



Savannah River National Laboratory™

OPERATED BY SAVANNAH RIVER NUCLEAR SOLUTIONS



2015 • SAVANNAH RIVER NATIONAL LABORATORY

Research and Technology Recognition Reception

APRIL 30 • NEWBERRY HALL • AIKEN SC





2015 Research and

PATENTS • LICENSES • CRADAS • COPYRIGHT

“The Savannah River National Laboratory ranks among
the world’s leaders
at transferring its research and technology expertise
to a variety of customers to make the world
safer and better.”

Carol Johnson
SRNS President and CEO





“At the Savannah River National Laboratory, we are proud of the **exploring attitudes** held by our researchers and staff. It’s this sense of scientific adventure that leads us in the creation of **new technology**. It’s this quest for achievement that makes us a world leader in providing **innovative solutions** for pressing needs.”

Dr. Terry Michalske
SRNS Executive Vice President and SRNL Director

Technology Recognition

• LAB DIRECTOR AWARDS • FELLOWS



“Savannah River National Laboratory has made **tremendous strides** in the last several years, and continues to **demonstrate its value** on some of the Department’s and the nation’s most important problems. I’m confident that the possibilities for SRNL will continue to grow.”

Dr. David Moody
Manager, DOE-Savannah River



Dale Haas

Manager,
Strategic Development and
Technology Partnerships *(Acting)*

Welcome to the sixth Annual Research and Technology Recognition Reception and Congratulations to all this year's honorees. We're glad you've joined us this evening and for the opportunity to celebrate your many successes and accomplishments over the past year. Everyone here this evening has made a significant contribution to SRNL through your research, recognized expertise in your field or substantial impact on the technology transfer program.

Tonight is our opportunity to say "thanks" for your expertise, creativity and innovation. SRNL's reputation as a National Laboratory continues to grow as we enhance our relationships with universities, other laboratories and government agencies, as well as provide hands-on assistance and resolve critical problems for our customers on an international scale.

This evening is dedicated to honoring those of you who have received issued patents, copyrights, executed CRADAs, licenses, or garnered special awards such as the Don Orth Award and the Laboratory Director's Awards in recognition of Exceptional Scientific and Engineering Achievement, or Early Career Exceptional Achievement Awards, as well as recipients of Technical Society Fellowships.

I commend you and thank you for your hard work, ingenuity and innovative thinking.

Patent Award Recipients



Dr. Xiao

Dr. Steve Xiao

#8,674,152 (3/18/2014)

Coal Liquefaction by Base-Catalyzed Hydrolysis with CO₂ Capture

This new invention could have economic significance as it eliminates costly hydrogen production in coal liquefaction. It also converts lignin and cellulose easily which are unconvertible in biomass fermentation.



Coal and woodchip production

Patent Award Recipients



Dr. Brigmon



Mr. Berry



Mr. Altman

Dr. Robin L. Brigmon
Christopher J. Berry
Denis J. Altman

#2,596,386 (Canada) (3/25/14)

Surfactant Biocatalyst for Remediation of Recalcitrant Organics and Heavy Metals (BioTiger™)

This technology is a formulation comprised of a defined mixture of highly-selected microbes with a proven ability to remediate inland sites severely contaminated with petroleum. This product is especially suited to the task of destroying or otherwise mitigating complex petrochemicals and heavy metals, even under extreme or harsh conditions. BioTiger™ was used successfully to remediate toxic refinery wastes in eastern Europe.



BioTiger™ increases oil yield from oil sands



Mr. Herman

David T. Herman
Timothy J. Steeper
John L. Steimke

#8,709,229 (4/29/14)

**Method to Prevent Sulfur
Accumulation in Membrane
Electrode Assembly**

This technology uses sulfur dioxide and deionized water as anode reactants to form sulfuric acid. By using electrolyzer cell which includes a membrane that allows the hydrogen ions produced at the anode to pass through and preventing hydrogen gas, sulfuric acid or other chemicals from passing through. The hydrogen gas generated at the cathode can be collected. Water is introduced at the cathode to maintain hydration, allowing generation of hydrogen at a much lower voltage than conventional electrolysis. Therefore much less energy is required for hydrogen production resulting in significantly less cost.



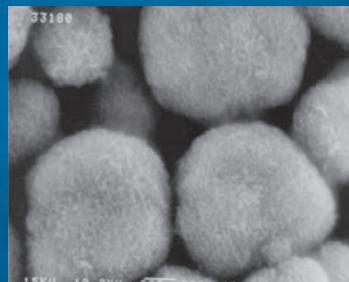
Dr. Hobbs

Dr. David T. Hobbs

#8,771,750 (7/18/14)

**Delivery or Removal of Metals
from Biological Systems**

This invention provides a method of metal ion delivery and/or removal using an inert, inorganic substance, monosodium titanate (MST). This technology could be used to deliver therapeutic doses of metal ions to diseased organs in humans and animals and also to remove elevated levels of accumulated metals in affected organs.



SEM image of monosodium titanate (MST)

Patent Award Recipients



Dr. Hoffman



Dr. Lam

Dr. Elizabeth N. Hoffman Dr. Poh-Sang Lam

#8,709,179 (4/29/14)

Suppressing Tin Whisker Growth in Lead-Free Solders and Platings

Tin Whiskers are spontaneous growths that take place from the lead-free solders and platings. As the metallic whiskers extend in length and contact electric components, device failure may occur (i.e. F-15 Radar, Galaxy IV and VII Satellites). Researchers found that when gamma irradiation is used for a short period, it changes the metallic crystal growth of whiskers to wide-but short hillock form without changing the solder chemistry.



Dr. Visser



Dr. Bridges

Dr. Ann E. Visser Dr. Nicholas J. Bridges

#8,747,786 (6/10/14)

Ionic Liquids as Templating Agents in Formation of Uranium- containing Nanomaterials

This process is using ionic liquids (ILs) as reaction media for inorganic nanomaterials, taking advantage of the pre-organized structure of the ILs, which in turn controls the morphology of the inorganic nanomaterials. Nanostructured uranium oxides have been prepared in ILs as templating agents. This invention is novel because of using uranium and produces UO_2 without the use of a reducing atmosphere. This technology would be useful for commercial nuclear fuel manufacturing.



Dr. Serkiz



Dr. Zidan



Dr. Wicks



Dr. Heung

Dr. Steven M. Serkiz
Dr. Ragaiy Zidan
Dr. George G. Wicks
Dr. Leung K. Heung

#8,758,715 (6/24/14)

**Porous Wall Hollow Glass
 Microspheres as a Medium
 or Substrate for Storage and
 Formation of Novel Materials**

This method proposes a new way to produce nanotubes and nanostructures and provides the potential of making them more unique. By making use of the porous glasses as a matrix for making the nanotubes. The resulting porosity can be filled with other nanomaterials to form or generate a unique class of materials- 'nanocomposites'. Potential applications include electronic switches and chemical gates.

Dr. Leung K. Heung
Ray F. Schumacher
Dr. George G. Wicks

#2,623,871 (Canada) (2/11/14)

**Hollow Porous-Wall Glass Microspheres
 for Hydrogen Storage**

This method is to drive a palladium compound through the pores into the hollow space of the microspheres and reduce the compound to palladium metal. The palladium filled microspheres can be used to recover and separate hydrogen isotopes. The method can be adapted to fill similar microspheres with other compounds to produce products that have potential applications in hydrogen and other commercial fields.



Patent Award Recipients



Dr. Looney



Dr. Denham



Mr. Jackson



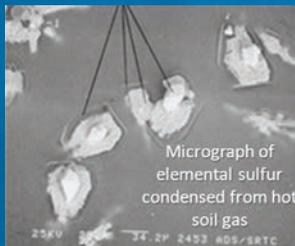
Mr. Blount

**Dr. Brian B. Looney
Dr. Miles E. Denham
Dennis G. Jackson**

#8,770,891 (7/08/14)

Vapor Phase Elemental Sulfur Amendment for Sequestering Mercury in Contaminated Soil

This technology uses elevated temperature and gas delivery to distribute significant quantities of sulfur throughout a treatment zone (without the need to inject liquids). Elemental mercury reacts with the sulfur to form stable compounds with low solubility and low toxicity. Because gases move easily in soil, gaseous delivery of a chemical reagent is a preferred enhancement for many in situ treatment processes.



**Gerald C. Blount
Alvin A. Siddall**

#8,783,371 (7/22/14)

Subsurface Capture of Carbon Dioxide

A new and efficient process to produce biofuels from coal and other biomass. The new single-step hydrolysis process converts coal and any biomass to a liquid fuel while generating a high purity carbon dioxide as a byproduct.



Dr. Fox



Dr. Visser



Dr. Bridges



Dr. Gray



Dr. Garcia-Diaz

**Dr. Elise B. Fox, Dr. Ann E. Visser,
Dr. Nicholas J. Bridges,
Dr. Joshua R. Gray,
Dr. Brenda L. Garcia-Diaz**

#8,801,957 (8/12/14)

**Nanoparticle Enhanced Ionic Liquid Heat
Transfer Fluids**

This technology involves the use of NEILs in the solar concentrating section of the concentrating solar power (CSP) system due to their higher heat capacity, higher volumetric density and higher volumetric heat capacity. The process is complemented by the lack of appreciable vapor pressure and volatilization of NEILs, which allows for simplification of the system design that typically requires engineering to prevent phase change of traditional liquids. Finding a HTF with high volumetric heat capacity as well as favorable physical properties has the potential to substantially improve the efficiency of CSP systems.

Patent Award Recipients



Dr. Washington



Dr. Duff



Dr. Teague

Dr. Aaron L. Washington, II, Dr. Martine C. Duff, Dr. Lucile C. Teague

#8,884,228 (11/11/14)

Modification of Solid State CdZnTe (CZT) Radiation Detectors with a High Sensitivity or High Resolution Operation

This invention involves developing and progressing the current commercial capabilities of solid state CZT radiation detectors in the field. This invention has the ability to switch from a high sensitivity setting without the need for two different detectors (such as CZT for sensitivity and a scintillator for resolution and their corresponding electronics packages). In addition, the resolution has been improved over an existing technology by using a different wavelength.

Dr. Lucile C. Teague

#8,822,984 (9/02/14)

Method and System for Reducing Device Performance Degradation of Organic Devices

This technology proposes the use of wavelength and intensity matched illumination to reduce and/or prevent degradation in the performance of organic semiconductor-based devices. It involves tuning the illumination conditions so that photogenerated charges prevent charge trapping and constant application of light prevents even short-term stress effects.



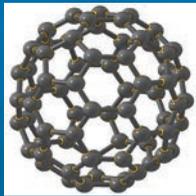
Dr. Zidan

Dr. Ragaiy Zidan

#8,883,109 (11/11/2014)

High Capacity Stabilized Complex Hydrides for Hydrogen Storage

This new process adds metal hydrides to nanocarbon structures to yield high capacity hydrogen storage materials. Testing of these materials has shown that hydrogen can be efficiently absorbed and released in multiple cycles and in significant quantities. Processes to add Lithium Hydride to Fullerenes have resulted in structures that can retain and release significant quantities of hydrogen at lower temperatures and pressure.



Mr. Blanton

Paul S. Blanton

#8,844,748 (9/30/14)

Clamshell Closure for Metal Drum

This drum closure device was designed to address the U.S. Department of Energy requirement for improved packaging of radioactive shipment materials. It is a flanged steel ring for securing a lid to an open-head steel shipping drum. Due to its superior performance in drop testing, this ring has been endorsed for use throughout the DOE complex for shipment of radioactive waste.

Patent Award Recipients



Dr. Nance



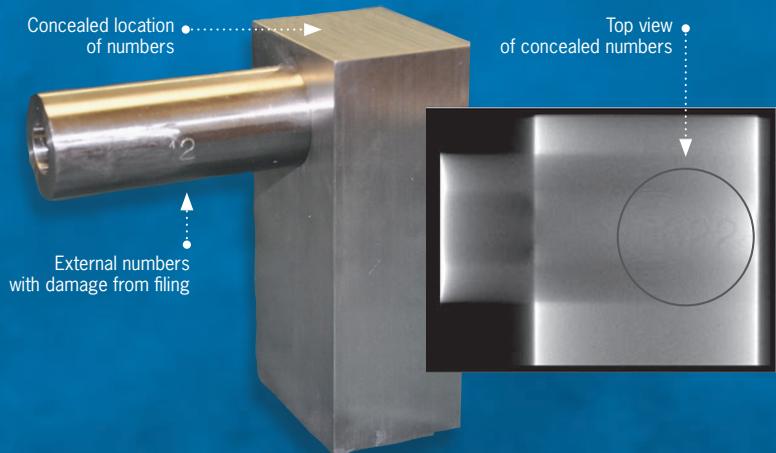
Dr. Gibbs

Dr. Thomas A. Nance
Dr. Kenneth Gibbs

#8,837,672 (9/16/14)

**Concealed Identification Symbols
and Nondestructive Determination
of the Identification Symbols**

This invention provides a method to conceal identification symbols (i.e. symbols, bar codes, numbers, letters, etc.) within an object and retrieval of information by X-ray inspection without destructively dismantling the object. The internal placement makes it difficult to remove or alter identification information. These properties would be useful in protecting valuable property by deterring theft, identifying lost or stolen property, or tagging and tracking of property and sealed containers during shipment.





Dr. Fugate



Mr. Cadieux



Dr. King

Dr. Glenn A. Fugate
James R. Cadieux
Dr. George S. King, III

#8,916,829 (12/23/14)

System and Method for Assaying a Radionuclide

The combination of a photo-electron rejecting alpha liquid scintillation (PERALS) spectrometer and a high purity germanium detector together allows detection of select radionuclides which undergo alpha decay with an associated gamma-ray emission. Detection of the counts at each detector can allow determination of the true disintegration rate, allowing quantitative determination of the mass without independent measurement of detector efficiency factors. The system could be gated to beta decay to perform beta-gamma coincidence determinations.

Patent Award Recipients



Dr. Looney



Ms. Millings



Mr. Nichols

Dr. Brian B. Looney
Margaret R. Millings
Ralph L. Nichols
William L. Payne

#8,911,630 (12/16/14)

Process for Treating Waste Water Having Low Concentrations of Metallic Contaminants

Recent scientific literature and national U.S. regulatory policies have led to significant reductions in the concentrations of a variety of metals that can be discharged to surface water. The toxicity of many metals is directly related to the biological variety of metals that can be discharged. This process uses a commercially available material (soluble humic acid) to competitively bind contaminant metals and detoxify a surface water discharge to meet regulatory requirements without the need for expensive traditional metals removal technologies. It provides a high level of environmental protection, is simpler and less expensive to design and operate, and reduces secondary waste.

CRADAs



Dr. Jim Marra

**Australian Nuclear Science & Technology Organization (ANSTO)
Waste Forms Development (CR-13-006)**

Durable ceramic waste forms that incorporate a wide range of radionuclides have the potential to broaden the available disposal options and to lower the storage and disposal costs associated with advanced fuel cycles. This collaboration will leverage researchers' experience from the Australian Nuclear Science and Technology Organization with the design and processing of crystalline based ceramic waste forms ceramics to benefit DOE-NE mission of making the U.S. fuel cycle more effective by the development of next generation waste management technologies. The objective of this collaboration is to refine the reference ceramic compositions and processing conditions for the fabrication of ceramic waste forms by a melt and crystallization process. The structure and properties of melt derived waste forms will be compared to samples fabricated by solid state consolidation methods such as hot isostatic pressing.



Dennis Jackson

**South Carolina State University Research Collaboration with
Savannah River Environmental Sciences Field Station (CR-14-001)**

DOE Office of Environmental Management has provided funding to South Carolina State University (SCSU) in support of the Savannah River Environmental Sciences Field Station (SRESFS). The SRESFS objective is to increase recruitment and retention of under represented students and women in science, engineering, natural resources management and environmental career professions. The SRESFS consists of 29 member institutions that are mostly Historically Black Colleges and Universities (HBCU) in a four-state area (SC, GA, NC, FL) including six 1890 Land Grant Institutions. In order to promote the recruitment and retention of students in the fields of science, engineering, natural resources management and environmental career professions, SC State will partner with SRNL and perform cooperative research in the field of environmental sciences.

CRADAs



Dr. Jay Gaillard

CR-14-009

NanoTech Labs Development of Nanomaterial Anode for a Low Voltage Proposal Counter for Neutron Detection

This project addresses a need in Environmental Stewardship seeking to develop innovative strategies for characterization and monitoring to enable more effective and efficient environmental risk reduction, as well as a National Security need for Nonproliferation and Nuclear Deterrent need for radiation detector and measurement advances. NanoTech Labs, Inc. (NTL) and SRNL are developing a portable proportional counter (PC) for neutron detection. This CRADA is part of a DOE PH 1 STTR demonstrating the advantages of boron coated nanotube arrays for low voltage, ^3He -free portable neutron detectors. Anodes were supplied by NTL and tested and evaluated by SRNL.

Licenses



Dr. Steve Xiao

Coal Liquefaction by Base-Catalyzed Hydrolysis with CO₂ Capture

Intelligent Syncrude, LLC



Gerald Blount

Carbon Dioxide Capture

Partnering in Innovation, Inc.



Greg Rucker

NAPLator

*CHM2Hill, Lightsey Technologies, LLC,
AMEC Environmental & Infrastructure, Inc.*



Dr. Jay Gaillard

**Nano-Structural Anodes
for Radiation Detection**

Nano Tech Labs, Inc.

Don Orth Lifetime Award of Merit



Dr. Brian Looney

The Don Orth Lifetime Award of Merit was established in February 1992 to honor Dr. Donald Orth for his numerous accomplishments and contributions. This award is given to an individual who by character, technical performance and leadership best exemplifies Donald Orth's character and contributions. It is the highest distinction at SRS to recognize the ideals of technical excellence and leadership.

Dr. Looney has received two R&D 100 Awards given by R&D Magazine to honor innovative technologies. He holds 11 patents related to environmental remediation and characterization and is adjunct professor at Clemson University. He is also known for his two-volume book, "Vadose Zone: Science and Technology Solutions."

Award Recipients

Laboratory Director Awards

Exceptional Scientific and Engineering Achievement

Heather Brant, Dr. Christopher Martino, Dr. David Tamburello, Dr. Dennis Fish, Margaret Millings, Dr. Paul Korinko, Dr. John Mickalonis, Gerald Jannik



Ms. Brant



Dr. Martino



Dr. Tamburello



Dr. Fish



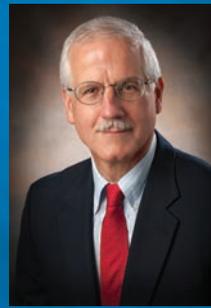
Ms. Millings



Dr. Korinko



Dr. Mickalonis



Mr. Jannik

Award Recipients

Laboratory Director Awards

Early Career Exceptional Achievement

**Dr. Brian Viner, Dr. Marissa Reigel, Christopher Verst,
Dr. Michael Martinez-Rodriguez, Dr. Joseph Teprovich**



Dr. Viner



Dr. Reigel



Mr. Verst



Dr. Martinez-Rodriguez



**Gold Cross of Merit
of the Republic
of Hungary**

John Dewes

Secretary of Energy Honor Awards

The Secretary of Energy Honor Awards are the Department's highest form of non-monetary employee recognition. These recognize individual and team excellence and achievement during the past year and are selected personally by the Secretary.

NNSA's Global Threat Reduction Initiative Efforts to Recover Fissile Materials Around the World in Support of the Nuclear Security Summit Objectives

Dr. Natraj Iyer, Kerry Dunn, Greg Chandler, John Dewes, Mike Dunsmuir, Steve Bellamy



Dr. Iyer



Ms. Dunn



Mr. Chandler



Mr. Dewes



Mr. Dunsmuir



Mr. Bellamy

Secretary of Energy Honor Awards

Development and Implementation
of High Level Salt Waste Processing Technology (ARP/MCU)

**Dr. Sam Fink, Joe Carter, Dr. Fernando Fondeur, David Herman,
Dr. David Hobbs, Thomas Peters, Robert Pierce, Michael Restivo,
Dr. Major Thompson, Dr. Thomas White, Dr. Michael Poirier, Bill Wilmarth**



Dr. Fink



Mr. Carter



Dr. Fondeur



Mr. Herman



Dr. Hobbs



Mr. Peters



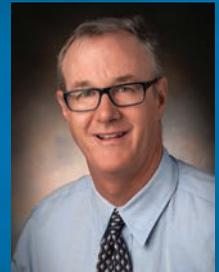
Mr. Pierce



Mr. Restivo



Dr. Thompson



Dr. White



Dr. Poirier



Mr. Wilmarth

Successful Closure of SRS Tanks: F Tank Farm

Dr. Greg Flach, Glenn Taylor, Dr. Dan Kaplan



Dr. Flach



Mr. Taylor

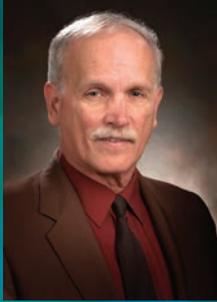


Dr. Kaplan

Technical Society Fellows



Dr. Hensel



Dr. Leishear



Dr. Iyer

American Society
of Mechanical Engineers (ASME)

Dr. Stephen Hensel
Dr. Robert Leishear

Ceramics Society

Dr. Natraj Iyer





Savannah River National Laboratory™

OPERATED BY SAVANNAH RIVER NUCLEAR SOLUTIONS