



Savannah River National Laboratory™

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SAVANNAH RIVER NATIONAL LABORATORY

Research and Technology Recognition Reception

JUNE 9, 2016 • NEWBERRY HALL • AIKEN SC



PATENTS
CRADAS
LICENSES
AWARDS
FELLOWS



“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** in advanced manufacturing.”

Dr. Terry Michalske
SRNS Executive Vice President and Director, Savannah River National Laboratory

2015 Research and Technology Recognition

“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



“The Savannah River National Laboratory is **a treasure trove** of expertise, ingenuity and innovation. These patents, copyrights, executed CRADAs, licenses and special awards are proof positive that SRNL really does **put science to work.**”

Jack Craig
Manager, DOE-Savannah River



Matthew Biasiny

Manager,
Partnerships and
Commercialization

Welcome to the seventh Annual Research and Technology Recognition Reception.

We are so honored that everyone could join us tonight and I offer my heartfelt congratulations on the numerous successes and accomplishments we are here to celebrate. SRNL continues to be a world leader in science and technology that is because of your efforts—we could not do this without you. It is your intellectual leadership and innovative solutions which have proved invaluable to our many customers and the nation as a whole.

Tonight we gather here to show our appreciation for those of you who have received patents, copyrights, executed CRADAs, licenses and other 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, Young Research Award for Excellence in Scientific Research, as well as recipients of Technical Society Fellowships. In addition, we recognize Dr. Michalske's exceptional leadership as being named the 2015 National Laboratory Director of the Year.

I sincerely appreciate your time, hard work and sacrifices made by you and your families.



To view a presentation featuring this year's honorees, scan the QR code above with your smartphone, or go to <https://vimeo.com/165182627>

Patent Award Recipients



Mr. Cordaro



Mr. Tibrea



Mr. Shull



Mr. Coleman

Joseph V. Cordaro, Steven L. Tibrea, Davis J. Shull, J. Todd Coleman

#9,019,096 (04/28/15)

Rapid Deployable Global Sensing Hazard Alert System (SAV-EM™)

This invention relates to a new system that tracks sensors or personnel in real time anywhere on earth. The system is designed to connect to a variety of gas, environmental and radiation sensors. It contains three major components; man wearable location sensor, wireless backhaul network and a central command computer with software to detect and calculate the appropriate response and alert individuals of hazards.



Patent Award Recipients



Mr. Cordaro



Dr. Serkiz



Dr. McWhorter



Dr. Sexton

**Joseph V. Cordaro, Dr. Steven Serkiz
Dr. Christopher S. McWhorter, Dr. Lindsay T. Sexton**

#9,075,148 (7/07/15)

Nano Structural Anodes for Radiation Detectors

This invention is a change in the design of gas proportional counters (PC) used primarily for radiation detection. This involves the use of conductive nanoscale structures other than carbon nanotubes as an anode and the use of boron-doped structures either in the anode or near proximity to the anode as a means of neutron detection. With minor modifications, an alternative to the ³He PC detector would eliminate the need for it in neutron detection. Since 9-11, the demand for helium-3 (³He) for neutron detectors has increased greatly, and the available supply of ³He is projected to fall significantly short of demand in the near future. This technology potentially represents the most significant technical advancement in PC technology since its invention over 50 years ago.



Mr. Torres



Dr. Sexton



Dr. Fuentes



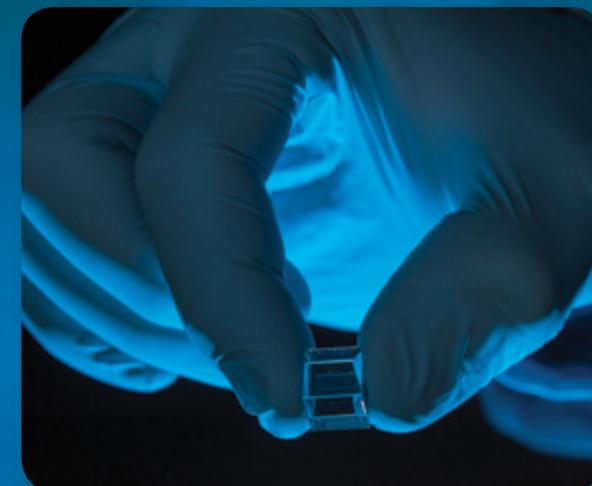
Dr. Cortes-Concepcion

**Ricardo D. Torres, Dr. Lindsay T. Sexton,
Dr. Roderick E. Fuentes, Dr. Jose Cortes-Concepcion**

#9,103,921 (08/11/15)

Photonic Crystal Scintillators and Methods of Manufacture

This invention provides significant energy resolution enhancement of scintillation-based detectors by increasing photon yield. This application uses photonic crystals (PhCs) for enhanced light outcoupling from the scintillator surface. PhCs allow for efficient light extraction through two-dimensional nanoscale patterns on the scintillator, which inhibit light propagation along directions transverse to the surface and lead to redistribution of saved energy. SRNL has developed a convenient low-cost method for creating these nanoscale patterns using a highly ordered porous anodic alumina membrane as a selective dry etching mask for large-area pattern transfer.





Patent Award Recipients



Dr. Lascola



Dr. McWhorter



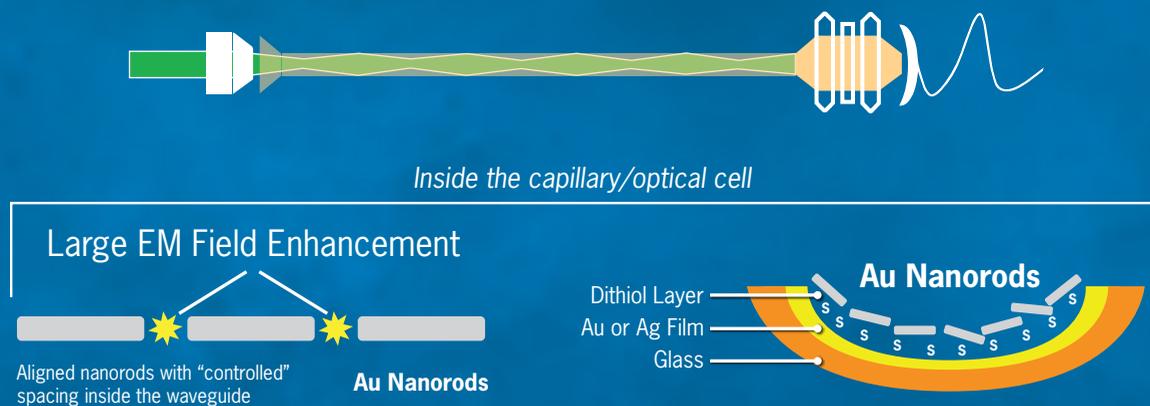
Dr. Murph

Dr. Robert J. Lascola, Dr. Christopher S. McWhorter, Dr. Simona Murph

#9,007,576 (04/14/15)

Surface Enhanced Raman Scattering Spectroscopic Waveguide (SERS)

This invention relates to a waveguide for use with surface enhanced Raman spectroscopy, a flow cell for introducing a sample into the waveguide, and a method of applying nanoparticles. This device is an optical cell that is suitable for the use of surface-enhanced Raman spectroscopy (SERS) for gaseous samples. It utilizes a specifically modified glass capillary and holder that simultaneously allows gas flow through the capillary, exposure of the capillary interior to laser light, and collection of light scattering arising from the SERS effect.



Dr. Nance



Mr. Kremetz



Mr. Marzolf

Dr. Thomas A. Nance

Daniel Kremetz

Athneal Dale Marzolf

#8,944,192 (02/03/15)

Robotic Platform for Traveling on Vertical Piping Network

The Pipe Traveler (Orangutank™) is a remote controlled, tethered robotic platform for traveling from one pipe to another using a network of vertical pipes for support. The Orangutank is designed to deliver payloads for various applications including, but not limited to; sampling equipment, spray nozzles, radiological analysis equipment, or other equipment for cleanup and remediation activities.





Patent Award Recipients



Dr. Almond



Dr. Langton



Dr. Stefanko

**Dr. Philip M. Almond
Dr. Christine A. Langton
David B. Stefanko**

#9,217,738 (12/22/15)

Method for Characterization of the Redox Condition of Cementitious Materials

This patent relates to methods for determining the redox condition of cementitious materials. The methods are leaching methods that utilize an in situ redox indicator that is present in the cementitious materials as formed. The in situ redox indicator leaches from cementitious material and, when the leaching process is carried out under anaerobic conditions can be utilized to determine the redox condition of the material. The in situ redox indicator can exhibit distinct characteristics in the leachate depending upon the redox condition of the indicator.



Dr. Wicks



Dr. Heung

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

200980111649.8 (China) (07/08/15)

Gas Storage Materials, including Hydrogen Storage Materials

A material for the storage and release of gases comprises a plurality of hollow elements, each hollow element comprising a porous wall enclosing an interior cavity, the interior cavity including structures of a solid-state storage material. In particular examples, the storage material is a hydrogen storage material such as a solid state hydride. An improved method for forming such materials includes the solution diffusion of a storage material solution through a porous wall of a hollow element into an interior cavity.



Dr. Zidan

Dr. Ragaiy Zidan, Dr. Joseph A. Teprovich, Dr. Ted Motyka

#9,199,844 (12/01/15)

Two Step Novel Hydrogen System Using Additives to Enhance Hydrogen Release from the Hydrolysis of Alane and Activated Aluminum

A system for the generation of hydrogen for use in portable power systems utilizing a two-step process that involves the thermal decomposition of AlH₃ (10 wt % H₂) followed by the hydrolysis of the activated aluminum (Al^{*}).



Patent Award Recipients



Mr. Blount Dr. Goresek Dr. Hamm

Gerald C. Blount
Dr. Maximilian Goresek
Dr. L. Larry Hamm

#9,155,992 (10/13/15)

Mass Transfer Apparatus and Method for Separation of Gases

A process and apparatus for separating components of a source gas is provided in which more soluble components of the source gas are dissolved in an aqueous solvent at high pressure. The system can utilize hydrostatic pressure to increase solubility of the components of the source gas. The apparatus includes gas recycle throughout multiple mass transfer stages to improve mass transfer of the targeted components from the liquid to gas phase. Separated components can be recovered for use in a value added application or can be processed for long-term storage, for instance in an underwater reservoir.

Thomas L. Allison

#9,151,099 (10/6/15)

Egress Door Opening Assister

In many commercial buildings and manufacturing facilities, heavy metal doors are often utilized for purposes of security, fire doors, or serve as containment doors between an enclosure having a negative air pressure relative to an environment on an opposing side of the door. This device provides an automatic door opening assistance apparatus using a combination of rods and coil springs. This spring assisted door opening device reduces the amount of force a manual operator must apply to set the door in motion and open the door.



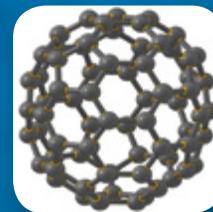
Dr. Zidan Mr. Wellons

Dr. Ragaiy Zidan
Matthew S. Wellons

#8,945,500 (02/03/15)

High Capacity Hydrogen Storage Nanocomposite Materials

This is a new process to add 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.



Dr. Hobbs Dr. Taylor-Pashow

Dr. David T. Hobbs
Dr. Kathryn M. Taylor-Pashow

#9,145,304 (09/29/15)

Synthesis of Nanosized Sodium Titanates

This invention applies to the synthesis and peroxide-modification of nanosized monosodium titanate. Methods include combination of reactants at a low concentration to a solution including a nonionic surfactant. The nanosized monosodium titanate can exhibit high selectivity for sorbing various metallic ions.



Patent Award Recipients



Mr. Coleman

**Eduardo B. Farfan
Jody R. Coleman**

#9,147,503 (09/29/15)

**System and Method
for the Identification of Radiation
in Contaminated Rooms (GrayQb)**

The invention is related to the characterization of areas such as shielded cells (hot cells), glove boxes, and rooms contaminated by radioactive materials involving gamma-ray, alpha-particle and neutron emitters. The present application involves a directional shield, a position determination system, a back-projected radiation analyzer and cell evaluator method, and a system for visually highlighting contaminated areas on objects such as walls of a contaminated room.



Dr. Serkiz



Dr. Wicks

**Dr. Steven M. Serkiz
Dr. George G. Wicks**

2,768,242 (Canada) (11/17/15)

**Porous-Walled Hollow Glass
Microspheres as Carriers
for Biomolecules**

The present invention includes compositions of porous-wall hollow glass microspheres and one or more biomolecules, where one or more biomolecules are positioned within a void location within the hollow glass microsphere, and for the use of such compositions to diagnostic and/or therapeutic delivery of biomolecules.



Mr. Pak



Mr. Young

**Donald J. Pak
John E. Young**

#8,397,356 (03/19/13)

**Triple Bar, High Efficiency
Mechanical Sealer**

This invention is directed towards a mechanical sealer which is designed to provide even pressure along the length of a bag opening which provides for an efficient, temporary seal of a storage bag. The storage bag may hold any number of a variety of materials, including hazardous waste, various fluids, gases, and mixtures thereof.



Dr. Korinko



Dr. Fox

**Dr. Paul S. Korinko
Dr. Elise B. Fox**

#9,005,486 (04/14/15)

**Proton Conducting Ceramics
in Membrane Separations**

Perovskite materials are produced having improved conductivity while maintaining an original ratio of chemical constituents, by altering the microstructure of the material. A process for making Perovskite materials is also provided in which wet chemical techniques are used to fabricate nanocrystalline ceramic materials which have improved grain size and allow lower temperature densification than is obtainable with conventional solid-state reaction processing.



Patent Award Recipients



Dennis G. Jackson

#8,928,325 (01/06/15)

Identification of Elemental Mercury in the Subsurface

A device and method designed for the identification of elemental mercury in the subsurface using a probe and direct push technique. The device provides a cone-penetrometer based sensor that produces an electric potential when mercury is contacted in the subsurface. This direct-push approach provides an easy-to-use and minimally invasive technique for characterization of mercury contaminated soils and sediments.



Dr. Maximilian B. Gorenssek

#8,956,526 (02/17/15)

Hybrid Sulfur Cycle Operation for High-Temperature Gas-Cooled Reactors

This invention relates to hybrid sulfur (HyS) cycle processing for the production of hydrogen. The process uses a proton exchange membrane (PEM) SO₂-depolarized electrolyzer (SDE) for the low-temperature, electrochemical reaction step and a bayonet reactor for the high-temperature decomposition step. The process can be operated at lower temperature and pressure ranges while still providing an overall energy efficient cycle process.



Dr. Kyle S. Brinkman

#9,023,550 (05/05/15)

Nanocrystalline Cerium Oxide Materials for Solid Fuel Cells Systems

Invention is related to solid fuel cells, including solid oxide fuel cells and PEM fuel cells that include nanocrystalline cerium oxide materials as a component of the fuel cells. A solid oxide fuel cell can include nanocrystalline cerium oxide as a cathode component and microcrystalline cerium oxide as an electrolyte component, which can prevent mechanical failure and interdiffusion common in other fuel cells. A solid oxide fuel cell can also include nanocrystalline cerium oxide in the anode. A PEM fuel cell can include cerium oxide as a catalyst support in the cathode and optionally also in the anode.



Dr. Ragaiy Zidan

5823961 (Japan) (10/16/15)

High Capacity Stabilized Complex Hydrides for Hydrogen Storage

This 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.

Patent Award Recipients

David P. Lemonds

#9,194,175 (11/24/15)

Interchangeable Breech Lock for Glove Boxes

Glove boxes are commonly used for the manipulation of hazardous or potentially hazardous substances within a controlled environment. This system provides a portable breech lock developed to improve sample management or transfer one or more items into a glovebox in a more safe and efficient manner.



CRADAs



Dr. Ragaiy Zidan
Dr. Ted Motyka

Dr. Zidan

Developing Aluminum Hydride for Portable Energy Storage Systems (CR-12-001)

Ardica Technologies, Inc.



The proposed research for this CRADA is in the area of developing aluminum hydride for portable energy storage systems. Alane is attractive as a hydrogen storage material based on the abundant availability and low cost of aluminum as a base material. The intrinsic properties of Alane-based systems provide a high probability of meeting the DOE targets for on-board hydrogen storage system gravimetric and volumetric density as well as making it potentially an ideal material for portable power applications.

Solar Receiver with Integrated Thermal Energy Storage for a Supercritical Carbon Dioxide Power Cycle CR-15-004

Brayton Energy



During this project, an innovative pairing between a Concentrated Solar Power (CSP) Solar Receiver and TES system will be developed for use in conjunction with a high efficiency sCO₂ power cycle that can be mounted atop the central receiver tower. The solar receiver itself will leverage the high-pressure, high-performance solar absorber technology developed by Brayton Energy, and the TES will incorporate metal-hydride thermochemical energy storage.

CRADAs



Connie Herman

Waste Control Specialists



Technical Collaboration Regarding Offsite Disposition of Hanford Low Activity Waste (CR-15-001)

The collaboration between WCS and SRNL was a technical approach for filtration technology, separations resin selection, and grout formulation. The goal of this CRADA is to provide SRNL technical support and expertise that WCS desires for a potential WCS project regarding low activity waste treatment, disposal and storage.



Dan Kremenz

Tetramer Tech, Inc.



Development of Tamper Indicating Coating Technology (CR-13-004)

This is a collaborative effort between SRNL and Tetramer Technologies, LLC for Development of Nanocomposite Coating Technologies. Tetramer's funding for this project is provided through a SBIR Award. Tetramer Technologies is a small business located in Pendleton, S.C.

This work is aimed at developing fluorescent ceramic coatings and a detection system for tamper indicating seals that are targeted towards arms control and international safeguards initiatives. The material, chemistry of fluorescent dopant, and processing techniques will be tailored to enable 3D conformal spray application for device manufacturing. In addition, the coatings will be tailored such that they will be transparent to visible light so that they are compatible with laser surface authentication (LSA) which provides unique identification of seal surfaces.

Licenses



Mr. Berry



Dr. Brigmon



Mr. Altman

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

BioTiger™ Patent and Trademark License Agreement
(LA-14-003)

SRNS & Opportunities Group, LLC



BioTiger™ increases oil yield from oil sands



Dr. Xiao



Mr. Sessions

Dr. Steve Xiao, Henry Sessions

Thermal Cycling Adsorption Process
(LA-15-002)

Shine Medical Technologies

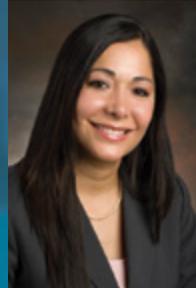


Award Winners



Dr. Terry Michalske
DOE National Laboratory Director of the Year

Dr. Terry Michalske was selected as National Laboratory Director of the Year by the Department of Energy's Office of Small and Disadvantaged Business Utilization. This was a new award category in the Secretarial Small Business Program, and Dr. Michalske was chosen for this honor. It recognizes successful directors who display leadership and commitment to maximizing small business utilization.



Dr. Brenda Garcia-Diaz
S.C. Governors Office 2015 Young Researcher Award for Excellence in Scientific Research

This award was presented by South Carolina Lieutenant Governor Henry McMaster in a program at the state capitol. Dr. Michalske referred to her as "an exceptionally strong research engineer with high-impact accomplishments. Her record proves her to be an effective technical researcher and manager, and an emergent leader in the Savannah River National Laboratory."



Dr. Marra (left) accepts the Don Orth Award of Merit from Dr. Michalske

Dr. James Marra
Don Orth Award of Merit

The Savannah River National Laboratory named Dr. Jim Marra as the 2015 winner of the Donald Orth Lifetime Achievement award, the highest distinction SRNL has to recognize the ideals of technical excellence and leadership.

Marra's career at SRNL began in 1990. He has a B.S. in Ceramic Science and a B.A. in Mathematics from Alfred University; an M.S. in Materials Engineering from Worcester Polytechnic Institute, and a PhD from Clemson in Ceramic and Materials Engineering. While at SRNL, Marra was noted for his work in waste treatment and immobilization. He was instrumental in SRNL's work for external clients at Hanford and in Japan, and has served on multiple occasions as a consultant and instructor to the International Atomic Energy Agency. He is a fellow in both ASM International and the American Ceramic Society, with over 140 scientific publications to his credit.

In addition to his responsibilities at SRNL, he has served as a Board member for the both the American Ceramic Society and the Glass Manufacturers Industrial Council; he currently is chairman of the International Commission on Glass Technical Committee on Nuclear Waste Vitrification.



Award Winners



Dr. Sexton



Dr. Kriz



Dr. Armstrong



Dr. Taylor-Pashow



Dr. Gaillard

Laboratory Director Award

Early Career Exceptional Achievement

Dr. Lindsay Sexton
Dr. Maria Kriz
Dr. Christopher Armstrong

Dr. Kathryn M. Taylor-Pashow
Dr. Jay Gaillard



Dr. Amoroso



Mr. Brisson



Mr. Hunter



Dr. Langton



Dr. Olson



Ms. Poore



Mr. Wellons



Mr. Wilson

Laboratory Director Award

Exceptional Scientific and Engineering Achievement

Dr. Jake Amoroso
Michael Brisson
Douglas Hunter
Dr. Christine Langton

Dr. Luke Olson
Anita Sue Poore
Matthew Wellons
Jason Wilson

Technical Society Fellows



Dr. Kevin M. Fox
American Ceramic Society

Dr. Fox was designated as Fellow and recognized by The American Ceramic Society (ACerS) for his accomplishments and technical contributions, largely focused on performing research and development to advance understanding of high-level radioactive waste glass processing in the international nuclear community. He has also made contributions in the areas of novel applications of advanced materials for the nuclear industry.



Dr. Paul Korinko
ASM International

Dr. Korinko was designated as Fellow and recognized “for significant impacts of hydrogen isotopes on materials and the development of novel welding processes.” Dr. Korinko has made significant impacts on the application of materials science and materials processing to nuclear technologies in the DOE. Much of his work has focused on technologies for the safe handling of hydrogen isotopes for national security and alternative energy applications.

We put science to work.™





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