

CURRICULUM VITAE

George W. Roberts
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EDUCATION

<u>Institution</u>	<u>Degree</u>	<u>Date Graduated</u>	<u>Comments</u>
Cornell University Ithaca, NY	B.Ch.E (5 yr)	6/61	Graduated with Honors; Tau Beta Pi; Sigma Xi
Massachusetts Institute of Technology, Cambridge, MA	Sc.D (Ch.E.)	8/65	Eastman Kodak Award (Outstanding graduate student in chemical engineering - 1964); National Science Foundation Pre-Doctoral Fellow

PROFESSIONAL EMPLOYMENT

6/89-present

North Carolina State University
Department of Chemical Engineering
Box 7905
Raleigh, NC 27695-7905

8/94 - present: Professor of Chemical Engineering

Teaching and research interests include chemical reaction engineering, applied catalysis, polymerization kinetics, polymer synthesis in supercritical carbon dioxide, synthesis of oxygenated fuels, automotive catalysts, environmentally-benign chemical synthesis, multiphase reactors, and the development and commercialization of new technology.

Outstanding AIChE Student Chapter Advisor Award, 1997

7/89 - 8/94: Professor and Head of the Chemical Engineering Department

Responsible for leading a department consisting of 18 full-time faculty members plus 8 support personnel, with an enrollment of about 500 undergraduates and 75 graduate students. Major accomplishments included: 1) initiated a departmental alumni relations program; 2) restructured departmental corporate relations programs; 3) recruited four outstanding new faculty members; 4) obtained almost \$500M in outside faculty recruitment/development grants; 5) obtained corporate grants totaling over \$250M to

support graduate education and facilities improvement, and; 6) obtained over \$1.2MM in outside grants/contracts for research on alternate fuels.

PROFESSIONAL EMPLOYMENT (continued):

4/77 - 6/89

Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195-1501

4/81 - 7/89: General Manager, Commercial Development Division,
Process Systems Group

Directly managed approximately 120 employees engaged in research and development, new business development, strategic planning, product management, market research and patent development. Functionally responsible for about \$20 million/yr. of research and development activity carried out in the Process Systems Group.

Major accomplishments included: 1) developed and commercialized Air Products' first non-cryogenic (adsorption) product for air separation; 2) identified and negotiated the acquisition of Separex, Inc., a small company with strategically-important technology for gas separation with membranes; 3) identified landfill gas recovery as an attractive new business opportunity; developed and commercialized several products for landfill gas purification; 4) developed and commercialized a new process (the COPE™ Process) for debottlenecking Claus plants, which won the 1987 Kirkpatrick Award from Chemical Engineering Magazine; 5) developed and commercialized a new adsorption process for simultaneously purifying hydrogen and carbon dioxide; 6) identified and negotiated the acquisition of Dorr-Oliver's Biological Systems Venture as an extension of Air Products' existing wastewater-treatment business, and 7) developed the Liquid-Phase Methanol™ Process through a successful pilot-plant operation.

7/80 - 4/81: General Manager, Research and Development Department, Process
Systems Group

Directly managed approximately 40 employees engaged in the development of new processes and equipment for the production and purification of industrial gases and new applications for industrial gases. Functionally responsible for about \$15 million/yr. of research and development activity in the Process Systems Group.

4/77 - 7/80: Director, Corporate Research and Development Department

Directly managed approximately 60 employees engaged in the development of new technology in areas such as direct and indirect coal liquefaction, coal gasification, chemicals manufacture, and new applications for industrial gases. Major project involved development of SRC-I coal liquefaction technology for use in a planned 6000 T/D demonstration plant. Successfully developed a new technology for carburizing steel.

Also managed a small department engaged in the preparation and sale of research proposals to outside agencies, primarily the U.S. government, and in the administration of the resulting research contracts. Approximate sales of \$5 million/yr.

PROFESSIONAL EMPLOYMENT (continued):

6/72 - 4/77

Engelhard Minerals and Chemicals Corporation
Engelhard Industries Division
Menlo Park, Edison, NJ 08817

Research Manager, Chemical Engineering

Directly managed approximately 35 employees engaged in the development of new catalysts and catalytic processes. Projects fell into four technical areas: petroleum processing, chemicals manufacture, air pollution control, and synthetic fuels.

Significant accomplishments included: 1) development and successful commercial introduction of a new catalyst for petroleum reforming; 2) development and licensing of two new selective hydrogenation processes; 3) development and successful commercial introduction of an improved aromatics isomerization catalyst; 4) development and successful commercial introduction of a new selective oxidation process for improving yield in ammonia plants, and; 5) development of a new, low-pollution combustion process.

9/69 - 6/72

Washington University
St. Louis, Missouri 63130

Associate Professor of Chemical Engineering and
Director of the Chemical Reaction Engineering Laboratory

Teaching responsibilities included graduate and undergraduate courses in Chemical Reaction Engineering, graduate courses in Catalysis and Special Topics in Reaction Engineering, undergraduate courses in Systems Analysis and Design (Plant Design) and a motivational course for freshman and sophomore engineers entitled "The Science and Art of Catalysis".

Major research areas included liquid-solid contacting in trickle-bed reactors, mathematical modeling of polymerization reactors, design of radial fixed-bed reactors, the influence of shear and diffusion on thrombosis, and regional blood flow in the deep venous system of the leg.

Recipient of the Distinguished Faculty Award in 1971.

PROFESSIONAL EMPLOYMENT (continued):

10/65 - 9/69

Rohm and Haas Company
5000 Richmond Street
Philadelphia, Pennsylvania 19137

1/68 - 9/69: Projects Supervisor, Process Engineering Division

Supervised about 6 chemical engineers engaged in pilot-plant and bench-scale engineering studies. Activities ranged from economic analysis through pilot-plant operation and mathematical modelling. Areas of technology included addition and condensation polymerization, preparation of vinyl monomers, emulsion polymerization, and extrusion.

10/65 - 12/67: Research Engineer, Process Engineering Division

Bench-scale and pilot-scale studies, primarily involving development and scaleup of a new process for polymer manufacture. Startup of first commercial facility using this process. Mathematical modelling of polymerization reactors and extruders.

2/63 - 6/63

Massachusetts Institute of Technology
Department of Chemical Engineering
Cambridge, Massachusetts 02139

Instructor in Chemical Engineering - taught undergraduate heat transfer to chemical engineering majors

Summer Employment during Graduate and Undergraduate Studies:

1962	Esso Research and Engineering Company
1961	Rohm and Haas Company
1960	Chevron Research Corporation
1959	National Lead Company

PATENTS AND PUBLICATIONS:

Co-inventor on 13 U.S. patents
Author or co-author of more than 50 refereed technical publications and over 80 technical presentations

PROFESSIONAL ACTIVITIES:

Member, American Chemical Society (1965-present)

Member, American Institute of Chemical Engineers (1965-present)
Fellow (1998-present)

PROFESSIONAL ACTIVITIES (continued):

Member, North American Catalysis Society (1972-1989; 2000-present)
Member, Association of Research Directors (1981-1989)
Alternate Representative, Industrial Research Institute (1977-1989)
Emeritus Member (1989-present)
Member, Chemical Engineering Advisory Board, Cornell University (1982 -
1995)
Member, Chemical Engineering Advisory Board, Clemson University (1991-
1994)
Member, Undergraduate Advisory Board, Department of Chemical and Materials
Engineering, University of Kentucky (2000 -present)
Member, Society of Automotive Engineers (1971-1974)
Ralph R. Teetor Award (1971)
Member, Council for Entrepreneurial Development (1993-1997)