

ANIMAL AND NATURAL RESOURCES INSTITUTE DIRECTORY

SY's and their Specialties



USDA, AGRICULTURAL RESEARCH SERVICE
Henry A. Wallace Beltsville Agricultural Research Center
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**ANIMAL AND NATURAL RESOURCES INSTITUTE
BELTSVILLE AGRICULTURAL RESEARCH CENTER, BARC-EAST
BELTSVILLE, MARYLAND 20705-2350**

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Mission: The research mission of the Animal and Natural Resources Institute is to conduct research and to development technology transfer programs that ensure high quality and safe food while protecting the natural resource base and the environment.

The Institute is comprised of 8 laboratories and 3 service units:

Animal Biosciences and Biotechnology Laboratory
Animal Improvement Programs Laboratory
Animal Parasitic Diseases Laboratory
Bovine Functional Genomics Laboratory
Environmental Management & Byproduct Utilization Laboratory
Environmental Microbial and Food Safety Laboratory
Hydrology and Remote Sensing Laboratory
Sustainable Agricultural Systems Laboratory

Animal Care Compliance Office
Veterinary Services Unit
Administrative Unit

ANIMAL BIOSCIENCES AND BIOTECHNOLOGY LABORATORY
ANIMAL AND NATURAL RESOURCES INSTITUTE
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Mission: The mission of the Animal Biosciences and Biotechnology Laboratory (ABBL) is to develop the knowledge and technology to improve the genetic, reproductive and feed efficiency of livestock and poultry by the application of functional genomics and proteomics. Research emphasis includes: 1) Identification of genes and their products responsible for nutrient intake and utilization; 2) Development of stem cell lines and enhanced nuclear cloning technologies; 3) Optimize transgene integration efficiency and fabricate candidate antimicrobial genes; 4) Enhance embryo, fetal and neonatal development and survival; 5) Improve semen cryobiology and storage techniques and develop alternative strategies for germplasm preservation.

Dr. David Guthrie
Acting Research Leader
Research Physiologist
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Conducting research to improve liquid and frozen storage of swine and striped bass spermatozoa.

Dr. Murray R. Bakst
Research Physiologist
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Investigating molecular mechanisms that regulate sperm selection and storage in poultry. Determining factors regulating turkey oocyte maturation and factors regulating fertilization, embryo development and early embryonic survival.

Dr. Le Ann Blomberg
Research Molecular Biologist
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Utilizing functional genomics to elucidate uterine stress-induced alterations in the prenatal "programming" of physiological mechanisms in vital organs/tissues of swine concepts, which compromise postnatal metabolic stress responses.

Dr. Thomas Caperna
Research Biologist
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Development of invitro models for investigation of hepatic metabolism in pigs. Biomarker discovery, proteomics and gene expression analysis of pathways associated with perinatal stress, growth and nutrient intake.

Dr. David M. Donovan
Research Molecular Biologist
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Developing novel transgene constructs to convey disease resistance trait characteristics to cattle. Analyses of transgenic technology methodology (conventional vs BAC vs Kockin vs Lentiviral) to identify the technology yielding highest reproducibility of expression between founder animals.

Dr. Julie A. Long

Research Physiologist
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Improve poultry germplasm preservation by elucidating how and why poultry sperm lose functional competence during hypothermic storage. Specific areas of interest: sperm physiology, sperm glycocalyx, lipid peroxidation, proteomics, artificial insemination, sperm storage tubule genomics and fertilization events.

Dr. Alva D. Mitchell

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Develop, validate and apply methods for direct, nondestructive determination of body composition in swine and poultry.

Dr. Timothy Ramsay

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Bioregulation of neonatal stress in swine. Identification of biomarkers for the impact of neonatal stress on preweaning growth and development. Interaction of endocrinology and immunology in adipose tissue formation of neonatal swine.

Dr. Mark Richards

Research Animal Scientist
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Genetic control of appetite and energy balance in poultry. Development of gene expression assays, gene sequencing techniques and capillary electrophoresis-based methodologies.

Dr. Robert Rosebrough

Research Animal Scientist
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Control of appetite and energy metabolism in poultry. Regulation of lipid metabolism.

Dr. Neil C. Talbot

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Isolating and culturing embryo-derived cell lines from cows, pigs, and sheep to investigate nuclear reprogramming and cellular differentiation during embryo development. Performing proteomic analysis of nuclear transfer embryos and donor cells.

Dr. Robert J. Wall

Research Physiologist
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Enhance the phenotype of cattle, sheep, and swine by introduction of new genes into early embryos. Determine factors which limit efficiency of producing transgenic animals.

ANIMAL IMPROVEMENT PROGRAMS LABORATORY
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Mission: The mission of the Animal Improvement Programs Laboratory (AIPL) conducts research to discover, test, and implement improved genetic evaluation techniques for economically important traits of dairy cattle and goats. Research is directed at genetic improvement of efficiency of yield traits (milk, fat, and protein) and nonyield traits that affect health and profitability (longevity, conformation, fertility, calving, and disease resistance).

Dr. H. Duane Norman

Research Leader
Supervisory Research Geneticist
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Coordinates the research effort to improve genetic evaluation of dairy animals, the operation of USDA-DHIA evaluation systems, and policy with industry cooperators. Oversees the maintenance and improvement of the national research database. Conducts research using milk and component yields, fitness, and health traits.

Dr. John B. Cole

Research Geneticist
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Investigates genetic differences among dairy cattle for calving ease, stillbirth, persistency of yield, and health traits. Develops tools for analyzing genomic data. Studies relationships between genetic markers with large effects and economically important phenotypes. Evaluates changes in genetic diversity in U.S. dairy cattle over time.

Dr. Paul M. VanRaden

Research Geneticist
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Develops statistical methods to improve national and international genetic evaluations and to use genomic data in predictions. Investigates genetic differences among dairy cattle for yield, longevity, fertility, and udder health traits. Determines economic values for traits included in Net Merit. Examines effects of inbreeding, crossbreeding, and non-additive genetic merit.

Dr. Curtis P. Van Tassell

Research Geneticist
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Works between the Bovine Functional Genomics Laboratory and the Animal Improvement Programs Laboratory. Develops and implements methodologies for detection and characterization of quantitative trait loci (QTL) in cattle. Designs, conducts, and evaluates research to improve systems used in the national and international genetic evaluation of dairy cattle. Develops bioinformatic tools to acquire, store, and analyze genomic data.

Dr. George R. Wiggans

Research Geneticist
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Investigates methods to improve accuracy of genetic evaluations of yield traits, type traits, and calving ease, including use of genomic data. Conducts genetic evaluation of dairy goats. Advises on procedures to develop, improve, and access the national database and on distribution of evaluation information.

ANIMAL PARASITIC DISEASES LABORATORY
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Mission: The mission of the Animal Parasitic Diseases Laboratory (APDL) is to reduce economic losses incurred by producers that result from infectious diseases of livestock and poultry pathogens, and to decrease the transmission risk of parasite zoonoses to humans. The laboratory utilizes a wide range of expertise to accomplish this mission, including in-depth biochemical, molecular, genomic, immunological, and epidemiological approaches as well as systematics and population genetics. Research areas include basic and applied studies on (1) mechanisms of transmission, infection, and pathogen development; (2) diagnosis and epidemiology of livestock parasites transmissible to humans; (3) methods to control livestock pathogens which target both the pathogen and the host through genomic mapping, host gene expression and immune reagent development directed at the host-pathogen interface; and (4) biodiversity, systematics and population genetics of parasite groups of veterinary and medical importance.

Dr. Dante S. Zarlenga
Research Leader

Molecular Biologist
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Conducts research on the molecular biology of food borne parasites related to diagnosis, immune intervention, classification and epidemiology. Also develops immune reagents and investigates their relation to host-pathogen interactions among gastrointestinal nematodes and their swine and/or bovine hosts.

Dr. John F. Carroll

Research Entomologist
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Investigates methods of suppressing populations of the black-legged tick (deer tick), vector of the pathogen causing Lyme disease and other ticks of medical and veterinary importance. Studies host-finding behavior and ecology as they relate to tick control. Conducts research on compounds that repel ticks or modify their behavior in ways that prevent tick bites.

Dr. Jitender P. Dubey

Microbiologist
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Develops procedures to render meat and meat products safe from *Toxoplasma*-infection through diagnosis, epidemiology and on-farm control programs. Develops methods for the diagnosis and control of *Neospora* in domestic animals and *Sarcocystis neurona* in horses.

Dr. Raymond H. Fetterer
Zoologist
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Conducts research on physiology and biochemistry of parasites, particularly related to characterizing proteins involved in development of coccidia parasites of poultry. Uses proteomic techniques to identify proteins important in the biology of coccidian parasites.

Dr. Dolores E. Hill
Research Parasitologist
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Conducts research on the biochemistry, molecular biology, and epidemiology of the zoonotic pathogens *Toxoplasma gondii* and *Trichinella spiralis*. Develops methods to detect and identify parasites and strategies for the control of animal and human parasites of food safety concern.

Dr. Eric P. Hoberg
Zoologist
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Conducts research on the biodiversity, systematics and phylogeny of helminth parasites of animals relying on integrated approaches using comparative morphology and molecular data. Conducts analyses of coevolutionary and biogeographic relationships for nematodes of ungulates. Explores parasite faunal structure, biogeography, and emergent pathogens in relation to ecological disturbance, particularly the influence of climate change. Serves as Chief Curator, US National Parasite Collection.

Dr. Mark C. Jenkins
Microbiologist
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Conducts research on the molecular genetics of parasites of humans and food animals using various biochemical methods including recombinant DNA technology to identify parasites and to develop diagnostic probes. Utilizes molecular methods to produce recombinant proteins to serve as antigens in diagnostic assays and as immunogens in vaccine formulations. Studies epidemiology of drug-resistance in avian coccidian with goal of developing rapid detection methods.

Dr. Hyun S. Lillehoj
Research Immunologist
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Investigates immunobiology of host-pathogen interactions in avian diseases caused by mucosal pathogens including coccidia, clostridium and respiratory viruses using immunology and functional genomics technology. Develops immune reagents to assess poultry innate and adaptive immunity. Identifies chicken genes which control coccidiosis resistance/susceptibility and investigates genetic resistance mechanisms. Develops recombinant vaccine and alternative control strategies against avian coccidiosis and other mucosal pathogens. Develops novel mucosal vaccination strategies to induce local protective immunity against coccidiosis.

Dr. Joan K. Lunney
Research Scientist

Analyzes functional genomic and immune controls of swine responses to vaccines and respiratory infections,

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e.g., porcine reproductive and respiratory syndrome virus (PRRSV) and porcine circovirus (PCV2) infections. Investigates immunologic and genomic factors that regulate swine health and disease resistance. Leads the PRRS Host Genomics Consortium's efforts to determine the genetic basis of resistance/ susceptibility to PRRS. Develops molecular reagents to assess swine immunity and to measure cell surface antigen and cytokine and chemokine protein expression.

Dr. Katarzyna Miska
Research Molecular Biologist
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Develops molecular techniques to rapidly assess species composition of *Eimeria* in poultry facilities. Investigates genetic diversity of *Eimeria*. Identifies novel targets for anti-coccidia vaccines. Employs molecular techniques to study gene expression during life-cycle progression and parasite invasion.

Dr. Benjamin M. Rosenthal
Molecular Systematist
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Conducts research on the molecular systematics, diagnostics, and population genetics of food borne and water borne parasites. Characterizes the relationships among foodborne parasites, defines their evolutionary history, and identifies the biological and geographical factors that promote or limit their dissemination as a means to better manage the risks they pose to human health.

Dr. Wenbin Tuo
Research Animal Scientist
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Investigates local and systematic immunologic mechanisms that control parasite infection. Develops vaccines against *Neospora caninum* infection in cattle. Studies reproductive immunology and mechanisms of congenital transmission of infectious diseases and pregnancy failure in farm animals.

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Mission: The mission of the Bovine Functional Genomics Laboratory (BFGL) is to improve the genetic and productive efficiency of cattle through fundamental research on gene expression, and marker-assisted genetic selection. Research in the laboratory uses methods of molecular biology and bioinformatics to: enhance genetic selection by the identification of quantitative trait loci, identify genes that are important for enhanced productivity and disease resistance, and develop fundamental knowledge about physiology and development of the mammary gland, the bovine immune system and gastrointestinal tract. Implicit in these endeavors is the development of molecular, biological and bioinformatic tools to facilitate functional genomic studies, and the development of management and breeding tools that enhance producer efficiency and profitability.

Dr. Louis C. Gasbarre

Research Leader
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Identifies genes that control resistance to parasitic infections in ruminants and defines the expression in infected animals, characterizes cellular immune response of cattle with special emphasis on the role of cytokines in protective immunity; develop management programs that use genetics and host immunity to control parasite infection.

Dr. Ransom L. Baldwin, VI

Research Animal Scientist
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Quantitative assessment of energy metabolism in ruminant gut tissues. Identify mechanisms of cell growth and differentiation in gut tissue as affected by whole animal nutritional status and physiological state.

Dr. Anthony V. Capuco

Research Physiologist
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Evaluate genetic regulation of mammary gland function. Characterize mammary stem cells and develop methods to regulate their activity, with goals of promoting mammary growth, cell renewal, and repair of tissues damaged by mastitis.

Dr. Erin E. Connor

Research Molecular Biologist
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Uses molecular approaches to study genetic mechanisms contributing to nutrient use efficiency in dairy cattle; develops tools to identify dairy cattle inherently more efficient in the conversion of feed to support lactation; and develops management strategies to improve nutrient uptake and use in cattle.

Dr. Theodore H. Elsasser

Research Animal Scientist
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Identification of novel signal transduction pathways, pathway component modifications, and biomarkers involved in pathobiological response of the host (cattle) to low-level inflammatory and noninflammatory stresses; development of pathway-based intervention strategies to limit overt complications to stress.

Dr. Congjun Li

Research Molecular Biologist
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Functional genomic analysis and dissection of the epigenomic mechanisms and pathways of butyrate-induced cell proliferation regulation for a better understanding of its anti-metastatic, immune-mediating, and anti-inflammatory properties.

Dr. Robert Li

Research Molecular Biologist
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Utilize genomic tools to investigate genes and pathways defining host resistance. Characterize bovine transcriptome and investigate gene expression during mammary gland development using whole genome oligo microarrays. Validate and fine-map selected quantitative trait loci (QTL) and identify causative genetic variation underlying the QTL.

Dr. Ge Liu

Research Biologist (Bioinformatics)
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Design and apply structural and functional genomics approaches to facilitate candidate gene(s) and mutation(s) mapping for economic traits and disease resistance. Develop bioinformatics tools to analyze genomic data and gene expression data.

Dr. Tad S. Sonstegard

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Identify causative genetic variation underlying economic trait loci (ETL) by evaluating and mapping positional candidate genes. Generate expressed sequence tags (EST) from mammary and gut tissue and evaluate gene expression in these tissues to determine genetic factors involved in regulation of growth and disease resistance.

Dr. Curtis P. Van Tassell

Research Geneticist
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Works between BFGP and APIL. Develops and implements methodologies for detection and characterization of quantitative trait loci (QTL) in cattle. Designs, conducts and evaluates research to improve systems used in the national and international genetic evaluation of dairy cattle. Develop bioinformatic tools to acquire, store, and analyze genomic data.

ENVIRONMENTAL MANAGEMENT AND BYPRODUCT UTILIZATION LABORATORY
ANIMAL AND NATURAL RESOURCES INSTITUTE
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Mission: The Mission of the Environmental Management and Byproduct Utilization Laboratory (EMBUL) is to

reduce the footprint of agricultural production on the environment through advances in science and engineering; to discover innovative technologies that address the environmental concerns in the production of food, fiber, feed, and fuel; and to develop environmentally-responsible uses for agricultural and industrial byproduct/waste streams.

Dr. Matt C. Smith

Research Leader

Supervisory Agricultural Engineer
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Conducts research on treatment of animal manures with emphasis on low-input, sustainable, aquatic treatment systems. Studies the environmental impacts of manure management practices at multiple scales including modeling of potential hydrologic and water quality impacts of agricultural management practices. Engineering design of pilot-and full-scale treatment units and complete systems.

Dr. Rufus L. Chaney

Research Agronomist

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Conducts research on the characterization of Cd uptake, transport in plants, and bioavailability to animals; benefits/risks associated with land application of diverse organic resources; and remediation of toxic element contaminated soils using hyperaccumulator plants or biosolids.

Dr. Eton E. Codling

Research Agronomist

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Conducts research on the characterization and utilization of industrial, municipal and agricultural byproducts; benefit /risk associated with their uses in agriculture and horticulture. The bioavailability of lead and arsenic from lead-arsenate contaminated soils.

Dr. Thanh H. Dao

Soil Scientist

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Conducts laboratory and field research on the fate and transport of agricultural phosphorus in the soil-water-crop-livestock system, linking the molecular- to the landscape-scale processes. Develops biological and field phosphorus sensing tools to examine processes of nutrient bioavailability and transport as a function of management and environment.

Dr. Cathleen J. Hapeman

Research Chemist

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Examines pollutant fate and transport as a function of land use, including the agriculture-urban interface, conservation practices, and bioenergy production; discerns processes that affect air and water quality; assesses risk potential of agricultural pollutants to nearby ecosystems at landscape and regional scales.

Dr. Laura L. McConnell

Research Chemist

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Investigates the environmental fate of organic chemicals and the impact of these pollutants on air and water quality. Current projects range from a study of atmospheric deposition of pesticides in a Chesapeake Bay watershed to the development of analytical methods to determine odorous VOCs emissions released from agricultural operations.

Dr. John J. Meisinger

Research Soil Scientist
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Conducts field and laboratory research developing improved management practices for manure and fertilizer nitrogen. Studies the fate and transformations of nitrogen, such as ammonia volatilization, nitrate leaching, and crop utilization as affected by practices such as cover crops and conservation tillage. Develops nitrogen management practices for improving nitrogen use efficiency and reducing nitrogen losses to the environment.

Dr. Walter W. Mulbry, III

Research Microbiologist
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Conducts research on the development of bioremediation technologies for soil and contaminated liquids. Current research includes use of composting to reduce levels of antibiotics in manure from treated animals; capture and recycling of nitrogen from composting operations; and production of algae using agricultural drainage water.

Dr. James B. Reeves, III

Research Chemist
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Focus is on the development and validation of analytical methods for the measurement of nitrogen (N) and phosphorus (P) in solid, liquid, and volatile animal waste components. Research includes near-infrared spectroscopic (NIRS) and mid-infrared spectroscopic (MIDIR) for quantitative analysis of carbon, N, P in soil and animal waste.

Dr. Clifford P. Rice

Research Chemist
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Conducts field and laboratory research on transport and fate of agrochemicals with emphasis on atmospheric fate, transport, and deposition to the Chesapeake Bay and adjoining wetlands. Examines physical and chemical properties of the compounds and the environmental factors that influence their transformation, transport and deposition. Develops trace analytical methods using LC/MS-MS instrumentation for their measurement.

Dr. Walter F. Schmidt

Research Chemist
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Identifies the how and when and why and if individual chemical forms of compounds of agricultural interest are critical to predicting and impacting their desired or undesired environmental fate. Investigates the macro, micro and/or nano-scale interrelationship between physical chemical and spectroscopic properties of agricultural by-products. Formulates prototype end products from such by-products and develops CRADA (Cooperative Research and Development Agreements) among partners enabling technology to be converted to practice.

Dr. Paul H. Schwartz

Staff Scientist
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Plans, reviews, evaluates and establishes priorities for development of data by ARS scientists for support of the registration of minor use pesticides. Special emphasis is given to safer, more environmentally-friendly compounds. Coordinates the minor use pesticide research program for ARS with State and Federal scientists.

email: paul.schwartz@ars.usda.gov

ENVIRONMENTAL MICROBIAL and FOOD SAFETY LABORATORY
ANIMAL AND NATURAL RESOURCES INSTITUTE
BELTSVILLE, MARYLAND 20705-2350
PHONE 301/504-5607 FAX 301/504-6608

Mission: The mission of the Environmental Microbial and Food Safety Laboratory (EMFSL) is to identify, determine sources, and reduce transmission of pathogenic enteric microorganisms that affect the health of food animals and can also be transmitted to humans by contaminated food and water. The research is designed to develop and test novel methods to identify and characterize pathogenic enteric microorganisms; use the methods to determine the presence of these microorganisms in livestock and associated domesticated animals, potential wild animal vectors, as well as edible plants, milk, meat, soil and water impacted by agriculture; develop physical, chemical, and immunological methods to reduce the number and virulence of these microorganisms in host animals, food, and the environment.

Dr. Daniel Shelton

Research Leader

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301/504-6582
301/504-5760

email: Dan.Shelton@ars.usda.gov

Includes developing new methods for rapid, quantitative detection of human pathogens, elucidating environmental parameters controlling pathogen transport to surface and ground waters, assessing pathogen dispersal and survival in water, soil, manure, and produce, and developing strategies to minimize transport and dissemination of pathogens from animal manures to potable waters and fresh produce.

Dr. Arvind A. Bhagwat

Research Microbiologist

Bldg. 002, Room 210, BARC-West
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Beltsville, MD 20705-2350
301/504-5106

email: Arvind.Bhagwat@ars.usda.gov

Develop rapid and sensitive methods for detection of enteric human pathogens from fresh produce, and examines the efficacy of current postharvest sanitizing procedures for survival of human pathogens. Molecular biology and genetics of survival mechanisms of human pathogens.

Dr. Kuanglin Chao

Research Agricultural Engineer

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301/504-8450, Ext. 260

email: Kevin.Chao@ars.usda.gov

Hyperspectral and multispectral imaging technologies to assess safety and quality of agricultural produce and poultry carcasses. Development of nondestructive high-speed line scan imaging inspection systems using multispectral reflectance and Raman chemical imaging technologies.

Dr. Ronald Fayer

Research Zoologist

Bldg. 173, Room 100, BARC-East
Powder Mill Road
Beltsville, MD 20705-2350
301/504-8750

Email: Ronald.Fayer@ars.usda.gov

To develop and test novel methods to identify and characterize the parasites *Cryptosporidium*, *Giardia*, *Microsporidia*, and *Blastocystis*. Determine the presence of these organisms in livestock, associated domesticated and wild animals, as well as in edible foods, soil and water impacted by agriculture. Develop methods to reduce the number and virulence of these organisms in domesticated animals, food, and the environment.

Dr. Jeffrey S. Karns

Research Microbiologist
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301/504-6493
email: Jeffrey.Karns@ars.usda.gov

Develop methods for the specific detection and enumeration of pathogenic forms of microorganisms in foods, soil, manure and water. Use those methods to describe the fate of pathogens on the farm and the routes for their transmission to foods.

Dr. Moon Kim

Research Physicist
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301/504-8450, Ext. 245
email: Moon.Kim@ars.usda.gov

Hyperspectral and multispectral imaging technologies to assess safety and quality of agricultural produce and animal carcasses. Development of rapid on-line inspection systems and portable devices using multispectral laser-induced fluorescence and multispectral reflectance imaging technologies.

Dr. Alan Lefcourt

Research Biomedical Engineer
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Hyperspectral and multispectral imaging technologies to assess safety and quality of apples and other fruits and vegetables. Development of on-line systems for inspection of apples for contaminants.

Dr. Yaguang Luo

Research Food Technologist
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Beltsville, MD 20705-2350
301/504-6186
email: Yaguang.Luo@ars.usda.gov

Develop rapid and sensitive methods for detection of enteric human pathogens and spoilage bacteria from conventional and organically grown produce, and develop effective postharvest sanitizing procedures providing improved antimicrobial activity while maintaining produce quality and shelf-life, and understand the ecology and mechanisms that allow specific human and spoilage microorganisms to persist on fresh produce and develop control agents to reduce food safety risks.

Dr. Patricia A. Millner

Research Microbiologist
Bldg. 001, Room 122, BARC-West
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301/504-5631
email: Pat.Millner@ars.usda.gov

The long-term research objective of this project is to develop and translate fundamental agroecological knowledge into recommendations and products to improve the economic position of organic farmers and to improve their ability to meet consumer demand for organic products. Develop component technologies and management strategies that lead to improved productivity, enhanced soil and water conservation, and efficient nutrient cycling on organic farms. Understand agroecological principles that drive the function of organic cropping systems and quantify ecosystem services.

Dr. Xiangwu Nou

Research Microbiologist
Bldg. 201, Room 100A, BARC-East
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301/504-8991
email: Xiangwu.Nou@ars.usda.gov

Studies microbial ecology of zoonotic bacterial pathogens in leafy green production systems. Determines the effects of various environmental factors on the survival and dissemination of bacterial pathogens in various leafy green production environments. Develops effective agricultural practices to minimize pathogen contamination of fresh produce at pre-harvest and post-harvest production stages.

Dr. Yakov Pachepsky

Research Hydrologist
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301/504-7468
email: Yakov.Pachepsky@ars.usda.gov

Develops functional relationships between environmental parameters and pathogen transport from animal manure; integrates information on pathogen transport and survival to improve and validate pathogen transport and dispersal models for prediction and risk assessment of pathogen transmission from animal manures to potable water and fresh produce

Dr. Jitendra Patel

Research Food Technologist
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301/504-7003
email: Jitu.Patel@ars.usda.gov

Identify mechanisms of attachment, growth and survival of human pathogens on fresh produce. Determine molecular factors involved in the interaction of human pathogens with natural microflora on fresh produce and biofilm formation. Develop rapid, sensitive methods for detection of enteric pathogens in produce and soil.

Dr. Monica Santin

Research Microbiologist
Bldg. 173, Room 008A, BARC-East
Powder Mill Road
Beltsville, Maryland 20705-2350
301/504-6774
email: Monica.Santin-Duran@ars.usda.gov

Develop molecular methods to detect zoonotic protozoan parasites and apply these methods to specimens obtained from farms, wildlife, and surface waters in order to better understand the complex epidemiology of zoonotic diseases.

Dr. Manan Sharma

Research Microbiologist
Bldg. 201, Room 100B, BARC-East
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301/504-9198
email: Manan.Sharma@ars.usda.gov

Research focuses on the survival, persistence and growth of the bacterial foodborne pathogen *Escherichia coli* O157:H7 in leafy green pre-harvest environments. *E. coli* O157:H7 has been associated with several high profile outbreaks associated with lettuce, spinach and other leafy greens. This work examines the ability of *E. coli* to internalize to spinach tissues through root uptake. His research team also examines the ability of *E. coli* O157:H7 to persist in pre-harvest environments (soil, water). The expression of virulence factors of *E. coli* O157:H7 on leafy greens stored under various conditions is also evaluated. Bacteriophages, viruses that target and kill *E. coli* O157:H7, are also being examined as a potential intervention against *E. coli* O157:H7 on leafy greens.

Dr. Jo Ann S. Van Kessel

Research Animal Scientist

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Powder Mill Road

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301/504-8287

email: JoAnn.VanKessel@ars.usda.gov

Studies the incidence and ecology of zoonotic bacterial pathogens in dairy production systems, to evaluate and develop on-farm control strategies that will minimize pathogen infection of the herd, maintenance in the environment, and subsequent contamination of bulk milk.

HYDROLOGY AND REMOTE SENSING LABORATORY
ANIMAL AND NATURAL RESOURCES INSTITUTE
BELTSVILLE, MARYLAND 20705-2350
PHONE 301/504-7490, FAX 301/504-8931

Mission: The mission of the Hydrology and Remote Sensing Laboratory (HRSL) is to conduct nationally oriented basic and applied research on water resources and remote sensing concerns related to the production of food and fiber and the conservation of natural resources.

Dr. William P. Kustas
Research Leader

Supervisory Research Hydrologist
Room 104, Bldg. 007, BARC-West
10300 Baltimore Avenue
Beltsville, Maryland, 20705-2350
301/504-8498
email: Bill.Kustas@ars.usda.gov

Conducts research in the field of hydro-meteorology and remote sensing. Major interests include the application of remote sensing-based soil-vegetation-atmosphere-transfer schemes for energy balance estimation at multiple scales. Studies the effects of landscape heterogeneity on remotely sensed data and land-atmosphere dynamics. Investigates the effects of remote sensing resolution on modeled-derived water and energy fluxes for heterogeneous landscapes.

Dr. Martha Anderson

Research Physical Scientist
Room 120A, Bldg. 007, BARC-West
10300 Baltimore Avenue
Beltsville, Maryland 20705-2350
301/504-6616
email: Martha.Anderson@ars.usda.gov

Develops remote-sensing techniques for assessing the land-surface carbon, water and energy balance at local to continental scales. Emphasis on monitoring drought using multi-scale satellite imagery. Has expertise in hydrology, remote sensing, and soil-plant-atmosphere interactions.

Dr. Michael H. Cosh

Research Hydrologist
Room 129, Bldg. 007, BARC-West
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301/504-6461
email: Michael.Cosh@ars.usda.gov

Major research interests include temporal and spatial characteristics of land surface parameters, including soil moisture and vegetation. Conducts research in soil moisture profiles and large scale hydrologic networks for validation and calibration of satellites.

Dr. Wade Crow

Research Physical Scientist
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301/504-6847
email: Wade.Crow@ars.usda.gov

Develops techniques for integrating spaceborne and aerial remote sensing with hydrologic and land surface models. Major research goal is the development of land surface modeling and data assimilation techniques which enhance the value of remotely sensed observations for agricultural and water resource applications. Places special emphasis on techniques capable of optimally combining remote sensing information describing multiple components of the hydrologic cycle (e.g. evapotranspiration, surface soil moisture and rainfall). Has expertise in data assimilation, hydrologic modeling, surface energy balance modeling, and remote sensing. Measures and models the spectral and biophysical characteristics of vegetation and soils. Develops reflectance and fluorescence techniques for assessing crop and soil conditions. Develops remote sensing methods to measure crop residue cover.

Dr. Craig S.T. Daughtry

Research Agronomist
Room 122A, Bldg. 007, BARC-West
10300 Baltimore Avenue
Beltsville, Maryland 20705-2350
301/504-5015

email: Craig.Daughtry@ars.usda.gov

Dr. Paul C. Doraiswamy

Agricultural Meteorologist
Room 121A, Bldg. 007, BARC-West
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Beltsville, Maryland 20705-2350
301/504-6576
email: Paul.Doraiswamy@ars.usda.gov

Conducts research in the retrieval and integration of vegetation parameters from remotely sensed data with simulation models to assess crop condition and yields at local and regional scales. Uses biogeochemical models to study the impact of soil and crop management practices on potential soil carbon sequestration, erosion and productivity. Has expertise in agricultural meteorology, remote sensing and crop management.

Dr. Timothy J. Gish

Soil Scientist
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10300 Baltimore Avenue
Beltsville, Maryland 20705-2350
301/504-8378
email: Timothy.Gish@ars.usda.gov

Major research efforts focus on quantifying agricultural chemical fate as a function of management practice, landscape position, and climate. Particular interests deal with determining chemical fluxes (including preferential flow) through soil. Has expertise in soil physics, mathematics, soil chemistry, and water resources.

Dr. E. Raymond Hunt, Jr.

Physical Scientist
Room 101, Bldg. 007, BARC-West
10300 Baltimore Avenue
Beltsville, Maryland 20705-2350
301/504-5278
email: Raymond.Hunt@ars.usda.gov

Develops new techniques using remote sensing for detection of invasive weeds. Develops algorithms for NASA's Moderate-Resolution Imaging Spectroradiometer (MODIS) remote sensing for determination of vegetation water content. Combines remote sensing data with computer simulation models and meteorological data to estimate carbon sequestration during agricultural production.

Dr. Thomas Jackson

Hydrologist
Room 117, Bldg. 007, BARC-West
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301/504-8511
email: Thomas.Jackson@ars.usda.gov

Conducts research on remote sensing techniques and methods for use in hydrology. Major research involves the use of microwave remote sensing for the measurement of soil moisture. Studies include large-scale experimentation and the development of satellite technology and data retrieval methods. Has expertise in hydrology, water resources, and remote sensing.

Dr. Gregory W. McCarty

Research Soil Scientist
Room 202, Bldg. 007, BARC-West
10300 Baltimore Avenue
Beltsville, Maryland 20705—2350
301/504-7401
email: Greg.McCarty@ars.usda.gov

Conducts research concerning the ecology and biochemistry of microorganisms in soil with specific focus on carbon and nitrogen transformations in landscapes. Investigates the fate of nutrients in riparian/wetland systems and the effectiveness of these systems to mitigate agricultural pollution. Develops new methods to measure carbon sequestration.

Dr. Jerry Ritchie

Soil Scientist
Room 110A, Bldg. 007, BARC-West
10300 Baltimore Avenue
Beltsville, Maryland 20705-2350
301/504-8717
email: Jerry.Ritchie@ars.usda.gov

Major research efforts are on the use of remote sensing to measure landscape properties, the use of native grasses to improve soil conditions and control soil erosion, the use of tracers to measure soil erosion patterns, and the development of techniques to evaluate carbon sequestration on agricultural lands.

Dr. Ali M. Sadeghi

Research Soil Scientist
Room 207A, Bldg. 007, BARC-West
10300 Baltimore Avenue

Conducts research to examine effects of and interactions between various environmental parameters on the fate and transport of agrochemicals and pathogens at laboratory, field, and watershed scales. Improves and

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301/504-6693
email: Ali.Sadeghi@ars.usda.gov

develops environmental models and decision support systems (DSS) as management tools for assessing BMPs and other agricultural/conservation practices.

SUSTAINABLE AGRICULTURAL SYSTEMS LABORATORY
ANIMAL AND NATURAL RESOURCES INSTITUTE
BELTSVILLE, MARYLAND 20705-2350
PHONE 301-504-7199 FAX 301-504-6491/8370

Mission: The mission of the Sustainable Agricultural Systems Laboratory (SASL) is to determine principles and practices that support the development of sustainable agricultural systems. Emphasis is placed on multi-disciplinary research to understand fundamental agro-ecological processes underlying the functioning of sustainable systems. Communication with the community of growers, suppliers, information specialists, and consumers that value sustainable agriculture is integral to the definition of research problems and the transfer of technology.

Dr. John R. Teasdale

Research Leader, Sprvsy. Plant Physiologist
Bldg. 001, Rm 245, BARC-West
Beltsville, MD 20705
PH: (301) 504-5504
FAX: (301) 504-6491
Email: John.Teasdale@ars.usda.gov

Develops sustainable cover crop and integrated weed management systems and determines processes underlying weed population dynamics within sustainable agro-ecosystems.

Dr. Jeffrey S. Buyer

Research Chemist
Bldg. 001, Rm 124, BARC-West
Beltsville, MD 20705
PH: (301) 504-8436
FAX: (301) 504-8370
Email: Jeffrey.Buyer@ars.usda.gov

Evaluates microbial community structure and diversity in soil rhizosphere by analysis of 16S ribosomal DNA and lipid biomarkers to compare the microbial impacts of various conventional and alternative agricultural systems. Develops new methods for identification of bacteria and characterization of microbial communities.

Dr. Michel Cavigelli

Research Soil Scientist
Bldg. 001, Rm 118, BARC-West
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PH: (301) 504-8327
FAX: (301) 504-8370
Email: Michel.Cavigelli@ars.usda.gov

Coordinates the Farming Systems Project, a long-term evaluation of the sustainability of five cropping systems, organic and conventional. Project addresses various aspects of sustainability including: agronomic factors (crop yields etc.); environmental impact (carbon, nitrogen and phosphorus balances, greenhouse gas production, carbon sequestration); soil biology dynamics (soil invertebrate communities, weed seedbank dynamics); and economics.

Dr. C. Benjamin Coffman

Agronomist
Bldg. 001, Rm 121, BARC-West
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FAX: (301) 504-8370
Email: Ben.Coffman@ars.usda.gov

Conducts weed management and crop production research in organic and conventional systems. Field manager and coordinator for BARC sustainable agriculture research program. Organizes outreach programs for small farmers.

Dr. Thomas E. Devine

Research Geneticist
Bldg. 001, Rm 226, BARC-West
Beltsville, MD 20705
PH: (301) 504-6375
FAX: (301) 504-6491
Email: Thomas.Devine@ars.usda.gov

Conducts research on hairy vetch genetics and breeding. Breeds hairy vetch for use as green manure and cover crop.

Dr. John Lydon

Research Plant Physiologist
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FAX: (301) 504-6491
Email: John.Lydon@ars.usda.gov

Conducts research on the biological control of invasive weeds. Emphasis is on characterizing and enhancing the activity of biological agents.

Dr. Autar K. Mattoo

Research Plant Physiologist
Bldg 001, Rm 119, BARC-West
Beltsville, MD 20705
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FAX: (301) 504-8370
Email: Autar.Mattoo@ars.usda.gov

Develops fundamental information on cross talks between plant hormones, signaling pathways and regulatory genes involved in nutrient accumulation, fruit ripening, senescence, programmed cell death, and plant responses to environmental extremes. Studies assembly and function of key membrane proteins. Investigates integration of genetically engineered crops into sustainable, alternative agriculture using biochemical, molecular genetics and biotechnological approaches. Functional genomics and proteomics are used for gene discovery and transcriptional regulation.

Dr. Jude Maul

Research Ecologist
Bldg. 001, Rm 123, BARC-West
Beltsville, MD 20705
PH: (301) 504-9068
FAX: (301) 504-8370
Email: Jude.Maul@ars.usda.gov

Conducts research on plant / soil ecology and biogeochemistry of agroecosystems. Current research focus is on the fundamental differences between organic and conventional farming systems, in particular how changes in microbial community structure and function influence greenhouse gas flux, organic matter cycling and plant decomposition.

Dr. Patricia D. Millner

Microbiologist
Bldg. 001, Rm 122, BARC-West
Beltsville, MD 20705
PH: (301) 504-5631
FAX: (301) 504-8370
Email: Pat.Millner@ars.usda.gov

Conducts basic and applied research on microbially-mediated processes associated with food safety of fresh fruits and vegetables from organic and conventional production systems, including high tunnels. Develops and applies basic knowledge to prevent pathogen survival and dispersal from manure, biosolids and composts to soils and fresh produce crops. Investigates and develops technologies for increasing the fertilizer value of composts through in-vessel composting. Conducts cover crop systems research for ecologically based crop/weed management to maintain crop profitability while enhancing soil and

Dr. Steven B. Mirsky

Research Ecologist
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water quality and reducing crop production energetic requirements. Empirical agronomic research in a long-term cropping system experiment and additional field trials are coupled with simulation models to optimize agro-ecosystem economic profitability and environmental sustainability.

Dr. Clifford Rice

Research Chemist
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FAX: (301) 504-6491
Email: Cliff.Rice@ars.usda.gov

Isolates and identifies allelopathic compounds in cover crop residue and soils in sustainable agricultural systems.

Dr. Daniel P. Roberts

Microbiologist
Bldg. 001, Rm 228, BARC-West
Beltsville, MD 20705
PH: (301) 504-5680
FAX: (301) 504-6491
Email: Dan.Roberts@ars.usda.gov

Develops alternative biologically-based control measures for soilborne pathogens of vegetable crops. Conducts basic research on the means by which biological control microorganisms associate with plants and suppress disease.

BELTSVILLE, MARYLAND 20705-2350

VETERINARY SERVICES UNIT

Mission: This unit is responsible for care and welfare of all experimental animals at the Beltsville Agricultural Research Center and provides program guidance for health, quarantine, and other regulations.

Dr. William Hare

Veterinary Medical Officer
Bldg. 177C, BARC-East
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301/504-9081
FAX: 301/504-8746
email: William.Hare@ars.usda.gov

Provides program support to scientists conducting studies with or involving all species of animals by diagnosis of pathological conditions, plans and initiates therapy, develops and carries out health programs, performs routine and experimental surgery as needed or requested, and provides reproductive and obstetrical care. Administers Federal and State regulations related to the purchase, sale, and transport of domestic animals; carries out the federal and State testing for herd certification; carries out mandatory regulations regarding laboratory animals covered under the Animal Welfare Act (Public Law 89-544).

Dr. Gregory Sample

Veterinary Medical Officer
Bldg. 177C, BARC-East
10300 Baltimore Avenue
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301/504-5624
FAX: 301/504-8746
email: Greg.Sample@ars.usda.gov

ADMINISTRATIVE SERVICE UNIT

Mission: Provides administrative support service to ANRI management units.

Ms. Lynn Windsor

Administrative Officer
Bldg. 209, BARC-East
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301-504-8202
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email: lynn.windsor@ars.usda.gov

This unit is responsible for the budget, accounting, and contracting activities for ANRI.

ANIMAL CARE COMPLIANCE OFFICE

Mission: The Beltsville Agricultural Research Center is committed to the humane care and use of animals in activities related to research and teaching. There are three separate components designated to ensure appropriate implementation of the animal care and use program. The Beltsville Area Animal Care and Use Committee (BAACUC), Veterinary Services and the Animal Care Compliance Office which all strive to provide oversight of the animal care and use program including ensuring compliance with federal, state and local regulations.

Ms. Mary Lou Miner

Program Manager
Bldg. 200, Rm. 100, BARC-East
10300 Baltimore Avenue
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301-504-5714
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Provides oversight of the Animal Care Compliance Office as well as consultation for the BAACUC, scientists and technical support with regards to rules, regulations, policies and procedures that govern the care and use of research animals.