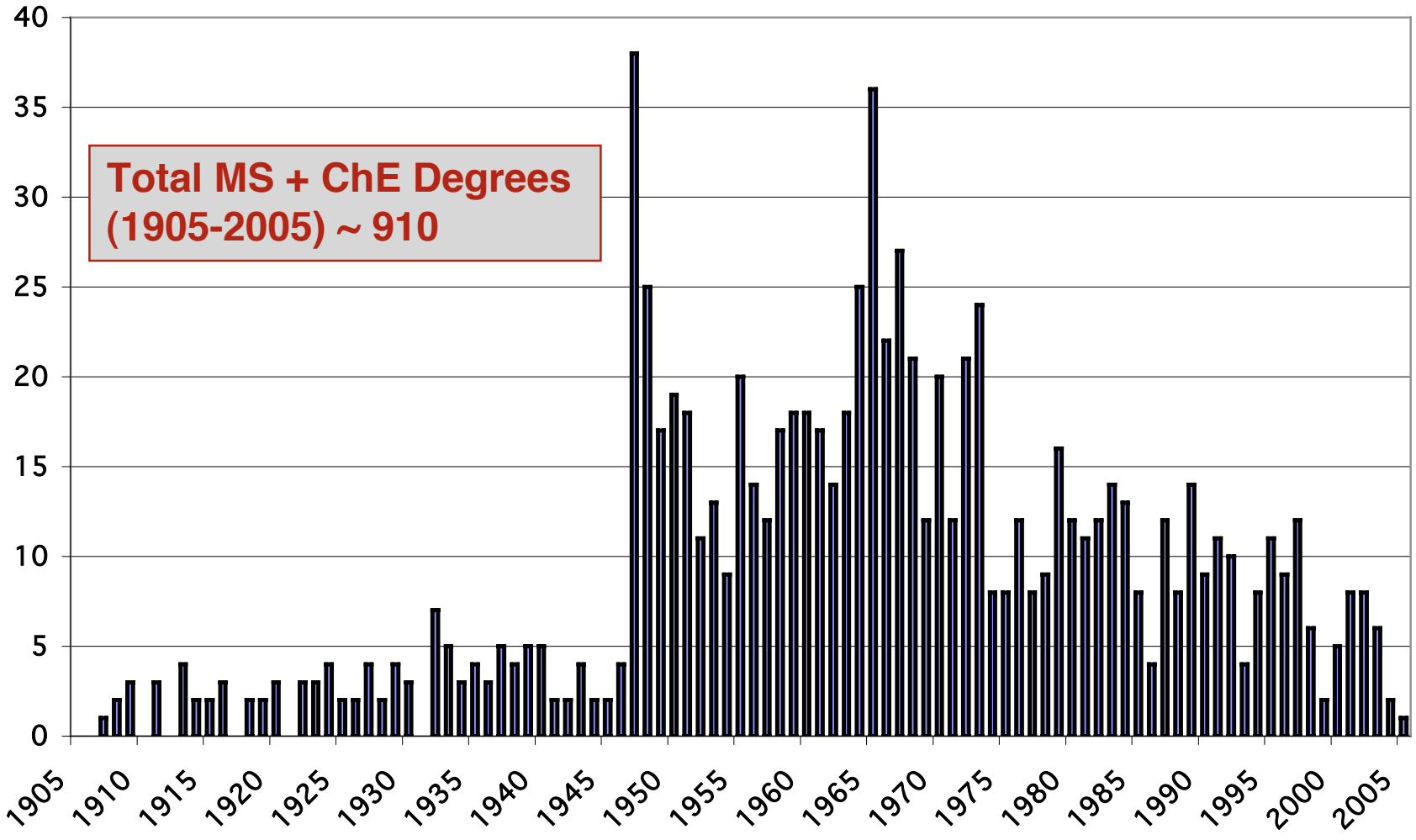
**PhD Thesis Topics (1905-12):**
- Study of Boride and Silicides
- Alloys of Calcium
- Properties of Metallic Cerium
- Efficiency of Gas Calorimeters

Also: Appl. Electrochemisty. Batteries

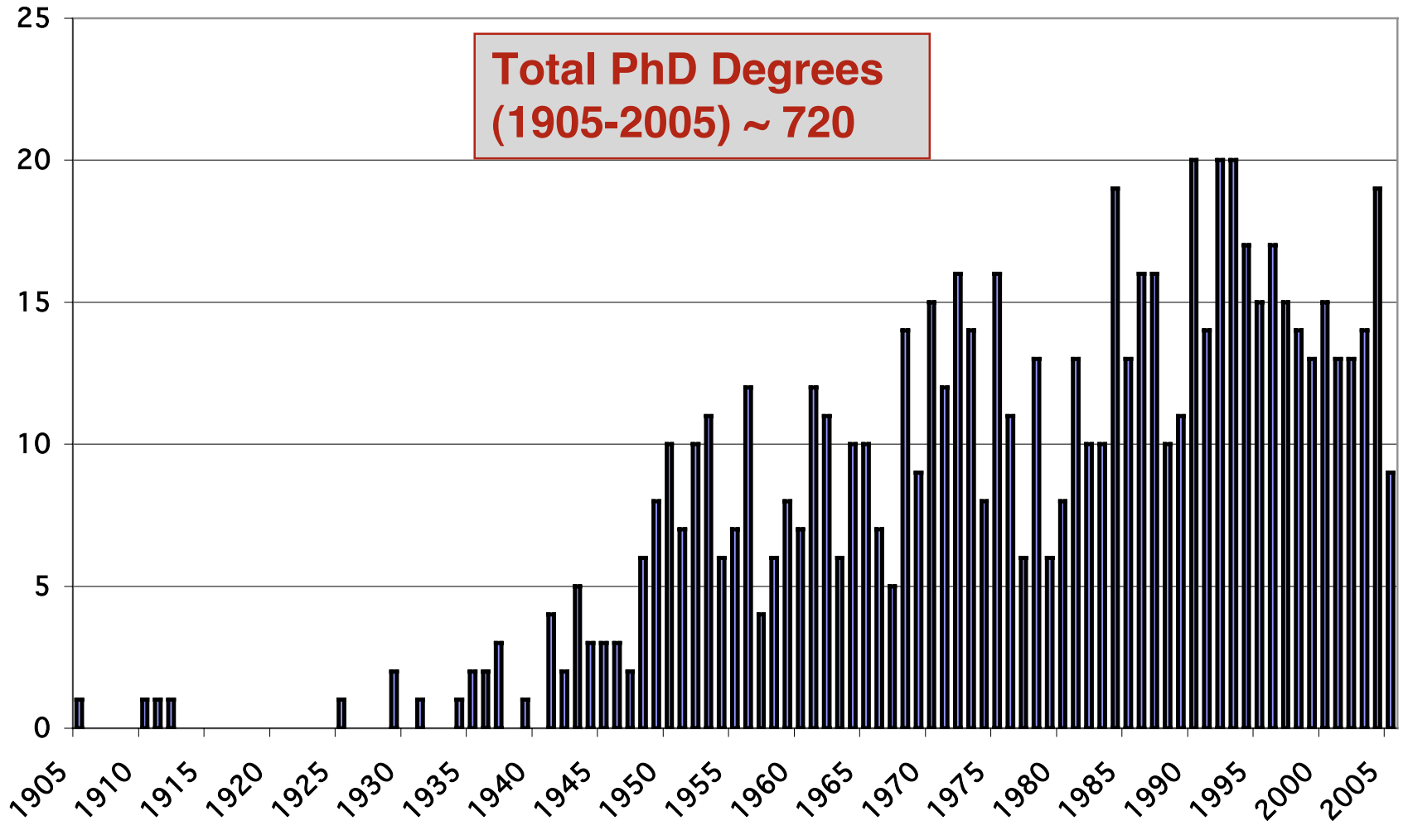
# BS Degrees Awarded, 1905-2005



# MS & ChE Degrees Awarded, 1905-2005



# PhD Degrees Awarded, 1905-2005



# From the beginning our graduates were very successful

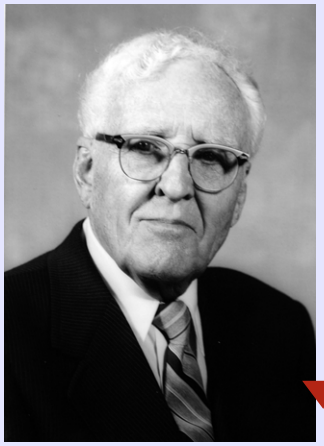
**Walter B. Schulte (BS 1910, ChE 1911)**

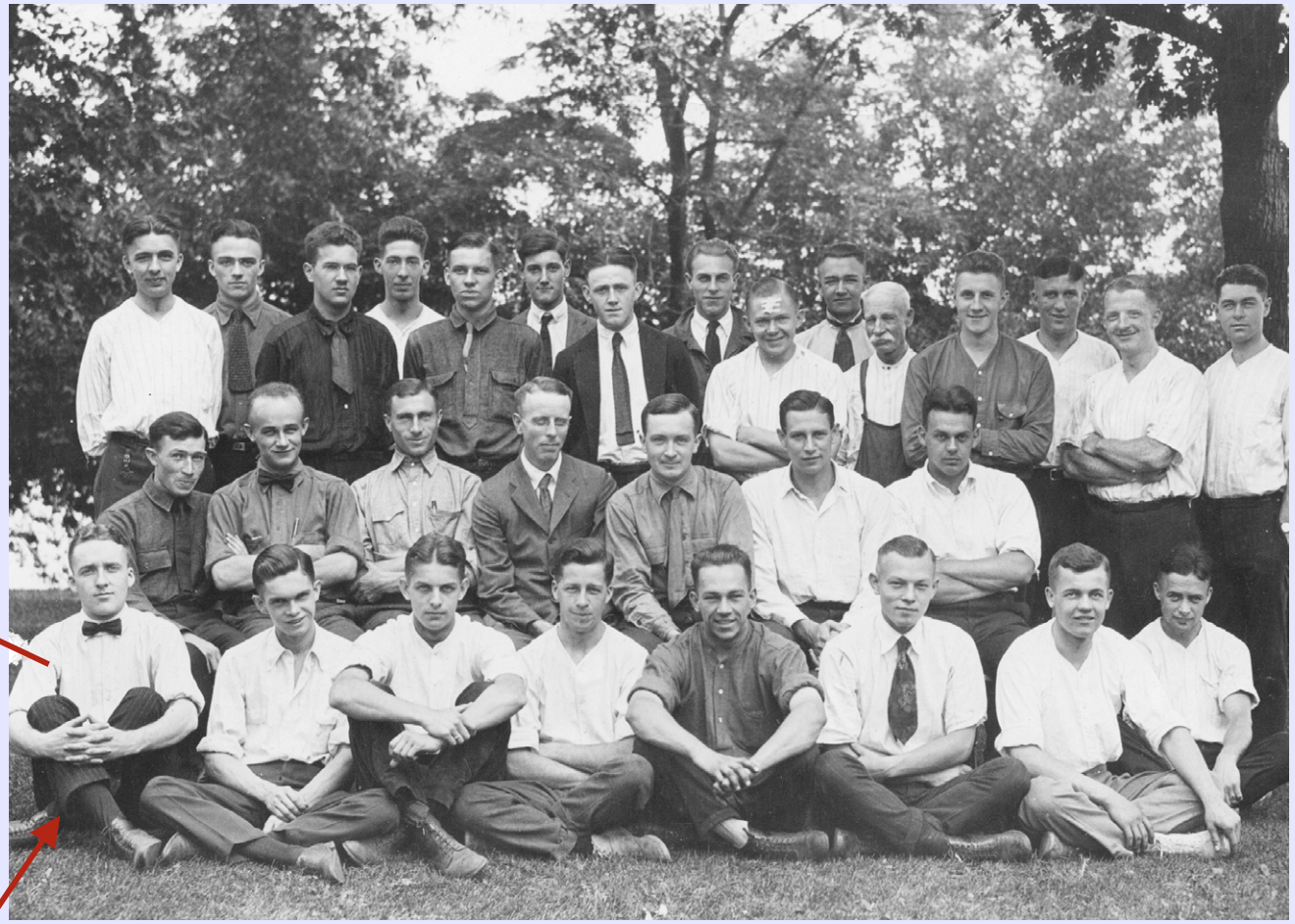
***Went to work for Burgess Battery and became one of the directors. In 1937, Schulte took over the Electronics Division of Burgess Battery and formed the Microswitch Corporation (later a division of Honeywell Inc.). Schulte created a ChE trust fund at UW with substantial income to support student scholarships & teaching laboratories. These funds enabled many innovations In laboratories over the last 40 years!***

**Oliver Storey (BS 1910, ChE 1913)**

***Taught in our Department for a short time and then joined the Burgess Battery Co. Later he became Legal Counselor for the company. He received a Distinguished Service Award In 1951. Upon his death,his widow, Miriam Storey, created a UW Fund to support the Chemical Engineering Dept.***

**Summer Lab 1920:** **Although the "Summer Lab" began in 1905, we have pictures only from the 1920's onward.**

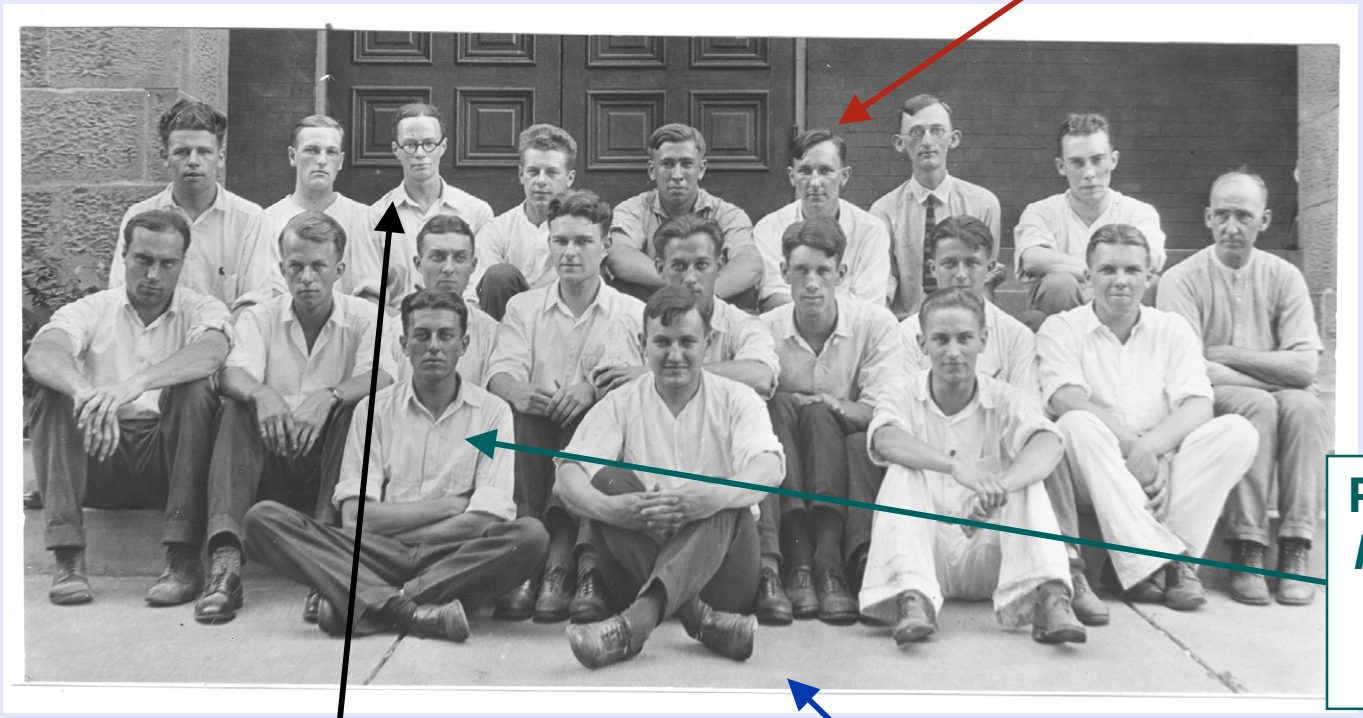


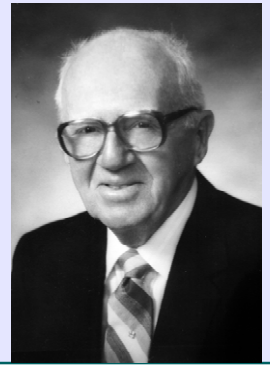


**Milton J. Shoemaker, *founder of Research Products Corp,* holds > 50 patents, creator of the Shoemaker Chair**

# Summer Lab 1925: A small but distinguished group

**Russel Harr, went on for PhD and was *Senior Engineer at Western Electric Co.*
Established the Harr Fund for Summer Lab Student Awards**



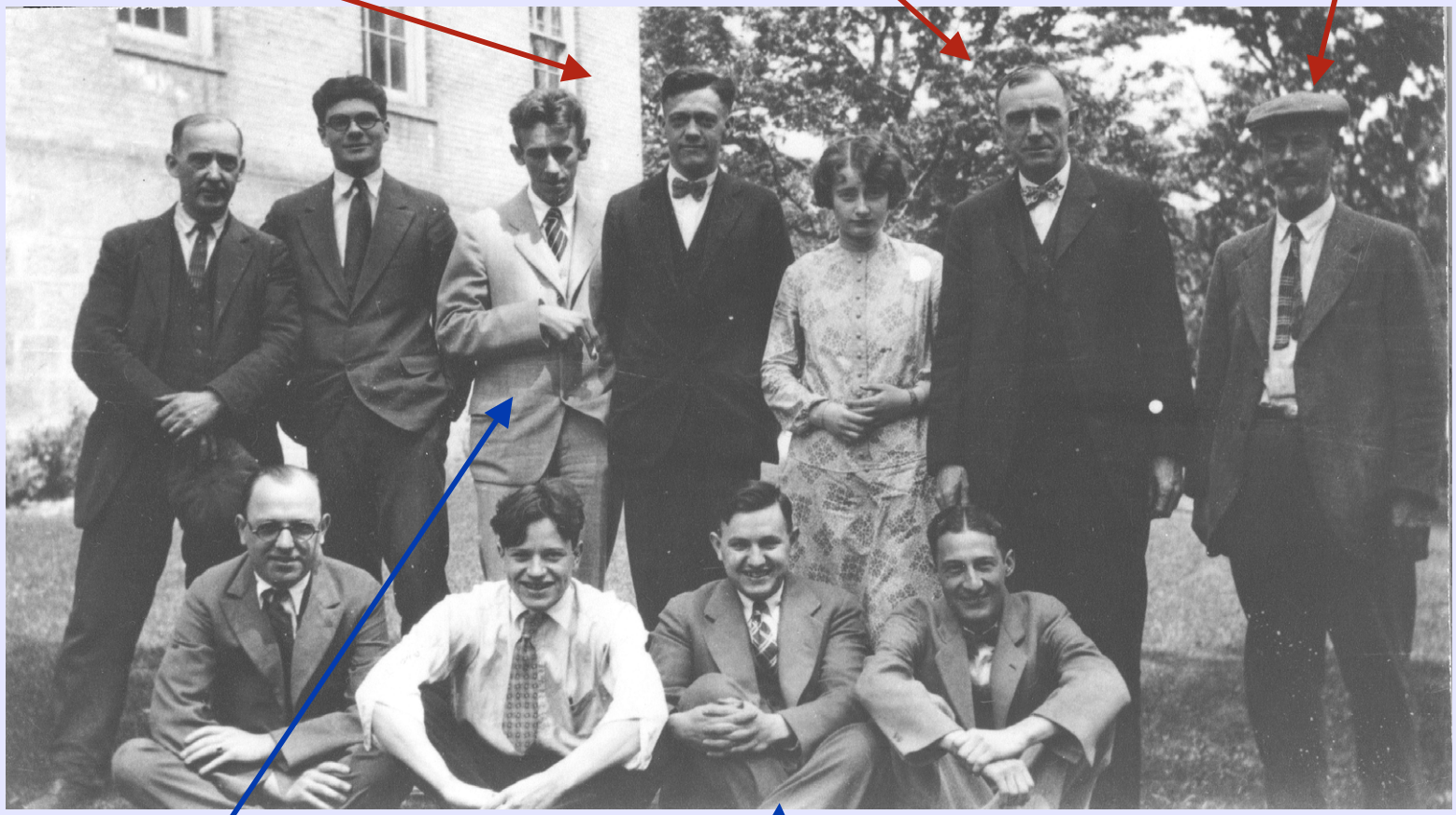


**Paul Elfers, *Director Fisher Governor Co.*
Created the Elfers Chair in ChE**

**Roland Ragatz (BS 1920), gifted teacher and future Dept Chair**

**Allan P. Colburn, became Olaf Hougen's first PhD student; while at DuPont he discovered fundamental heat and mass transfer relations that appear in every ChE textbook today, *Chairman of ChE at Univ. of Delaware***

# ChE Faculty 1926: Three Professors and Two Instructors



# Some other graduates in the first 25 years of the ChE Department who rose to high position in industry

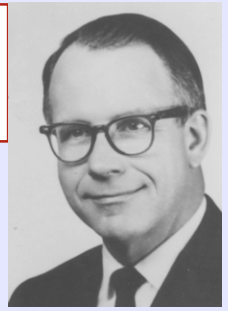
- Eugene Herthel (BS 1915) *Manager, R&D, Sinclair Refining Co.*
- Harvey Higley (BS 1915) *Board Chairman, Ansul Chemical Co.*
- Keith McHugh (BS 1917) *President, New York Telephone Co.*
- Donald Tyrrell (BS 1917) *President, Ray-O-Vac Co.*
- Erwin Brenner (BS 1919) *Vice President, Milwaukee Gas & Light Co.*
- William Kellett (BS 1922) *Gen'l Supt. & Director, Kimberly-Clark Corp.*
- Donald Slichter (BS 1922) *Vice President, Northwestern Mutual Life Insurance Co.*
- Kenneth Watson (BS 1923, MS 1924, PhD 1926) *Vice-President R&D, Pure Oil Company. Also wrote books and papers with Olaf Hougen.*
- Edwin Nelson (BS 1924) *Vice President, Universal Oil Products Co.*
- John Chyle (BS 1924) *Director of Welding Research, A.O.Smith Co.*
- Merrill A Scheil (BS 1927) *Director Metals Research, A.O. Smith Co.*
- W. Beverly Murphy (BS 1928) *President, Campbell Soup Co.*
- Pierce G. Ellis (BS 1931) *Vice President, Wisc. Public Service Corp.*

# A few of our distinguished BS grads from the 1930's & 40's

**John Sobota (BS 1932),**
***Vice President for R&D, Fort Howard Paper Co.***
**His widow, Magdalen, created**
**the Sobota Chair in his honor**

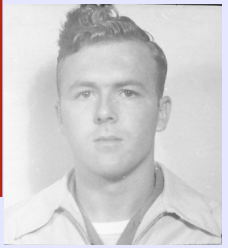
**Robert Sutherland (BS 1933)**
***Vice President for Eng. & Dev., Universal Oil Products***

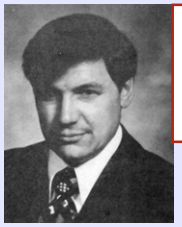
**William Arvold (BS 1942)**
***President &CEO, Wausau Paper Mills***



**Edward Brenner (BS 1947)**
***US Commissioner of Patents***

**Howard Curler (BS 1948),** ***CEO, Bemis Co.***
**Bemis created the Howard Curler**
**Distinguished Chair in his honor**

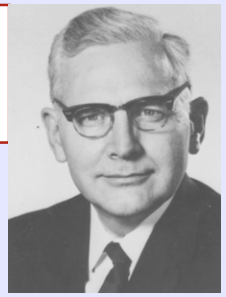


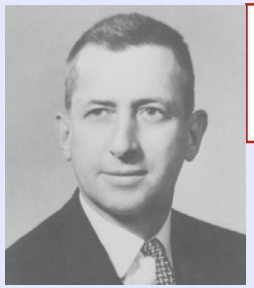


**James Randall (BS 1948)**
***President, Archer Daniels Midland***

# Some PhDs from the first 50 years leading industry

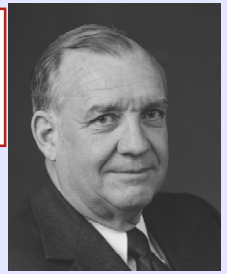
**Charles Rowe (PhD 1941)**
***Chief Engineer, Standard Oil California***

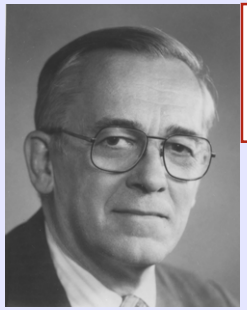




**Herman Hoerig (PhD 1942),**
***Vice President, DuPont of Canada***

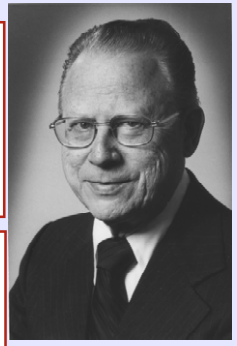
**Charles Brown (PhD 1946)**
***Executive Vice President, Abbott Labs***





**Kenneth Smith (PhD 1949)**
***Vice President, Anaconda Industries***

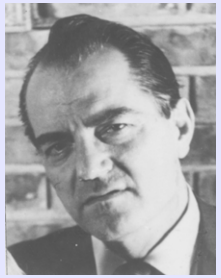
**Bernard Gamson (PhD 1948)**
***President & CEO,***
***Martin-Marietta Corp.***



**James Mathis (PhD 1952)**
***Vice President Science & Tech., Exxon* Corp.**
**Active fund-raiser & contributor to ChE**

**John Lambert (PhD 1956)**
***Vice President, Fansteel Inc.***

# Some PhDs from the first 50 years staffing other Universities

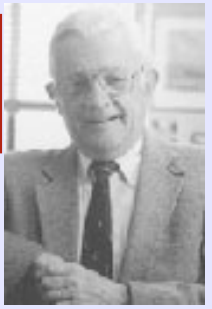


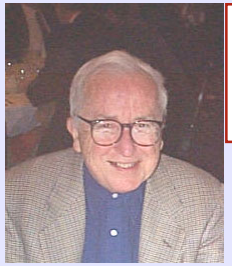
George Thodos (PhD 1943)
*Northwestern University*

Robert B. Beckmann (PhD 1944)
*Dean, University of Maryland*

Charles R. Wilke, (PhD 1944)
*University of California - Berkeley*

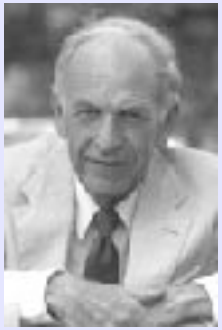
William F. Stevens (PhD 1949)
*Northwestern University*





William E. Ranz (PhD 1950)
*University of Minnesota*

L. K. Doraiswamy (PhD 1952)
*Director, National Chemical Lab, India*



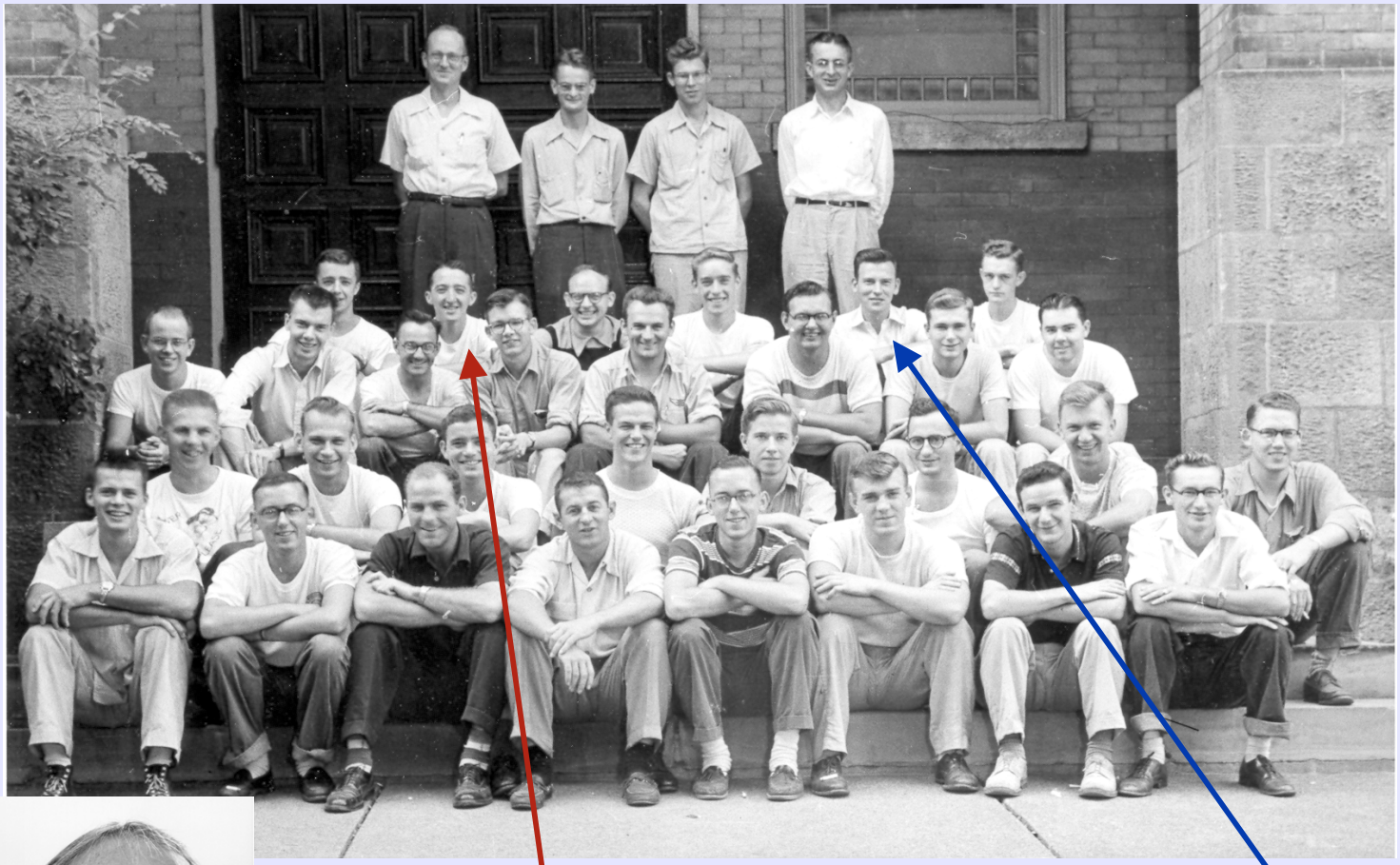
Howard Rase (PhD 1952)
*University of Texas, Austin*

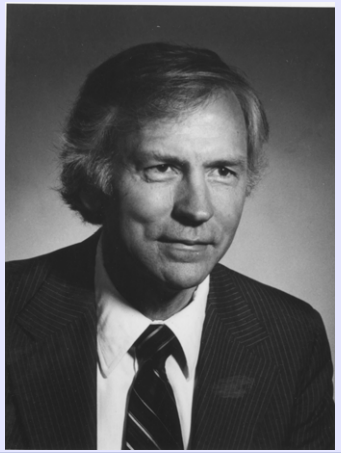
J. D. (Bob) Seader (PhD 1952)
*University of Utah*

# Summer Lab 1950: Toward the end of the postwar crowds

William R. Schowalter, nephew of Otto Kowalke,
*ChE Dept Chair at Princeton, Dean at Illinois,*
Member and Officer of Nat'l Academy Engineering

# Summer Lab 1952: Industrial Leaders

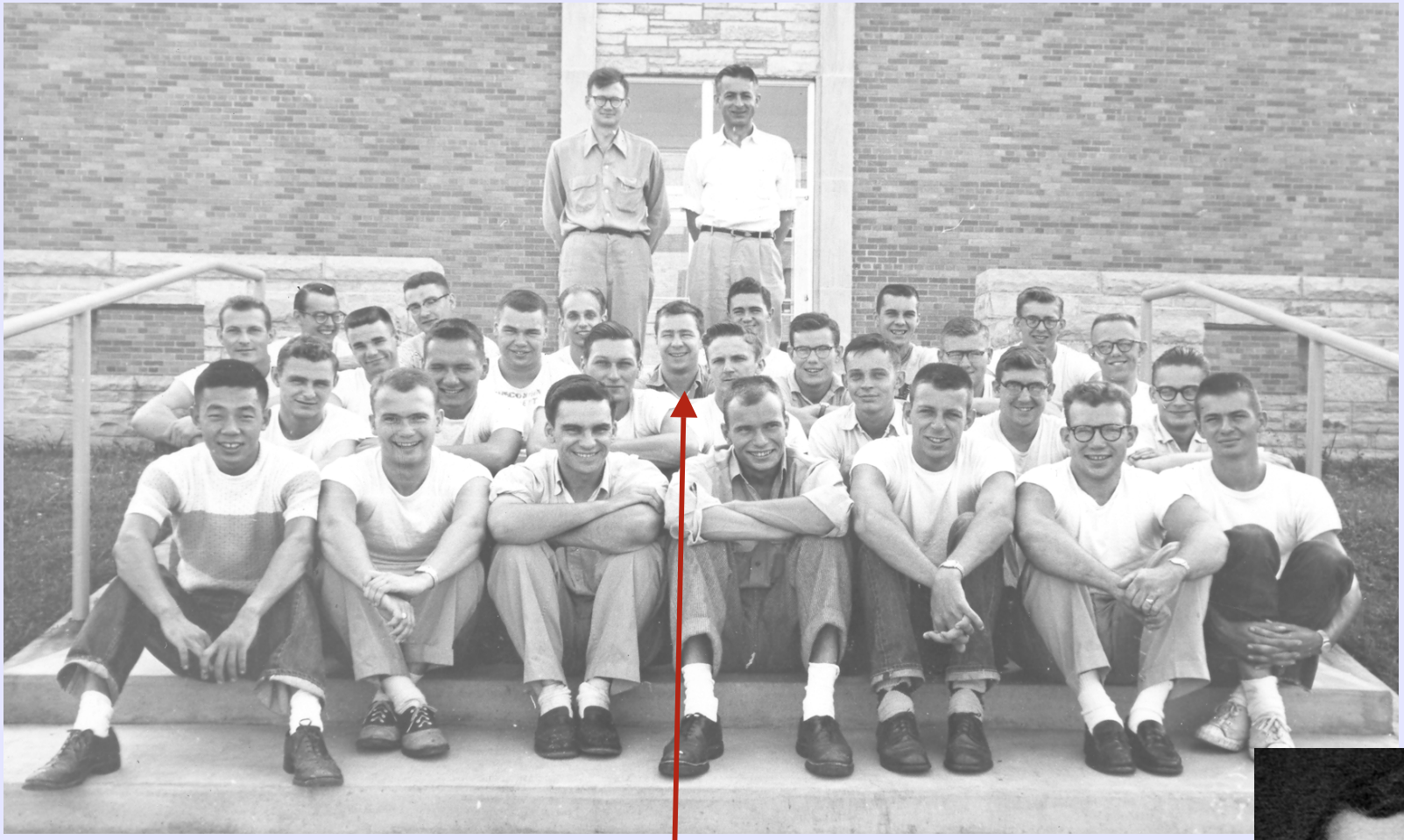




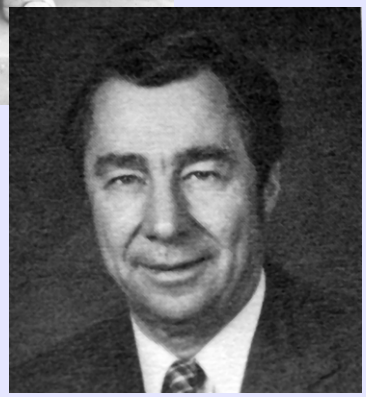
**Richard J. Schoofs (BS 1953),**
***Chairman, Schoofs Inc.,***
**supporter of College of Engineering student activities**

**Donald F. Root**
**(BS 1953, PhD 1957)**
***Director of R & D,***
***Weyerhaeuser Company***

# Summer Lab 1953: First one in the new ChE building

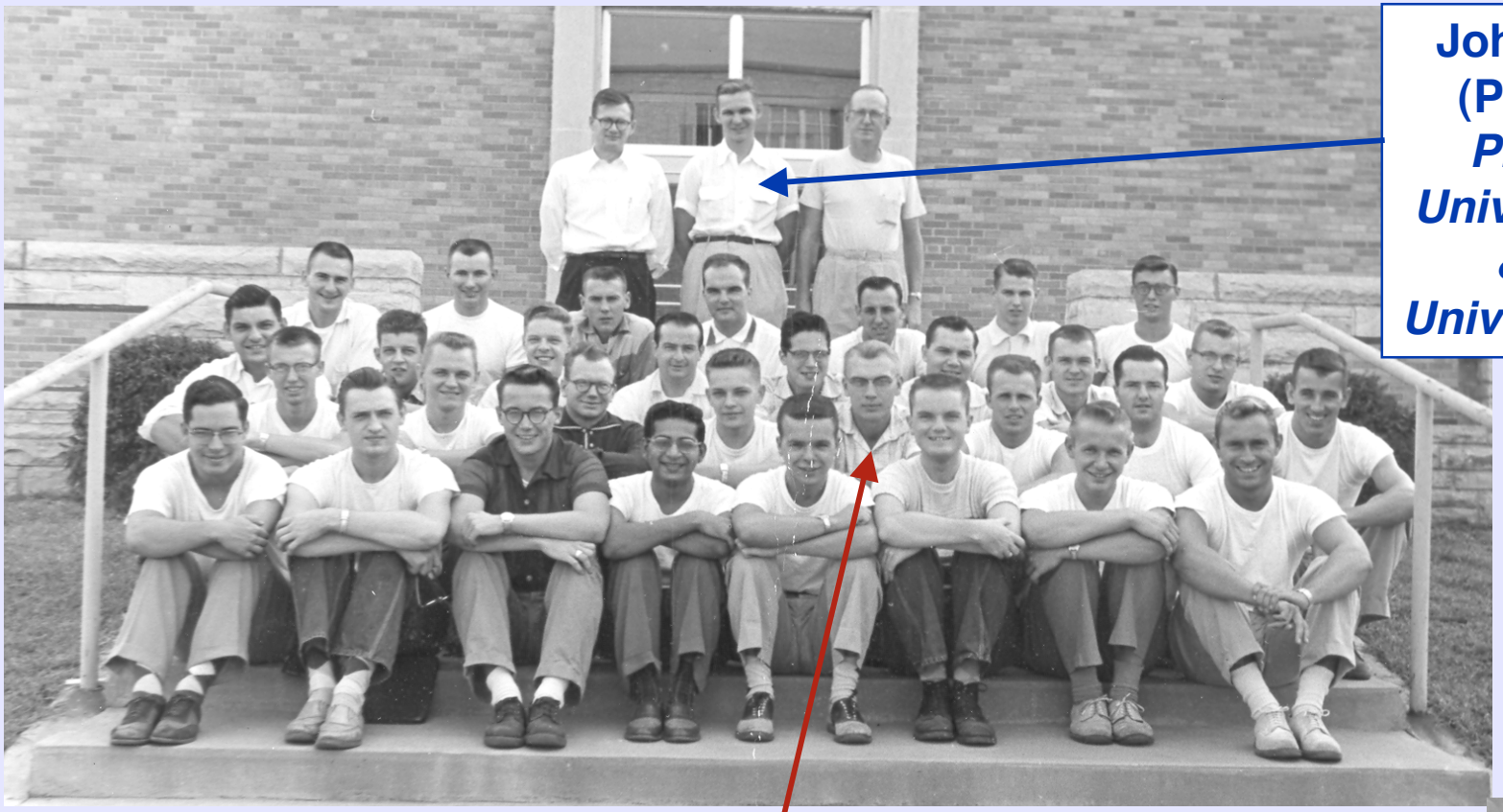


Robert A. Greenkorn (BS 1954, PhD 1957)
*Professor, Vice President & Provost*
*Purdue University*



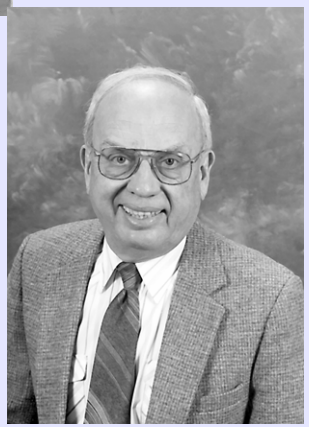
# 1953: Chemical Engineering Faculty

# Summer Lab 1955: Alumni to Industry and Academia



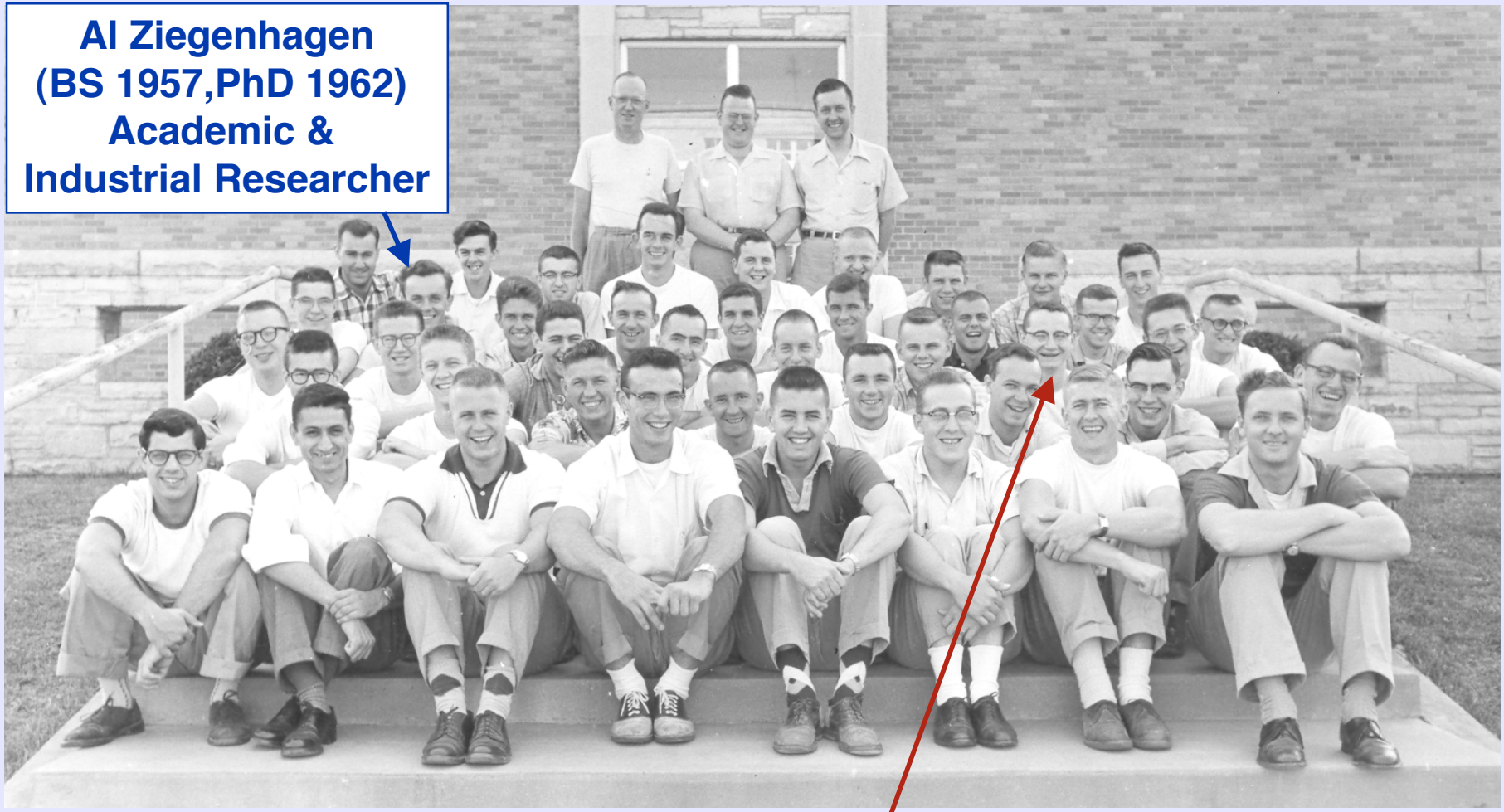
**John Ferron**
**(PhD 1958)**
***Professor***
***Univ. Delaware***
***& Chair***
***Univ. Rochester***

**Harvey D. Spangler (BS 1956), Leader in Fertilizer Industry, supporter of high tech instruction in the College of Engineering, and creator of the Spangler Chair in Chemical Engineering.**



# Summer Lab 1956: Alumni to Industry and Academia

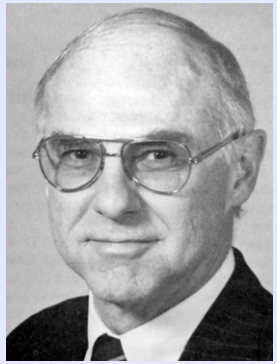
**Al Ziegenhagen**
**(BS 1957,PhD 1962)**
**Academic &**
**Industrial Researcher**



**Donald E. Baldovin (BS 1957), *Vice President, Worldwide Exploration Business Group, Amoco Corp.***
**Created Scholarships and Fellowships in Chemical Engineering.**

# Summer Lab 1957: Alumni to Industry and Academia

**Harry L. Spiegelberg (BS 1959)**
***Vice President for Research, Kimberly-Clark Co.***
**Active fund-raiser and contributor**
**to the Chemical Engineering Department**



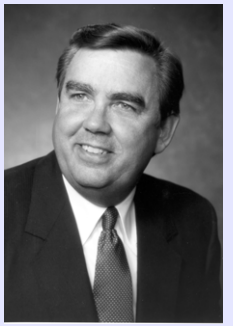
# Summer Lab 1958: Alumni to Industry and Academia

Robert Kadlec, *Professor at Univ. of Michigan*

Mike Williams, *Professor at Univ. of California - Berkeley*

Ernest S. Micek (BS 1959), *CEO of Cargill Inc.,*
Honorary DSc from UW, major supporter of ChE Dept. and College of Eng.

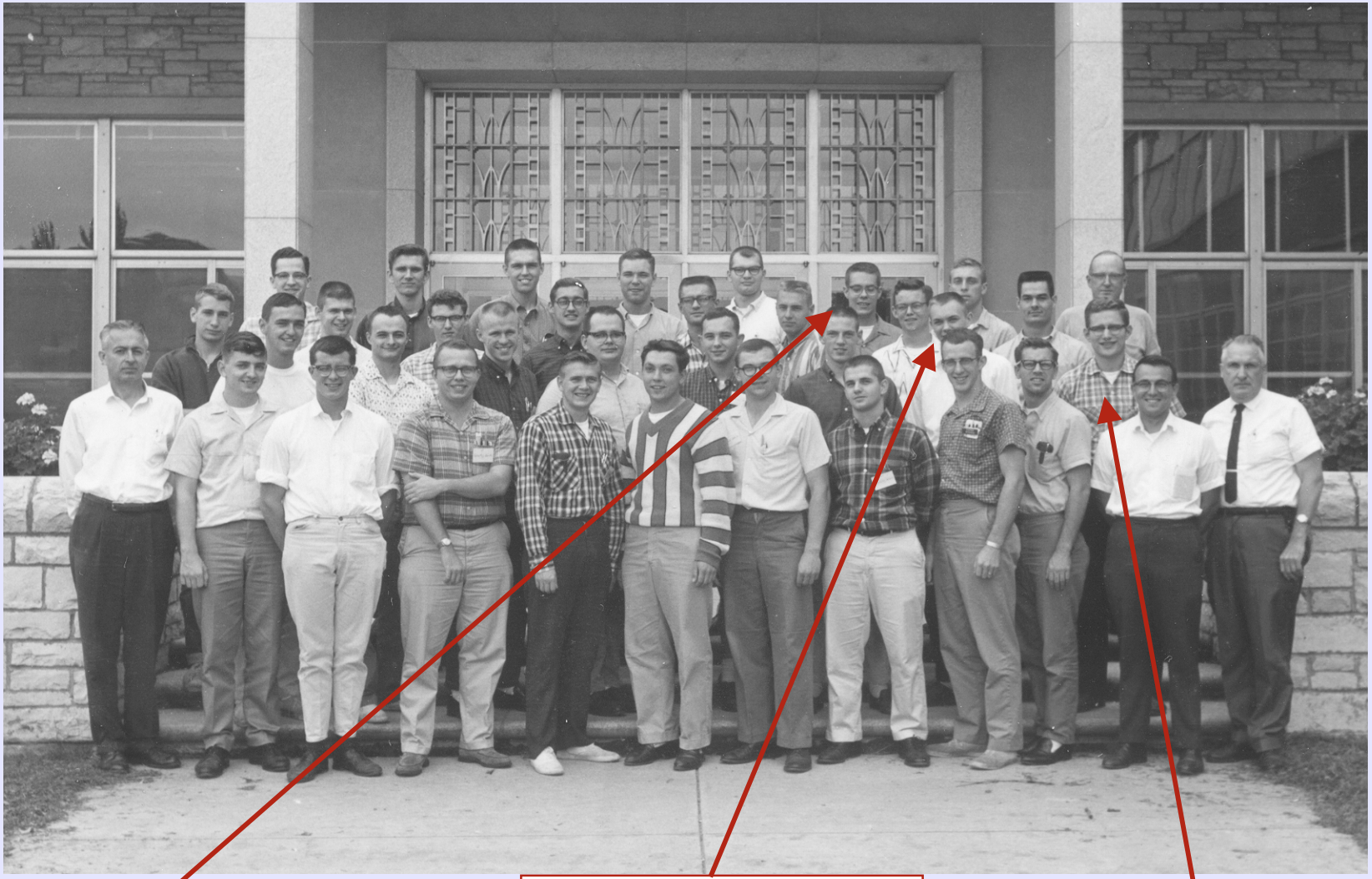
# Summer Lab 1959: Very Distinguished Industrial Leaders

Lee R. Raymond,
*CEO of Exxon - Mobil*,
Nat'l Academy Eng'g

Gordon Brunner, *Chief Technology Officer & Board Member, Proctor & Gamble*

# Summer Lab 1963: Distinguished Academics



Dale Seborg, *Professor & Dept Chair, Univ. of California - Santa Barbara*

Joel Barlow *Professor, Univ. of Texas - Austin*

James Christensen *Professor, Univ. of Oklahoma*

# 1967: Chemical Engineering Faculty

# Summer Lab 1972: Alumni to Industry


**Jeffrey Curler, (BS 1973)**
***CEO, Board Chairman***
***Bemis Co.***
**(not pictured)**

**John Schmid (BS 1973),**
***Director R&D Infant Care***
***Kimberly-Clark Corp.***

# Summer Lab in the last 25 years - London,Oviedo, Vienna


**Since 1981, summer lab students have had the option of taking the course in Europe to broaden their cultural & language experience while learning from foreign faculty together with students from other places**

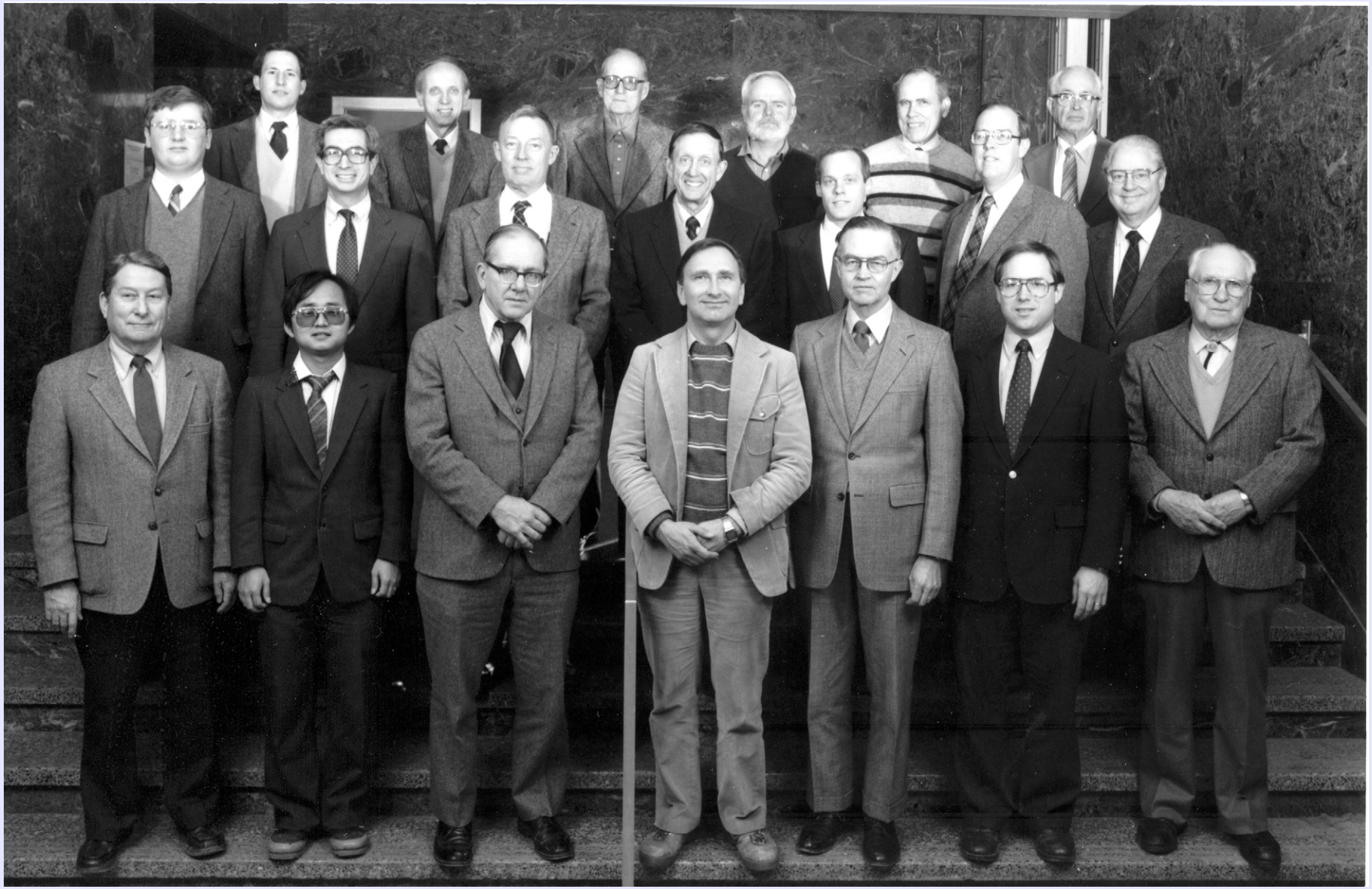

# 1970: Chemical Engineering Office Staff

# 1970: Chemical Engineering Shop Staff

# 1987: Chemical Engineering Office and Technical Staff

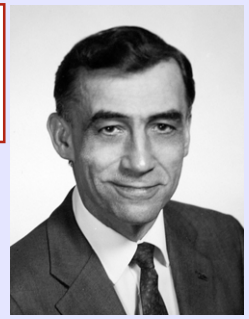
# 1976: Chemical Engineering Faculty

# 1987: Chemical Engineering Faculty



# A few of our distinguished BS grads from more recent years

**John Riggs (BS 1959),**
***Vice President for R&D, Hoechst-Celanese***

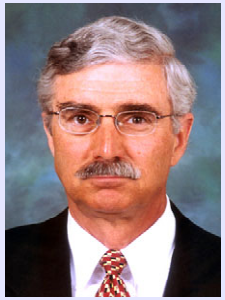


**Roger Rolke (BS 1963)**
***Director of Engineering, Shell Development***

**Richard Weaver (BS 1964)**
***Manager, New Business Development, Exxon***

**Ronald Schuh (BS 1965)**
***Exec. Vice President, Oxychem***

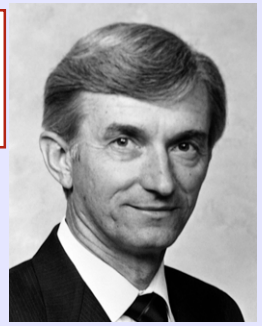
**Richard Antoine (BS 1969)**
***Global Resources Officer, Proctor & Gamble***



**John Schremp (BS 1972)**
***President, Firestone Polymers & Rubber***

# Some more recent PhDs leading industry

**Warren Haug (PhD 1965)**
***Vice President for R & D, Proctor & Gamble***



**Jeffrey Siirola (PhD 1970),**
***Technology Fellow, Eastman Chemical***
**Nat'l Academy Eng'g, President of AIChE**

**Dong Soo Hur (PhD 1971)**
***CEO, Honam Oil Group, Korea***

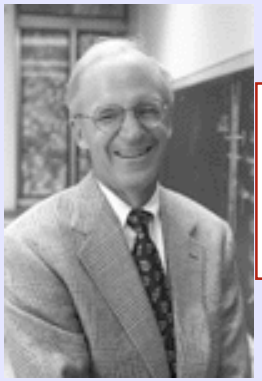
**Allen Kozinski (PhD 1971)**
***Vice President for R & D, Amoco***

**Roualeyn Fenton-May (PhD 1971)**
***President Coca-Cola China***
**Created a Graduate Fellowship**

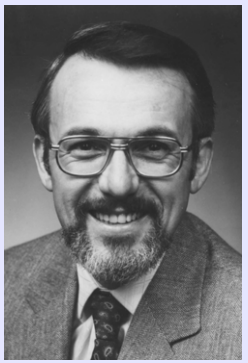
**James Patton (PhD 1971)**
***Vice President Prof. Imaging, Eastman Kodak***

**Jay Ihlenfeld (PhD 1978)**
***Vice President for R & D, 3M Co.***

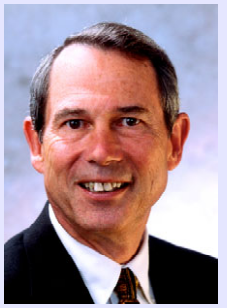
# Some more recent PhDs staffing other Universities



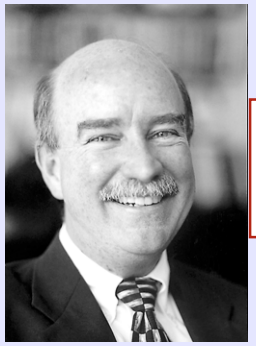
**Edward Cussler (PhD 1964)**
***University of Minnesota***
**Nat'l Academy Eng'g, Past President of AIChE**



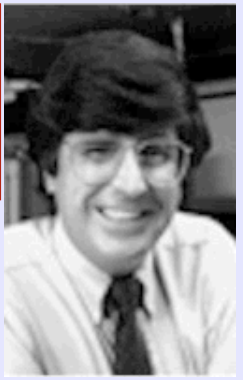
**Anthony DiBenedetto (PhD 1960)**
***Vice President University of Connecticut***



**Donald Paul (PhD 1965)**
***Chair, University of Texas - Austin***
***National Academy Eng'g***



**Robert Armstrong (PhD 1973)**
***Head, Massachusetts Institute Technology***



**Klavs Jensen (PhD 1980)**
***Mass. Inst. Technology,***
**Nat'l Academy Eng'g**

**Babatunde Ogunnaike (PhD 1981)**
***University of Delaware***

## Wisconsin has had hundreds of alumni become Professors.

## Those in the audience today include:

Arizona State University: Greg Raupp, Jim Beckman
SUNY Buffalo: Carl Lund
University of California: Dale Seborg, Bernhard Palsson
Carnegie-Mellon University: Mike Massey
Catholic University: Marshall Lih (later Division Director at NSF)
University of Delaware: Tunde Ogunnaike, Bramie Lenhoff
Illinois Institute Technology: Fouad Teymour, Jay Schieber
University of Illinois-Chicago: Lew Wedgewood
University of Maryland: Kyu-Yong Choi, Duane Bruley (Baltimore Cty)
MIT: Bob Armstrong, Klavs Jensen, Alan Hatton
University of Minnesota: Arnie Fredrickson
Northwestern University:( Mrs.) George Thodos, John Torkelson
Penn State University: Alfred Engel
Princeton University: Rick Register, Bill Schowalter (also U.Illinois)
Purdue University: Bob Greenkorn
University of Texas: Don Paul, Joel Hougen
Queens University, Canada: Robin Hutchinson
McMaster University, Canada: Chris Swarz, Don Woods
Ben Gurion University, Israel: Moshe Gottlieb
Universidad Autonoma de San Luis Potosi, Mexico: Rafael Alcala
Instituto Tecnologico de Celaya, Mexico: Arturo Jimenz

# Some of our PhDs as they were in 1980

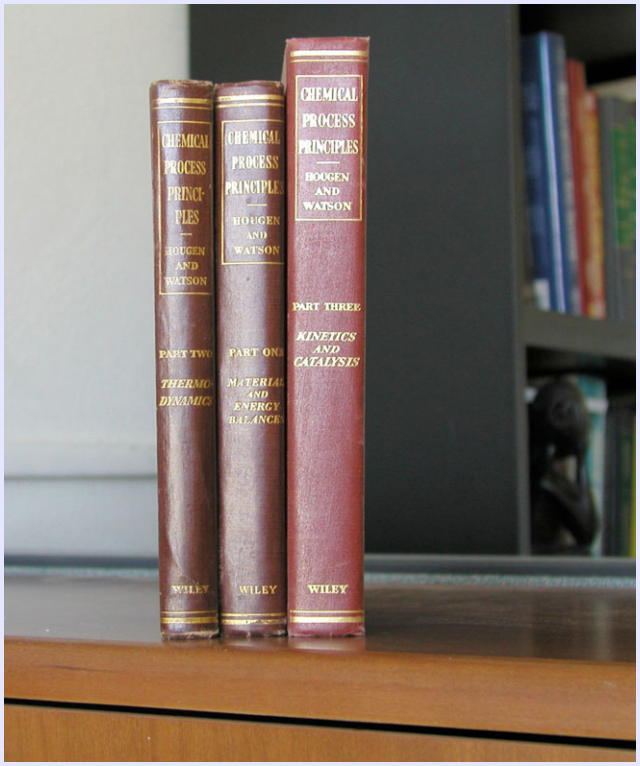
**Front Row: Jim Rawlings (Past UW Dept. Chair & Elfers Professor),**
**Tunde Ogunnaike ( W.L. Friend Professor, Univ.of Delaware),**
**Alan Schmidt (Indiana EPA)**
**Back Row: John Hamer (Head of ChE Research, Eastman Kodak),**
**Marvin Schwedock (Senior Engineer, Unocal),**
**Klavs Jensen (Lammot du Pont Professor , MIT ),**
**Joe Schork (Professor and Associate Chair, GeorgiaTech)**

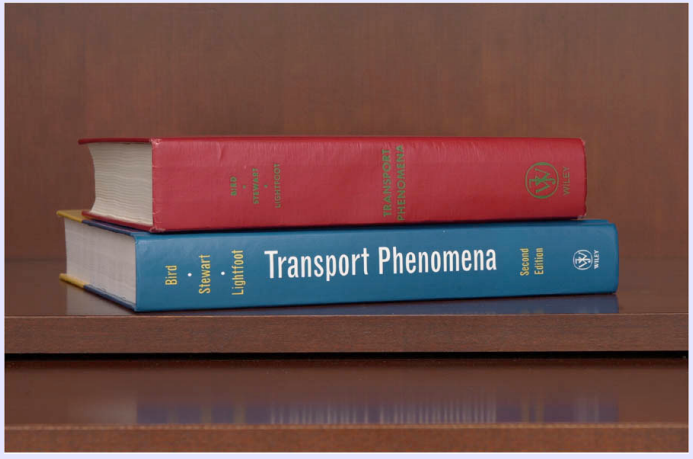
**1905-2005: There have been strong ties to many countries around the globe and today we have influential alumni throughout the world.**

**Some of the most active interactions have been with**

**Norway: Olaf Hougen & Ed Lightfoot created these ties.**
**Japan: Olaf Hougen and Bob Bird built exchange programs.**
**India: Olaf Hougen stimulated close relationships.**
**Taiwan: Olaf Hougen established early ties.**
**Netherlands: Bob Bird created close relationships.**
**Mexico: In 1960, Bob Marshall established an exchange program with Monterrey Tech. Later programs involved other universities also.**
**Denmark: Ed Lightfoot and Ed Crosby established close relationships with Denmark; three Professors at DTH studied in Madison.**
**Indonesia: Tom Chapman and Cam Coberly helped design the Institute of Technology in Surabaya. Many Indonesian engineers are alumni.**
**Germany: In 1980 an exchange program with the University of Stuttgart was established and today has 90 German alumni.**
**China: Bob Bird established early ties to our department.**
**Spain: Charlie Hill and Jose Coca created close relationships in both teaching and research.**
**Czech Republic: First Ed Lightfoot & later Harmon Ray with Milos Marek created close ties leading to many research interactions with UW.**

# 1931-1960: Some Landmark Textbooks



# 1905-2005: The Faculty have helped shape our Field through many Textbooks and Monographs

## The first 50 years:

1. O. P. Watts, *Laboratory Course in Electrochemistry*, McGraw-Hill, New York (1914)
2. O. A. Hougen and K. M. Watson, *Industrial Chemical Calculations*, Wiley, New York, 1st Edition (1931), 2nd Edition (1936)
3. O. A. Hougen and K. M. Watson, *Chemical Process Principles*, Wiley, New York, 1st Edition:
   - Vol. 1, *Material and Energy Balances* (1943)
   - Vol. 2, *Thermodynamics* (1947)
   - Vol. 3, *Kinetics and Catalysis* (1947)
4. O. A. Hougen, K. M. Watson, and R. A. Ragatz, *Chemical Process Principles*, Wiley, New York, 2nd Edition:
   - Vol. 1, *Material and Energy Balances* (1954)
     Japanese Edition (1954), Asian Edition (1959), International Edition (1962), Spanish Edition (1964), Italian Edition (1966)
   - Vol. 2, *Thermodynamics* (1959)
     Asian Edition (1960), Japanese Edition (1964), Spanish Edition (1964), Italian Edition (1966)
5. O. A. Hougen and K. M. Watson, *CPP Charts*, Wiley, New York, 1st Edition (1946); O. A. Hougen, K. M. Watson, and R. A. Ragatz, 2nd Edition (1960) and 3rd Edition (1964)
6. O. L. Kowalke, *Chemical Process Calculations*, Macmillan, New York (1947)
7. W. R. Marshall, Jr. and R. L. Pigford*, *Applications of Differential Equations to Chemical Engineering Problems*, University of Delaware Press, Newark, Delaware (1947)
8. J. O. Hirschfelder,* C. F. Curtiss,* and R. B. Bird, *Molecular Theory of Gases and Liquids*, Wiley, New York (1954, 1964); Russian Edition (1961)
9. F. Daniels* and J. A. Duffie, *Solar Energy Research*, University of Wisconsin Press, Madison (1955)

# 1905-2005: The Faculty have helped shape our Field through many Textbooks and Monographs

**The next 20 years:**

10. R. B. Bird, W. E. Stewart, and E. N. Lightfoot, *Transport Phenomena*, Wiley, New York, 1st Edition (1960), 62nd Printing (2001); Spanish Edition (1964), Czech Edition (1968), Italian Edition (1970), Russian Edition (1974), Chinese Edition (1990); 2nd Edition (2002)
11. R. B. Bird and W. Z. Shetter,* *Een goed begin* (*A Contemporary Dutch Reader*), Martinus Nijhoff, The Hague (1963, 1971)
12. E. J. Crosby, *Experiments in Transport Phenomena*, Wiley, New York (1961); Spanish Edition (1968)
13. D. F. Rudd and C. C. Watson, *Strategy of Process Engineering*, Wiley, New York (1968); Spanish Edition (1976)
14. W. H. Ray and J. Szekely*, *Process Optimization*, Wiley, New York (1973)
15. D. F. Rudd, G. J. Powers,* and J. J. Siirola,* *Process Synthesis*, Prentice-Hall, Englewood Cliffs, New Jersey (1973)
16. E. N. Lightfoot, *Transport Phenomena and Living Systems*, Wiley, New York (1974); Russian Edition (1977)
17. J. A. Duffie and W. A. Beckman*, *Solar Energy Thermal Processes*, Wiley, New York (1974); German Edition (1976), Russian Edition (1977), Italian Edition (1978)
18. E. E. Daub,* R. B. Bird, and N. Inoue,* *Comprehending Technical Japanese*, University of Wisconsin Press and University of Tokyo Press (1975)
19. P. M. Berthouex* and D. F. Rudd, *Strategy of Pollution Control*, Wiley, New York (1977)
20. W. A. Beckman,* S. A. Klein,* and J. A. Duffie, *Solar Heating Design by the f-Chart Method*, Wiley, New York (1977); German Edition (1979)
21. C. G. Hill, *An Introduction to Chemical Engineering Kinetics and Reactor Design*, Wiley, New York (1977)

## The last 30 years:

22. R. B. Bird, R. C. Armstrong,[2] and O. Hassager,[3] *Dynamics of Polymeric Liquids, Vol. 1, Fluid Mechanics*, Wiley, New York, 1st Edition (1977); 2nd Edition (1987), Japanese Edition (1999)
23. R. B. Bird, O.Hassager,[3] R. C. Armstrong,[2] and C. F. Curtiss,[4] *Dynamics of Polymeric Liquids, Vol. 2, Kinetic Theory*, Wiley, New York (1977); 2nd Edition by R. B. Bird, C. F. Curtiss, R. C. Armstrong, and O. Hassager (1987), Japanese Edition (2004)
24. J. A. Duffie and W. A. Beckman,* *Solar Engineering of Thermal Processes*, Wiley, New York, 1st Edition (1980), 2nd Edition (1991)
25. W. H. Ray, *Advanced Process Control*, McGraw-Hill, New York (1981); Russian Edition (1983), Chinese Edition (1987)
26. D. F. Rudd, S. Fathi-Afshar, A. A. Treviño, and M. A. Stadtherr, *Petrochemical Technology Assessment*, Wiley, New York (1981)
27. W. Z. Shetter and R. B. Bird, *Reading Dutch*, Martinus Nijhoff, Leiden (1985)
28. M. D. Lelah* and S. L. Cooper, *Polyurethanes in Medicine*, CRC Press, Boca Raton, Florida (1986)
29. E. E. Daub,* R. B. Bird, and N. Inoue, *Basic Technical Japanese*, University of Wisconsin Press and University of Tokyo Press (1990)
30. S. Kim and S. J. Karrila,* *Microhydrodynamics*: *Principles and Selected Applications*, Butterworth-Heinemann, Boston (1991)
31. J. A. Dumesic, D. F. Rudd, L. M. Aparicio,* J. E. Rekoske,* and A. A. Treviño,* *The Microkinetics of Heterogeneous Catalysis*, American Chemical Society, Washington, D. C. (1993)
32. B. A. Ogunnaike* and W. H. Ray, *Process Dynamics, Modeling, and Control*, Oxford University Press, New York (1994)
33. N. Phan-Thien* and S. Kim, *Microstructures in Elastic Media*: *Principles and Computational Methods*, Oxford Univeristy Press, New York (1994)
34. R. B. Bird and S. Floyd*, *Polymer Science and Engineering* (a supplement to *Basic Technical Japanese*), University of Wisconsin Press and University of Tokyo Press (1995)
35. J. B. Rawlings and J. G. Ekerdt,* *Chemical Reactor Analysis and Design Fundamentals*, Nob Hill Publishing, Madison, Wisconsin (2002)

# 1905-2005: The Faculty have helped shape our Field through many Textbooks and Monographs

## Soon to be published:

36. J. B. Rawlings and David Q. Mayne, *Model Predictive Control—Theory and Computation*, Nob Hill Publishing, Madison, Wisconsin (2005)
37. R. M. Murphy, *Introduction to Synthesis and Analysis of Chemical Processes*, McGraw-Hill, New York (2005)
38. J. D. Schieber* and J. J. de Pablo, *Chemcal, Biological, and Materials Engineering Thermodynamics* (2005)
39. W. E. Stewart and M. Caracotsios, *Computer-Aided Modeling of Reactive Systems* (2005)

# Changes over 100 years, 1905-2005

**Department Faculty**
1905: 4 (1 PhD)
2005: 18 (all PhD)

| Madison and University | 1905 | 2005 |
|---|---|---|
| Population of Madison | 24,000 | 220,000 |
| Number of UW Students | 2,500 | 42,000 |

| Undergraduate Students | 1906-07 | 2004-05 |
|---|---|---|
| Freshman | 20 | - |
| Sophomores | 16 | - |
| Juniors/Seniors - | 12 | 223 |
| BS Degrees | 5 | 75 |

**Total BS Degrees (1905-2005) ~ 5,600**

| Graduate Students | 1906-07 | 2004-05 |
|---|---|---|
| MS/ChE enrolled | 2 | 9 |
| PhD enrolled | 3* | 102 |
| MS/ChE Degrees | 2 | 3 |
| PhD Degrees | 0* | 18 |

*There may have been 3 enrolled because a single PhD was granted in 1910, in 1911, and in 1912.

**Total MS/ChE Degrees (1905-2005) ~ 910**

**Total PhD Degrees (1905-2005) ~ 720**

# 1905-2005: Where our students have been employed - then and now. Typical mix of industries employing BS Grads.

**BS Grads 1905-1930**

*ALCOA*
*Ansul Chemical*
*A.O.Smith*
*Burgess Battery*
*Campbell Soup*
*Fisher Governor*
*Kimberly-Clark*
*Milwaukee Gas & Light*
*New York Telephone*
*Northwestern Mutual*
*Pure Oil*
*Ray-O-Vac*
*Research Products*
*Sinclair Refining*
*Universal Oil Prod.*

**BS Grads 2004-05**

*Bemis*
*Cargill*
*Clorox*
*Corn Products*
*Dow Chemical*
*Ecolab*
*Epic Software*
*Equistar*
*Exxon-Mobil*
*GE Healthcare*
*General Mills*
*Georgia Pacific*
*Henkel Tech*
*Kraft Foods*
*Schlumberger*
*Shell*
*Teach America*
*Trane*
*Union Pacific*
*Universal Oil Prods*
*US Patent Office*
*Virent Energy*
*WL Gore*
*ZS Assoc.*

**Average Salary = $55,000 + signing bonuses!**
***Still highest starting salaries in Engineering.***

**No Great Change in employing industries over 100 years!**

# 1905-2005: Where students have been employed - then and now. Typical mix of industries employing PhD Grads.

**PhD Grads 1905-1995**

*University Faculty!*
*Abbot Labs*
*Amoco*
*Anaconda Industries*
*Chevron*
*Coca-Cola*
*Dow Chemical*
*DuPont*
*Eastman Chemical*
*Exxon*
*Fansteel*
*Honam Oil*
*Kodak*
*Martin-Marietta*
*Nekoosa Paper*
*Proctor & Gamble*
*Pure Oil*
*3M*
*Universal Oil Prod.*
*Weyerhaeuser*

**PhD Grads 2004-05**

*University Faculty!*
*Abbott Labs*
*Albemarle*
*Amgen*
*BASF*
*Battelle Lab*
*BP*
*Bristol-Myers-Sq*
*Engelhard*

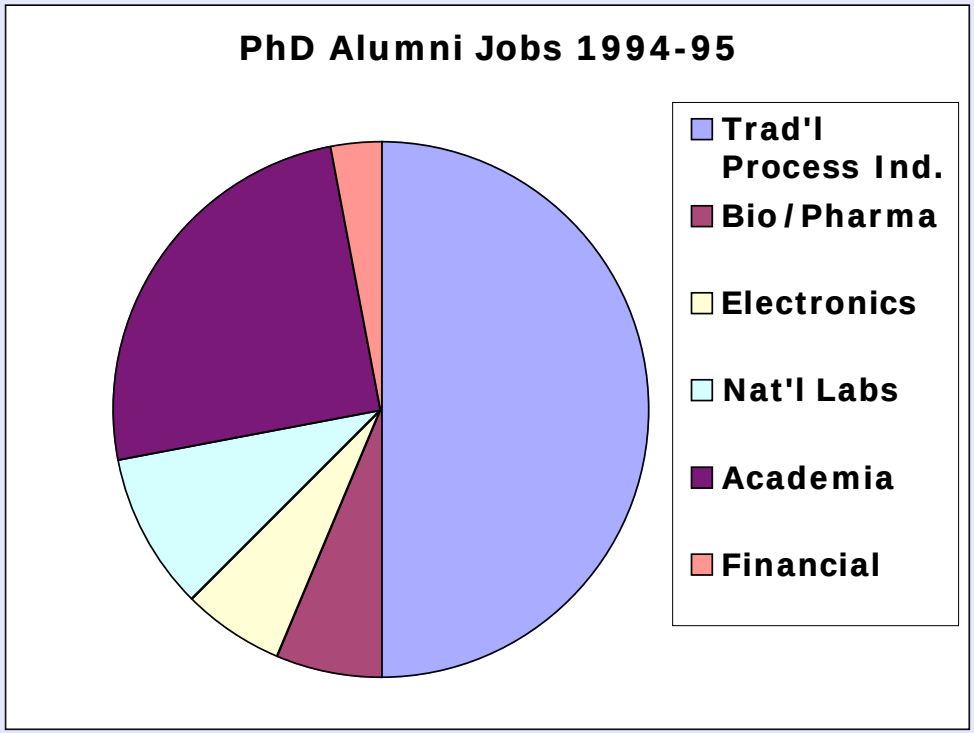
*GE Plastics*
*Intel*
*Kraft Foods*
*Los Alamos Lab*
*NIST*
*Novozymes*
*Oak Ridge Lab*
*Seagate Research*

**Average Salary = $82,000 + signing bonuses!**

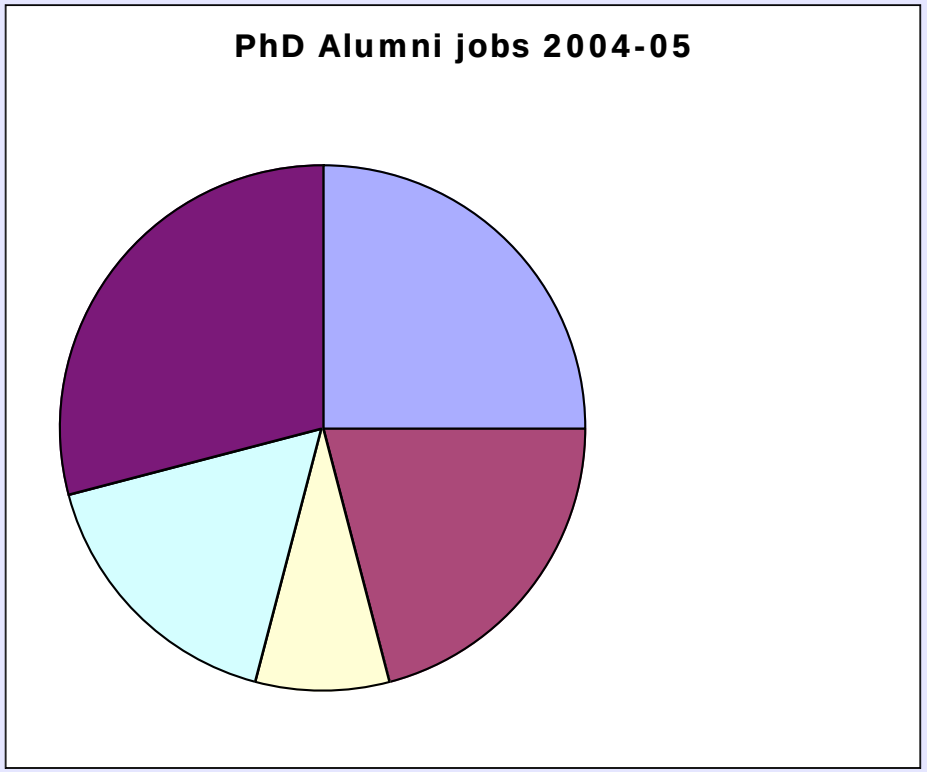
**A significant shift towards Bio/Pharma & some increase in electronics can be seen for very recent PhD grads!**

# 1995-2005: The industries hiring our PhD Grads - significant changes over the last decade.

**PhD Grads 1994-95**




**PhD Grads 2004-05**




**A noticeable shift towards Bio/Pharma can be seen over the last 10 years**

# 1905-2005: UW Chemical Engineering has been a family experience in some cases.

**Department Faculty**

- Otto Kowalke (BS 1906) - (nephew) Bill Schowalter (BS 1951)

- Olaf Hougen (ChE 1918) - (brother) Joel Hougen (BS 1936)
  - (great-grandnephew) Karl Olaf Stuen (PhD student)

- Roger Altpeter (BS 1931) - (son) Franz Altpeter (BS 1965)
  - (son) Philip Altpeter (BS 1969)

- Warren Stewart (BS 1945) - (nephew) Douglas Weiss (BS 1968)

# 1905-2005: UW Chemical Engineering has been a family experience in some cases.

**Some of our Alumni Families:**

- Lester Massey (BS 1942) - (son) Michael (BS 1970)
- Rollin Taecker (MS 1942) - (nephew) Lee Raymond (BS 1960)
- Howard Curler (BS 1948) - (son) Jeffrey (BS 1973)
- Francis Schraufnagel (BS 1950) - (son) Richard (BS 1972)
  (3 generations!) - (grandson) Peter (BS 2002)
- Lawrence Ernest (BS 1950) - (daughter) Kathy (BS 1974)
- Roger Huibregtse (BS 1950) d. in law - (brother) Richard (BS 1957)
- Duane Bluemke (BS 1955) - (son) David (BS 1982)
- Dale Schumaker (BS 1955) - (son) Howard (BS 1982)
- Harry Spiegelberg (BS 1959) - (son) Stephen (BS 1988)
- Robert Shabaker (PhD 1965) - (son) John (PhD 2004)
- Charles Mohr (BS 1970) - (son) Jeff Mohr (PhD student 2005)
- Andrew Spence (BS 1970) - (daughter) Dianna (BS 2006)
- John Schmid (BS 1973) - (daughter) Jody (BS 2003)
- Kenneth Johnson (BS 1974) - (daughter) Jenica (BS 2005)
  - (brother) Karl (BS 1981)
- Mark Wiese (BS 1980) - (daughter) Melissa (BS 2004)
- Shrikar Chakravarti (PhD 1997) - (brother) Shreyas (PhD 2000)

* Also a large number of marriages between alumni in recent years!