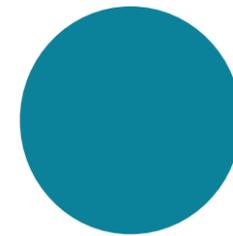
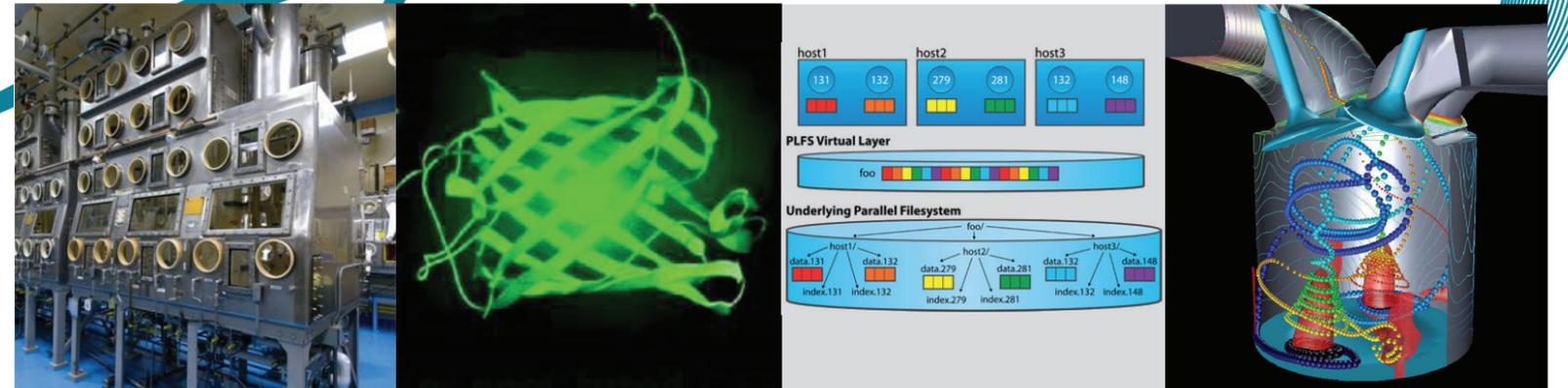


outStanding
innOvation

2011 Technology Transfer Awards
Carrying on the tradition of world-changing innovation.





Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by Los Alamos National Security, LLC, for the National Nuclear Security Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the Los Alamos National Security, LLC, the U.S. Government, or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of Los Alamos National Security, LLC, the U.S. Government, or any agency thereof.

*outStanding
innOvation*

Carrying on the tradition of world-changing innovation

Los Alamos National Laboratory
Los Alamos, New Mexico





Welcome to the 14th Annual Technology Transfer Awards reception. Tonight we celebrate Los Alamos National Laboratory's premiere innovators and recognize their vital role in transferring significant science and technology from the Laboratory to the private sector.

Los Alamos National Laboratory provides the United States with innovative technical solutions to our most difficult national problems. The accomplishments of tonight's honorees—inventors of copyrighted, patented, and licensed technologies—bring recognition to the Laboratory for our world-class science. The commercialization of these technologies helps to strengthen our economic security by creating jobs and enhancing U.S. industrial competitiveness.

The exceptional work produced by tonight's honorees also helps the Laboratory attract the next generation of innovators, program sponsors, and collaborators by expanding our interactions with the business community. The men and women of Los Alamos use science and technology to meet challenges in national security, materials science, energy security, and basic sciences while at the same time fueling startup companies, creating job opportunities, and attracting business and capital to Northern New Mexico. That outcome benefits the region, the national economy, and all of society.

On behalf of the senior management team and the Laboratory community, I extend congratulations and appreciation to this evening's honorees. Continued participation by Laboratory innovators in technology transfer will allow Los Alamos National Laboratory to grow its contributions to the region and the nation well into the future.

A handwritten signature in black ink, appearing to read 'C. McMillan'. The signature is fluid and cursive, with a long, thin tail extending to the right.

Charles F. McMillan
Laboratory Director



Keynote Speaker: Percy Tzelnic

Percy Tzelnic, Ph.D. is EMC Fellow and Senior Vice President of Engineering of EMC Corporation (EMC). He is currently in charge of the cross-divisional Fast Data Initiative in the EMC Office of the Chief Technology Officer.

Tzelnic founded and has managed Network Attached Storage at EMC, since 1994, as an EMC-internal start-up introducing new product lines for EMC in the network storage market. He led the design and development of several Network Attached Storage Systems, based on Intel platforms: Celerra File Server, Celerra Media Server, Backup and Archival Server, etc. He led market development and revenue growth to the point where NAS sales reached over \$1.5B annual revenue and positioned EMC as the market share leader in the NAS market.

Before EMC, Tzelnic managed the Network Advanced Development group at Digital Equipment Corporation between 1989 and 1994 and was Director of Software Engineering at Bytex between 1987 and 1989. He was the Director of VS Operating System Development at Wang Laboratories between 1981 and 1987. Prior to that, he taught Computer Science at two universities, in the United States and abroad.

Abstracts of Issued Patents

Listings are in accordance with issue dates from beginning to end of fiscal year 2011

Acoustic Concentration of Particles in Fluid Flow

Gregory Kaduchak (B-9)
Michael Dennis Ward (B-9)
U.S. Patent 7,837,040

An apparatus for acoustic concentration of particles in a fluid flow including a substantially acoustically transparent membrane and a vibration generator that defines a fluid flow path between. The fluid flow path is in fluid communication with a fluid source and outlet and the vibration generator is capable of producing an acoustic field in the fluid flow path. The acoustic field produces at least one pressure minima in the fluid flow path at a predetermined location and forces predetermined particles to at least one pressure minima.

Active Terahertz Metamaterial Devices

Mark Lee (FWO-IP)
Richard D. Averitt (MPA-CINT)
John F. O'hara (MPA-CINT)
Houtong Chen (MPA-CINT)
U.S. Patent 7,826,504

Metamaterial structures are taught which provide for the modulation of terahertz frequency signals. Each element within an array of metamaterial elements comprises multiple loops and at least one gap. The MM elements may comprise resonators with conductive loops and insulated gaps, or the inverse in which insulated loops are present with conductive gaps; each providing useful transmissive control properties. The metamaterial elements are fabricated on a

semiconducting substrate configured with a means of enhancing or depleting electrons from near the gaps of the MM elements. An on to off transmissivity ratio of about 0.5 is achieved with this approach. Embodiments are described in which the MM elements incorporated within a Quantum Cascade Laser (QCL) to provide surface emitting properties.

Adaptive Real-Time Methodology for Optimizing Energy-Efficient Computing

Chung-hsing Hsu (CCS-1)
Wu-chun Feng (N-2)
U.S. Patent 7,971,073

Dynamic voltage and frequency scaling (DVFS) is an effective way to reduce energy and power consumption in microprocessor units. Current implementations of DVFS suffer from inaccurate modeling of power requirements and usage, and from inaccurate characterization of the relationships between the applicable variables. A system and method is proposed that adjusts CPU frequency and voltage base on run-time calculations of the workload processing time, as well as a calculation of performance sensitivity with respect to CPU frequency. The system and method are processor independent, and can be applied to either an entire system as a unit, or individually to each process running on a system.

Anion-Conducting Polymer, Composition, and Membrane

David L. Thorn (C-IIAC)

Bryan Scott Pivovar (MPA-11)
U.S. Patent 7,846,980

Anion-conducting polymers and membranes with enhanced stability to aqueous alkali include a polymer backbone with attached sulfonium, phosphazanium, phosphazene, and guanidinium residues. Compositions also with enhanced stability to aqueous alkali include a support embedded with sulfonium, phosphazanium, and guanidinium salts.

Anomalous Change Detection in Imagery

James Patrick Theiler (ISR-3)
Simon John Perkins (XISR-2)
U.S. Patent 7,953,280

A distribution-based anomaly detection platform is described that identifies a non-flat background that is specified in terms of the distribution of the data. A resampling approach is also disclosed employing scrambled resampling of the original data with one class specified by the data and the other by the explicit distribution, and solving using binary classification.

Apparatus for Producing Voltage and Current Pulses

Gregory E. Dale (AOT-HPE)
Hugh Carlton Kirbie (ISR-6)
U.S. Patent 7,855,904

An apparatus having one or more modular stages for producing voltage and current pulses. Each module includes a diode to charge a capacitive means that stores energy. One or more charging impedance means are connected to the diode to provide a

return current pathway. A solid-state switch discharge means, with current interruption capability, is connected to the capacitive means to discharge stored energy. Finally, a control means is provided to command the switching action of the solid-state switch discharge means.

Buffer Layers for Coated Conductors

Quanxi Jia (MPA-CINT)
Stephen R. Foltyn (MPA-STC)
Liliana Stan (MPA-STC)
U.S. Patent 8,003,571

A composite structure is provided including a base substrate, an IBAD oriented material upon the base substrate, and a cubic metal oxide material selected from the group consisting of rare earth zirconates and rare earth hafnates upon the IBAD oriented material. Additionally, an article is provided including a base substrate, an IBAD oriented material upon the base substrate, a cubic metal oxide material selected from the group consisting of rare earth zirconates and rare earth hafnates upon the IBAD oriented material, and a thick film upon the cubic metal oxide material. Finally, a superconducting article is provided including a base substrate, an IBAD oriented material upon the base substrate, a cubic metal oxide material selected from the group consisting of rare earth zirconates and rare earth hafnates upon the IBAD oriented material, and an yttrium barium copper oxide material upon the cubic metal oxide material.

Carbon Microtubes

Quanxi Jia (MPA-CINT)
Dean E. Peterson (MPA-STC)
Huisheng Peng (MPA-STC)
Yuntian Theodore Zhu (T-CNLS)
U.S. Patent 7,959,889

A carbon microtube comprising a hollow, substantially tubular structure having a porous wall, wherein the microtube has a diameter of from about 10 μm to about 150 μm , and a density of less than 20 mg/cm³. Also described is a carbon microtube, having a diameter of at least 10 μm and comprising a hollow, substantially tubular structure having a porous wall, wherein the porous wall comprises a plurality of voids, said voids substantially parallel to the length of the microtube, and defined by an inner surface, an outer surface, and a shared surface separating two adjacent voids.

Circular Permutant GFP Insertion Folding Reporters

Geoffrey S. Waldo (B-9)
Stephanie Cabantous (B-9)
U.S. Patent 7,960,144

Provided are methods of assaying and improving protein folding using circular permutants of fluorescent proteins, including circular permutants of GFP variants and combinations thereof. The invention further provides various nucleic acid molecules and vectors incorporating such nucleic acid molecules, comprising polynucleotides encoding fluorescent protein circular permutants derived from superfolder GFP, which polynucleotides include an internal cloning site into which a heterolo-

gous polynucleotide may be inserted in-frame with the circular permutant coding sequence, and which when expressed are capable of reporting on the degree to which a polypeptide encoded by such an inserted heterologous polynucleotide is correctly folded by correlation with the degree of fluorescence exhibited.

Coating for Leak Detection and Method

David L. Thorn (C-IIAC)
James M. Boncella (MPA-MC)
Karl K. Jonietz (PADSTE)
U.S. Patent 7,915,047

A coating used to detect a fluid leak.

Controlling the Pressure within an Annular Volume of a Wellbore

Robert E. Hermes (TT-DO)
Brian Christopher Llewellyn (TT-DO)
U.S. Patent 7,870,905
U.S. Patent 7,950,460
U.S. Patent 7,963,333

A process for replacing at least a portion of the liquid within the annular volume of a casing system within a wellbore with a second liquid. The second liquid is preselected to provide a measure of control of the pressure within the annular volume as the fluid within the volume is being heated.

Desensitization of Metastable Intermolecular Composites

James R. Busse (C-ADI)
Robert C. Dye (TT-DO)

Betty S. Jorgensen (WEPEXP-3)
Steven Forrest Son (WX-6)
Victor Eric Sanders (WX-6)
Timothy J. Foley (WX-6)
U.S. Patent 7,931,764

Metastable intermolecular composite (MIC) materials are energetic materials. Some are blended powder mixtures of oxidant and reductant. The invention relates to desensitizing MIC materials to ignition by electrostatic discharge (ESD) and friction. The invention was demonstrated by mixing nanoaluminum and nano molybdenum trioxide with a solution of hexane and fluoroinert FC-40 (a 3M product), which contains liquid fluorinated hydrocarbon. After evaporating the hexane, the resultant powder was less sensitive to ignition by ESD and friction.

Determination of Time Zero from a Charged Particle Detector

Jesse Andrew Green (P-25)
U.S. Patent 7,908,121

A method, system and computer program is used to determine a linear track having a good[0] fit to a most likely or expected path of charged particle passing through a charged particle detector having a plurality of drift cells. Hit signals from the charged particle detector are associated with a particular charged particle track. An initial estimate of time zero is made from these hit signals and linear tracks are then fit to drift radii for each particular time-zero estimate. The linear track having the best fit is then search and selected and errors in fit and track-

ing parameters computer. The use of large and expensive fast detectors needed to time-zero in the charged particle detectors can be avoided by adopting this method and system.

Determining Effects of Turbine Blades on Fluid Motion

Rodman Ray Linn (EES-16)
Eunmo Koo (EES-16)
U.S. Patent 7,953,563

Disclosed is a technique for simulating wind interaction with wind turbines. A turbine blade is divided into radial sections. The effect that each of these radial sections has on the velocities in Eulerian computational cells they overlap is determined. The effect is determined using Lagrangian techniques such that the calculations need not include wind components in the radial direction. A force on each radial section of turbine blade is determined. This force depends on the axial and azimuthal components of the fluid flow in the computational cell and the geometric properties of the turbine blade. The force on the turbine blade is fed back to effect the fluid flow in the computational cell for the next time step.

Device and Method for Generating a Beam of Acoustic Energy from a Borehole, and Applications Thereof

Kurt T. Nihei (EES-17)
Dipen N. Sinha (MPA-11)
Cristian Pantea (MPA-11)
U.S. Patent 7,839,718

A novel source for generating low frequency sound beam is described. The frequency is tunable over a wide frequency range (e.g., 1- 100 kHz). Such sources can be used for imaging down hole. The technique can also be used to characterize materials and defects in materials and structures.

Diamond-Silicon Carbide Composite and Method

Yusheng Zhao (LANSCE-LC)
U.S. Patent 7,959,841

Uniformly dense, diamond-silicon carbide composites having high hardness, high fracture toughness, and high thermal stability are prepared by consolidating a powder mixture of diamond and amorphous silicon. A composite made at 5 GPa/1673K had a measured fracture toughness of 12 MPa \times m^{1/2}. By contrast, liquid infiltration of silicon into diamond powder at 5 GPa/1673K produces a composite with higher hardness but lower fracture toughness.

Energy Efficient Synthesis of Boranes

Daniel Eugene Schwarz (ADPSM)
David L. Thorn (C-IIAC)
Anthony Keiran Burrell (MPA-MC)
William Tumas (SPO-AE)
U.S. Patent 7,837,852

The reaction of halo-boron compounds (B-X compounds, compounds having one or more boron-halogen bonds) with silanes provides boranes (B-H compounds, compounds having one or more B-H

bonds) and halosilanes. Inorganic hydrides, such as surface-bound silane hydrides (Si-H) react with B-X compounds to form B-H compounds and surface-bound halosilanes. The surface bound halosilanes are converted back to surface-bound silanes electrochemically. Halo-boron compounds react with stannanes (tin compounds having a Sn-H bond) to form boranes and halostannanes (tin compounds having a Sn-X bond). The halostannanes are converted back to stannanes electrochemically or by the thermolysis of Sn-formate compounds. When the halo-boron compound is BCl₃, the B-H compound is B₂H₆, and where the reducing potential is provided electrochemically or by the thermolysis of formate.

Explosive Complexes

My Hang Vo Huynh (WEPEXP-7)
U.S. Patent 7,999,116

Lead-free primary explosives of the formula[MII(A)R(BX)S](CY)T, where A is 1,5-diaminotetrazole, and syntheses thereof are described. Substantially stoichiometric equivalents of the reactants lead to high yields of pure compositions thereby avoiding dangerous purification steps.

Fiber Optical Assembly for Fluorescence Spectrometry

Martin S. Piltch (MST-6)
Robert William Carpenter (MST-6)
Perry Clayton Gray (MST-6)
U.S. Patent 7,847,941

A system for analyzing a sample for the presence of an analyte in a sample. The system includes a sample

holder for containing the sample; an excitation source, such as a laser, and at least one linear array radially disposed about the sample holder. Radiation from the excitation source is directed to the sample, and the radiation induces fluorescent light in the sample. Each linear array includes a plurality of fused silica optical fibers that receive the fluorescent light and transmits a fluorescent light signal from the first end to an optical end port of the linear array. An end port assembly having a photo-detector is optically coupled to the optical end port. The photo-detector detects the fluorescent light signal and converts the fluorescent light signal into an electrical signal.

Flat-Panel X-Ray with Reduced Internal Scattering for Improved Attenuation Accuracy and Dynamic Range

Thomas Nelson Claytor (AET-6)
Phillip Charles Berry (AET-6)
Peter Decost Smith (AET-6)
Charles Robert Hills (W-9)
U.S. Patent 7,812,314

Flat-panel x-ray detectors based on amorphous silicon and a scintillator have a problem measuring attenuations accurately because a spatially varying error signal of significant magnitude is measured in the shadow of a highly attenuating object. The error is worse at higher energies used in industrial digital radiography and computed tomography, but it is also present in lower energies used in the medical field. The invention reduces the error signal significantly, which increases the dynamic range

of the measurements, allows accurate correction for beam hardening, and allows quantitative determinations of density.

Flow Method and Apparatus for Screening Chemicals Using Micro X-Ray Fluorescence

Thomasin Clare Miller (C-ACS)
George Joseph Havrilla (C-CDE)
Cynthia Ann Mahan (C-DO)
Cyndi Ann Wells (C-DO)
Cris Lee Lewis (GS-PO)
Benjamin Peter Warner (MPA-MC)
U.S. Patent 7,929,662

Method and apparatus for screening chemicals using micro x-ray fluorescence. A method for screening a mixture of potential pharmaceutical chemicals for binding to at least one target binder involves flow-separating a solution of chemicals and target binders into separated components, exposing them to an x-ray excitation beam, detecting x-ray fluorescence signals from the components, and determining from the signals whether or not a binding event between a chemical and target binder has occurred.

Highly Thermostable Fluorescent Proteins

Geoffrey S. Waldo (B-9)
Andrew M. Bradbury (B-9)
Csaba Kiss (B-9)
U.S. Patent 7,910,700

Thermostable fluorescent proteins (TSFPs), methods for generating these and other stability-enhanced proteins, polynucleotides encod-

ing such proteins, and assays and method for using the TSFPs and TSFP-encoding nucleic acid molecule are provided. The TSFP's of the invention show extremely enhanced levels of stability and thermotolerance. In one case, for example, a TSFP of the invention is so stable it can be heated to 99C for short periods of time without denaturing, and retains 85% of its fluorescence when heated to 80C for several minutes. The invention also provides a method for generating stability-enhanced variants of a protein, including but not limited to fluorescent proteins.

Hydrogen Sensor

Yixiang Duan (C-CDE)
Quanxi Jia (MPA-CINT)
Wenqing Cao (MPA-STC)
U.S. Patent 7,839,499

A hydrogen sensor for detecting/quantitating hydrogen and hydrogen isotopes includes a sampling line and a microplasma generator that excites hydrogen from a gas sample and produces light emission from excited hydrogen. A power supply provides power to the microplasma generator, and a spectrometer generates an emission spectrum from the light emission. A programmable computer is adapted for determining whether or not the gas sample includes hydrogen, and for quantitating the amount of hydrogen and/or hydrogen isotopes are present in the gas sample.

In-Line Stirling Energy System

Scott N. Backhaus (MPA-CMMS)

U.S. Patent 7,908,856

The invention allows a thermoacoustic engine and generator set to produce multi-phase electrical power. In addition, it allows modular scale up to high power levels without scaling up the individual unit size.

Integrated Calibration Sphere and Calibration Step Fixture for Improved Coordinate Measurement Machine Calibration

Harry J. Clifford (QA-SCL)
U.S. Patent 7,908,756

The invention addresses a method and apparatus for mounting a calibration sphere to a calibration fixture for Coordinate Measurement Machine (CMM) calibration and qualification, decreasing the time required for such qualification, thus allowing the CMM to be used more productively. A number of embodiments are disclosed that allow for new and retrofit manufacture to perform as integrated calibration sphere and calibration fixture devices. This invention renders unnecessary the removal of a calibration sphere prior to CMM measurement of calibration features on calibration fixtures, thereby greatly reducing the time spent qualifying a CMM.manufacture in various lengths.

Isotopically Labeled Compositions and Method

David Bryan Kimball (B-7)
Robert F. Williams (B-7)
Marc Anthony Alvarez (B-8)
Rodolfo Antonio Martinez (B-8)

Jurgen G. Schmidt (C-DO)
U.S. Patent 7,977,102

Compounds having stable isotopes ^{13}C and/or ^2H were synthesized from precursor compositions having solid phase supports or affinity tags.

Measuring Momentum for Charged Particle Tomography

Alexei Vasilievich Klimenko (ISR-1)
Andrew Mcleod Fraser (ISR-3)
Larry Joe Schultz (P-21)
Christopher Morris (P-25)
Konstantin N. Borozdin (P-25)
Michael James Sossong (P-25)
U.S. Patent 7,838,841

Methods, apparatus and systems for detecting charged particles and obtaining tomography of a volume by measuring the momentum of a charged particle passing through a charged particle detector. Sets of position sensitive detectors measure scattering of the charged particle. The position sensitive detectors having sufficient mass to cause the charged particle passing through the position sensitive detectors to scatter in the position sensitive detectors. A controller can be adapted and arranged to receive scattering measurements of the charged particle from the charged particle detector, determine at least one trajectory of the charged particle from the measured scattering; and determine at least one momentum measurement of the charged particle from at least one trajectory. The charged particle can be a cosmic ray-produced charged particle, such as a cosmic

ray-produced muon. The position sensitive detectors can be drift cells, such as gas-filled drift tubes.

Metal-Polymer Composites Comprising Nanostructures and Applications Thereof

Hsing-lin Wang (C-PCS)
Nathan Harris Mack (C-PCS)
U.S. Patent 7,988,887

Metal-polymer composites, and methods of making and use thereof, said composites comprising a thermally-cured dense polyaniline substrate; an acid dopant; and, metal nanostructure deposits wherein the deposits have a morphology dependent upon the acid dopant.

Method and Apparatus for Detecting Explosives

David Steven Moore (WX-9)
U.S. Patent 7,939,803

This development enables the stand-off detection of improvised explosive devices.

Method and Apparatus for Measuring Enrichment Of UF6

Kiril Dimitrov Ianakiev (N-1)
Thomas Roy Hill (N-2)
U.S. Patent 7,957,504

A system and method are disclosed for determining the enrichment of ^{235}U in Uranium Hexafluoride (UF_6) utilizing synthesized X-rays which are directed at a container test zone containing a sample of UF_6 . A detector placed behind the container test zone then detects and counts the X-

rays which pass through the container and the UF_6 . In order to determine the portion of the attenuation due to the UF_6 gas alone, this count rate may then be compared to a calibration count rate of X-rays passing through a calibration test zone which contains a vacuum, the test zone having experienced substantially similar environmental conditions as the actual test zone. Alternatively, X-rays of two differing energy levels may be alternately directed at the container, where either the container or the UF_6 has a high sensitivity to the difference in the energy levels, and the other having a low sensitivity.

Method for Detecting Binding Events Using Micro-X-Ray Fluorescence Spectrometry

George Joseph Havrilla (C-CDE)
Grace Mann (C-SIC)
Benjamin Peter Warner (MPA-MC)
U.S. Patent 7,858,385

Method for detecting binding events using micro-X-ray fluorescence spectrometry. Receptors are exposed to at least one potential binder and arrayed on a substrate support. Each member of the array is exposed to X-ray radiation. The magnitude of a detectable X-ray fluorescence signal for at least one element can be used to determine whether a binding event between a binder and a receptor has occurred, and can provide information related to the extent of binding between the binder and receptor.

Method of Making Chalcogen Catalysts for Polymer Electrolyte Fuel Cells

Piotr Zelenay (MPA-11)
 Jong-ho Choi (MPA-11)
 U.S. Patent 7,851,399

A method of making an electrode catalyst material using aqueous solutions. The electrode catalyst material includes a support comprising at least one transition metal and at least one chalcogen disposed on a surface of the transition metal. The method includes reducing a metal powder, mixing the metal powder with an aqueous solution containing at least one inorganic compound of the chalcogen to form a mixture, and providing a reducing agent to the mixture to form nanoparticles of the electrode catalyst. The electrode catalyst may be used in a membrane electrode assembly for a fuel cell.

Microwave Determination of Location and Speed of an Object inside a Pipe

Dipen N. Sinha (MPA-11)
 U.S. Patent 7,852,091

Current methods of using odometers and sondes for locating instrumented pigs used for pipeline inspections have serious limitations in terms of accuracy and range. A novel microwave technique is invented that allows simultaneous determination of the location of the pig and the speed of movement of the pig.

Mixed Semiconductor Nanocrystal Compositions

Victor Ivanovich Klimov (C-PCS)

Richard Daniel Schaller (C-PCS)
 Garry Russell Maskaly (XTD-3)
 U.S. Patent 7,888,855

Composition comprising one or more energy donors and one or more energy acceptors, wherein energy is transferred from the energy donor to the energy acceptor and wherein: the energy acceptor is a colloidal nanocrystal having a lower band gap energy than the energy donor; the energy donor and the energy acceptor are separated by a distance of 40 nm or less; wherein the average peak absorption energy of the acceptor is at least 20 meV greater than the average peak emission energy of the energy donor; and wherein the ratio of the number of energy donors to the number of energy acceptors is from about 2:1 to about 1000:1.

Mosaic Clade M Human Immunodeficiency Virus Type 1 (HIV-1) Envelope Immunogens

William Mclean Fischer (T-6)
 Bette Tina Marie Korber (T-6)
 U.S. Patent 7,951,377

The present invention relates, in general, to an immunogenic composition (e.g., a vaccine) and, in particular, to a polyvalent immunogenic composition, such as a polyvalent HIV vaccine, and to methods of using same. The invention further relates to methods that use a genetic algorithm to create sets of polyvalent antigens suitable for use, for example, in vaccination strategies.

Multimodal Radiation Imager

Mark Sidney Wallace (GS-NNS)
 Andrew Scott Hoover (ISR-1)
 Richard Marc Kippen (ISR-1)
 Shawn Robert Tornga (ISR-1)
 Bernard Harris (ISR-1)
 David Palmer (ISR-2)
 Michael Vincent Hynes (MPA-MC)
 Edward Thomas Homfray Clifford (N-4)
 Larry Joe Schultz (P-21)
 Daniel Wakeford (XISR-1)
 U.S. Patent 7,863,567

According to one embodiment, generating image data includes receiving coded aperture imaging sensor data collected according to coded aperture imaging and receiving Compton imaging sensor data collected according to Compton imaging. The coded aperture imaging sensor data and the Compton imaging sensor data are generated by a sensor system sensing radiation from a radiation source. A coded aperture imaging pixel value and a Compton imaging pixel value are determined for each pixel of an image. A combining function comprising addition is applied to the coded aperture imaging pixel value and the Compton imaging pixel value to yield a combined pixel value for each pixel. Combined image data is generated from the combined pixel values. The combined image data is configured to yield a combined image of the radiation source.

Multiplexed Lateral Flow Microarray Assay for Detection of Citrus Pathogens *Xylella Fastidiosa* and *Xanthomonas Axonopodis* Pv Citri

Robert Bruce Cary (B-7)
Christopher John Stubben (B-7)
U.S. Patent 7,910,309

Nucleic acid microarrays offer a high information content platform for the detection, identification and genetic characterization of pathogenic agents. Though this approach is useful for in laboratory analyses, the reliance of microarray assays on polymerase chain reaction (PCR) and fluorescence-based detection strategies significantly hinder their utility for field applications where access to supporting laboratory infrastructure is limited or impractical. To provide assays that retain the potential information content of microarray platforms yet present reduced instrumentation requirements we have developed a lateral flow microarray system that obviates the need for thermocycling and fluorescence detection. Coupled with the signal amplification methods disclosed here, the LFM platform will provide previously unattainable sensitivity in the context of a low cost disposable device.

Nanophosphor Composite Scintillators Comprising a Polymer Matrix

Ross Edward Muenchausen (MST-7)
Robert David Gilbertson (MST-7)
Edward Allen Mckigney (XCP-7)

U.S. Patent 7,834,319

An improved nanophosphor composite comprises surface modified nanophosphor particles in a solid matrix. The nanophosphor particle surface is modified with an organic ligand, or by covalently bonding a polymeric or polymeric precursor material. The surface modified nanophosphor particle is essentially charge neutral, thereby preventing agglomeration of the nanophosphor particles during formation of the composite material. The improved nanophosphor composite may be used in any conventional scintillator application, including in a radiation detector.

Non-Aqueous Liquid Compositions Comprising Ion Exchange Polymers

Tommy Rockward (MPA-11)
Yu Seung Kim (MPA-11)
U.S. Patent 7,981,319

Compositions, and methods of making thereof, comprising from about 1% to about 5% of a perfluorinated sulfonic acid ionomer or a hydrocarbon-based ionomer; and from about 99% of a solvent, said solvent consisting essentially of a polyol; wherein said composition is substantially free of water and wherein said ionomer is uniformly dispersed in said solvent.

Non-Contact Feature Detection Using Ultrasonic Lamb Waves

Dipen N. Sinha (MPA-11)
U.S. Patent 7,963,165

An ultrasonic technique for stand-

off characterization of defects in pipelines is presented. This technique allows determination of defects on the opposite sides of a pipe wall from the measurement side. This does not suffer from the traditional approaches where the sensors come in close contact with the inside of a pipe wall during inspection or produce a lot of drag due to magnetic sensors.

Nucleic Acid Encoding a Self-Assembling Split-Fluorescent Protein System

Geoffrey S. Waldo (B-9)
Stephanie Cabantous (B-9)
U.S. Patent 7,955,821

The invention provides a protein labeling and detection system based on self-complementing fragments of fluorescent and chromophoric proteins. The system of the invention is exemplified with various combinations of self-complementing fragments derived from *Aequorea victoria* Green Fluorescent Protein (GFP), which are used to detect and quantify protein solubility in multiple assay formats, both in vitro and in vivo.

Optoelectronic Devices Utilizing Materials Having Enhanced Electronic Transitions

Marcie Rochelle Black (IAT-2)
U.S. Patent 7,893,512

An optoelectronic device that includes a material having enhanced electronic transitions. The electronic transitions are enhanced by mixing electronic states at an

interface. The interface may be formed by a nano-well, a nano-dot, or a nano-wire.

Polymorphous Computing Fabric

Maya Gokhale (CCS-1)
Kevin Peter McCabe (ISR-4)
Christophe Wolinski (XISR-3)
U.S. Patent 7,873,811

Fabric-based computing systems and methods are disclosed. A fabric-based computing system can include a polymorphous computing fabric (101) that can be customized on a per application basis and a host processor (128) in communication with said polymorphous computing fabric (101). The polymorphous computing fabric (101) includes a cellular architecture that can be highly parameterized to enable a customized synthesis of fabric instances for a variety of enhanced application performances thereof. A global memory (150) concept can also be included that provides the host processor (128) random access to all variables and instructions associated with the polymorphous computing fabric (101).

Polynucleotides Encoding Anti-Sulfotyrosine Antibodies

Andrew M. Bradbury (B-9)
U.S. Patent 7,868,152

The invention provides anti-sulfotyrosine specific antibodies capable of detecting and isolating polypeptides that are tyrosine-sulfated.

The sulfotyrosine antibodies and antibody fragments of the invention may be used to discriminate between the non-sulfated and sulfated forms of such proteins, using any number of immunological assays, such as ELISAs, immunoblots, Western Blots, immunoprecipitations, and the like. Using a phage-display system, single chain antibodies (scFvs) were generated and screened against tyrosine-sulfated synthetic peptide antigens, resulting in the isolation of scFvs that specifically recognize sulfotyrosine-containing peptides and/or demonstrate sulfotyrosine-specific binding in tyrosine sulfated proteins. The VH and VL genes from one such sulfotyrosine-specific scFv were employed to generate a full length, sulfotyrosine-specific immunoglobulin.

Portable Sample Preparation and Analysis System for Micron and Sub-Micron Particle Characterization Using Light Scattering and Absorption Spectroscopy

John Martin Dunbar (B-8)
Michael Dennis Ward (B-9)
Peter C. Stark (C-CDE)
Jeffrey V. Wheat (C-CDE)
Jose Antonio Olivares (SPO-AE)
U.S. Patent 7,986,399

A device has been designed and constructed enabling remote sampling, preparation and optical interrogation of a sample enabling microbial identification through absorption and light scattering methodology. The device incorporates miniature pumps, properly sized filters, optical

waveguides, a low-voltage UV/Vis continuous light source, a small UV/Vis spectrometer and CCD camera, and associated logic circuit boards and customized control software. This is a filtration-based system which removes interfering background material from the sample matrix, resuspends the analyte in a proper optical media (e.g. H₂O, buffer), calculates an initial concentration, and appropriately dilutes the sample such that reliable optical measurements can be made. Fluidic, optical, and Data analysis software routines have been written and combined into an integrated platform resulting in an automated hands-free system.

Preparation of A Dense, Polycrystalline Ceramic Structure

Jason Christopher Cooley (MST-6)
David John Alexander (MST-6)
Ching-fong Chen (MST-6)
U.S. Patent 7,846,378

This invention can give a fully dense structure without any grain growth. This invention is to provide a method to densify the ceramic powder under severe deformation and sintered body of ceramic without any cracking problem. In addition, this invention can provide a method to protect moisture sensitive material or high vapor pressure material during sintering with a container approach.

Preparation of Bulk Superhard B-C-N Nanocomposite Compact

Duanwei He (LANSCE-LC)
Yonghao Zhao (MPA-STC)
U.S. Patent 7,938,997

Bulk, superhard, B-C-N nanocomposite compacts were prepared by ball milling a mixture of graphite and hexagonal boron nitride, encapsulating the ball-milled mixture at a pressure in a range of from about 15 GPa to about 25 GPa, and sintering the pressurized encapsulated ball-milled mixture at a temperature in a range of from about 1800-2500 K. The product bulk, superhard, nanocomposite compacts were well sintered compacts with nanocrystalline grains of at least one high-pressure phase of B-C-N surrounded by amorphous diamond-like carbon grain boundaries. The bulk compacts had a measured Vicker's hardness in a range of from about 41 GPa to about 68 GPa.

Primary Explosives

Michael Allen Hiskey (WEPEXP-7)
My Hang Vo Huynh (WEPEXP-7)
U.S. Patent 7,875,725

The present invention provides a compound of the formula $(Cat)_+z[M^{++}(5\text{-nitro-1H-tetrazolato-N}_2\text{-x(H}_2\text{O)}_y)]$ where x is 3 or 4, y is 2 or 3, x + y is 6, z is 1 or 2, and M^{++} is selected from the group consisting of iron, cobalt, nickel, copper, zinc, chromium, and manganese, and $(Cat)_+$ is selected from the group consisting of ammonium, sodium, potassium, rubidium and cesium. A method of preparing the compound of that formula is also disclosed.

Proboscis Extension Reflex Platform for Volatiles and Semi-volatiles Detection

Timothy Karl Haarmann (B-7)
Kirsten J. McCabe (B-7)
Robert Matthew Wingo (C-CDE)
U.S. Patent 7,841,226

An olfactory based system has been developed for qualitative volatiles and semi-volatiles detection.

Regeneration of Polyborzaylene

John Cameron Gordon (C-IIAC)
Benjamin L. Davis (MPA-MC)
U.S. Patent 7,846,410

Method of producing ammonia borane, comprising providing polyborazylene; digesting the polyborazylene with a dithiol-containing agent to produce a boro-sulfide compound and a byproduct; converting the byproduct to the boro-sulfide product of step (b) by reaction with a first alkyl-tin hydride; and, converting the boro-sulfide compound produced in steps (b) and (c) to ammonia borane by reaction with a second alkyl-tin hydride.

Semiconductor Neutron Detector

Clair J. Sullivan (IAT-1)
James L. Smith (MST-6)
Jason Charles Lashley (MST-6)
Peter B. Littlewood (MST-8)
Kiril Dimitrov Ianakiev (N-1)
Martyn Thomas Swinhoe (N-1)
Boian Alexandrov (T-1)
Krastan Blagoev Blagoev (T-10)
U.S. Patent 7,902,517

A neutron detector has a compound

of lithium in a single crystal form as a neuron sensor element. The lithium compound, containing improved charge transport properties, is either lithium niobate or lithium titanate. The sensor element is in a direct contact with a monitor that detects an electric current. A signal proportional to the electric current is produced and is calibrated to indicate the neurons sensed. The neuron detector is particularly useful for detecting neutrons in a radiation environment. Such radiation environment may include gamma radiation and noise.

Synthesis of Fluorescent Metal Nanoclusters

Richard Brian Dyer (C-PCS)
Dung M. Vu (C-PCS)
Jennifer Martinez (MPA-CINT)
Chang Zhong (MPA-CINT)
Yuping Bao (MPA-CINT)
U.S. Patent 7,914,588

Fluorescent metal nanoclusters were prepared.

System and Method for Measuring Particles in a Sample Stream of a Flow Cytometer or the Like

Robert Clayton Habbersett (B-9)
Steven Wayne Graves (B-9)
U.S. Patent 7,835,000

A system and method for analyzing a particle in a sample stream of a flow cytometer of the like. The system has a light source, such as a laser pointer module, for generating a low powered light beam and a fluidics apparatus which is configured to transport particles in the sample

stream at substantially low velocity through the light beam for interrogation. Detectors, such as photomultiplier tubes, are configured to detect optical signals generated in response to the light beam impinging the particles. Signal conditioning circuitry is connected to each of the detectors to condition each detector output into electronic signals for processing and is designed to have a limited frequency response to filter high frequency noise from the detector output signals.

System and Method for Knowledge Based Matching of Users in a Network

Cornelia Maria Verspoor (CCS-3)
Benjamin Hayden Sims (CCS-6)
John Joseph Ambrosiano (D-4)
Timothy James Cleland (D-6)
U.S. Patent 7,933,856

This invention represents a knowledge-based method intended for implementation as a digital service to match up or link individuals or organizations based on shared areas of interest. The invention is intended to greatly enhance the ability of people to form social networks and collaborative communities, within or across organizational boundaries, for the purpose of developing innovative solutions to difficult problems.

Thick-Shell Nanocrystal Quantum Dots

Victor Ivanovich Klimov (C-PCS)
Yongfen Chen (C-PCS)
Jennifer Ann Hollingsworth (MPA-CINT)

Han Htoon (MPA-CINT)
U.S. Patent 7,935,419

Colloidal nanocrystal quantum dots comprising an inner core having an average diameter of at least 1.5 nm and an outer shell, where said outer shell comprises multiple monolayers, wherein at least 30% of the quantum dots have an on-time fraction of 0.80 or greater under continuous excitation conditions for a period of time of at least 10 minutes.

Wide Band Gap Semiconductor Templates

Quanxi Jia (MPA-CINT)
Raymond F. Depaula (MPA-STC)
Paul Nelson Arendt (MPA-STC)
Liliana Stan (MPA-STC)
Igor Olegovich Usov (MST-7)
U.S. Patent 7,851,412

The present invention relates to a thin film structure based on an epitaxial (111)-oriented rare earth-Group IVB oxide on the cubic (001) MgO terminated surface and the ion-beam-assisted deposition ("IBAD") techniques that are amendable to be over coated by semiconductors with hexagonal crystal structures. The IBAD magnesium oxide ("MgO") technology, in conjunction with certain template materials, is used to fabricate the desired thin film array. Similarly, IBAD MgO with appropriate template layers can be used for semiconductors with cubic type crystal structures.

X-Ray Radiography for Container Inspection

Christopher Morris (P-25)
Jonathan I. Katz (XCP-DO)
U.S. Patent 7,957,505

The disclosed apparatus/ method details the use of a high energy electron accelerator (10 MeV range), use of downward illumination, use of a "Bucky" collimator, and use of oblique illumination at multiple angles, in order to identify/ inspect materials inside cargo containers.

Copyrights Asserted in Fiscal Year 2011

Amanzi, Version 0.x

John David Moulton (T-5)

Amanzi provides a flexible and extensible multiphase, multicomponent, flow and reactive transport simulation capability for environmental applications. It includes toolsets for meshing infrastructure, discretizations, and solvers for the resulting nonlinear systems of equations. The code is parallel and makes use of open-source parallel frameworks such as Trilinos developed at Sandia National Laboratory and PETSc (the Portable Extensible Toolkit for Scientific Computing) developed at Argonne National Laboratory. Amanzi is used to model contaminant migration at various DOE waste sites (e.g., Hanford and Savanna River), and is generally applicable to contaminant migration in groundwater/surface water under partially saturated, nonisothermal conditions and its interaction with surface water.

BABBO, Version 1.0

A. J. Scannapieco (XCP-2)

BABBO is a mesh adaption code that combines Adaptive Mesh Refinement with a mesh relaxer. Typically, mesh relaxation is used as a mesh optimization technique in Arbitrary Lagrangian Eulerian hydrodynamics codes, while AMR is typically used in Eulerian hydrodynamics codes. The combination of these two techniques allows a computational mesh to mirror local and global spatial symmetries as well as spatially resolve

the modal structures inherent in the physics of any given simulation. The BABBO code capability can be applied to any quadrilateral lagrangian hydrodynamics scheme that contains zone centered thermodynamic variables and vertex centered kinematic variables to create what would be an AMR/ALE hydrodynamic capability. BABBO combines a mesh relaxation technique based on a grid potential with an AMR adaption technique and a remap algorithm developed by the author. We intend to use BABBO as a research tool to further develop this combined adaption capability.

Climate-Energy Assessment for Resiliency (CLEAR), Version 1.0

Donatella Pasqualini (EES-16)

CLEAR, Version 1.0 is an integrated decision model to understand environmental and socio-economics impacts and adaptations to climate change within the context of transformative energy policies. CLEAR, Version 1.0 is a generic framework for analyzing mitigation strategies to reduce emissions as well as strategies and understanding of adaptation and socio-economic effects when faced with implementation of new energy systems and climate impacts. The model consists in several sectors all coupled together: water, energy, renewable energy (RE), climate, economy, agriculture, industry, transportation, CO2 emissions, RE policy, transportation policy and population. An I/O model is

developed for the economy and a first link to GIS is also developed in this version of the model. Two CO2 sources are modeled: transportation and electricity generation. Emissions from these sources are modeled in several sectors, including residential and commercial (industrial) transportation and electricity demand and electricity demand for water supply and treatment. Economic and population growth drive changes in demand and policies for renewable energy (wind, solar) and low-emissions transportation (hybrid cars, mass transportation) provide mitigation choices. Climate change in the form of increase in average daily temperature drives electricity and water demand. An interface is also developed. It allows inserting emission reduction energy policies, such as the photovoltaic system and wind, and transportation policies. The user can also compare results as various scenarios. The interface is also a web-ready Java applet.

Continuum Dynamics Evaluation and Test Suite (CODY), Version 1.0

David John Daniel (CCS-7)
Allen L. Mcpherson (CCS-7)

CODY is a development framework and suite of small applications or 'mini-apps' characteristic of continuum dynamics applications that will be used for research in new programming models and the assessment of new computer architectures.

Genome Majority Vote (GMV), Version 0.x

Michael E. Wall (CCS-3)

The GMV pipeline works as follows. Input is a set of genomes. The pipeline runs PRODIGAL gene predictions on all genomes, runs pan-reciprocal BLAST, and identifies ortholog sets. For a given set of orthologous genes, if the positions of the PRODIGAL selected starts coincide in a multiple sequence alignment, they are accepted. If they do not coincide, a consistent start position is sought where a majority of the highest-scoring PRODIGAL selected sites coincide. If such a position is found, it is accepted, and the predictions are changed for the outlying genes. Otherwise, no start site prediction is made for the ortholog set.

iDREAM Space Weather App, Version 1.1

Michael R. Tamashiro (ISR-1)

The iDREAM Space Weather App is software designed to view images created by the DREAM model on a mobile platform. The iDREAM Space Weather App is a viewer that optimizes viewing of the images on the iPad and Android devices. Users can view, magnify, and save those images. There is also a description of the science behind the images along with general information about the DREAM project included in the application. The software will be released and made publicly available in binary form.

Improvements to MARFA Code (released as MARFA version 3.2.3)

Scott Leroy Painter (EES-16)

The software will be used to assess long-term migration of radioactive material and other contaminants beneath the surface of the Earth. The intended application is in assessing the long-term risk of engineered subsurface repositories for radioactive waste generated by the commercial nuclear power industry.

Infrastructure on Demand, Version 2.0

Anil Karmel (NIE-3)
Heather Neville Mcniff (SAE-3)
Scott Daniel Blauert (SAE-3)
Monika Bittman (IRM-CAS)

Infrastructure on Demand (IoD) is an easy to use self-service web portal (or cloud services broker) allowing users to request and automatically provision virtual compute resources within a cloud computing infrastructure. Requesters fill out one simple form to create a new system reducing average provisioning cycle time from 30 days to 30 minutes. Existing approaches fail to provide a single corporate web portal to access Infrastructure-as-a-Service cloud computing environments. Today, users need to access a variety of cloud computing portals to compare costs. IoD provides a single pane of glass listing all virtual computing resources deployed within an organization regardless of the cloud computing environment said resources are running upon. Just as a power outlet is

the portal to the electricity grid, IoD is the portal to Cloud Computing. Unique advantages of this technology include: Chargeback, Dynamic Cost Calculator, Green IT function, Lifecycle Management, Approval Workflow, and security features. This technology is available for license as software and has been filed as a patent application.

LANL DSDdriver and LANL DSD Library, Version 1.0

John William Walter, Jr. (XCP-4)

Detonation Shock Dynamics (DSD) is a theoretical and experimental model and computational methodology used to calculate the propagation of a detonation wave (or burn front) in a high-explosive (HE) material. The principal outputs of a DSD computation are the set of times at which the burn front arrives at the points of the computation grid and the detonation velocity at those points. This information is typically used to compute the release of HE energy in the hydro-dynamical simulation of an engineered HE-driver device. DSD falls within the broad class of 'programmed burn' algorithms in which the computation of the HE burn front is typically performed prior to the start of the hydrodynamics simulation. Among programmed burn algorithms, DSD is unique in its ability to accurately account for the effect of finite reaction zone thickness on the propagation speed of the burn front. The LANL DSD software implements the DSD Methodology in a DSD solver library which uses a

level-set method to solve the DSD governing equations. The other component of our software is DSDdriver which provides an interface between the DSD solver and any of the several other hydrodynamics simulation codes which we support. DSDdriver is responsible for extracting problem definition data, such as the location and identity of HE and adjacent inert material regions, from hydrodynamics code setup, and converting it into a form that can be understood by the DSD solver. DSDdriver is also responsible for converting the DSD solution generated by the solver into a form that can be used by the hydrodynamics codes.

LANL Go Suite

Scott D. Pakin (CCS-7)

The LANL Go Suite is a collection of packages, libraries, utilities, and software patches related to Google's Go programming language (<http://www.golang.org/>). The LANL Go Suite largely takes a high-performance computing angle to Go by providing some of the mechanisms needed to use Go in a supercomputing environment. For instance, the LANL Go Suite provides a Go interface to PAPI, the University of Tennessee at Knoxville's Performance Application Programming Interface (<http://icl.cs.utk.edu/papi/>), which helps software developers identify performance bottlenecks in their code.

Los Alamos Transferable Tight-binding for Energetics (LATTE), Version 1.0

William Matthew Challacombe (T-1)

Anders Mauritz Niklasson (T-1)

Nicolas Bock (T-1)

Marc Jon Cawkwell (T-1)

Edward Joseph Sanville (T-1)

LATTE is a code used for computing the energy of, and forces acting on atoms in molecular materials using an implementation of the self-consistent charge transfer tight-binding approximation. Advanced algorithms allow computational cost to scale linearly with the number of atoms, facilitating large-scale, long-duration molecular dynamics simulations of dynamic phenomena using an explicitly quantum mechanical method. Furthermore, these algorithms offer a straightforward path toward parallelization on multi-core/multi-processor and hybrid hardware architectures. Precise energy conservation in quantum-molecular dynamics is made possible via the extended Lagrangian Born-Oppenheimer molecular dynamics formalism. Medium and long-range interactions in molecular materials are described and bond-making and breaking events are tolerated via spin polarization. LATTE facilitates high-fidelity atomistic simulations of static and dynamic phenomena in condensed and gas phases where interatomic interactions are some combination of covalent, electrostatic, and van der Waals bonding. The main features of LATTE are implementa-

tion of concepts discussed in the scientific literature.

McPhD, Version 1.0

Michael William Buksas (CCS-7)
Timothy M. Kelley (CCS-7)

McPhD is a research code designed to explore the applications of the Haskell programming language to Monte Carlo algorithms. Specifically, it will explore the use of parallel language constructs in Haskell to obtain good performance on single-machine multi-core parallelism. Monte Carlo algorithms employ randomness to find solutions for large and otherwise intractable problems. A particular application of interest for McPhD is the flow of radiation in supernovae.

MESA++, Version 0.1

Kent Grimmett Budge (CCS-2)

MESA++ is a collection of C++ wrappers for the MESA stellar astrophysics code component library. It facilitates the use of the MESA components, which are written in Fortran 95, in C++ coding environments.

Multi-Dimensional Hashed Indexed Metadata (MDHIM) System

James A. Nunez (HPC-5)

The Multi-Dimensional Hashed Indexed Metadata (MDHIM) System is a research prototype infrastructure capable of managing massive amounts of index infor-

mation representing even larger amounts of scientific data to enable data exploration at enormous scale. In other words, MDHIM is a scalable parallel multi-dimensional key / value store that, currently, depends on MPI for communication and PBL ISAM for the key value storage at the storage nodes. The communication and storage layers will be modular and, thus, will be able to plug in a variety of communication and storage packages.

Neutron Transport Evaluation and Test Suite (HILO), Version 1.0

Allen L. McPherson (CCS-7)
Dana Alan Knoll (T-3)
Han Dong (T-1)
Jeffrey Alan Willert (T-3)
Paul Daniel Sathre (CCS-7)
Michael Brendan Sullivan (CCS-7)
William Taitano (T-3)

The HILO test and evaluation suite codes are used to iterate an optimization approach to code development. Tests of various parts of the overall algorithm are written and run on various hardware platforms. Results are fed back to numerical algorithm developers who then modify their algorithms to run more efficiently on chosen hardware platforms. The software produces a steady-state solution to a one-dimensional neutral particle, fixed source, transport problem with vacuum boundary conditions. The physics problem is modeled by a one-dimensional Boltzmann Transport equation. The software uses uniform, constant, material properties (absorption and

scattering) and isotropic scattering. It can employ either a deterministic or stochastic solution algorithm.

Nuclear Power Human Resource Modeling Tool, Version 1

Kristen Tulloch Kern (D-5)
Dmitry Keselman (D-3)
Crystal Buchanan Dale (D-5)

The NPHR tool is based on a systems dynamics model of a nuclear power program. The model includes power plants, fuel services, and human resources. The model is used by adjusting parameters representing the major decisions facing a new nuclear power program to analyze the impact of those decisions on the human resource needs for construction, licensing, and operating a nuclear power plant. The model projects staffing needs at the plant, overall workforce dynamics, and the pipeline of students through the educational system.

Prototype All Sky Imager FX correlator (PASIFX), Version 1.0

Andrew John Dubois (HPC-5)

This is research/example code for doing high-performance FX correlation on streaming radio telescope data. It is written in C and uses SSE, Pthreads and MPI. It performs the cross-correlations and also the polyphase FFTs required by an FX correlator. It is not a complete FX pipeline.

py_siminput, Version 1.0

Robert Byron Lowrie (CCS-2)

A user creates a Python script that uses the classes and objects in this package to define a problem and define the numerical solution parameters such as final simulation time. This script then generates a text file, either written as a flat text file or XML format file, that a simulation code reads. The final input file is typically very large and tedious to edit. The Python script is much more manageable to edit and read.

REDfish, Version 1.xMichael Kenneth Lang (HPC-5)
Hugh N. Greenberg (HPC-5)

A dramatic change is needed for systems services to address the challenges of large-scale HPC environments. Services need to be resilient, dynamic, distributed, and scalable. That is, they must respond and recover from failures; be self-healing; recruit and relinquish helper servers based on demand; function without access to global system state, which is too large and too fluid for one process to contain; and scale arbitrarily by exploiting hierarchical domains of peers. Redfish is trying to address these needs for HPC systems by replacing and creating new system services to deal with the challenges of faults, power and scale.

Scout, Version 0.xPatrick Sean McCormick (CCS-7)
Steven Laurence Martin (CCS-7)
James Alexander Jablin (CCS-7)

Scout is a programming language for data analysis and visualization that leverages the power of traditional CPUs and graphics processors for computations. The work is described in two publications: LA-UR-07-2094-Scout: A data parallel Programming Environment for Graphic Processors and LA-UR-04-6226-Scout: A Hardware-Accelerated System for Quantitatively Driven Visualization and Analysis.

SpacePy, Version 0.1.0Steven Karl Morley (ISR-1)
Josef Koller (ISR-1)
Michael Gerard Henderson (ISR-1)
Daniel T. Welling (ISR-1)
Brian Arthur Larsen (ISR-1)

SpacePy is a library of Python modules and extensions. Current capabilities: conversions between a number of time standards; basic coordinate conversions between commonly used systems, both geocentric and helio centric; superposed epoch analysis; visualization of output from Space Weather Modeling Framework simulations; reading of NASA CDF files; a one-dimensional radial diffusion code and visualization methods; calculation of electron drift shells, and access to magnetic field models (using a Python-wrapper for the ONERA library, an open source library developed at CNRS, France); a number of convenience routines for e.g. windowing means, set operations on times, file input/output.

STEM Education CRADA, Phase 4 August 2010: Video Interviews with Jonathan Cape, Paul Dowden, Kirk Flippo, Sandrine Gaillard, James Michel, David Montgomery, Dustin Offermann, Quanxi Jia, Thomas Spickermann, Charles (Chuck) Swenson, Cynthia Welch, and Hans-Joachim ZiockSteven F. Stringer (TT-DO)
Jonathan L. Cape (MPA-MC)
Paul Charles Dowden (MPA-STC)
Kirk Adler Flippo (P-24)
Sandrine Anne Gaillard (P-24)
James Raleigh Michel (MPA-CMMS)
David Montgomery (P-24)
Dustin Theodore Offermann (P-24)
Quanxi Jia (MPA-CINT)
Thomas Spickermann (AOT-OPS)
Charles Allen Swenson (MPA-CMMS)
Cynthia F. Welch (MST-7)
Hans Joachim Ziock (EES-14)
Timothy John Bass (IRM-RMMSO)
Warren H. Young (IRM-RMMSO)

The materials are digital video/ audio interviews with LANL scientific staff. The staff members, their topical subjects, and the dates of the different Phases of this project during which the interviews were conducted are summarized below. Each video is approximately one (1) hour long, and captures the interview done between an employee of the CRADA participant (the interviewer) and a Laboratory scientist (the interviewee). Laboratory staff members from IRM-RMMSO operated the video recording equipment (John Bass and Warren Young). Phase

4, Summer 2010 1. Trident Laser Facility; Kirk Flippo, David Montgomery, Dustin Offermann, Sandrine Gaillard 2. Engineering Proto-Cells; Hans-Joachim Ziock, Jonathan Cape 3. Materials Engineering; Cynthia Welch 4. Accelerator Operations; Thomas Spikermann 5. Nanoscale Electronics and Mechanics; Quanxi Jia, Paul Dowden 6. Condensed Matter and Magnet Engineering; Charles (Chuck) Swenson, James Michel

Three Layer Diffusion, Version 1

Scott Leroy Painter (EES-16)

The software will be used to assess long-term migration of radioactive material and other contaminants beneath the surface of the Earth. The intended application is in assessing the long-term risk of engineered subsurface repositories for radioactive waste generated by the commercial nuclear power industry.

Total-Variation Regularized Numerical Differentiation, Version 1.0

Rick Chartrand (T-5)

This code computes the derivative of a function specified by noisy data using regularization to suppress noise amplification.

YAP, Version 4.6.8

Eric Michael Nelson (XCP-4)

YAP is a software library for computing finite-element solutions of electrostatic and magnetostatic

problems, and for tracking charged particle trajectories. The library operates on multiblock structured and unstructured meshes, in both two dimensions and three dimensions. The MICHELLE finite-element gun code uses the YAP libraries. MICHELLE is typically used to model electron guns and collectors in microwave vacuum electron devices (MVEDs, a.k.a. microwave tubes). With YAP, MICHELLE is able to model such devices robustly with unprecedented accuracy and efficiency. MICHELLE also models ion source and beam transport lines.

Fiscal Year 2011 Active License Participants

Elshan Aziz Akhadov (IAT-1)
Electrochemical Detection of Single Molecules Using Abiotic Nanopores Having Electrically Tunable

Anthony A. Amsden (T-3)
 KIVA-3V
 KIVA-3V, Version 2
 KIVA-4mpi.beta, Version 0, (C-10,013); KIVA-3V, Version 0, (C-98,004); KIVA-4, Version 4, (C-03,134)

Aaron S. Anderson (C-PCS)
Robust, self-assembled, biocompatible films

Penelope S. Anderson (B-8)
Los Alamos Plant Growth and Yield Improvement

Paul Nelson Arendt (MPA-MC)
Superconductivity Technology CNT Portfolio for Structural Applications

Jeffrey M. Audia (AOT-RFE)
MiniGRAND Family of Instruments

Scott N. Backhaus (MPA-CMMS)
Pulse Tube Refrigerator with Variable Phase Shift and Traveling Wave Device with Mass Flux Suppression

Ying Bai (ISR-5)
MiniGRAND Family of Instruments

Marcie Rochelle Black (IAT-1)
Increased Energy Conversion via Incorporation of an Intermediate Bandgap

Craig Blackhart (AET-5)
Apparatus and Method For Handheld Sampling

Johan Lambert Trudo Maria Bollen (STB-RL)
 Blackbox Version 1.0
 Terrence F Bott (D-6)
 LED Tree v.1.0

Steven C. Bourret (N-1)
MiniGRAND Family of Instruments Cosmic-Ray Neutron Background Reduction Using Localized Coincidence Veto Neutron Counting for Use with SuperHENC

Jeffrey Richard Bowles (ISR-6)
Combined Thermal/ Epithermal Neutron (CTEN-FIT EXE), Version 1.0 and WIN-CTEN, Version 1

Andrew M. Bradbury (B-9)
 Split GFP
 Green Florescent Protein End User License

Jonathan N. Bradley (CIC-3)
MultiResolution Seamless Image Compression Invention and Software (MRSID)

Scott Douglas Briles (ISR-3)
 INFICOMM

Lawrence Eugene Bronisz (IAT-2)
Superconductivity Technology

Donald Weber Brown (EES-17)
*Down Hole Sealing Method (Ceramicrete) -- RSA
 Geothermal Energy Production with Supercritical Fluids*

Steven Patrick Brumby (ISR-3)
 Genie Pro, Version 2.0

Glenn S. Brunson, Jr. (N-2)
Combined Thermal/ Epithermal Neutron (CTEN-FIT EXE), Version 1.0 and WIN-CTEN, Version 1

Anthony Keiran Burrell (MPA-MC)

*Method for Detecting Binding Constants Using Micro X-Ray Fluorescence (MXRF)
Quantitative Method Of Determining Beryllium Or An Oxide Thereof In A Sample*

Deanna Nicole Busick (MST-11)

Composite Bipolar Plates for Electrochemical Cells

Stephanie Cabantous (B-2)

*Self Assembling Split Fluorescent Protein System (Los Alamos Green Florescent Protein Portfolio)
LANL GFP Portfolio
GFP
Split GFP
Green Florescent Protein End User License*

Michael Paul Caffrey (ISR-3)

Adaptive Software Radio

Hong Cai (B-2)

DNA Dipstick

David Bradley Carrington (T-3)

*KIVA-4mpi, Version 0
KIVA-4mpi.beta, Version 0,
(C-10,013); KIVA-3V, Version 0,
(C-98,004); KIVA-4, Version 4,
(C-03,134)*

Robert Bruce Cary (B-7)

DNA Dipstick

Anu Chaudhary (B-7)

Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.

David E Chavez (WEPEXP-7)

BTATz

David D. Clark (P-24)

INFICOMM

Don Mayo Coates (TT-DO)

INFICOMM

Michael Loren Collins (N-4)

*LANL Hybrid K-Edge Densitometer (HKED), Version 2007, C-07,047
K-Edge Hybrid Densitometer Software*

Gavin E. Collis (C-SIC)

Quantitative Method Of Determining Beryllium Or An Oxide Thereof In A Sample

James Yates Coulter (MPA-CMMS)

Superconductivity Technology

Taraka T Dale (B-9)

DNA Dipstick

Andrew Martin Dattelbaum (MPA-CINT)

Robust, self-assembled, biocompatible films

Raymond F. Depaula (MPA-MC)

*Superconductivity Technology
CNT Portfolio for Structural Applications*

Judith Louise Driscoll (MPA-CINT)

Superconductivity Technology

Damian R. Eads (ISR-3)

Genie Pro, Version 2.0

Kimberley Marie Edlund (ISR-3)

Genie Pro, Version 2.0

Deborah Sue Ehler (C-SIC)

Quantitative Method Of Determining Beryllium Or An Oxide Thereof In A Sample

Stephen Ward Eisenhower (D-6)

LED Tree v.1.0

Diana M. Esch-mosher (ISR-3)

Genie Pro, Version 2.0

Michelle A. Espy (P-21)

*Low Magnetic Field Detection for Imaging and Medical Diagnosis
MagViz/CoilViz*

Robert Jerome Estep (N-2)

*Combined Thermal/ Epithermal Neutron (CTEN-FIT EXE), Version 1.0
and WIN-CTEN, Version 1
TGS-FIT/TGS-MAT*

Paul D. Felsher (N-2)

PeakEasy, Version 3.5

Stephen R. Foltyn (MPA-MC)

Superconductivity Technology

David Thomas Shaw Fox (B-8)

DNA Dipstick

Christen Mark Frankle (ISR-1)

Handheld Isotope Identification System

Samuel M. Freund (LC-IP)

INFICOMM

Mark C. Galassi (ISR-1)

Genie Pro, Version 2.0

David Lee Gardner (MPA-CMMS)

Pulse Tube Refrigerator with Variable Phase Shift and Traveling Wave Device with Mass Flux Suppression

Scott Edward Garner (N-2)*PeakEasy, Version 3.5***Seth Sheer Gleiman (WT-6)***Method for producing ceramic particles agglomerates
Spherical boron nitride particles and method for preparing them***Greg Russ Goddard (C-IIAC)***Acoustic Focusing Technology***Roy Michael Goeller (ISR-4)***Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.***Karen Michelle Grace (ISR-4)***Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.***Wynne Kevin Grace (C-PCS)***Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.***Steven Wayde Graves (B-9)***Acoustic Focusing Technology***James Randal Groves (MPA-STC)***Superconductivity Technology
CNT Portfolio for Structural Applications***Robert Clayton Habbersett (B-2)***Acoustic Focusing Technology***James K. Halbig (N-1)***MiniGRAND Family of Instruments***Michael Scott Hamada (CCS-6)***Reliability Engineering (RE) Computer Codes***Walter J. Hansen (N-4)***MiniGRAND Family of Instruments***William Clarkson Harker (N-4)***SuperHENC Neutron Coincidence Code, Version 1.0***Neal Richard Harvey (ISR-3)***Genie Pro, Version 2.0***George Joseph Havrilla (C-CDE)***Method for Detecting Binding Constants Using Micro X-Ray Fluorescence (MXRF)***Ivars Henins (P-24)***Atmospheric Pressure Plasma Jet Portfolio***Hans W. Herrmann (P-24)***Atmospheric Pressure Plasma Jet Portfolio***Robert F. Hicks (P-24)***Atmospheric Pressure Plasma Jet Portfolio***Michael Allen Hiskey (DE-2)***BTATz
Lead-Free (Green) Primaries***Mark Arles Hoffbauer (C-CDE)***Electrochemical Detection of Single Molecules Using Abiotic Nanopores Having Electrically Tunable***Terry George Holesinger (MPA-MC)***Superconductivity Technology***Charles Lawrence Hollas (N-2)***Combined Thermal/ Epithermal Neutron (CTEN-FIT EXE), Version 1.0 and WIN-CTEN, Version 1***Jennifer Ann Hollingsworth (MPA-CINT)***Optical Amplifiers and Lasers***Earl Christopher Horley (ISR-5)***SuperHENC Neutron Coincidence Code, Version 1.0***Andrew Michael Howat (X-6)***SABRINA***Jianyu Huang (MPA-CINT)***Manufacture and Application of Nanostructured Metals and Alloys***My Hang Vo Huynh (DE-2)***Lead-Free (Green) Primaries***Kiril Dimitrov Ianakiev (N-1)***MiniGRAND Family of Instruments***James Hubert Jett (B-9)***Acoustic Focusing Technology***Quanxi Jia (MPA-CINT)***Superconductivity Technology***Honggang Jiang (MST-STC)***Manufacture and Application of Nanostructured Metals and Alloys***Kevin Dale John (SPO-SC)***Quantitative Method Of Determining Beryllium Or An Oxide Thereof In A Sample***Jeffrey R. Johnson (HPC-3)***SABRINA***David C Jones (N-1)***Hand Held Multiplicity Register***Gregory Kaduchak (B-2)***Acoustic Focusing Technology***Thomas A Kelley (N-1)***PC/FRAM, Version 2.3*

Csaba Kiss (B-9)

*Split GFP
Green Florescent Protein End User License*

Victor Ivanovich Klimov (C-PCS)

Optical Amplifiers and Lasers

Shirley F. Klosterbuer (N-4)

MiniGRAND Family of Instruments

Thomas J. Knight (B-DO)

*Use of Prolines for Improving Growth and Other Properties of Plants and Algae
Los Alamos Plant Growth and Yield Improvement*

Jerome D. Kolar (ISR-SIS)

Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.

Robert Henry Kraus (TT-DO)

*Low Magnetic Filed Detection for Imaging and Medical Diagnosis
MagViz/CoilViz*

Sascha Kreiskott (MST-STC)

Superconductivity Technology

Merlyn S. Krick (N-4)

Cosmic-Ray Neutron Background Reduction Using Localized Coincidence Veto Neutron Counting for Use with SuperHENC

Christopher Scott Kwiatkowski (IAT-2)

Acoustic Focusing Technology

Cris Lee Lewis (GS-IDC)

Method for Detecting Binding Constants Using Micro X-Ray Fluorescence (MXRF)

Qingwen Li (MST-STC)

CNT Portfolio for Structural Applications

Meghan Aileen Lockard (B-9)

GFP

Terry Curtis Lowe (CAO-OFF)

Manufacture and Application of Nanostructured Metals and Alloys

Cynthia Ann Mahan (DHS)

Method for Detecting Binding Constants Using Micro X-Ray Fluorescence (MXRF)

Grace Mann (C-SIC)

Method for Detecting Binding Constants Using Micro X-Ray Fluorescence (MXRF)

John Calvin Martin (B-9)

Acoustic Focusing Technology

Jennifer Martinez (MPA-CINT)

Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.

Rodolfo Antonio Martinez (B-8)

*Use of Prolines for Improving Growth and Other Properties of Plants and Algae
Los Alamos Plant Growth and Yield Improvement*

Harry F Martz (D-1)

Reliability Engineering (RE) Computer Codes

Vladimir Matias (MPA-MC)

Superconductivity Technology

Andrei Nikolaevich Matlashov (P-21)

Low Magnetic Filed Detection for Imaging and Medical Diagnosis

MagViz/CoilViz

Thomas Mark McCleskey (MPA-MC)

*Method for Detecting Binding Constants Using Micro X-Ray Fluorescence (MXRF)
Quantitative Method Of Determining Beryllium Or An Oxide Thereof In A Sample*

John Morton McGhee (CCS-4)

Attila, version 2.0

Sheila G. Melton (N-2)

*Combined Thermal/ Epithermal Neutron (CTEN-FIT EXE), Version 1.0 and WIN-CTEN, Version 1
TGS-FIT/TGS-MAT*

Howard O. Menlove (N-1)

*Cosmic-Ray Neutron Background Reduction Using Localized Coincidence Veto Neutron Counting for Use with SuperHENC
SuperHENC Neutron Coincidence Code, Version 1.0*

Alexandre Alexeevich

Mikhailovski (C-PCS)

Optical Amplifiers and Lasers

John Otto Milewski (MST-6)

Method for Welding Fin and Tube Solar Collectors

Thomasin Clare Miller (C-ACS)

Method for Detecting Binding Constants Using Micro X-Ray Fluorescence (MXRF)

Edel Mary Minogue (C-DO)

Quantitative Method Of Determining Beryllium Or An Oxide Thereof In A Sample

Terence Edward Mitchell (MST-8)
Photonic Crystal - LiNi and LiTi

Leland Jean Morrison (ISR-5)
Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.

John Compton Mosher (P-21)
Low Magnetic Filed Detection for Imaging and Medical Diagnosis

Harshini Mukundan (C-PCS)
Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.

Darren Lewis Naud (DE-2)
BTATz

Daniel Lee Neagley (ISR-3)
INFICOMM

David Clair Nelson (ESA-AET)
Continuous Air Monitor (CAM) Technology

Eric Michael Nelson (XCP-8)
YAP Version 4.6.8 which accompanies SAIC's code, MICHELLE (R&D 100 winner)

Matthew R. Newell (N-1)
Hand Held Multiplicity Register

Michael John O'Connell (C-ACS)
CNT Portfolio for Structural Applications

Virginia Olazabal (C-CDE)
Electrochemical Detection of Single Molecules Using Abiotic Nanopores Having Electrically Tunable

Richard H. Olsher (RP-2)
Proton Recoil Scintillator Neutron Rem Meter

Peter J. O'Rourke (T-DO)
*KIVA-3V
 KIVA-3V, Version 2*

Frank Anthony Ortega (XCP-1)
General Mesh Viewer, Version 4.5

Kevin Curtis Ott (SPO-AE)
Hybrid Catalyst for Selective Reduction of NOx (also known as ENDURE SCR Catalyst)

Joseph Mcrae Palmer (ISR-4)
Adaptive Software Radio

Jaeyoung Park (P-24)
Atmospheric Pressure Plasma Jet Portfolio

Robert Francis Parker (N-4)
MiniGRAND Family of Instruments

Shawn Daniel Pautz (SNL-ASCI)
Attila, version 2.0

David George Pelowitz (N-1)
MiniGRAND Family of Instruments

Simon John Perkins (ISR-SRS)
Genie Pro, Version 2.0

William L. Perry (WX-7)
*Plasma Torch Production of Metal Particles of Controlled Sizes
 Low Power Plasma Production of Metallic Nanoparticles*

Jonathan Phillips (MST-7)
*Method for producing ceramic particles agglomerates
 Spherical boron nitride particles and method for preparing them
 Plasma Torch Production of Metal*

*Particles of Controlled Sizes
 Low Power Plasma Production of Metallic Nanoparticles*

David Platts (P-21)
INFICOMM

Reid Buchanan Porter (ISR-3)
Genie Pro, Version 2.0

Michael Bruce Prime (W-13)
System and Method for Measuring Residual Stress

Jiang Qian (LANSCE-12)
Diamond Silicon Carbide Composites and their Method for Preparation I

David Wesley Reagor (MPA-MC)
Through-the-Earth Radio Technology

Pamela Sue Reass (ISR-5)
MiniGRAND Family of Instruments

Antonio Redondo (T-DO)
Electrochemical Detection of Single Molecules Using Abiotic Nanopores Having Electrically Tunable

John C. Rodgers (HSR-4)
Alpha Environmental Continuous Air Monitor with Cyclo-Shroud Inlet Continuous Air Monitor (CAM) Technology

Brian D. Rooney (N-2)
PeakEasy, Version 3.5

Gary Clyde Salzman (ISR-4)
Acoustic Focusing Technology

Thomas E. Sampson (N-1)
PC/FRAM, Version 2.3

Jan Henrik Sandin (P-21)
MagViz/CoilViz

Jose-maria Sansinena (C-CDE)
Electrochemical Detection of Single Molecules Using Abiotic Nanopores Having Electrically Tunable

Igor Mykhaylovich Savukov (P-21)
MagViz/CoilViz

Jurgen G. Schmidt (C-DO)
Robust, self-assembled, biocompatible films

Larry Joe Schultz (P-21)
MagViz/CoilViz

David Troy Seagraves (RP-2)
Proton Recoil Scintillator Neutron Rem Meter

Gary Stewart Selwyn (P-24)
Atmospheric Pressure Plasma Jet Portfolio

E. Brooks Shera (C-CDE)
Single Molecular Detection Instrument Diagnostic Test (Ordered Transport and Identification of Particles)

Andrew Paul Shreve (MPA-CINT)
Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.

Dipen N. Sinha (MPA-11)
Acoustic Focusing Technology

Jian Song (B-7)
DNA Dipstick

Xuedong Song (B-4)
Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.

Torsten Albert Staab (C-CSE)
Apparatus and Method For Handheld Sampling

Liliana Stan (MPA-STC)
Superconductivity Technology

Basil Ian Swanson (B-7)
Robust, self-assembled, biocompatible films
Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.

Martin Russell Sweet (ISR-4)
SuperHENC Neutron Coincidence Code, Version 1.0
Waveguide portfolio only for the detection of mammalian response to pharmaceuticals and illicit drugs.

Gregory William Swift (MPA-CMMS)
Pulse Tube Refrigerator with Variable Phase Shift and Traveling Wave Device with Mass Flux Suppression

Thomas Charles Terwilliger (INST-OFF)
Inter-Institutional Agreement SOLVE, Version 2.0 and Resolve, Version 2.0

James Patrick Theiler (ISR-3)
Genie Pro, Version 2.0

David John Torres (T-3)
KIVA-4mpi.beta, Version 0, (C-10,013); KIVA-3V, Version 0, (C-98,004); KIVA-4, Version 4, (C-03,134)

Pat Jean Unkefer (B-DO)
Use of Prolines for Improving Growth and Other Properties of Plants and Algae
Los Alamos Plant Growth and Yield Improvement

Algis V. Urbaitis (P-21)
MagViz/CoilViz

Igor Olegovich Usov (MST-7)
Superconductivity Technology
CNT Portfolio for Structural Applications

Herbert Van De Sompel (STBPO-RL)
Blackbox Version 1.0

Kenneth Alan Van Riper (X-10)
SABRINA

Jose Vasquez-dominguez (MST-STC)
Through-the-Earth Radio Technology

Duc Ta Vo (N-1)
PC/FRAM, Version 2.3

Petr Lvovich Volegov (P-21)
Low Magnetic Field Detection for Imaging and Medical Diagnosis
MagViz/CoilViz

Geoffrey S. Waldo (B-9)
Self Assembling Split Fluorescent Protein System (Los Alamos Green Florescent Protein Portfolio)

Haiyan Wang (MPA-CINT)
Superconductivity Technology

Michael Dennis Ward (B-8)
Acoustic Focusing Technology

Todd Arlin Wareing (CCS-4)
Attila, version 2.0

Benjamin Peter Warner (C-SIC)

Method for Detecting Binding Constants Using Micro X-Ray Fluorescence (MXRF)

Quantitative Method Of Determining Beryllium Or An Oxide Thereof In A Sample

Cyndi Ann Wells (C-DO)

Method for Detecting Binding Constants Using Micro X-Ray Fluorescence (MXRF)

James Terrell West (X-6)

SABRINA

Mahlon Scott Wilson (MPA-11)

Composite Bipolar Plates for Electrochemical Cells

Xiefei Zhang (MST-STC)

CNT Portfolio for Structural Applications

Yusheng Zhao (LANSCE-LC)

Diamond Silicon Carbide Composites and their Method for Preparation I

Lianxi Zheng (MST-STC)

CNT Portfolio for Structural Applications

Yuntian Theodore Zhu (T-CNLS)

CNT Portfolio for Structural Applications

Manufacture and Application of Nanostructured Metals and Alloys

Fiscal Year 2011 Executed Cooperative Research and Development Agreements (CRADAs)

Achieving a 10,000 GPU Permeance for Post- Combustion Carbon Capture with Gelled Ionic Liquid- Based Membranes

Kathryn A. Berchtold (MPA-MC)

The development and demonstration of an innovative next generation membrane technology for selective and energy efficient carbon dioxide separation from power plant flue gas. The impact of these enhancements will be further amplified through the development of commercially viable selective layer fabrication techniques that enable controlled thin film selective layer deposition on commercially attractive support platforms.

Audit/Accelerator Demonstration

Deborah Ann Leishman (D-6)

Development of an Audit / Assessment Accelerator software demonstration. The project will combine the LANL IKE (Integrated Knowledge Engine) software subsystems with the CRADA Participant's software subsystems to provide an overall solution to support auditors in their work.

Crop Transformations and Enzyme Development for Plant Growth and Yield Improvement

Pat Jean Unkefer (B-DO)

The CRADA Participant and the Los Alamos National Laboratory (LANL) will be developing methods and technologies related to

the genetic plant growth platform. This work will include genetic transformations, assays, transformation constructs, new metabolic pathways and the resulting species that utilize the glutamine synthetase (GS) and glutamine phenylpyruvate transaminase (GPT) and associated enzymatic pathways. The expected outcome is an advanced and improved transgenic technology that supports CRADA Participant's commercial products and expands LANL's technical base to develop this technology for energy applications.

Detection and Analysis of Corrosion Under Insulation

Dipen N. Sinha (MPA-11)

Investigate a number of Non-Destructive Evaluation ("NDE") techniques for detecting corrosion of equipment through insulation. Corrosion Under Insulation ("CUI") is a challenging equipment maintenance issue affecting a large percentage of fixed equipment assets in all business segments. Although a series of technologies are available to detect CUI, none are capable of reliably detecting CUI without expensive manual access to the equipment. This project will allow for improved detection capabilities which will reduce maintenance cost by minimizing inspection time, the need for staging and insulation removal, as well as improve reliability by reducing equipment failures. This product could come in the form of an improvement to existing techniques, or, application of a novel technology. It is envisioned

that a successful tool will reduce the need for staging and stripping insulation.

Development of Superluminal Radio Frequency (RF) Sources

John Singleton (MPA-CMMS)

Investigate the characteristics of novel Radio Frequency (RF) Sources. Participant designs and manufactures a wide range of telecommunication infrastructure products; the study will identify synergies appropriate for commercialization.

Down-Hole, RF-Interrogated, Temperature-Compensated Acoustic-Based Sensors for INFICOMM Technology

Albert Migliori (INST-OFF)

This agreement will address the design of a piezoelectric-resonator-based, temperature-compensated pressure transducer, the design of a direct current (DC) power source that is driven by radio-frequency energy transmitted down the hole of a well, and the design of simple amplifiers to condition signals in the bore.

Dynamic Response of Perforating Systems Upon Down-Hole Activation

Steven Loyd Renfro (W-DO)

Exchange and develop novel technologies, best practices, and analysis capabilities for the benefit of both

organizations. Shall address the following technical project: Dynamic Response of Perforating Systems Upon Down-hole Activation: Develop a complete understanding of the dynamic response of down-hole perforating systems from system initiation through the time period required for several wave reverberations along the perforation gun sections. Develop computational models, confirmed by experiment, that predict pressure, stress, and onset of failure during the perforation event.

Energy-Efficient Purification of Bio-Fuels and Bio-Chemicals Using a Novel Advanced Polymeric Membrane System

Kathryn A. Berchtold (MPA-MC)

Develop, demonstrate and move towards the commercialization of a pervaporation membrane system, which will reduce the energy required for product isolation from dilute fermentation broths. Avoiding the energy consumption associated with the latent heat of vaporization for water is the key benefit. This work will isolate high boilers from dilute feeds without evaporating water. These activities will lead to the development, fabrication, and demonstration of proprietary, advanced polymer membrane cartridges that will dramatically reduce the cost of bio-chemical and bio-fuel manufacture.

Exchange of Safety and Security Best Practices

Ronald Brook Parker (W-14)

Exchange and develop novel technologies, best practices, and analysis capabilities for the benefit of both organizations, particularly with respect to safety and security practices.

Free Electron Laser Innovative Naval Prototype

Sheila McKay Long Brandt (AOT-HPE)

Collaborate to provide support to the Participant's prime contract with the Office of Naval Research to develop a Critical Design Review (CDR) Phase 1B data package for a scalable 100 Kilo Watt (kW) FEL based on superconducting energy recovery linac (ERL) technology.

Growth and Characterization of Nanostructured Glass-Ceramic Scintillators for Miniature High-Energy Radiation Sensors

Markus Peter Hehlen (MST-7)

Collaborate on a DTRA-funded fundamental research project to grow and characterize a new class of scintillator materials. High-performance scintillators detect and identify gamma-ray sources and are a critical component in a range of homeland security, threat reduction, and non-proliferation activities. Commercial scintillator crystals are difficult to grow, limited in size, brittle and hygroscopic, and very expensive. This project aims

to develop rugged nanostructured glass-ceramic scintillators that can be fabricated at low cost in large shapes and may offer efficient scintillation performance. A specific application is a small sensor that can be worn by personnel in the field and alarm in the presence gamma radiation. The project focuses on the fundamental aspects of scintillator growth and scintillation mechanisms in nanostructured glass-ceramic.

Integrating the Past Web into the Current Web

Herbert Van De Sompel
(STBPO-RL)

Develop tools that leverage and promote existing technologies such as Open Archives Initiative (OAI) Protocol for Metadata Harvesting (OAI-PMH), MPEG-21 DIDL, and the Atom Syndication Format and make those tools an integral part of standard web server software. This software will provide preservation clients with a uniform manner to interact with enabled web servers. This will yield a far better coverage of the web for digital preservation activities than the current crawling-based techniques. It will also provide preservation clients with a uniform approach in which to-be-preserved documents are represented to them, yielding a more straightforward handling process.

Kinetic Energy

Kevin Morris Farinholt (AET-1)
This CRADA will involve the

growth and analysis of oxide and nitride thin films. The Participant will grow films using Kinetic Energy Activated Molecular Beam Epitaxy, a novel deposition technique. Optimization of the growth process will require characterization capabilities and expertise not possessed by the Participant, but readily available at LANL. This CRADA will involve the growth and analysis of oxide and nitride thin films. The Participant will grow films using Kinetic Energy Activated Molecular Beam Epitaxy, a novel deposition technique. Optimization of the growth process will require characterization capabilities and expertise not possessed by the Participant, but readily available at LANL. The films will be analyzed to determine crystal quality and electronic properties using a number of techniques.

Multi-layer B-10 Prototype for He3 Portal Monitor Replacement

Zhehui Wang (P-25)

LANL will design, build and test a prototype B-10 detector that can be directly compared with the performances of a He-3 portal monitor in terms of efficiency and neutron/gamma discrimination.

Novel and Environmentally Friendly Fracturing

Jonathan Lee Mace (WX-3)

Investigate the use of environmental friendly and safe high explosive systems to create fracturing in situ within geologic formations. This

project is designed to be executed in several phases, and will result in the execution of one field-scale detonation experiment.

Scaleup of Nanorestructured Fiber Coloring Process

Bruce Carvell Lamartine (MST-7)

The work will demonstrate diffraction-based fiber color phenomena at naked eye scale, and will test the ability to create commercially replicable versions of the phenomena using industrial milling and lithographic methods that have been uniquely refined for the Stockpile Stewardship mission at Los Alamos National Laboratory (LANL).

Small Reactor Development

Patrick Ray McClure (D-5)

Design a small transportable reactor with a power output of approximately 70 mega watts thermal. The design will incorporate the Participant's technology to make the reactor simple to operate, reliable and very safe. The goal of the project is to produce a design that can be certified by the Nuclear Regulatory Commission (NRC) using current regulatory statutes. The end state of this project would be a design that has sufficient detail, such that, the next phase of the project could develop the conceptual design and begin the development of the design certification document that would be submitted to the NRC.

Fiscal Year 2011 Work for Others – Non Federal Agreements Executed

Advanced Radiation Monitoring Devices (ARMD)

Laura Catherine Stonehill (ISR-1)

LANL will develop a compact, low-power, highly reliable front-end data acquisition electronics module assembly for a handheld radiation detector for the Sponsor.

Allergy, Immunology and Transplantation Research

Alan S. Perelson (T-6)

Develop mathematical models of Hepatitis C virus (HCV) replication in vitro. We will also develop models of the molecular effects of antiviral therapy and use these models to interpret experimental data collected at UIC.

Antigenic Protein and Lipopolysaccharide Signatures from Burkholderia Pseudomallei Towards Specific Biothreat Detection Strategies

Srinivas Iyer (B-8)

Studies by the sponsor, of the antigenic diversity in *B. pseudomallei* and its near-neighbor species, *B. oklahomensis* and *B. thailandensis*, provide the foundation for this project, which includes both broad exploratory studies on antigenic proteins and more focused analysis of known antigenic signatures in this pathogen. One very specific *B. pseudomallei* signature is the lipopolysaccharides (LPS) component, which can elicit a strong immune

response. The project includes three specific aims: 1) Development, optimization and validation of laboratory protocols to rapidly identify antigenic signatures specific to identification of *B. pseudomallei*, 2) Continued characterization of *B. pseudomallei*-specific lipopolysaccharides across multiple strains, and 3) Identification of *B. pseudomallei* specific antigenic proteins.

ARRA Geothermal Project

Paul William Reimus (EES-14)

In this project, a new class of tracers that offers great promise for use in characterizing fracture networks in Enhanced Geothermal System (EGS) reservoirs will be developed and demonstrated. Colloidal quantum dots will be synthesized and surface-modified to serve as both conservative (nonreactive) and reactive tracers to provide unprecedented interrogation of fracture surface area to volume ratios in EGS reservoirs. This information will support optimal stimulation and operation of the reservoirs so that heat can be more efficiently extracted from the rock. LANL will provide modeling support for design and interpretation of both laboratory and field experiments using the new tracers.

Assisted Deployment of LANL Technology in ORTEC Hybrid K-Edge Densitometer Systems

Michael Loren Collins (N-4)

Assist with the integration and deployment of LANL technology in Hybrid K Edge Densitometer (HKED) systems.

CGCS Mosaic

Bette Tina Marie Korber (T-6)

This work is directed at optimizing methods of data analysis of immunogens. The continual input of LANL is critical to both the evaluation of the current clinical trials materials and the design of the next generation of immunogens based on the preclinical results from these studies and the studies of others.

Clean and Secure Energy from Domestic Oil Shale and Oil Sands Resources

Donatella Pasqualini (D-4)

The principal objective of this project is to develop a basin scale simulation of environmental and economic impacts of oil shale and oil sands development. LANL has developed a model, CLEARuff, which is able to assess the environmental and socio-economic implications of an oil shale development. In this project experimental data and process model simulations will be integrated into the CLEARuff framework to produce a tool with quantified predictability to assess

the basin-scale impacts of oil shale and oil sands development. Based on a methodology developed at the University of Utah, LANL will also develop a first generation methodology for doing validation and uncertainty quantification on system models like CLEARuff.

Collaborative Integration of HCV Molecular Virology and Mathematical Modeling

Alan S. Perelson (T-6)

Support the Sponsor by developing mathematical models of hepatitis C virus (HCV) replication in vitro. LANL will also develop models of the molecular effects of antiviral therapy and use these models to interpret experimental data collected by Sponsor.

Development of Carbon Nanotube Composite Cables for Ultra Deepwater Oil and Gas Fields

Kenneth Ralph Marken (MPA-STC)

Electrical applications of Carbon Nanotubes (CNTs) require dense arrays with alignment in the direction of current flow. Also transverse electrical connections between tubes are needed. Two new Los Alamos National Laboratory (LANL) technologies may enable manipulation of multiple CNTs. Acoustic Flow Cytometry manipulates small structures using pressure of acoustic waves, while Acoustically Engineered Materials does this with ultrasound. Using these and

other technologies, this project aims to develop means to align CNTs, interconnect them, and consolidate them into a metal matrix. The anticipated result is a wire with twice the conductivity of copper over 100 m length. Another aim is a process for producing such composite wires that can be fully automated. The project will attempt to address the additional requirements of ruggedness, vibration resistance, chemical stability, and ability to withstand power surges.

Development of Chemical Model to Predict the Interactions between Supercritical Carbon Dioxide and Reservoir Rock in EGS Reservoirs

Peter C. Lichtner (EES-16)

The purpose of this project is to develop a reactive transport model that predicts mineral precipitation and dissolution within an EGS (Enhanced Geothermal Systems) reservoir and in EGS surface facilities. To develop this model, a database will be assembled for thermodynamic equilibrium constants for aqueous complexes and minerals, and kinetic reaction rates for water/brine/rock/CO₂ systems. In addition to literature reviews, extrapolation of existing data combined with laboratory experiments conducted at the University of Wyoming will be used to develop a robust database for modeling EGS behavior. Following the creation of the database, the massively parallel reactive transport code PFLOTRAN

will be modified to apply to temperature and pressure conditions relevant to EGS applications. In addition to the implementation of the new database, a dual and/or multi-continuum capability will be added to PFLOTRAN to account for reactive flow in fractured porous media. Simulations using the modified code will be conducted to investigate the interaction between injected supercritical CO₂ and EGS reservoir fluids and rocks. The feasibility and suitable conditions of using CO₂ as a working fluid, as an acidization agent, and the simultaneous use of the EGS for CO₂ geologic storage (sequestration) and efficient geothermal heat extraction will be explored through numerical simulations. Finally, simplified numerical simulations will be conducted to investigate mineral and salt precipitation in production wells and surface equipment associated with EGS.

Differential Metabolic Network of Tumor Progression

Pat Jean Unkefer (B-DO)

Forensics Investigation into the State of New Mexico Gas Emergency 2011

Venkateswara Rao Dasari (D-DO)

Recent severe cold weather contributed to operational challenges for the natural gas transmission in Northern New Mexico. These operational challenges raised concerns

regarding the resilience of the natural gas system in Northern New Mexico. The Los Alamos National Laboratory (LANL) will perform a study on system resilience for the Sponsor using a regional model of the NM Gas system. This study will evaluate the natural gas network's physical capabilities given the constraints on production and withdrawal from storage. LANL will examine the impacts to the natural gas network of scenarios defined by the Sponsor. Individual operational actions will be evaluated using a dynamic model of system response. At the conclusion of the analysis, LANL will make deliver data regarding resiliency planning and potential mitigation measures in an emergency.

ITER Near Term Fuel Cycle Planning and Interface Activities

R. Scott Willms (C-DO)

The Sponsor's Fuel Cycle consists of 16 individual systems. These systems are highly integrated with each system generally having multiple interfaces to other systems. These interfaces need to be described both graphically and in words. These descriptions are needed at each of the major phases of the project. And major necessary steps to meet these milestones need to be scheduled. This contract will require addressing each of these issues.

Mass spectrometry Analysis of lipid and protein antigenic determinants

Srinivas Iyer (B-8)

The work to be performed is MALDI-TOF mass spectrometry analysis of lipids and protein samples generated by the Sponsor. LANL will assist with analysis and provide interpretation of the resultant spectra for the Sponsor.

MCNP/MCNPX Training Course in Paris, France

Michael Richard James (D-5)

Will conduct several training course/workshops for MCNP/MCNPX (Monte Carlo N-Particle eXtended). The workshops will contain the following modules: Geometry, Sources, Tallies, Physics, Statistics, Variance Reduction and Criticality. Will conduct several training course/workshops for MCNP/MCNPX (Monte Carlo N-Particle eXtended). The workshops will contain the following modules: Geometry, Sources, Tallies, Physics, Statistics, Variance Reduction and Criticality.

Near Real-Time Nondestructive Active Inspection Technologies Utilizing Delayed Gamma-Rays for Advanced Safeguards

Eric Benton Rauch (N-4)

The work we are proposing to be done is the generation of a model inside MCNP to simulate the

response of a new type of detector to the gamma radiation emitted from spent nuclear fuel. This model will be used to benchmark actual results from a prototype detector built at the Sponsor's Facility.

Polycrystalline Ceramic as a Replacement for ^3He Neutron Detector

Ching-fong Chen (MST-6)

This program proposes a potential solid state polycrystalline neutron detector as a mid-term alternative to the use of ^3He tubes. The LiAl_5O_8 polycrystalline ceramic proposed in this program has ^6Li as a component of the matrix, which will not result in any light scattering. The concentration of ^6Li is estimated at about 2 to 3 orders of magnitude higher than that of ^3He , making these solid-state neutron detectors more sensitive and more efficient. Furthermore, the small thickness envisioned for the ^6Li neutron detector is about 1 mm where the mechanical strength becomes critical. The polycrystalline ceramics proposed here have a much higher mechanical strength due to the polycrystalline structure strengthened by the grain boundaries. Its low density and small thickness can also provide an advantage for gamma ray rejection.

Population Genetics Phase 2

Karen Koons Hill (B-7)

Botulinum bacterial strains will be acquired for DNA isolation and DNA sequencing to understand the population genetics of the bacteria.

Predictive Maturity of Multi-Scale Computer Models for Fuel Performance

Brian J. Williams (CCS-6)

Calibrating the nominal mesoscale polycrystal plasticity code to relevant experimental data, evaluating the model form uncertainty, and computing a quantitative predictive maturity index. The second task consists of the first phase of coupling atomistic scale simulations with the polycrystal plasticity code to provide the interstitial trapping rate of irradiation-generated defects by dislocations. The third task consists of repeating the activities of the first task on the first-phase multi-scale polycrystal plasticity code developed in the second task. The fourth task consists of the second phase of coupling atomistic scale calculations with the polycrystal plasticity code to model the dislocation-loop and dislocation-bubble interactions. The fifth task consists of repeating the activities of the first task on the second-phase multi-scale polycrystal plasticity code, and reporting on the evolution of predictive maturity as the coupling of atomistic scale calculations progresses.

Structures of M. Tuberculosis Proteins Conferring Susceptibility to Known M. Tuberculosis

Thomas Charles Terwilliger (INST-OFF)

The overall goal of this project is to identify potential drug targets and companion inhibitors that inhibit growth of *Mycobacterium tuberculosis* (Mtb) and other pathogenic bacteria in order to develop a foundation for antimicrobial drug discovery. LANL will accomplish this by identifying proteins that are targeted by whole cell growth inhibitors of Mtb discovered by a recently conducted high-throughput screen of over 200,000 drug-like small molecules. LANL will use a ligand-binding assay that LANL has developed to identify which Mtb proteins interact with each of 10 different anti-tubercular compounds.

Study of interfacial interactions using thin film surface modification radiation and oxidation effects in materials

Jinsuo Zhang (D-5)

The goal of this project is to understand the role of surfaces and interfaces in the long-term stability of materials under influence of radiation and high temperatures. The proposed research work will be conducted by experimental investigation in close conjunction with simulation modeling. A BCC Fe-12%Cr binary alloy will be selected

as the substrate, and three materials yttrium, tantalum, and silicon will be selected as the coatings. Oxidation corrosion and irradiation damage will be studied. Los Alamos will focus on modeling work.

US Advanced Coal Technology Consortium (US-ACTC)

Philip H. Stauffer (EES-16)

LANL will work for the Sponsor on the US-China Advanced Research Consortium (ACTC) to build models of risk analysis for possible CO₂ sequestration sites. The data for these sites will be provided to LANL by the Sponsor and the results of the risk analysis and modeling will be returned to the Sponsor for use on the ACTC project. LANL will also work for the Sponsor on building novel approaches for membrane synthesis that may prove useful in CO₂ capture from power generation facilities. The Sponsor, in their role as head of the ACTC, will ensure that the LANL work on membranes is in line with the needs of the project.

Distinguished Awards for Fiscal Year 2011

Distinguished Patent Award

The Distinguished Patent Award honors inventors whose patented invention exhibits outstanding innovation. The award is selected by the Laboratory Patent Advisory Council and recognizes a premier patent exemplifying significant technical advance, adaptability to public use, and noteworthy value to the mission of Los Alamos National Laboratory. The patent and the inventors recognized for this award reflect the Laboratory's stalwart tradition of superior technical innovation and creativity.

2011 Award Winners

The 2011 Distinguished Patent Award goes to the patent titled "Nucleic acid encoding a self-assembling split fluorescent protein system", submitted by Geoffrey S. Waldo and Stephanie Cabantous of Biosciences Division. This patent covers a highly engineered version of green fluorescent protein (GFP) that is stable as two components comprising strands 1-10 and strand 11 of the protein. When in close proximity, strand 11, an 14 amino acid fragment spontaneously assembles with the strand 1-10 fragment allowing the assembly to fluoresce.

Waldo and Cabantous, through this technology, have significantly changed how protein systems are studied thereby increasing our ability to understand the underpinnings of disease. So far, the technology has been used to study

how neurons interact, what causes protein misfolding, and is a crucial component of a recently funded NIH proposal to generate highly specific antibodies against every protein in the human body.

Distinguished Licensing Award

The Distinguished Licensing Award recognizes innovators who proactively engage in commercialization activities at Los Alamos National Laboratory and who have had a positive impact on the Laboratory's Licensing Program. These individuals, by example, demonstrate outstanding success in transferring Laboratory-developed technologies to the public and private sectors. In addition, recipients' commercialization track record has served to enhance the reputations of Los Alamos National Security LLC, and the Laboratory.

The recipients of this distinguished award are champions for the Laboratory's licensing program and are recognized for their role in confirming the benefits of proactive technology commercialization activities.

2011 Award Winner

The 2011 Recipient of this award is David B. Carrington of the T-3 Division, Fluid Dynamics and Solid Mechanics Team. David B. Carrington's knowledge and experience in computational fluid dynamics spans over decades, and

have been culminating in the evolving KIVA modeling code suite. KIVA is an advanced computational fluid dynamics modeling code that simulates the in-cylinder processes of internal combustion engines. KIVA simulations allow engineers to better understand ignition, air flows, combustion, and pollutant formation to optimize engine designs for high efficiency.

Today, KIVA software suite is used by universities and other federal laboratories for CFD research and education purposes. Private industry, including all major U.S. car and engine manufacturers, uses KIVA to design more efficient engines. KIVA has over 500 executed licenses, hundreds of active users, and respected name recognition in the CFD community. The worldwide adoption and broad licensee portfolio would not be possible without David B. Carrington's dedication to the KIVA project and his invaluable and consistent support for the licensing program at the Los Alamos National Laboratory.

Programmatic Impact Award

The Programmatic Impact Award honors individuals or groups who have made advancements to the programmatic mission of Los Alamos National Laboratory through their interactions with industry partners. Nominees have interacted with industry partners through a technology transfer mechanism (Cooperative Research and Development Agreement, Work for Others, Licensing, User Facility

Agreement, or Memorandum of Understanding) to add value to the technology field in which they work for programmatic and commercial uses.

The recipients of this award demonstrate stellar technical prowess as well as the innovation and creativity needed to demonstrate excellence in both programmatic and commercial applications.

2011 Award Winners

Toby J. Vigil of IPM (Integrated Program Management) and Louis Schulte of MET-1 (Actinide Processing Support) are this year's recipients of the Programmatic Impact Award for their efforts in the Americium Recovery Project to develop the capability to extract americium-241 from reprocessed plutonium reserves and fabricate americium-beryllium sources for the oil and gas well-logging industry.

Funded by an industry consortium by way of the Isotope Program through the DOE Office of Science - Nuclear Physics Office, the Americium Recovery Project stems from the CLEAR (Chloride Extraction and Actinide Recover) Glovebox Line at TA-55 that was designed in the late 1990s primarily as a waste minimization project in support of existing hydrochloric acid process operations. The CLEAR Glovebox Line can be integrated directly into the present plutonium recovery process and reduces the alpha-emitting actinides to the Rad Liquid Waste Line, reducing treatment costs. Large scale extraction runs have demonstrated

efficient recoveries (approximately 99%) of americium and plutonium from process effluent streams. Combining complementary programs with material supply, infrastructure and world class subject-matter expertise at TA-55, the project supports the Lab's safety and security missions and fuels new program potential while also producing a source with high commercial utility in the well-logging industry.

Distinguished Copyright Award

The Distinguished Copyright Award honors the authors of disclosed copyrighted materials that are considered extraordinary creations. Nominated copyrights for this award demonstrate a breadth of commercial applications, potential to create economic value, and the highest level of technical excellence. In addition, these works represent vital contributions to the Laboratory's mission and provide reciprocal benefit to the Laboratory programs under which they were developed.

Recipients of this award are true innovators in their field and advance the Laboratory's and Nation's reputation in scientific excellence through their copyrighted works and software.

2011 Award Winners

The 2011 Distinguished Copyright Award is presented to the Parallel Log-structured File System (PLFS) open source software project.

The main contributing organizations to the PLFS Open Source Project are:

- Los Alamos National Laboratory
- EMC Corporation
- Carnegie Mellon University

PLFS is a transformative input/output (I/O) middleware layer for HPC systems that is placed within the software stack that transparently rearranges a challenging workload, a concurrently written single shared file, into an optimized workload, non-concurrently written non-shared component pieces. This reorganized I/O has made write size a non-issue and improved checkpoint performance by orders of magnitude measured to be as much as 150x with improvements in write, read, and meta data performance of I/O workloads.

Under a Cooperative Research and Development Agreement with EMC Corporation, LANL and EMC have successfully demonstrated a prototype “burst buffer”, a method of exploit in system storage to absorb large and fast bursts of data, and are working together to further enhance, design, build, test, and deploy PLFS. Future work for PLFS includes integration with the Scalable Checkpoint/Restart (SCR) Library, further improving metadata rates, and capturing semantic information about the data streams.

PLFS is starting to get great adoption into the high performance computing community and will help pave the road to overcome some of the data storage and file system challenges with Exascale computing.”

Regional Impact Award

The Regional Impact Award honors individuals, organizations, or programs that have made a significant contribution to the northern New Mexico economy. Recipients must have a tie to LANL technology, personnel, or expertise. (Per Appendix N of the LANS, LLC M&O Prime contract, the Laboratory actively encourages the development of new businesses based on Laboratory technology or expertise.)

Nominees for this award must demonstrate northern New Mexico economic impact through the creation or growth of LANL-affiliated venture(s), creation of new jobs or new products, or implementation of a unique resource for entrepreneurs. In addition, the individual, organization or program must reflect the spirit of entrepreneurship through personal risk taking, strong personal commitment, ingenuity, and act as a role model for regional innovation.

2011 Award Winner

This year's Regional Impact Award goes to RockSmith Precision Machining, Inc. The technology behind RockSmith was established September 15, 1991 in Los Alamos New Mexico, but it wasn't until 2007 that the group joined with LANL's "IAT" group to develop and extended a reach utility tool for safely disabling an explosive device.

The project with LANL was successful, and in 2010 RockSmith bid for the pro-

duction of 80 complete utility tool kits that were completed in September 2011. A bomb disposal group with the United States Navy is the primary user of the completed product, although the technology has been shared with other investigation and disposal groups.

The need for bomb disposal tools is growing quickly as many state and local authorities become more active with bomb disposal needs. RockSmith hopes to be an early supplier of such tools. There is no such product on the market currently, therefore, the potential to establish an expertise in this field is high and the timing of entering the market is good.

In February 2012, RockSmith Precision became the Licensee of the 4 Hazardous Device Utility Tools, LCC, MCC, HCC and Hot Knife. The Hazardous Device Utility Tools are designed to allow work on hazardous equipment or devices at a standoff or within a confined space. These tools allow for cutting, manipulating, assembling and disassembling operations on equipment where a standoff is required because of either contamination or being within a confined space.

CODES

Los Alamos National Laboratory's Technology Transfer (TT) Division has announced the release of the new Copyright Disclosure Electronic System (CODES). CODES streamlines TT's copyright disclosure and the Classification Group's (SAFE-1) LA-CC paper processes into one, simple web-based questionnaire.

Launched in 2012, this new system allows multiple users to author and edit disclosure drafts online, helping authors create, modify, review, and submit copyright disclosures electronically. The collaborative tool allows users to track the progress of their disclosure through the entire process from disclosure submission to TT Division all the way to the completion of SAFE-1 review and issuance of an LA-CC number.

Disclosing copyrightable works through CODES may open the door to potential licensing opportunities, additional programmatic funding opportunities, and collaborations with industry and showcases the capabilities and expertise within LANL.

Submit copyright disclosures through CODES at codes.lanl.gov.



IDEAS 2.0

Los Alamos National Laboratory's Technology Transfer (TT) Division's Information Disclosure Electronic Application System (IDEAS) automates the first and most critical step in the technology transfer process—submitting invention disclosures from the Laboratory's research staff. This collaboration tool allows individual or multiple users to: create, modify, review, and submit invention disclosures electronically.

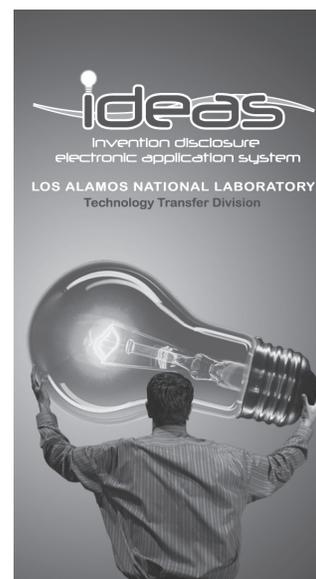
The disclosure process provides Laboratory Legal Counsel with the information necessary to assess patentability and file a patent application, as appropriate. In addition, the disclosure process provides TT Division with the vital information necessary to enhance the possibility of a successful transfer of intellectual property to the public/private sector via one of the many technology transfer mechanisms available. After submission, invention disclosures are routed electronically for approvals, archiving, and entry into TT Division's Opportunity Module.

Launched in November 2005 as a part of TT Divisions commitment to streamlining their processes, IDEAS has had an immediate impact on the disclosure process by enabling enhanced collaboration and reducing the total time required to produce high quality disclosures and expedite the approval process. The total number of invention disclosures submitted annually has continued to increase over the years since the launch of IDEAS.

An upgrade to the IDEAS system was recently released in **IDEAS 2.0**. The new release supports information disclosures with increased system speed and reliability decreasing the completion time for disclosures. Additional business logic has been implemented within IDEAS 2.0, reducing the number of questions needed for submitting a disclosure to only those applicable to the invention.

For further info on IDEAS and invention disclosures visit: www.lanl.gov/my_idea

Submit invention disclosures through IDEAS at ideas.lanl.gov.



Contact List

Outstanding innovation is the cornerstone that enables patents, copyrights, licenses, and the ensuing entrepreneurial ventures to occur. The teams cited below are key to the Laboratory's activities required to protect our intellectual property and encourage the transfer of technology to the private sector.

For questions or assistance, please contact any of these individuals.

Technology Transfer Division

Division Leader

David Pesiri, 665-7279

Laboratory Counsel

General Counsel

David Sosinski, 667-3970

Intellectual Property Office

Group Leader

Bruce Cottrell, 667-9168

Technology Transfer Division

www.lanl.gov/partnerships/

Laboratory Counsel

www.lanl.gov/orgs/lc/