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Education:

B.S. Emory University, Atlanta, Georgia, 1967 (Geology)
M.S. University of North Carolina, Chapel Hill, 1970 (Geology)
Ph.D. University of North Carolina, Chapel Hill, 1972 (Geology)

Professional Affiliations:

Geological Society of America
American Institute of Mining, Metallurgical and Petroleum Engineers
Certified Professional Geologist, States of Georgia and South Carolina
Sigma Xi (President, Central Savannah River Chapter, 1993-94)
South Carolina Academy of Science (President, 1994-95; 2002-05)
Central Savannah River Geological society (Vice President, 1996-00; President, 2000-01)

Work Experience:

1993-present	Director, Sponsored Research Office, USCA
1986-93	Dean, College of Sciences, USCA
1984-86	Chair, Division of Natural Sciences, USCA
1982-present	Professor of Geology, USCA
1975-82	Associate Professor of Geology, USCA
1973-85	Project Geologist, SC Geological Survey
1972-75	Assistant Professor of Geology, USCA
1972	Instructor of Geology, UNC, Chapel Hill
1971	Faculty Member, Evening College, UNC, Chapel Hill
1969	Geologist, Dixie Lime & Stone Co., Ocala, FL Subsidiary of New York & Honduras Rosario Mining Company

Research Interests: Sedimentology, Mineral Deposits, Coastal Processes, Hydrogeology

Publications:

Heavy-mineral sands of the Atlantic and Gulf coastal plains, USA *in* Mange, Maria A. and Wright, David T., editors, *Heavy Minerals in Use, Developments in Sedimentology*, v. 58: Elsevier, Amsterdam, p. 1145-1232. 2007. (With 2 other authors).

Introduction to heavy–mineral sand deposits of the Florida and Georgia Atlantic coastal plain, *in* Rich, Fredrick J., editor, *Guide to Fieldtrips – 56th Annual Meeting, Southeastern Section, Geological Society of America, Savannah, GA, Department of Geology and Geography Contribution Series #1: Georgia Southern University, Statesboro, GA*, p. 129-135. 2007. (With 1 other author).

The geology, stratigraphy, and paleontology of Reids, Bells, and Roses Bluffs in northeastern Florida, *in* Rich, Fredrick J., editor, *Guide to Fieldtrips – 56th Annual Meeting, Southeastern Section, Geological Society of America, Savannah, GA, Department of Geology and Geography Contribution Series #1: Georgia Southern University, Statesboro, GA*, p. 137-151. 2007. (With 5 other authors).

Heavy-mineral deposits of Bailey, North Carolina, *Geol. Soc. America, Abstracts with Programs*, v. 39, no. 2, p. 77. 2007. (With 3 other authors).

Chromite from deposits in Southeastern Oregon as a foundry sand, *in* Reid, Jeffrey C., editor, *Proceedings of the 42nd Forum on the Geology of Industrial Minerals: Information Circular 34, North Carolina Geological Survey*, p. 395-411. 2006. (With 4 other authors).

Heavy mineral mining in the Atlantic coastal plain of Florida and Georgia and the chemical and physical characteristics of the deposits *in* Akser, M., and Elder, J., eds., *2005 Heavy Minerals Conference Proceedings, Society for Mining, Metallurgy, and Exploration, Littleton, CO.*, p. 7-18. 2005. (With 3 other authors).

Organic dye effects on dense nonaqueous phase liquids (DNAPL) entry pressure in water saturated porous media, *Water Resources Research*, 39 (8), 1207, doi:10.1029/2001WR001000, p. SBH5-1 – SBH5-13. 2003. (With 2 other authors).

DNAPL penetration of saturated porous media under conditions of time-dependent surface chemistry *in* Wyatt, D. E., and Harris, M. D., eds., *Carolina Geological Society 2000 Field Trip Guidebook, Savannah River Site*, p. K-1 – K-16. 2000. (With 2 other authors).

Effect of grain morphology on intrinsic permeability in various porous media, *South Carolina Academy of Science Bulletin*, v. 61, p. 70. 1999 (With 4 other authors)

- Time-dependent interfacial property effects on DNAPL flow and distribution, *in* Wickramanayake, G. B. and Hinchee, R. E., eds., *Remediation of Chlorinated and Recalcitrant Compounds*, Columbus, OH, Batelle Press, p.73-78. 1998. (With 3 other authors).
- Estimating Heterogeneous Multiphase Flow Parameter Distributions from Infrared Image-Characterization of Porous Media: *Eos*, Transactions, 78(46):F322-323. 1997. (With 4 other authors).
- Capillary Barriers and Time-Dependent Wetting Relationships: Effects of Complex DNAPL Components: *Eos*, Transactions, 78(46):F289. 1997. (With 4 other authors).
- Complex organic co-contaminant effects on DNAPL mobility in saturated porous media: *Eos*, Transactions, 77 (46):F257. 1996. (With 2 other authors).
- The Folkston West and Amelia heavy mineral-deposits of Trail Ridge, southeastern Georgia: *Economic Geology*, v. 88, p. 961-971. 1993. (With 5 other authors).
- Cabin Bluff heavy-mineral deposits of southeastern Georgia: *Economic Geology*, v. 86, p. 436-441. 1991. (With 6 other authors).
- Altama heavy-mineral deposits of southeastern Georgia: *Economic Geology*, v. 84, p. 425-433. 1989. (With 5 other authors).
- Evaluation through correlation and principle component analyses of a delta origin for the Hawthorne and Citronelle sediments of peninsular Florida: *Journal of Geology*, v. 93, p. 493-501. 1985. (With 3 other authors).
- The Yulee heavy-mineral sand deposits of northeastern Florida: *Economic Geology*, v. 79, p. 725-737. 1984. (With 3 other authors).
- Physiographic features and field relations of Trail Ridge in northern Florida and southeastern Georgia *in* Okefenokee Swamp: its natural history, geology and geochemistry: Cohen, A. D., Casagrande, D. J., Andrejko, M. J., and Best, G. R., editors: *Wetlands Surveys*, Los Alamos, N. M., p. 613-628. 1984. (With 1 other author).
- Geological framework of the Winterseat quadrangle in the southwestern portion of the Carolina slate belt, South Carolina: *South Carolina Geology*, v. 26, p. 69-79. 1982.
- Geology of the Limestone quadrangle, west-central South Carolina: *South Carolina Geology*, v. 25, p. 21-27. 1981.

Preliminary report on the geology of the Parksville quadrangle, McCormick and Edgefield Counties, South Carolina: Geologic notes, v. 22, p. 94-104. 1978.

Geology of the Red Hill quadrangle, Edgefield County, South Carolina: Geologic Notes, v. 21, p. 75-84. 1977.

The Highland heavy-mineral sand deposit on Trail Ridge in Northern peninsular Florida: Florida Bureau of Geology Report of Investigation No. 84, 50 p. 1977. (With 2 other authors).

Field trip stop descriptions 2,3,4,5, & 6, *in* Chowns, T. M., compiler, Stratigraphy, structure and seismicity in slate belt rocks along the Savannah River: Georgia Geol. Survey, Guidebook 16, Atlanta, Ga., p. 56-62. 1976. (with 1 other author).

Geologic section across the Modoc fault zone, Modoc, South Carolina, *in* Chowns, T. M., compiler, Stratigraphy, structure and seismicity in slate belt rocks along the Savannah River: Georgia Geol. Survey, Guidebook 16, Atlanta, Ga., p. 16-20. 1976. (With 1 other author).

The Green Cove Springs and Boulougne heavy-mineral sand deposits of Florida: Economic Geology, v. 69, p. 1129-11347. 1974. (With 2 other authors).

The geological setting of Cape Kennedy, Florida, *in* Space-age geology: Southeastern Geological Society 16th Field Conference, Guidebook, Tallahassee, Fla., p. 1-29. 1972. (With 2 other authors).

The offset course of the St. Johns River, Florida: Southeastern Geology, v. 13, p. 39-59. 1971.

Technical Reports (for U.S. Dept. of Energy):

Permeability-Pore Entry Pressure Relationship for Oyster, VA, Sediments: Batelle Pacific Northwest National Laboratory, 19 p. plus appendices. 1998. (With G. Iversen and D. Tuck)

DNAPL Penetration of Capillary Barriers Due to Time-Dependent Wetting Relationships: WSRC/DOE/SCUREF. 25 p. plus appendices. 1997. (With G. Iversen)

The Effect of an Organic Dye on DNAPL Entry Pressure into Water Saturated Porous Media, Phase II Final Report. WSRC/DOE/SCUREF, 88p. plus appendices, 1997. (With G. Iversen)

Feasibility Study of Using Contaminated Soil as Backfill Material in SRS High-level Waste Tanks during Closure. WSRC/DOE/SCUREF. 23 p. 1996. (With G. Iversen)

DNAPL Entry Pressure into Water Saturated Porous Media. WSRC/DOE/SCUREF. 35 p. 1996. (With G. Iversen)

In Situ Monitoring, Final Report. WSRC/DOE/SCUREF. 10 p. 1995. (With T. Nadolski).
Environmental Fiber Optic Sensor System, Final Report, WSRC/DOE/SCUREF. 102 p.
1994. (With T. Nadolski).

Environmental Fiber Optic Sensor System, Phase I Final Report, WSRC/DOE/SCUREF. 96
p. 1993. (With T. Nadolski).

Major Grants and Contracts:

2001-2006 USCA/SCSU/SRS Undergraduate Student Intern Program

Project Director

The overarching goal of the program is to encourage undergraduate students to attend graduate school in science, mathematics, engineering and related fields. Selected students from USCA and South Carolina State University (SCSU) spend two to three months during the summer at SRS conducting research under the supervision of a SRS technical mentor. Students spend the fall at USCA or SCSU under the direction of a USCA or SCSU faculty member to complete the project and prepare a written report and an oral presentation. Oral presentations are held at USCA during December. Students are encouraged to present their results at the SC Academy of Sciences Annual Meeting.

Funding – Approx. \$40,000/yr

Funded by the US Department of Energy (DOE) through the South Carolina Universities Research and Education Foundation (SCUREF).

1998-05 WSRC/USCA Joint Faculty Appointment Project

Project Director

The project provided summer salary support to selected new USCA faculty members in scientific or engineering fields to work on research projects at SRS for two consecutive summers. The purpose was to help USCA attract talented scientists and engineers to its faculty.

Funding - \$40,000/yr.

Funded by DOE through SCUREF

1998 Permeability – Pore Entry Pressure Relationship for Oyster, VA, Sediments

Principal Investigator

The purpose of the project is to examine how small-scale stratigraphic heterogeneity, such as cross bedding, influences the manner by which a dense non-aqueous phase liquid (DNAPL) moves and distributes itself in the subsurface.

Funding - \$8,000

Funded by Batelle Pacific Northwest National Laboratory/US Department of Energy (DOE)

1997-98 DNAPL Penetration of Capillary Barriers due to Time-Dependent Wetting Relationship Changes

Principal Investigator

The project purpose is to extend the previous studies of capillary pressure - saturation measurements. The primary object is to confirm preliminary experimental tests of the hypothesis that time-dependent wetting relationship changes can lead to thin-film flow into a porous media

that would otherwise act as a capillary barrier to PCE penetration. The research has important implications for groundwater contamination because the results indicate that, due to thin-film migration, contaminants can migrate into areas where hydrologically they would not be expected.

Funding - \$18,000 Funded by the US Department of Energy (DOE) and Westinghouse Savannah River Company (WSRC) through the South Carolina Universities Research and Education Foundation (SCUREF).

1996-97 DNAPL Capillary Pressure – Saturation Measurements Phase II: The Effect of Organic Dye on DNAPL Entry Pressure into Water Saturated Porous Media

Principal Investigator

The goal of the project was to examine the effect of oil based organic dye on the movement of DNAPL through porous media. This knowledge helps to understand DNAPL behavior underground so that the mobilization of DNAPLs associated with remediation of contaminated subsurface areas will not lead to a greater contamination problem.

Funding - \$40,700 DOE/WSRC/SCUREF

1995-96 Feasibility Study of Using Contaminated Soil as Backfill Material in SRS High-level Waste Tanks During Closure

Principal Investigator

This project tested various mixtures of naturally occurring soils and concrete for their suitability to fill high-level waste tanks at the Savannah River Site (SRS) after those tanks are emptied.

Funding - \$42,020 DOE/WSRC/SCUREF

1995-96 DNAPL Capillary Pressure - Saturation Measurements

Principal Investigator

The purpose of the project was to measure the capillary pressure - saturation relationship for a two-fluid system consisting of water and tetrachloroethylene in several porous media.

Funding - \$8,900 DOE/WSRC/SCUREF

1994-95 Savannah River Site - Site Characterization Study

Chief Principal Investigator

Coordinated a team of more than 30 scientists to study the geological characteristics of the SRS with the goal of enabling SRS to address more effectively and more inexpensively various environmental problems that have geological components.

Funding - \$29,800 DOE/WSRC/SCUREF

1994-95 Quality control/Quality Assurance Verification

Principal Investigator

The project involved assessing the quality of various data added to the site database created by the SRS Site Characterization Task.

Funding - \$44,700 DOE/WSRC/SCUREF

1994-95 In-Situ Monitoring

Principal Investigator

This project demonstrated the field capability of the Environmental Monitoring Fiber Optic Sensing System (EMFOSS) developed in the preceding EMFOSS grant.

Funding - \$189,000 DOE/WSRC/SCUREF.

1992-94 Environmental Monitoring Fiber Optic Sensor System (EMFOSS)

Principal Investigator

Coordinated a team composed of USCA Scientists plus scientists from two private technology firms to develop a prototype system to provide continuous, real time, remote monitoring of certain environmental conditions and to transmit the monitor readings by radio to a secure software system .

Funding - \$550,000 DOE /WSRC/SCUREF.

1991-94 Establishment of a Field Geohydrology Experimental Site.

Subcontract with Clemson University

Assisted in the development of a field geohydrology experimental site for educational purposes.

Funding - \$75,000 DOE/WSRC/SCUREF/Clemson University

1987-90 Ruth Patrick Science Education Center

Project Director

This project established and provided start-up funding for the Ruth Patrick Science Education Center at USC-Aiken.

Funding - \$506,000 National Science Foundation

1986 Physical Sciences Program for Teachers

Project Director

Directed a team of educators from USC-Aiken to create a program to help improve instruction in the physical sciences in middle schools.

Funding - \$28,800 Education for Economic Security Act (Eisenhower Program)

1973-85 Geological Studies of the South Carolina Piedmont

Principal Investigator

The project involved study of the geology and mineral resources of the Slate Belt region of the South Carolina Piedmont

Funding - \$25,000 South Carolina Geological Survey