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## **Research Management and Global Security, Sandia National Laboratories**

### *INTERNATIONAL CHEMICAL THREAT REDUCTION DEPARTMENT, MANAGER*

The International Chemical Threat Reduction Department (ICTR) focuses on preventing the use of chemicals as weapons by terrorists and malevolent actors. ICTR is the technical partner of the U.S. Department of State that founded and now supports the Chemical Security Engagement Program CSP. For CSP, we work with foreign governments, universities, professional chemical associations and chemical industry trade groups to engage the chemical community in chemical safety and security. We provide training in chemical safety and security for universities, laboratories, and industry in developing countries. The department develops and delivers a number of different training sessions in chemical safety and security. Primary focus of this program has been in South and Southeast Asia and the Middle East. In addition, we provide support and training to other agencies and organizations interested in chemical security and chemical safety.

January 2007 - Present

### *LABORATORY-MANAGED RESEARCH AND DEVELOPMENT (LDRD) PROGRAM*

Manage the Sandia-funded research and development program in the Global Security investment area. Write call for proposals, oversee peer and programmatic team review process, mentor scientists, and solicit proposals. This is a multidisciplinary investment area requiring the building of cross-laboratory teams. Topics include radiation detection development, biosecurity, intelligence analysis, security/policy issues (for example: systematic border security methodology development), and nuclear nonproliferation technologies. Success during the time Dr. Jackson managed the GS LDRD program led to the doubling of funding available for Global Security LDRD research. Also participated in energy-related LDRD investment teams. 2005-present.

### *INTERNATIONAL SECURITY CENTER, DEPUTY DIRECTOR*

This center was a \$140 million program with 70 employees that focused on US sponsored nonproliferation program primarily those that partnered with international organizations to prevent the proliferation of weapons of mass destruction. and/or Partnered with center management to lead an integrated international security program in the area of regional security, Russian nuclear weapons and materials security, port and border security, and biosecurity. Managed the \$1.4 million program development budget. Editor of Sandia's *International Security Newsletter*. Led the Global Nuclear Futures Initiative effort at Sandia bringing together representatives from the nuclear energy safety and waste centers with those from the nonproliferation center and science and engineering centers at Sandia to address the global challenges of nuclear energy. 2004- 2006

## **Chemical and Energy Research, Sandia National Laboratories**

### *CHEMICAL AND BIOLOGICAL SENSING, IMAGING & ANALYSIS DEPARTMENT, MANAGER*

Line manager of analytical chemistry research department with an average of 15 chemists. Responsibilities included managing, mentoring and hiring technical staff, postdocs, and students; program development; and building partnerships inside and outside the Laboratory. Program development included a major focus on imaging and spectroscopy (vibrational and fluorescence) for materials analysis and for biological applications. In addition, the department developed sensors for chemical and biological detection including counterterrorism-related sensors. Other focus areas included hyperspectral imaging research for remote sensing and data extraction and analysis imaging research and technique development. These duties required developing and maintaining internal Sandia customers including the LDRD program, the satellite program, and the explosives detection program. External customers included the Department of Energy, Department of Homeland Security (DHS), Department of Defense, National Institutes of Health, and Environmental Protection Agency. Collaborated with Lawrence Livermore National Laboratory in DHS program development. 2000 - 2004

### *CATALYSIS PROGRAM MANAGEMENT AND DEVELOPMENT*

Primary responsibility was to coordinate and manage catalysis research program at Sandia. Built a lab-wide program in the area of catalysis using both internal and external resources. Managed and chaired Sandia's Catalysis Steering Committee, coordinating body for catalysis research at Sandia that included representatives from across the laboratory. Organized and led research teams with members from academia, industry, multiple Sandia departments, and other national laboratories. Responsible for \$1.7 million LDRD funding (including first catalysis LDRD). These responsibilities were carried out as an Acting Manager, Process Research Department (6212) 1995-1996 and as a staff member, 1996-2000. Program development activities included leading the catalysis effort for the U.S. chemical industry's roadmapping process: Vision 2020. Brought in \$1.9 million of Department of Energy funding for six catalysis research projects. Research projects that I initiated and managed included collaboration with five industrial partners and two national labs. Collaborated with nine national labs and initiated and organized first DOE Laboratory Catalysis Research Symposium (which continues biannually to this day). Established Sandia's Catalysis Advisory Board which included representatives from industry and academia. 1995 - 2000

### *CATALYSIS RESEARCH*

Principal investigator of energy-related heterogeneous catalysis research. See research publications below. 1991-2001

## **Government and Education at Sandia**

### *SANDIA GOVERNMENT RELATIONS TEAM*

Tribal government liaison for Sandia (a part time position, 0.1 FTE, held concurrently with catalysis development position) As a member of the government relations team, I participated in the interplay of federal policy and science and technology at Sandia and represented Sandia at local, state, and national Native American events. 1997-98

*DEPARTMENT OF ENERGY, EDUCATION ACTIVITIES,*

Identified tribal colleges for participation in Science & Technology Alliance program (a part time position, 0.1 FTE, held concurrently with catalysis positions) Organized and contributed to science education consortium with three Montana Tribal Colleges. This activity required a great sensitivity to three different tribal cultures as well as the culture of the US Department of Energy and Sandia National Laboratories management. 1991- 1995

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**UNIVERSITY OF NEW MEXICO**

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Associate Research Professor, Chemical and Nuclear Engineering Department. Collaborative research and professional activities; search committee member for department chair, 1999-present.

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**AWARDS**

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- Howard Fawcett Award, ACS Division of Chemical Health and Safety, 2009
- Fellow, American Association for the Advancement of Science, 2005
- National Affiliate, National Academies, 2005
- Professional of the Year, American Indian Science and Engineering Society, 2005
- Distinguished Alumni Achievement Award, George Washington University, 2004
- Women on the Move Award, Rio Grande YWCA, Albuquerque, NM, 2003

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**PROFESSIONAL ACTIVITIES**

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**THE U.S. NATIONAL ACADEMIES**Studies

- Co-Chair, Catalysis for Energy: Fundamental Science and Long-Term Impacts of the US Department of Energy Basic Energy Sciences Catalysis Science Program, 2009
- Chair, Visualizing Chemistry: The Progress and Promise of Advanced Chemical Imaging, 2006
- Committee on the Review of Testing and Evaluation Methodology for Biological Point Detectors Study, National Research Council, 2004

Boards

- Board of Chemical Science and Technology, *National Academy of Sciences* 1999-2004
- Board on Higher Education and Workforce, *National Academy of Sciences* 2000-2004

## NATIONAL SCIENCE FOUNDATION

- Chemistry Committee of Visitors, 2007

## AMERICAN CHEMICAL SOCIETY

- Board of Directors, 2004-2006
  - \$500 million/year nonprofit organization that is both a chemical professional's organization and a publishing nonprofit corporation.
  - Multidisciplinary Task Force
    - Assisted the ACS to develop and modify programs to adapt to an increasing interest and emphasis in chemist's involvement in multidisciplinary topics of research
  - International Task Force
    - Assisted the ACS in developing programs and strategic vision to serve the chemical profession as it becomes increasingly global
- Petroleum Research Fund (PRF) Review Steering Committee 2006-2007
  - The PRF is an endowed fund, managed by ACS that supports fundamental research directly related to petroleum or alternate energy. The Steering Committee performed the first review of the program and developed a new strategy, organizational structure and grant selection process.
- International Affairs Committee 2007-present
- Corporations Associates, Sandia National Laboratories Alternative Representative, 2007-present
- Committee on Committees, 2003
- *Chemical & Engineering News*, Editorial Advisory Board, 2003-2008
- Committee on Science, 1998-2002
- Industrial & Engineering Chemistry Division
  - Chair, 1998; Councilor, 2001-2003; Secretary, 1992-1996; Newsletter Editor 1999-2003
- ACS Catalysis Secretariat, Secretary General, 1999, I&EC representative 1998-2001
- Editorial Advisory Board Member, *Industrial & Engineering Chemistry Journal*, 1996-1998.
- ACS Minority Affairs Committee, Chair, 1999-2001, Member 1997-2002
- ACS Younger Chemists Committee, Chair, 1985-86, Member, 1982-1986

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## COMMUNITY ACTIVITIES

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### ROCKY MOUNTAIN COLLEGE

Member, Board of Trustees, Rocky Mountain College, Billings, MT, 2002-2008. Actively involved with the Native American Studies program and scientific research.

### AMERICAN INDIAN SCIENCE AND ENGINEERING SOCIETY

- Organizer and Judge, Graduate Student Poster Sessions 2003-present
- Scientific Review Committee, American Indian Science and Engineering Society National Science Fair 1999-2002

### SARANAM

Saranam is a housing and education program for homeless families in Albuquerque that offers a comprehensive range of services to assist families in transitioning beyond homelessness. *Dr. Jackson was a founding member of the Board of Directors (2001-2007) and Board Chair (2005-2007) from the initial \$4 million bequest that founded the program to the development of the vision, structure, and realization of a two-year program design. This included the hiring of executive director and staff, purchase and management of an apartment complex, and the first graduation of Saranam families from the two-year program. She was personally involved in every aspect of the development and operation of this program including fund raising, management, hiring, and family selection.*

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## EDUCATION

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Ph.D., Chemical Engineering, University of Texas, Austin, 1990  
M.S., Chemical Engineering, University of Texas, Austin, 1986  
B.S., Chemistry, George Washington University, Washington, D.C., 1979

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## INVITED PRESENTATIONS

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1. *Report on the Chemical Safety and Security Workshop in Kuala Lumpur, Chemical Security Engagement Program, U.S. Department of State, Industry and Protection Forum, Organization for the Prohibition of Chemical Weapons, The Hague, Netherlands, November 2007.*

2. *How I got here*, Keynote presentation, McNair Fellows, Colorado State University, Ft. Collins, CO, September 2007.
3. *Living in Two Worlds*, Keynote presentation, Ford Fellows Conference, National Academies, Washington, DC, October 2006.
4. *Panelist*, Women of Color Working Mothers Conference, New York, NY, July 2006.
5. *The Peak of Oil Production*, Award Address, American Indian Science and Engineering Society National Meeting, Charlotte, NC, November 2005.
6. *What are the studies saying about women in the technical workforce today?* Materials Research Society, Women's Breakfast, Boston, MA, December 2003.
7. *Terrorism and Homeland Security: New Challenges for the Chemical Community*, Distinguished Lecturer, University of West Virginia, Department of Chemical Engineering, Morgantown, WV, October 2002.
8. *Terrorism and Homeland Security: New Challenges for the Scientific Community*, Keynote Address, Society for the Advancement of Chicanos and Native Americans in Science, National Conference, Anaheim, CA, September 2002.
9. "After all these years... What are the studies saying about women in the technical workforce today?", Society for Women Engineers, Regional Conference, Albuquerque, NM, March, 2002.
10. *Materials & Manufacturing Research Needs from a National Laboratory Perspective*, NRC Workshop of Materials & Manufacturing, Challenges for the Chemical Sciences in the 21<sup>st</sup> Century, National Research Council, Washington, D.C., June 2001.
11. *Vision 2020: Preparing for the future of the chemical enterprise*, Keynote Address, ACS 2000 Northwest & Rocky Mountain Joint Regional Meeting. Idaho Falls, ID, June 2000.
12. *Vision 2020: Laboratory-University-Industry Interactions*, Alabama Industries of the Future Meeting, Mobile, AL, July 2000.
13. "Partnering at the National Laboratories: Catalysis as a Case Study," Chemical Sciences Roundtable, National Research Council Workshop on Research Teams and Partnerships, Irvine, CA, May 1999, followed by publication of Jackson, N. B., in *Research Teams and Partnerships: Trends in the Chemical Sciences*, National Academy Press, Washington, D.C., 1999, p. 97.
14. "Attrition determining morphology changes on iron Fischer-Tropsch catalysts," Natural Gas Conversion Conference, Taormina, Italy, Sept. 1998, followed by publication with coauthors Evans, L. and Datye, A. K., in *Natural Gas Conversion V, Studies in Surface Science and Catalysis*, v. 119, pp 137-142, (A. Parmaliana: Editor) Elsevier, Amsterdam, 1998.

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## PUBLICATIONS

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- Jackson, N.B., Workshop Report, Reversing Global Warming: Chemical Recycling and Utilization of CO<sub>2</sub>, Sponsored by the National Science Foundation, July 2008, University of Southern California.
- Jackson, N.B., Visualizing Chemistry, Guest Editorial, Chemical & Engineering News, Vol. 85, Issue 31, July 30, 2007.
- Jackson, N.B., Zirconium, Chemical & Engineering News 80<sup>th</sup> Anniversary Issue, Vol. 81, Issue 36, September 8, 2003.
- Jackson, N.B., Thoma, S. D., Zirconium-titanium phosphate acid catalysts synthesized by sol gel techniques, SAND99-1215, Sandia National Laboratories, Albuquerque, NM, 1999.
- Miller, J. E., Jackson, N. B., Evans L., Sault A. G., Gonzales, M. M., "The Formation of Active Species for Oxidative Dehydrogenation of Propane on Magnesium Molybdates," Catalysis Letters, 58, (1999) 147.
- Jackson, N. B., Evans, L. and Datye, A. K., "Attrition determining morphology changes on iron Fischer-Tropsch catalysts," in Natural Gas Conversion V, Studies in Surface Science and Catalysis, v. 119, pp 137-142, (A. Parmaliana: Editor) Elsevier, Amsterdam, 1998.
- Jackson, N. B., Thoma, S. D., and Nenoff, T. M., "Zirconium-titanium phosphate acid catalysts synthesized by sol-gel techniques," in Scientific Basis for Preparation of Heterogeneous Catalysts VII, Studies in Surface Science and Catalysis v. 118, pp. 643-649, (G. Poncelet and R. Maggi: Editors) Elsevier, Amsterdam, 1998.
- Jackson, N.B., *Catalysis Technology Roadmap Report, Vision 2020*, SAND97-1424, Sandia National Laboratories, Albuquerque, NM, 1997.
- Jackson, N. B., Datye, A. K., Mansker, L., O'Brien, R. J., and Davis, B. H., "Deactivation and Attrition of Iron Catalysts in Synthesis Gas," in Catalyst Deactivation 1997, (C. H. Bartholomew and G. A. Fuentes: Editors) Elsevier, Amsterdam, 1997.
- Shroff, M. D., Datye, A. K. Jackson, N. B., and Sault, A. G., "Nanoscale Attrition During Activation of Precipitated Iron Fischer-Tropsch Catalysts: Implications for Catalysis Design" 11th International Catalysis Conference, (J. W. Hightower, W. N. Delgass, E. Iglesia, and A. Bell: Editors) Elsevier, Amsterdam, 1996, p. 1421.
- Shollenberger, K. A., Torczynski, J. R., Adkins, D. R., O'Hern, T. J., and Jackson, N. B., "Gamma-densitometry tomography of gas holdup spatial distribution in industrial scale bubble columns, Chemical Engineering Science, v. 52(13) pp. 2037-2048, 1997.
- Datye, A. K., Shroff, M. S., and Kalakkad, D. S., Harrington, M. S., Sault, A. G., and Jackson, N. B., "The role of catalyst activation on the activity and attrition of precipitated iron Fischer-Tropsch catalysts", 4<sup>th</sup> International Natural Gas Conversion Symposium, Kruger National Park, South Africa, published in Studies in Surface Science and Catalysis, v. 107, pp. 169-174, Elsevier, Amsterdam, 1997.
- Shroff, M. S., Kalakkad, D. S., Harrington, M. S., Jackson, N. B., Coulter, K. E., Sault, A. G., and Datye, A. K., "Carbide Formation During Activation of Iron Fischer-Tropsch Catalysts" in The Chemistry of Transition Metal Carbides and Nitrides, (T. Oyama: Editor) American Chemical Society, Washington, DC, 1996.
- Kalakkad, D. S., Shroff, M. D., Kohler, S. D., Jackson, N. B., Datye, A. K., "Attrition of Precipitated Iron Fischer-Tropsch Catalysts," Applied Catalysis A, 133 (1995) 335.
- Shroff, M. S., Kalakkad, D. S., Jackson, N. B., Harrington, M. S., Sault, A. G., and Datye, A. K., "Characterization of Carbides in Iron Fischer-Tropsch Catalysts" in Proceedings Microscopy and Microanalysis (G. Bailey, M. Ellisman, R. Hennigar, and n. Zaluzec: Editors) Jones and Begell Publishing, New York, 1995.
- Shroff, M. S., Kalakkad, D. S., Coulter, K. E., Kohler, S. D. Harrington, M. S., Jackson, N. B., Sault, A. G., and Datye, A. K., "Activation of Precipitated Iron Fischer-Tropsch Synthesis Catalysts," Journal of Catalysis, 156, 185 (1995).
- Tolman, C. A., and Jackson, N. B., "Puzzling Chemistry" in CHEMTECH, March 1992.

Jackson, N. B., Wang, C. M., Luo, Z., Schwitzgebel, J., Ekerdt, J. G., Brock, J. R., and Heller, A., "Attachment of TiO<sub>2</sub> Powders to Hollow Glass Microbeads: Activity of the TiO<sub>2</sub>-Coated Beads in the Photoassisted Oxidation of Ethanol to Acetaldehyde", *Journal of the Electrochemical Society*, 138(12), 3660 (1991).

Silver, R. G., Jackson, N. B., and Ekerdt, J. G., "Adsorption and Reaction of Carbon Dioxide on Zirconium Dioxide" in *Catalytic Activation of Carbon Dioxide*, ACS Symposium Series, v. 363, pp.123 – 132, American Chemical Society, Washington, DC, 1988.

Jackson, N. B., and Ekerdt, J. G., "Isotope Studies of the Effect of Acid Sites on the Reactions of C<sub>3</sub> Intermediates during Isosynthesis over Zirconium Dioxide and Modified Zirconium Dioxide," *Journal of Catalysis*, 126, 46 (1990).

Jackson, N. B., and Ekerdt, J. G., "The Surface Characteristics Required for Isosynthesis over Zirconium Dioxide and Modified Zirconium Dioxide", *Journal of Catalysis*, 126, 31 (1990).

Tseng, S., Jackson, N. B., and Ekerdt, J. G., "Isosynthesis Reactions of CO/H<sub>2</sub> over Zirconium Dioxide", *Journal of Catalysis*, 109, 284 (1988).

Jackson, N. B., and Ekerdt, J. G., "Methanol Synthesis Mechanism over Zirconium Dioxide", *Journal of Catalysis*, 101, 90 (1986).