Nuclear Science and Technology Division

**Director:**  
Anthony Hechanova

**Researchers:**  
Denis Beller  
Gary Cerefice  
Kenneth Czerwinski  
Thomas Hartmann  
Jian Ma  
Longzhou Ma

**Part Time Researchers:**  
Jeanette Daniels  
Joon Soo Lee  
Ning Li  
Valery Ponyavin  
Woosoon Yim  
Zhongbo Yu

**Administrative Staff:**  
Rebecca Arbour  
Steven Curtis  
Cristalyne Estella  
John Knoten  
Kathleen Lauckner  
Trevor Low (Laboratory Manager)  
Thomas O’Dou (Radiation Lab. Director)  
Leisa Rodriguez (Director of Finance)

**Postdoctoral Researchers:**  
Cynthia Gong  
Frederic Poineau  
Tyler Sullens

**Graduate Students:**  
Timothy Beller  
Craig Bias  
Julie Gostic  
Richard Gostic  
Matthew Hodges  
Kiel Holliday  
Lawrence Lakeotes  
Ryan LeCounte  
Yuyu Lin  
Lisa Mullen  
Quinton Newell  
Wendy Pemberton  
Richard (Troy) Robinson  
Chinthaka Silva  
Nick Smith  
Evgeny Stankovskiy  
Xiuju (Julia) Tan  
Amber Wright  
Charles Yeamans

**Undergraduate Students:**  
Deborah Callaway  
Ed Mausolfe  
Lillian Ratliff  
Tanya Sloma

**Mission:** The mission of the Nuclear Science and Technology Division is to conduct research and support academic programs regarding aspects of nuclear science and technology that are of interest to the community and sponsoring organizations.

**Summary:** The NSTD was formed in 2001 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. This year the structure of the division continued to evolve with the addition of a laboratory support group under the direction of Tom O’Dou, former UNLV Radiation Safety Officer. The division also implemented the reorganization of materials research under the coordination of adjunct professor Ning Li who is a technical group leader from Los Alamos National Laboratory. The research and academic activities of the division are well integrated with the UNLV campus with about a third of the
division’s funding sub-awarded to academic departments (Mechanical Engineering, Chemistry, Civil Engineering, 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:**


**Ongoing Projects:**


“Investigation of Optical Spectroscopy Techniques for On-Line Materials Accountability in the Solvent Extraction Process,” TRP Task 29, DOE Cooperative Agreements DE-FC07-06ID14781 and DE-FG07-01AL67358.009. Project start date: August 2005. Project end date: June 30,
2007.


Publications:


**Presentations:**


T. Beller, B. Howard, and R. LeCounte, “High-Power Accelerator Target Design for the AFCI
RACE Project,” poster and demonstration for the UNLV senior engineering design competition, May 3, 2006.


D. Beller, “The Need for Nuclear Power,” Graduate Colloquium, Department of Nuclear Engineering, Purdue University, September 21, 2006.


D. Beller, “The Need for Nuclear Power,” Graduate Colloquium, Department of Physics, Idaho State University, October 2, 2006.

A.E. Hechanova, “Efficiency Improvement and Cost Reduction of Solid Oxide Electrolysis Cells,”
presentation, DOE Nuclear Hydrogen Initiative, Semi-Annual Review Meeting, Germantown,
MD, October 31, 2006.
A.E. Hechanova, “UNLV Consortium Overview,” presentation, DOE Nuclear Hydrogen Initiative,
Semi-Annual Review Meeting, Germantown, MD, November 1, 2006.
A.E. Hechanova, “High Temperature Heat Exchanger Project,” presentation, DOE Nuclear
A.E. Hechanova, “Transmutation Technologies,” presentation and invited panelist, ASME
International Mechanical Engineering Congress and Exposition, Chicago, IL, November 7,
2006.
D. Beller, “Racing to Win the Public Communications Competition,” paper presentation, Winter
Meeting of the American Nuclear Society, November 14, 2006, Albuquerque, NM.
D. Beller, “Update on the Reactor-Accelerator Coupling Experiments (RACE) Project,”
presentation, Winter Meeting of the American Nuclear Society, November 16, 2006,
Albuquerque, NM.
Society, November 16, 2006, Albuquerque, NM.
Meeting of the American Nuclear Society, November 16, 2006, Albuquerque, NM.
F. Poineau, A. Sattelberger, S.D. Conradson, K. Czerwinski, Synthesis and Characterization of
Quadruple-Bonded Technetium Dimers, MRS Scientific Basis for Nuclear Waste
Management XXX Boston, MA November-December 2006.
F. Poineau, T. Hartmann, G. Jarvinen, and K. Czerwinski, “Synthesis and Characterization of
Technetium-Zirconium Alloys Waste Forms for the UREX+1 Process,” MRS Scientific Basis
for Nuclear Waste Management XXX Boston, MA November-December 2006.

Service:

Professional:

• Meeting with and tour of facilities for Japanese Scientists from the Japan Science and
• D. Beller, “Atomic Time Machines: Back to the Future of Nuclear Power,” Graduate
  Colloquium, Department of Physics, Idaho State University, November 27, 2006.
• Hosted a Molten Salt Working Group meeting, November 30, 2006
• Hosted a Materials Meeting for the Nuclear Hydrogen Initiative, December 6-8, 2006.
• Collaboration meeting with faculty from the Institute for Nuclear Power Engineering,
• Hosted a seminar series on electromagnetic pumps.
• Members of the Advanced Fuel Cycle Initiative (AFCI) Fuels Working Group,
• D. Beller, member, Public Information Committee of the ANS.
• D. Beller, member, American Nuclear Society President's Special Committee on Federal
  Investment in Nuclear Education.
• D. Beller, member, Board of Advisors for the Nuclear Engineering Department of Purdue
  University.
• D. Beller, member, Executive Committee of the Accelerator Applications Division of the
  ANS.

D. Beller, reviewed grant proposals for the DOE’s Nuclear Engineering Education and Research (NEER) Program.

D. Beller, reviewed technical papers for two archival engineering journals: Nuclear Technology and Nuclear Science and Engineering (both published by the American Nuclear Society).


D. Beller, coordinated and attended nuclear public communications events at two premier motor racing events with Newman Wachs Racing, staff from the American Nuclear Society and nuclear industry sponsors, and students and members of ANS sections.

D. Beller, worked with Susan Eisenhower, granddaughter of Pres. Eisenhower and former director of the Eisenhower Institute in Washington, DC, to organize two high-level dinner-discussions of nuclear energy issues hosted by actors Paul Newman and Joanne Woodward in their living room. Each discussion included about twenty top U.S. executives from industry, Wall Street, state and national government, academia, and environmental organizations.

K. Czerwinski, member, Separations and Actinide Science Board of Directors, Idaho National Laboratory, July 2006-Present.


K. Czerwinski, Editor of Radiochemistry, Central European Journal of Chemistry, April 2006-Present.


A.E. Hechanova, Chair, Accelerator Applications Division, American Nuclear Society.

Community:

- Staffed exhibits at the Pahrump Earth Day Festival, April 22, 2006.
- Staffed exhibits at the Pahrump Fall Festival, September 29 – October 1, 2006.
- D. Beller, Chair of the Nevada Section of the American Nuclear Society.
- D. Beller, Second Vice President and member of the Board of Management of the Eagle Alliance, and Chair of the Eagle Alliance Action Center of Nevada.
- K. Czerwinski, organized science club at Lamping Elementary, Henderson, NV
- A.E. Hechanova, participated as a panelist and also presented a lecture entitled “Advanced Nuclear Fuel Cycle” at the Membership Colloquium for the Sun City Summerlin Nuclear Science Club on May 5, 2006.
- A.E. Hechanova, Member, Nuclear Waste and Environmental Advisory Board, Town of Pahrump.
- A.E. Hechanova, Secretary, Nevada Section of the American Nuclear Society.

UNLV:

- Organized and hosted several visits by DOE and NSTec managers with the NSTD, Health Physics Department, and Colleges of Sciences and Engineering.
- Supported developmental research projects on the Transmission Electron Microscope for academic departments.
- D. Beller, organized a UNLV recruiting exhibit at the Annual ANS Student Conference at Rensselaer Polytechnic Institute.
- D. Beller, presented a poster “High-Power Accelerator Target Design for the AFCI RACE Project” for the UNLV College of Engineering Freshman Visit, November 18, 2006.
- D. Beller, served as technical advisor to the winning Mechanical Engineering team in the College of Engineering senior design competition.
- D. Beller, organized a student exhibit on the HP RACE Target for UNLV Engineering freshman recruitment on November 18th for about 50 students and parents.
- D. Beller, UNLV representative to Western Nuclear Science Alliance (DOE INIE).
- D. Beller, hosted the Academic Advisory Committee meeting of the Western Nuclear Science Alliance, of which UNLV is now a member, and organized tours of the Nevada Test Site and the Yucca Mountain Project for participants.
- D. Beller, advisor, UNLV Student Section of the ANS.
- D. Beller, UNLV representative to Nuclear Engineering Department Heads Organization (NEDHO).
- D. Beller, coordinator, UNLV Materials and Nuclear Engineering M.S. program.
- G. Cerefice, served on the UNLV Radiation Safety Advisory Committee.
- K. Czerwinski, Director of UNLV Radiochemistry Ph.D. program.
- J. Ma, developed a graduate and senior undergraduate student course: MEG (495/695), Special Topics: Liquid Metal Coolant Technology (M495/695).
- J. Ma, lecturer, independent study course: Modern Control System.
- T. O’Dou, taught a 2 hour session at the Hazmat Explo, November 16, 2006, on "Radioactive Material Laboratory Safety, Accident Prevention, and Emergency Response at the Harry Reid Center for Environmental Studies at the University of Nevada Las Vegas."
- Thesis committee members for graduating students:
  - Srinivas Chanda, M.S. Mechanical Engineering
  - Venkat Kondur, M.S. Mechanical Engineering
  - Joydeep Pal, M.S. Mechanical Engineering
  - Vinay Virupaksha, M.S. Mechanical Engineering
  - Jagadesh Yelavarthi, M.S. Mechanical Engineering