

Nuclear Science and Technology Division

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Rich Gostic
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Shruti Patil
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Amber Wright
Charles Yeaman

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Brice Howard
Paul Lawson
Jade Morgan
Trent Ohman

Mission: The mission of the Nuclear Science and Technology Division is to conduct research and academic support regarding aspects of nuclear science and technology that are of interest to the community and sponsoring organizations. The NSTD was formed in 2000 and houses a multi-disciplinary team with extensive expertise in radiochemistry, nuclear engineering, radioactive waste management, radiation detection and measurement, geology, environmental chemistry, risk assessment, and public communication. The division has state-of-the-art facilities including radiochemistry, radiation detection, transmission electron microscopy and a host of other analytical laboratories. The division also supports two academic programs: the Ph.D. program in Radiochemistry and the M.S. program in Materials and Nuclear Engineering.

Summary: This year the division experienced dramatic growth, especially in the radiochemistry arena, and currently includes 13 Ph.D. candidates, 2 M.S. students, 6 undergraduate students, 3 post-doctoral researchers and 8 full-time research faculty. The research and academic activities of the division are well integrated with the UNLV campus with about a third of the division's funding is sub-awarded to academic departments (Mechanical Engineering, Chemistry, Physics, Health Physics, Electrical and Computer Engineering, and Geology). Only

projects that are directly supervised by NTSD research faculty are identified in this report. Further information about projects can be found on the NSTD website at <http://nstg.nevada.edu>.

Completed Projects:

“Evaluation of US and UC-US Solid Solution Oxidation by CO₂,” a Nuclear Energy Research Initiative (NERI) project sub-awarded by the Massachusetts Institute of Technology (MIT) through the U.S. Department of Energy (DOE) under Cooperative Agreement Number DE-AC07-99ID13727. Project started January 2004, ended March 2005.

“Development of a Fundamental Understanding of the Complexation of Am, Cm, Np, and Pu with Organic Ion Exchange Resins,” a Presidential Early Career Award for Scientists and Engineers (PECASE) project sub-awarded by Los Alamos National Laboratory. Project started January 2004, ended April 2005.

“Enhanced Control of PWR Primary Coolant Water Chemistry Using Selective Separation Systems for Recovery of Enriched Boric Acid,” a NERI project sub-awarded by MIT through the DOE Cooperative Agreement Number DE-FG07-02SF22616. Project started January 2004, ended September 2005.

“Experimental Analysis of Fission Product Removal by CO₂,” a project sub-awarded by MIT through the DOE Cooperative Agreement DE-FG07-02SF22608. Project started January 2004, ended September 2005.

Ongoing Projects:

Transmission Electron Microscopy (TEM) User Facility: the TEM was officially accepted as a recharge center July 1, 2005 and held its grand opening on October 7, 2005 to the campus community.

“Microbial Transformations of TRU and Mixed Wastes: Actinide Speciation and Waste Volume Reduction,” funded by DOE Cooperative Agreement DE-FG-02-04ER63733. Project start date: December 2003, end date: November 2006.

“Groundwater Characterization at Yucca Mountain – Task 2: Surface Complexation and Solid Phase Dissolution,” a DOE Yucca Mountain Cooperative Agreement funded through the UNLV Research Foundation. Project start date: October 2004, project end date: September 2006.

“Fundamental Chemistry of U and Pu in the TBP-Dodecane-Nitric Acid System,” a continuing project (Task 26) of the UNLV Transmutation Research Program (TRP) funded by the DOE Advanced Fuel Cycle Initiative (AFCI) Cooperative Agreement DE-FG07-01AL67358. Project start date: August 2004, end date: June 2006.

“Dissolution, Reactor, and Environmental Behavior of ZrO₂-MgO Inert Fuel Matrix,” a continuing project (Task 19) of the TRP funded by the AFCI Cooperative Agreement. Project start date: August 2004, end date: June 2006.

“Neutron Multiplicity Measurements for the AFCI Program,” a continuing project (Task 6) of the TRP funded by the AFCI Cooperative Agreement. Project start date: August 2001, end date: June 2006.

“High Temperature Heat Exchanger Project,” a continuing project in support of the Nuclear Hydrogen Initiative, funded under the AFCI Cooperative Agreement. Project start date: May 2001, end date June 2006.

“The Crystal Structure and Nano Structure of Oxide and Nitride Transmutation Fuel,” a new project (Task 28) funded by the AFCI Cooperative Agreement. Project start date: June 2005, end date: June 2006.

“Investigation of Optical Spectroscopy Techniques for On-line Materials Accountability in the Solvent Extraction Process,” a new project (Task 29) funded by the AFCI Cooperative Agreement. Project start date: June 2005, end date: June 2006.

“Combined Radiation Detection Methods for Assay of Higher Actinides in Separations Processes,” a new project (Task 30) funded by the AFCI Cooperative Agreement. Project start date: June 2005, end date: June 2006.

“Deep Burn Separation and Repository Behavior,” a new project funded under the AFCI Cooperative Agreement. Project start date: June 2005, end date: June 2006.

“Deep Burn Reactor Physics Analysis,” a new project sub-awarded to General Atomics and funded under the AFCI Cooperative Agreement. Project start date: June 2005, end date: June 2006.

Publications:

Hartmann, T., *Lattice Parameter and Phase Constitution of ZrN Inert Matrix Fuel: Quantitative Phase Analysis of ZrN Inert Matrix Fuels (51892) by using X-Ray Powder Diffraction, Least Square and Rietveld Structure Refinement*, Report on Analytical Results on ZrN Samples of the Series 51892 shipped by LANL July 8, 2005, Part A: XRD/Rietveld Analysis, DSC/TGA Thermal Analysis, 96 pages, 2005.

Muramalla, K.K., Y. Chen, and A.E. Hechanova, “Simulation and Optimization of Homogeneous Decomposition of Sulfur Trioxide Gas on a Catalytic Surface,” *Proceedings of the ASME International Mechanical Engineering Congress and Exposition 2005*, Orlando, FL, November 2005.

Ponyavin, V., S. Subramanian, C.R. DeLosier, Y.T. Chen, A.E. Hechanova, and P.F. Peterson, “Stress Analysis of an High temperature Heat Exchanger Used in an Advanced Nuclear Reactor,” *Proceedings of the ASME International Mechanical Engineering Congress and Exposition 2005*, Orlando, FL, November 2005.

Subramanian, S., V. Ponyavin, C.R. DeLosier, Y.T. Chen, A.E. Hechanova, and P.F. Peterson, “The Effect of Fin Geometry on design of Compact Offset Strip-Fin High Temperature Heat Exchanger,” *Proceedings of the ASME International Mechanical Engineering Congress and Exposition 2005*, Orlando, FL, November 2005.

Voit, S.L., K.J. McClellan, C.R. Stanek, J.T. Dunwoody, T. Hartmann, S.A. Malloy, S.P. Willson, G.E. Egeland, R.W. Margevicius, and H.T. Hawkins, “The design and Production of Nitride Fuels for the AFCI Program,” *Proceedings of Global 2005*, Tsukuba, Japan, October 9-13, 2005.

- Kulik, V.V., J.C. Lee, and D.E. Beller, "Dynamic Analysis of Space-Time Effects in the ISU RACE Configuration," accepted October 2005 for publication in *Nuclear Instruments and Methods-A*.
- Maidana, C.O., A.W. Hunt, D.E. Beller, and K.L. Folkman, "Design, Modeling and Simulations in the RACE Project: First Study for the Development of a Transport Line," accepted October 2005 for publication in *Nuclear Instruments and Methods-A*.
- Beller, D., F. Harmon, T. Ward, and F. Goldner, "Update on the AFCI Reactor-Accelerator Coupling Experiments (RACE) Project," *Proceedings of the Nuclear Criticality Safety Division 2005 Conference*, Knoxville, TN, September 21, 2005.
- Subramanian, S., V. Ponyavin, C.R. DeLosier, Y. Chen, and A.E. Hechanova, "Design Considerations for Compact Ceramic Offset Strip-Fin High Temperature Heat Exchangers," *Proceedings*, Fifth International Conference on Enhanced, Compact and Ultra-Compact Heat Exchangers, Whistler, BC, Canada, September 11-16, 2005.
- Ponyavin, V., S. Subramanian, C.R. DeLosier, Y. Chen, A.E. Hechanova, and P.F. Peterson, "Flow Calculations in the High Temperature Heat Exchangers with Manufacturing Geometrical Effects," *Proceedings*, 2005 Summer Heat Transfer Conference, San Francisco, CA, July 17-22, 2005.
- Beller, D., editor, *Proceedings of the 3rd Annual Idaho ADSS Workshop*, Idaho State University, Idaho, June 2005.
- Beller, D., "AFCI Reactor-Accelerator Coupling Experiments (RACE) Project Overview," *Proceedings of the 3rd Annual Idaho ADSS Experiments Workshop*, Pocatello, ID, June 2005.
- Beller, D., "The Need for Accelerator-Driven Transmutation of Nuclear Waste," *Proceedings of the 3rd Annual Idaho ADSS Experiments Workshop*, Pocatello, ID, June 2005.
- Subramanian, S., R. Akberov, C.R. DeLosier, Y. Chen, A.E. Hechanova, and P.F. Peterson, "Design Considerations for Compact Ceramic Off-Set Strip Fin High Temperature Heat Exchangers," *Proceedings*, ASME Turbo Expo 2005: Power for Land, Sea and Air, Reno, NV, June 6-9, 2005.
- Liu, X.B., L.Z. Ma, K.M. Chang, and E. Barbero, "Fatigue Crack Propagation of Ni-base Superalloys," *Acta Metallurgica Sinica (English Letters)*, v 18, n 1, p 55-64, February 2005.
- Ma, J., P. Guo, J. Zhang, N. Li, and B.M. Fu, "Enhancement of Oxygen Transfer in Liquid Lead and Lead-Bismuth Eutectic by Natural Convection," *International Journal of Heat and Mass Transfer*, 48 (2005) 2601-2612, January 31, 2005.
- Beller, D. and J. Knebel, "Phase IV of the RACE Project: European Collaborations," *Transactions of American Nuclear Society*, 93, Washington, DC, pp. 901-902 (2005).
- Chen, J., D. Beller, F. Harmon, and K. Sabourov, "ISU Accelerator-Driven Sub-critical System Characterization," *Transactions of American Nuclear Society*, 93, Washington, DC, pp. 907-

908 (2005).

Charlton, W.S., V.K. Taraknath Woddi, S. O'Kelly, T. Green, and D. Beller, "Reactor-Accelerator Coupling Experiments (RACE): Heat Generation Rates Using W-Cu and U Targets," *Transactions of American Nuclear Society*, 93, Washington, DC, pp. 904-906 (2005).

O'Kelly, D.S., D. Beller, and W.S. Charlton, "Accelerator Driven Subcritical System Experiments at The University of Texas," *Transactions of American Nuclear Society*, 93, Washington, DC, p. 903 (2005).

Presentations:

Wright, A., K. Holliday, C. Gong, T. Hartmann, and K. R. Czerwinski, "Radiochemistry in the US Advanced Fuel Cycle Initiative (AFCI): Coupling Nuclear Fuel Development to Separation and Repository Behavior," Michigan State University, December 2005.

Czerwinski, K. R., "Archimedes Filter and Advanced Fuel Cycle (AFCI) Separations," DOE Office of Science Working Group on Plasma Separations, Archimedes Corporation, San Diego, CA, November 2005.

Beller, D., "Accelerator Applications Division," status report presented to the Board of Directors of the American Nuclear Society, Washington, DC, November 16, 2005.

Plaue, J., A. Gelis, and K.R. Czerwinski, "Actinide Third Phase Formation in 1.1 M TBP/Nitric Acid/Alkane Diluent Systems," 14th Symposium on Separation Science and Technology for Energy Applications, Gatlinburg, TN, October 2005.

Beller, D., "RACE Project Update," "Texas RACE Project," "RACE Targets for ISU and UT-Austin," and "Texas RACE Computational Work," ECATS/RACE 1st Technical Progress Review Meeting, Karlsruhe, Germany, October 26, 2005.

Ward, T., A. Rimski-Korsakov, N. Kudryashev and D. Beller, "Integral Neutron Multiplicity Measurements from Cosmic Ray Interactions in Lead," XVII Particle and Nuclei International Conference (PANIC05), Santa Fe, NM, October 24-28, 2005.

Stank, C.R., K.J. McClellan, J.T. Dunwoody, R.W. Margevicius, and T. Hartmann, "Optimization of Nitride Fuel Processing through Surrogate Experiments," Global 2005, Tsukuba, Japan, October 9-13, 2005.

Beller, D., "RACE: The AFCI Reactor-Accelerator Coupling Experiments Project," undergraduate colloquium, University of New Mexico, October 12, 2005.

Ma, L., T. Hartmann, G. Cerefice, and A. Hechanova, "Principals and Applications of Transmission Electron Microscopy (TEM)," Grand Opening of the TEM Recharge Center, October 7, 2005.

Beller, D., "RACE: The AFCI Reactor-Accelerator Coupling Experiments Project," presentation to the NE New York Section of the American Nuclear Society, Rensselaer Polytechnic Institute, October 6, 2005.

- Beller, D., "RACE: The AFCI Reactor-Accelerator Coupling Experiments Project," presentation to the NE New York Section of the American Nuclear Society, Rensselaer Polytechnic Institute, Troy, NY, October 6, 2005.
- Maidana, C. O., A. W. Hunt, and D. E. Beller, "Reactor Accelerator Coupling Experiments: Transport Line Design," poster displayed at the VI Latin American Symposium on Nuclear Physics and Applications, Iguazú, Argentina, October 6, 2005.
- Beller, D., "RACE: The AFCI Reactor-Accelerator Coupling Experiments Project," graduate colloquium presentation, University of California, Berkeley, CA, October 3, 2005.
- Beller, D., "Reactor-Accelerator Coupling Experiments (RACE) at UT-Austin NETL," presented to the Reactor Committee, UT-Austin, Austin, TX, September 28, 2005.
- Beller, D., "Update on the AFCI Reactor-Accelerator Coupling Experiments (RACE) Project," graduate colloquium presentation, UT-Austin, Austin, TX, September 27, 2005.
- T. Beller, K. Folkman, D. Beller, and S. O'Kelly, "Thermal Analysis of the Texas RACE Target," poster presentation, AFCI Semi-Annual Review Meeting, Arlington, VA, September 21-23, 2005.
- K.S. Holliday, G.W.C. Silva, T. Hartmann, and K.R. Czerwinski, "Studies on Nuclear Fuel at UNLV-HRC," poster presentation, AFCI Semi-Annual Review Meeting, Arlington, VA, September 21-23, 2005.
- A.D. Wright, J.L. Morgan, C.-M.S. Gong, and K.R. Czerwinski, "Nitrate Effects on Uranium and Plutonium Extractions," poster presentation, AFCI Semi-Annual Review Meeting, Arlington, VA, September 21-23, 2005.
- Patil, S., B. Howard and D. Beller, "Neutron Multiplicity Detector System," poster presentation, AFCI Semi-Annual Review Meeting, Arlington, VA, September 21-23, 2005.
- Beller, T., K. Folkman, D. Beller, and S. O'Kelly, "Thermal Analysis of the Texas RACE Target," poster presentation, AFCI Semi-Annual Review Meeting, Arlington, VA, September 21-23, 2005.
- Beller, D., F. Harmon, T. Ward, and F. Goldner, "Update on the AFCI Reactor-Accelerator Coupling Experiments (RACE) Project," Nuclear Criticality Safety Division 2005 Conference, Knoxville, TN, September 21, 2005.
- Hechanova, A.E., "Materials Research for Hydrogen Production from Nuclear Energy," invited lecture, UNLV Materials Advantage Student Section, September 16, 2005.
- Czerwinski, K.R., "Current and Future Fuel Cycles: US Approach and R&D Programs," International Atomic Energy Agency, Vienna, Austria, August 2005.
- Czerwinski, K.R., "The Chemistry of the Advanced Fuel Cycle," Archimedes Corporation, San Diego, CA, August 2005.

- Beller, D., F. Harmon, T. Ward, and F. Goldner, "The U.S. AFCI Reactor-Accelerator Coupling Experiments (RACE) Project," invited plenary presentation, International Conference on Accelerator Applications 2005 (AccApp05), Venice, Italy, August 31, 2005.
- Kulik, V. V., J. C. Lee, and D. E. Beller, "Dynamic Analysis of Space-Time Effects in the ISU RACE Configuration," International Conference on Accelerator Applications 2005 (AccApp05), Venice, Italy, August 30, 2005.
- Hechanova, A.E., "Overview of Nuclear Research at UNLV," invited lecture, Summer Institute of the World Nuclear University, Las Vegas, NV, August 19, 2005
- Beller, D., F. Harmon, T. Ward, and F. Goldner, "The U.S. AFCI Reactor-Accelerator Coupling Experiments (RACE) Project," abstract for invited plenary presentation to the International Conference on Accelerator Applications 2005 (AccApp05), Venice, Italy, August 29-September 1, 2005.
- Paviet-Hartmann, P. and T. Hartmann, "Optimization Long-Term Prediction of Nuclear Waste Disposal by Implementing Experimental Data," INCEED 2005, Charlotte, NC, July 24-30, 2005.
- Czerwinski, K.R., "Actinide Speciation in Separations and Solid Phases," Brookhaven National Laboratory, Upton, NY, July 2005.
- Mullen, L.M., C.S. Gong, T. Hartmann and K.R. Czerwinski, "The Effects of Microbial Growth on Redox of Uranium Solids," ACTINIDES 2005, Manchester, England, July 2005.
- Shaughnessy, D. A., K. J. Moody, P. A. Wilk, J. M. Kenneally, J. F. Wild, M. A. Stoyer, R. W. Loughheed, J. B. Patin, and K.R. Czerwinski, "Ceramic Plutonium Target Development for the MASHA Separator," ACTINIDES 2005, Manchester, England, July 2005.
- Plaue, J., A. Gelis, K.R. Czerwinski, "Insights into Third Phase Formation Using Neptunium," ACTINIDES 2005, Manchester, England, July 2005.
- Hechanova, A.E., "Innovative Concepts for Waste Management," invited lecture, European Nuclear YG Forum 2005, Zagreb, Croatia, June 7, 2005.
- Czerwinski, K.R., "Actinide speciation research on the Deep Burn TRISO fuels concept," Forschungszentrum Karlsruhe, Karlsruhe, Germany, June 2005.
- Czerwinski, K.R., "Research needs on SiC and graphite dissolution for the Deep Burn program," University of Savoie, Chambéry, France, June 2005.
- Beller, D., "The Need for Accelerator-Driven Transmutation of Nuclear Waste," 3rd Annual Idaho ADSS Experiments Workshop, ISU, Pocatello, ID, June 1, 2005.
- Beller, D., "AFCI Reactor-Accelerator Coupling Experiments (RACE) Project Overview," 3rd Annual Idaho ADSS Experiments Workshop, ISU, Pocatello, ID, June 1, 2005.
- Wu, X., J. Ma, Y. Jiang, B. Fu, W. Hang, J. Zhang, and N. Li, "Instrumentation of YSZ Oxygen Sensor Calibration in Liquid Lead-Bismuth Eutectic," IEEE International Symposium on

Circuits and Systems, Kobe, Japan, May 23-26, 2005.

Mullen, L., C. Gong, and K.R. Czerwinski, "Redox of Actinides by Bacteria: Implications for the Fuel Cycle," invited lecture, 1st International Nuclear Chemistry Conference, Kusadasi, Turkey, May 2005.

Czerwinski, K.R., "Education and Research in the Radiochemistry Ph.D. Program at the University of Nevada, Las Vegas," 1st International Nuclear Chemistry Conference, Kusadasi, Turkey, May 2005.

Beller, D., "UNLV Nuclear Engineering," UNLV-Framatome ANP meeting, UNLV, Las Vegas, NV, April 28, 2005.

Hechanova, A.E., "Overview of Nuclear Projects at UNLV," UNLV-Framatome ANP meeting, UNLV, Las Vegas, NV, April 28, 2005.

Beller, D. and F. Harmon, "AFCI Reactor-Accelerator Coupling Experiments (RACE) Project," 2nd Meeting on EUROTRANS DM2 ECATS Feasibility Study, Brussels, Belgium, April 20, 2005.

Patil, S., "Neutron Detector Characteristics in Dead Time Experiments," American Nuclear Society Student Conference, Columbus, OH, April 14-16, 2005. Awarded second place in session.

Silva, G., "Characterization of the Thermal Stability of Zinc Containing Fluorapatite," American Nuclear Society Student Conference, Columbus, OH, April 14-16, 2005.

Czerwinski, K.R., "Utilization of Actinide Speciation in Environmental Clean Up," McGuire Air Force Base, NJ, April 2005.

Beller, D., "UNLV Nuclear Engineering," UNLV-Argonne National Laboratory meeting, UNLV, Las Vegas, NV, March 24, 2005.

Beller, D., "RACE: The AFCI Reactor-Accelerator Coupling Experiments Project," graduate colloquium, University of Michigan, Ann Arbor, MI, March 23, 2005.

Beller, D., "RACE: The AFCI Reactor-Accelerator Coupling Experiments Project," graduate colloquium, Purdue University, W. Lafayette, IN, March 21, 2005.

Beller, D., "Accelerator-Driven Subcritical Systems & Materials Protection Control & Accountability Research for AFCI," Idaho State University Strategic Planning Conference, Pocatello, ID, March 16, 2005.

Hartmann, T. and P. Paviet-Hartmann, "The influence of Bromine on the irradiation-induced formation of alpha-radiolysis by-products featuring helium ion-beam line experiments," 229th ACS National Meeting, San Diego, CA, March 13-17, 2005.

Beller, D., "RACE: The AFCI Reactor-Accelerator Coupling Experiments Project," graduate colloquium, U Tennessee-Knoxville, Knoxville, TN, March 9, 2005.

Beller, D., "RACE: The AFCI Reactor-Accelerator Coupling Experiments Project," graduate colloquium, University of California, Berkeley, CA, March 7, 2005.

Beller, D., "RACE: The AFCI Reactor-Accelerator Coupling Experiments Project," graduate colloquium, University of Texas, Austin, TX, March 1, 2005.

Czerwinski, K.R., "Current and Future Fuel Cycles: US Approach and R&D Programs," French Atomic Energy Commission, Paris, France, February 2005.

Beller, D., "RACE: The AFCI Reactor-Accelerator Coupling Experiments Project," graduate colloquium, Texas A&M University, College Station, TX, Feb. 28, 2005.

Hartmann, T. and P. Paviet-Hartmann, "Application of high energy beam-line experiments on $MgCl_2$ solution to simulate alpha-radiolysis in the near-field of a nuclear repository," Waste Management 2005 conference, Tucson, AZ, February 27 – March 3, 2005.

Beller, D., "AFCI Reactor-Accelerator Coupling Experiments (RACE) Project," AFCI Semi-annual Technical Review Meeting, Alexandria, VA, February 16, 2005.

Czerwinski, K.R., "Deep Burn Concepts: Proposed Research Activities," AFCI Semi-Annual Technical Review Meeting, Alexandria, VA, February 16, 2005.

Wolfrom, E., T. Hartmann, K.R. Czerwinski, and E. Shwageraus, "Actinide Speciation in Nuclear Fuels," Oregon State University, Corvallis, OR, January 2005.

Czerwinski, K.R., "Deep Burn Concept: Proposed Research Activities," Chemical Technology Division, Argonne National Laboratory, Argonne, IL, January 2005.

Beller, D., "AFCI Reactor-Accelerator Coupling Experiments (RACE) Project," Joint AFCI/Gen-IV Nuclear Data Working Group and AFCI Physics Working Group Meeting, UNLV, Las Vegas, NV, January 28, 2005.

Service:

Professional:

- Hosted the Deep Burn Reactors Work Package Meeting, January 26, 2005.
- Hosted the Joint AFCI/Gen-IV Nuclear Data Working Group and AFCI Physics Working Group Meeting, January 27-28, 2005.
- Hosted Russian Visiting Scientists for installation of TC-1 Target Loop at UNLV, September 10-24, 2005.
- Organized Liquid Salt Technical Working Group Meeting, hosted by Pratt and Whitney, Rocketdyne, Canoga Park, CA, October 28, 2005.
- Organizer and Chair of a technical session titled "Experiments in Support of Accelerator Applications" at the ANS Winter Meeting, Washington, DC, November 14, 2005.
- Members of the Advanced Fuel Cycle Initiative (AFCI) Fuels Working Group, Separations Working Group, and Systems Working Group.
- Collaborated with the University of Idaho and Idaho State University on the Development of Waste Form Qualification Program for TRISO Fuel disposal at Yucca Mountain.

- Vice Chair and member of the Executive Committee of the Accelerator Applications Division of the American Nuclear Society (ANS).
- Member, Public Information Committee of the ANS.
- Chair and member of executive committee members for the Nevada Section of the ANS.
- Second Vice President and member of the Board of Management of the Eagle Alliance.
- Chair of the Eagle Alliance Action Center of Nevada.
- Reviewers for the U.S. Department of Energy Nuclear Engineering Education Research (NEER) program.
- Committee Member, National Research Council, Management of Certain Radioactive Waste Streams Stored in Tanks at Three Department of Energy Sites.
- Member, Advisory Panel on Radioactive Waste Treatment, Archimedes Technologies.
- Committee Member, International Atomic Energy Agency, Minor Actinide Inert Fuel Matrices.
- Visiting Instructor on Actinide Chemistry, Department of Energy Radiochemistry Summer School, Brookhaven National Laboratory July 2005.
- Visiting Professor, Conservatoire National des Arts et Métiers, Paris, Nuclear Science Group, June 2005.

Community:

- Participation on panel interviewed on public radio station NPR regarding nuclear waste issues, March 8, 2005.
- Staffed exhibits at the Pahrump Earth Day Festival, April 23, 2005.
- Provided lectures to Boy Scouts for the Nuclear Energy Merit Badge, May-June, 2005.
- Organized presentations for the Summer Institute of the World Nuclear University, Las Vegas, NV, August 19, 2005.
- Staffed exhibits at the Pahrump Fall Festival, September 30 – October 2, 2005.
- Member of the Town of Pahrump Nuclear and Environmental Advisory Board.
- Member of the Nye County Federal Facilities Impacts Advisory Board.

UNLV:

- Organized and hosted visit by Argonne National Laboratory, March 24, 2005.
- Organized and hosted visit by AREVA Framatome, ANP, April 28, 2005.
- Organized and hosted the Grand Opening of the TEM Recharge Center on October 7, 2005.
- Provided TEM sample preparation and analysis for over 300 hours in support of students and professors from the departments of Chemistry, Mechanical Engineering, Civil Engineering, Computer and Electric Engineering, Health Physics, HRC, as well as for staff from the national laboratories and industry.
- Helped develop a graduate and senior undergraduate student course: MEG 695 003, Special Topics: Principles and Application of Electron Microscopy.
- Director of the UNLV Radiochemistry Ph.D. program.
- Coordinator of the UNLV M.S. in Materials and Nuclear Engineering degree program.
- Hosted the seminar series for the UNLV Radiochemistry Program (Martine Duff, Gordon Jarvinen, and David Costa).
- Hosted seminars for UNLV Health Physics Department faculty candidates (Shuang Liu, Ralf Sudowe, and Steven Bakhtiar).
- UNLV representatives to the Nuclear Engineering Department Heads Organization (NEDHO).

- UNLV representative to the General Atomics Academic Advisory Group.
- UNLV representatives to the DOE INIE Western Nuclear Science Alliance.
- Advisers to the UNLV Student Section of the ANS.
- Members of the UNLV Radiation Safety Advisory Committee
- Affiliated Faculty, in Chemistry, Health Physics, and Mechanical Engineering.
- Guest Lecturers to the UNLV Radiochemistry Ph.D. Program (Applied Nuclear Physics, RDCM 701 and Radiochemistry, RDCM 702)
- Thesis committee members for graduating students:
 - Subhra Bandyopadhyay, M.S., Mechanical Engineering
 - Silpa Bugudur, M.S., Mechanical Engineering
 - Ancila Kaiparambil, M.S., Mechanical Engineering
 - Raghunandan Karamcheti, M.S., Mechanical Engineering
 - Harish Krishnamurthy, M.S., Mechanical Engineering
 - Kiran Muramalla, M.S., Mechanical Engineering
 - Radhakrishnan Santhanakrishnan, M.S., Mechanical Engineering
 - Lalit Savilia, M.S., Mechanical Engineering
 - Gregory Schmett, M.S. Chemistry
 - Sundaresan Subramanian, M.S., Mechanical Engineering