Delmarva Poultry
University-Industry
Partnership Summit

Hosted By:
University of Maryland Eastern Shore
and
University of Maryland, College Park

April 7, 2017
Acknowledgements

Thanks to members of the
Delmarva Poultry University-Industry Summit Planning Committee
for making this event possible:
Craig Beyrouty, Bill Bowerman, Cyril R. Clarke,
Stephen Collier, Rami Dalloul, Suzanne E. Dorsey, Jack Gelb, Alan Grant,
Moses Kairo, Calvin Keeler, Rubie G. Mize, Jonathan R. Moyle,
Nancy K. Nunn, F. William Pierson, Alverta J. Polk, Tom E. Porter,
Mark Rieger, Jennifer Lynn Rhodes, Adel Shirmohammadi,
Siba Samal, Bill Satterfield, Jurgen G. Schwarz, Chad Stahl,
Suzanne Street, and Jennifer Timmons

Special thanks to Graham Binder, Director of Communications, UMD-AGNR,
for the cover and editorial help

Information in this program are available online at:
https://agresearch.umd.edu/topic/poultry

Printing of this program is funded by the
Maryland Agricultural Experiment Station
1201 Symons Hall
University of Maryland
College Park, MD 20742
(301) 405-2462
http://agresearch.umd.edu/
Dear Attendee,

On behalf of the College of Agriculture and Natural Resources at UMD College Park, and the School of Agriculture and Natural Sciences at UMD Eastern Shore, we are pleased to welcome you to the Delmarva Poultry University-Industry Partnership Summit. Both institutions are committed to advancing the growth and sustainability of the poultry industry through our research and education programs, and as deans of each school, we recognize the value and importance of engaging our vital partners and stakeholders in collaboration and conversation.

The areas of animal production and development, disease prevention, nutrient efficiency, health and environmental impact and more will be focal points throughout the day in our collective effort to maintain and bolster the vibrant poultry economy of the Mid-Atlantic region. Our agenda offers a dynamic schedule of events, featuring poultry program presentations from our participating institutions, followed by conversation and informative poster sessions. Afternoon breakout sessions will offer a unique opportunity for industry partners and stakeholders to incorporate their voice and be heard as we consider ways to innovate and enhance research, teaching and extension efforts.

We’d like to thank the distinguished faculty and representatives from the University of Delaware, Delaware State University and Virginia Polytechnic Institute and State University for their participation and enthusiasm in working with us to organize this summit. We look forward to working with each of you to forge a successful partnership and evaluate next steps.

Sincerely,

Craig Beyrouty
Dean
College of Agriculture & Natural Resources
University of Maryland

Moses Kairo
Dean
School of Agricultural and Natural Sciences
University of Maryland Eastern Shore
Delmarva Poultry University-Industry Partnership Summit
University of Maryland Eastern Shore

Working together for a robust poultry economy in Delmarva

April 7, 2017

Agenda:

8:00 AM Arrival, Registration and Poster Set-up at Ballroom [Ballroom]
Continental Breakfast

9:00 AM Introduction [Ballroom]
- Siba Samal, Assoc. Dean and Chair, Department of Veterinary Medicine,
  University of Maryland, College Park

Welcome by the Deans and Industry Representative:
- Moses Kairo, Dean, School of Agricultural and Natural Sciences
  University of Maryland Eastern Shore
- Craig Beyrouty, Dean, College of Agriculture and Natural Resources
  University of Maryland, College Park
- Mark Rieger, Dean, College of Agriculture and Natural Resources
  University of Delaware
- Cyril R. Clarke, Dean, Virginia-Maryland College of Veterinary Medicine
  Virginia Polytechnic Institute and State University (Virginia Tech)
- Bill Satterfield, Executive Director, Delmarva Poultry Industry Inc.

9:30 AM University Poultry Programs [Ballroom]
- University of Delaware – Calvin Keeler, Professor, Department of Animal and
  Food Science, College of Agriculture and Natural Resources
- University of Maryland Eastern Shore – Jurgen Schwarz, Professor and Chair,
  Department of Agriculture, Food and Resource Sciences
- University of Maryland, College Park – Chad Stahl, Professor and Chair,
  Department of Animal and Avian Sciences
- Virginia Tech, College of Agriculture and Life Sciences – Rami Dalloul,
  Associate Professor, Animal & Poultry Sciences
Virginia-Maryland College of Veterinary Medicine – Nathaniel L. Tablante, Professor & Extension Poultry Veterinarian, Department of Veterinary Medicine, University of Maryland, College Park

Q & A

11:30 AM Lunch and Poster Session [Ballroom]

1:00 PM Overview of Breakout Sessions [Ballroom]
- Adel Shirmohammadi, Assoc. Dean & Assoc. Director, Maryland Agricultural Experiment Station, and
- Suzanne E. Dorsey, Executive Director Harry R. Hughes Center for Agro-Ecology

Breakout groups will explore the following:
1. Are university programs addressing the needs of the poultry industry in Delmarva? What are the strengths and weaknesses?
2. What challenges are industry and universities facing at both regional and national levels?
3. What current and future opportunities should the university-industry partnership explore?
4. Describe an ideal industry-university partnership.
5. What are the actions or next steps to move the partnership forward?

Breakout Groups:

- **Animal Production** [Room 2144]
  Facilitators: Jenny Rhodes, UMCP and Jennifer Timmons, UMES

- **Animal Health** [Room 2146]
  Facilitators: Daniel Bautista, UDEL and F. William (Bill) Pierson, VA Tech

- **Environment** [Room 2147]
  Facilitators: Bill Bowerman, UMCP and Rami Dalloul, VA Tech

2:30 PM Reports by Facilitators [Ballroom]

Moderator – Craig Beyrouty, Dean, UMCP

Reaction from Industry-Stakeholders:
- Ashley Peterson – Vice President of Science and Technology, National Chicken Council
- John Brooks, DVM - Maryland Ag Commission Member representing Veterinary Medicine, and Bel Air Veterinary Hospital Chief Operating Officer
- Jimmy Paulakuhn – Vice President of Live Operations, Mountaire Farms

Summary and Next Steps – Craig Beyrouty, Dean, UMCP

3:00 PM Thanks and Adjourn - Moses Kairo, Dean, UMES
1. Emergency Poultry Disease Response  
   Eric R. Benson and Robert L. Alphin

2. Energy Efficient Broiler Lighting  
   Robert L. Alphin and Eric R. Benson

3. Gene expression analysis of Wooden Breast Disease in three distinct modern broiler chicken populations  
   Michael Babak

4. Use of 9CFR Part 107.1 (b) to Control a Variant Strain of *Nephropathogenic* Infectious Bronchitis Virus in Delmarva Broiler Chickens  
   Brian Ladman

5. Innovative technologies to mitigating air emissions from poultry operations  
   Hong Li

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1. Reduction of Salmonella in Ground Chicken Using a Commercially Available Bacteriophage  
   Ar’Quette Grant, Salina Parveen, Jurgen Schwarz, Fawzy Hashem, and Bob Vimini

2. Molecular characterization of *Clostridium perfringens* isolated from broiler chickens experiencing necrotic enteritis  
   Samuel N. Mwangi

3. Controlling Ammonia Concentration Levels In Broiler Houses Using Flat Membrane Technology  
   Felix Buabeng
1. Nutritional Enhancement of Soybean  
   Wendy Peer

2. The Peer Lab  
   Wendy Peer

3. Composting effective at reducing estrogens in broiler litter  
   Lance Yonkos and Gary Felton

   Stephanie Lansing, Gary Felton, Freddy Witarsa, Amro Hassanein, Rohan Tikekar and Jonathan Moyle

5. Optimizing phosphorus digestibility through calcium management.  
   The importance of digestible calcium  
   Roselina Angel

6. Metabolic and hormonal effects of heat stress in broiler chickens  
   Tom Porter

7. The importance of UV light for broiler well-being  
   Rachel Lynn Dennis

8. A recombinant Newcastle disease virus (NDV) expressing S gene of infectious bronchitis virus (IBV) protects chickens against virulent IBV and NDV challenges  
   Edris Shirvani, Anandan Paldurai, Vinoth Manoharan, Berin Parambethu Varghese and Siba K. Samal

9. A recombinant Newcastle disease virus (NDV) expressing gD gene of infectious laryngotracheitis virus (ILTV) protects chickens against virulent ILTV and NDV challenges  
   Asuka Yoshida, Mallikarjuna Kanabagatte Basavarajappa, Anandan Paldurai, Sunil K. Khattar and Siba K. Samal
10. Preventing Outbreaks of Avian Influenza Through Timely Dissemination of Practical Science-Based Information  
   Nathaniel Tablante, Jennifer Rhodes, and Jonathan Moyle

11. A Novel Vaccination Strategy for Avian Influenza  
   Shin-Hee Kim and Siba K. Samal

12. Comparison of competitive exclusion of *Campylobacter jejuni* by *Lactobacillus casei* and linoleic acid overproducing *Lactobacillus casei*  
   Zajeba Tabashum, Mengfei Peng, Serajus Salaheen, Jungsoo Joo and Debabrata Biswas

13. Control of Fowl Cholera in poultry caused by *Pasteurella multocida* with Natural Organic Feed Supplement  
   Serajus Salaheen, Jose Alejandro Almario and Debabrata Biswas

14. Reduction of *Campylobacter jejuni* colonization in poultry by stimulation of *Lactobacillus casei* growth with peanut fraction  
   Serajus Salaheen, Daniel Hewes, Jose Alejandro Almario and Debabrata Biswas

15. Reduction of Campylobacter colonization in Poultry Grown in Mixed Crop-Livestock Farms with cheap byproducts of berry fruits  
   Serajus Salaheen, Mengfei Peng, Cecilia Nguyen, Christine Mui and Debabrata Biswas

16. AGNR's Agricultural Nutrient Management Program (table display)  
   Patricia Steinhilber

2. The Enemy of My Enemy is My Friend: An Unconventional Approach to the Control of Foodborne Salmonella. L. Settle, M. Seleem, N. Sriranganathan, and F. Pierson


4. Unusual Phenotypic Characteristics of Ornithobacterium rhinotrachealae in Virginia. J. Walters, M. Mahsoub, L. Craig, R. Evans, and F. Pierson

5. Determination and Analysis of the complete Genomic Sequence of an Avirulent Strain of Avian Hepatitis E Virus: Identification of Critical Amino Acid Mutations in the Capsid Gene. P. Billam, Z. Sun, and X. Meng

The following are faculty involved in projects and educational efforts that benefit the poultry industry. If you are interested in learning more about their work, or other research, education, and outreach programs, contact info are in their respective profile.

### University of Delaware (UDEL)

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<td>Behnam Abasht</td>
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### Virginia Polytechnic Institute and State University (VA Tech)

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<td>Thomas E. Cecere</td>
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<td>Xiang-Jin Meng</td>
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**Dr. Behnam Abasht**  
Assistant Professor  
University of Delaware  
College of Agriculture and Natural Resources  
Department of Animal and Food Sciences  
Email: abasht@udel.edu  
Phone: (302) 831-2822

**Area of Expertise:**
- Genetics and Breeding
- Genomics
- Muscle Diseases
- Metabolomics

**Focus of Research:**
- Genetic basis of Wooden Breast Diseases and White Striping in commercial broiler chickens
- Genomic imprinting and allele-specific expression in chickens
- Biological basis of variation in broiler’s feed efficiency
- Characterization of polymorphisms in the duck genome

**Current Funded Projects (Source):**
- Verification of Allele Specific Expression in Chicken Embryonic Brain and Liver by using Minor Allele Finder (NIH NIGMS IDeA through Delaware INBRE).
- Genome-wide Identification and Functional Validation of GenesCausing Susceptibility to Wooden Breast Disease in Commercial Broiler Chickens (NIFA).
- Identifying the Onset of a Novel Muscle Disorder in Chickens Through Differential Gene Expression and Histologic Analyses (USPEA).
Area of Expertise:

- Avian virology
- Poultry production
- Emergency disease outbreak response
- Biosecurity

Focus of Research:

- Improving the effectiveness of depopulation methods & equipment
- Decontamination of equipment & poultry facilities
- Improving poultry performance & sustainability using new alternative lighting technologies

Focus of Outreach:

- Emergency outbreak response training
- Improving broiler production using new lighting technologies

Courses Taught:

- ANFS 111 Animal Science Laboratory (Animal Health section)
- ANFS 112 Animal Handling Laboratory (Poultry section)
- ANFS 422 Poultry Production

Current Funded Projects (Source):

- Evaluation of Poultry House Heat Treatment as an Alternative to Post Outbreak Wet Cleaning and Disinfection. US Poultry Foundation
- Provide Emergency Poultry Disease Response Training. (USDA APHIS)
- Control of Endemic, Emerging, and Re-Emerging Poultry Respiratory Diseases in the United States (USDA AFRI)
- US Poultry Foundation Recruiting Grant (US Poultry Foundation)
Area of Expertise:

- Host-pathogen interaction
- Cellular signal transduction
- Gut health
- Immunology

Focus of Research:

- Molecular mechanisms of Necrotic Enteritis development
- Antibiotic alternatives
- Gut immune development
- Microbiota signaling

Current Funded Projects (Source):

- Immune and Metabolic Kinome Analysis of Animal Samples to Study Feed Formulation, Disease and Food Safety (USDA ARS)
- A Comparative Evaluation of the Development of the Broiler chicken Gut Immune System (Evonik Nutrition & Care)
- Immune and Metabolic Kinome Analysis of Chicken and Bovine to Study Mechanism of Action of Feed Enzymes and Disease (Elanco Animal Health)
- The Development and Application of Wild Duck-Specific Peptide Arrays for Kinome Immunometabolism Analysis of Influenza Infection (USGS)
- Crosslinkage between gut fermentation, adiposity and immune response activates mesenteric adipose depot inflammation in dairy cows (CANR)
Area of Expertise:

- Emergency poultry disease response including depopulation, carcass disposal, and disinfection
- Alternative lighting technologies
- Instrumentation, sensing, and machine vision
- Agricultural air quality

Focus of Research:

- Local, national, and international outreach on emergency poultry disease response coupled with development, evaluation, and process improvement and mass emergency depopulation procedures for emergency poultry disease response, carcass composting, and alternative disinfection strategies, equipment, and treatments
- Alternative lighting technologies for the poultry industry and the interaction between lamp technologies, specific lamps, dimmers, and dimming settings

Current Funded Projects (Source):

- Open-source mobile low cost vehicle undercarriage wash system (USDA APHIS)
- Evaluation of Poultry House Heat Treatment as an Alternative to Post Outbreak Wet Cleaning and Disinfection (US Poultry and Egg Association)
- Scope of Work for the University of Delaware to provide training for the 2017 Emergency Poultry Disease Response (EPDR) Certificate Training Program (USDA ITRCB)
- Scope of Work for the University of Delaware to provide Emergency Response and Foam Depopulation Training and Testing for 3-D contractors (USDA NVS)
Erin M. Brannick, D.V.M., M.S.
Assistant Professor,
Veterinary Anatomic Pathologist
University of Delaware
College of Agriculture and Natural Resources
Department of Animal and Food Sciences
brannick@udel.edu
302-598-3134

Area of Expertise:

- Veterinary Pathology, ACVP-certified Anatomic Pathologist
- Histologic surveillance of emerging and re-emerging avian diseases
- Animal models of disease

Focus of Research:

- Pathogenesis and lesion characterization in natural and experimental diseases in poultry, with recent focus on Wooden Breast Disease, Infectious Bronchitis, Infectious Bursal Disease, and Avian Influenza.
- Pathology and histopathology support for multispecies research in animal health and animal models of human disease.
- Interdisciplinary consultation regarding tissue dissection, collection, trimming, fixation, image capture, digital pathology, and techniques in staining and immunohistochemistry.

Current Funded Projects (Source):

- Evaluation of Cross-Protection Provided by IBV Vaccination Programs vs. Challenge with Current U.S. Variant Viruses. (U.S. Poultry & Egg Association)
- Undergraduate Research Experience- Exploring One Health: Protecting our food supply, animal health, and the environment. (USDA)
Area of Expertise:

- Avian ecology
- Radar ornithology
- Landscape ecology
- Conservation biology

Focus of Research:

- Mapping wild bird distributions with weather surveillance radar
- Risk mapping of Highly Pathogenic Avian Influenza (HPAI) based on waterfowl distributions
- Wildlife response to habitat management
- Stopover ecology of migratory land birds
- Identifying important stopover areas for conservation of migratory birds

Current Funded Projects (Source):

- Waterfowl and Highly Pathogenic Avian Influenza (HPAI): Spatio-Temporal Risk Mapping of HPAI in the Central Valley of California. (University of California Davis, Division of Agriculture and Natural Resources)
- Evaluating the impact of artificial light on the flight behavior and stopover ecology of nocturnally-migrating birds. (University of Delaware College of Agriculture and Natural Resources)
- Comprehensive assessment of the distribution, abundance, timing and habitat affiliations of migratory birds during spring and fall on the U.S. coast of the Gulf of Mexico. (National Fish and Wildlife Foundation)
- Developing methodology and written procedure for ECCC Scientists to map stopover habitats for migratory landbirds using Canadian weather surveillance radars. (Environment Canada)
- Do street lights affect flight behavior of nocturnally migrating birds? (Experiment.com)
Area of Expertise:

- Molecular virology
- Pathogenomics
- Innate immunity
- Vaccine development
- Metagenomics

Focus of Research:

- Molecular genetics and vaccine development of infectious laryngotracheitis virus
- Characterization of the avian innate immune responses to viruses and bacteria
- Characterization of the avian respiratory microbiome
- Improved molecular diagnostics for avian pathogens
- Transcriptional and post-transcriptional regulation of the avian inflammasome

Current Funded Projects (Source):

- Pathogenomics of infectious laryngotracheitis virus (USDA Animal Health)
- A Novel, translational, multidisciplinary approach to control respiratory diseases in the United States (USDA NIFA)
- Modified live vaccines of infectious laryngotracheitis virus (US Poultry & Egg Association)
Brian S. Ladman, Ph.D., M.B.A  
Scientist  
University of Delaware  
College of Agriculture & Natural Resources  
Avian Biosciences Center  
Department of Animal & Food Sciences  
Email: bladman@udel.edu  
Phone: (302) 831-8734

Area of Expertise:

- Avian virology  
- Select agent regulations and ISO 17025 laboratory accreditation  
- Biosafety level 3 laboratory management

Focus of Research:

- Vaccine development for avian respiratory diseases including infectious bronchitis virus (IBV) and infectious laryngotracheitis virus (ILTV)  
- Development of molecular diagnostic assays for avian pathogens  
- Evaluation of avian vaccines and vaccination programs: IBV; ILTV; avian influenza virus (AIV)  
- Characterization of emerging avian respiratory viruses: IBV; AIV

Current Funded Projects (Source):

- Protection provided by multivalent infectious bronchitis virus vaccines against challenge with current U.S. strains and variants (US Poultry & Egg Association)  
- Veterinary Diagnostic Laboratory Quality Assurance Training Program (APHIS USDA)
Hong Li, Ph.D.  
Assistant Professor  
University of Delaware  
College of Agriculture and Natural Resources  
Department of Animal and Food Sciences  
Email: hli@udel.edu  
Phone: (302) 831-1652

**Area of Expertise:**

- Animal environment management
- Poultry production management
- Environmental enrichment and animal welfare
- Animal agriculture air quality and emission

**Focus of Research:**

- Poultry litter management
- Poultry housing thermal environment management
- Evaluation of emerging air pollution control technologies
- Improving poultry welfare with environmental enrichment
- Characterizing process emission factors and developing emission inventories from animals
- Developing novel mass vaccination administration methods in poultry hatchery

**Current Funded Projects (Source):**

- Innovative approaches to capture nitrogen and air pollutant emissions from poultry operations (USDA NRCS)
- Developing and evaluating an innovative litter amendment application system for poultry operations (USDA NIFA)
- Using Poultry Litter-Derived Biochar to Control Ammonia Emissions (Delmarva Seed)
Area of Expertise:

- Molecular virology
- Tumor viruses
- Viral diseases
- Immunology and vaccine development

Focus of Research:

- Molecular biology of Marek’s Disease Virus (MDV)
- Understanding basic oncogenic mechanisms of MDV
- Understanding immunity to MDV-lymphomagenesis
- Development of novel vaccine and immune modulators for poultry

Courses Taught:

- ANFS 265, Careers in Animal and Food Sciences
- ANFS 332, Introduction to Animal Diseases
- ANFS 435/635, Animal Virology
- ANFS 671, Paradigms in Cell Signaling
- UNIV 101, First Year Experience

Current Funded Projects (Source):

- Recombinant vaccine development and testing (CEVA, Intervet-MSD)
- Undergraduate research experience (NIFA)
- Mechanism of Action (MOA) of immune modulators (Bayer Animal Health)
- Role of exosomes in MDV immunosuppression and vaccine responses (CANR)
Arthur L. Allen, Ph.D.
Professor
Director, Chesapeake Water Quality Center
Director, Geospatial Technologies Center
University of Maryland Eastern Shore
School of Agricultural and Natural Sciences
Department of Agriculture, Food and
Resource Sciences
alallen@umes.edu
410-251-6622

Area of Expertise:

- Soil Science
- Plant Nutrition
- Plant Physiology

Focus of Research:

- Water Quality/Nutrient Management

Current Funded Projects (Source):

- UMES-ARS Cooperative Agreement Awards in support of the Chesapeake Water Quality Center (USDA-ARS)
- Cost Effectively Reducing, Chesapeake Bay Phosphorus Pollution and the Production of Bio-Fuels and Bio-Products (Maryland’s MIPS Program)
- Combining Electrical Resistivity Imaging and Conservative Tracers to Characterize Subsurface Phosphorus Losses from Ditch-Drained Soils (AFRI-USDA)
- An Examination of the Autochthonous Sources of Urea in Watersheds and the Potential Role of Microbial Activity (Capacity Building Grant)
- SAM Initiative: Subsurface Application of Manures in the Chesapeake Bay Basin (National Fish and Wildlife Foundation Chesapeake Bay Stewardship Fund)
- A network Approach to Identifying and Promoting Innovations in Nutrient Management to Ensure Sustainable Water Resources and Aquatic Ecosystems (Environmental Protection Agency)
- Decreasing Nitrogen and Phosphorus in Drainage Waters Using a Comprehensive Drainage Management Approach (NRCS-CIG)
Area of Expertise:

- Comparative Pathology
- Fish Pathophysiology
- Ecotoxicology
- Ecology
- Aquaculture

Focus of Research

- Mobilization of metals in elasmobranchs
- Mobilization of methylated metals and chlorinated hydrocarbons in elasmobranchs
- Source, fate and transport of urea into aquatic systems
- Comparison of hydroponic and aquaponics systems
- Microbial communities in aquatic ecosystems

Current Funded Projects (Source):

- An Examination of the Autochthonous Sources of Urea in Watersheds and Potential Role of Microbial Activity (USDA)
- Fostering an Integrated Program on Food Safety of Fresh Produce Among 1890 Institutions (USDA)
- Awareness and Best Marketing Training: Viable Economic Opportunities for Socially Disadvantaged Groups on the Lower Eastern Shore of Maryland (USDA)
- Nontraditional Water Sources CONSERVE Center Grant (USDA)
- NOAA Living Marine Resources Cooperative Science Center (NOAA)
- CREST Center for the Integrated Study of Coastal Ecosystem Processes and Dynamics (NSF)
- Research Experiences for Undergraduates (REU) Site in Marine and Estuarine Science: University of Maryland Eastern Shore (NSF)
Area of Expertise:

- Meat science - meat quality and muscle chemistry
- Quality of animal - origin and sea foods
- Food chemistry and analysis
- Phytochemical research

Focus of Research:

- Understanding the mechanisms of meat quality issues in poultry, such as the relationships of environmental stressors like heat stress and oxidative stress to meat quality, wooden breast, lipid oxidation, etc.
- Investigating prevention strategies of meat quality issues in poultry
- Analyzing bioactive phytochemicals and their antioxidant capacities in agricultural products as affected by agricultural and environmental managements
- Impact of bioactive phytochemical-rich sources in animal feed on animal health and performance and meat quality
- Bioactive components and their functionalities in eggs and egg products as affected by nutrition and processing

Current Funded Projects (Source):

- Effect of environmental heat stress on the oxidative stress in live broilers and postmortem metabolism and quality characteristics in chicken breast meat (USDA/NIFA)
- Can Early Heat Conditioning Prevent Heat Stress-Induced Quality Deterioration in Broiler Breast Meat? (USDA/NIFA)
- Exploring Potentials of Irradiated Egg White as a Novel, Functional Food Source (USDA/NIFA)
- Antioxidant potentials in corn distiller’s grains from fuel ethanol production and the improvement of their bioavailability by alkali treatment (USDA/NIFA)
Area of Expertise:

- Poultry safety
- Ecology and molecular biology of bacteria associated with poultry
- Antimicrobial resistance and pathogenicity of bacteria associated with poultry

Focus of Research:

- Ecology of *Salmonella* and *Clostridium perfringens* in poultry
- Characterization of *Salmonella* and *Clostridium perfringens* recovered from broiler chicken using phenotypic and genotypic methods.
- Application of genotypic and phenotypic methods for tracking sources of *Salmonella* in poultry processing plants.
- Investigation of antimicrobial resistance, pathogenicity and control of *Salmonella* in poultry.

Current Funded Projects (Source):

- The Changes of *Salmonella* Typhimurium throughout the lifecycle under environmental and antimicrobial stresses (USDA)
- Prevalence and characterization of *Clostridium perfringens* recovered from broiler chicken with necrotic enteritis (MERCK)
- Genotypic and phenotypic characterization of *Salmonella* recovered from processed poultry (USDA & FDA)
- The evaluation of bacteriophage reduction of *Salmonella* in ground chicken (Perdue Foods, LLC)
Area of Expertise:

- Poultry Nutrition
- Broiler Production and Management

Focus of Research:

- Dietary studies with exogenous enzymes and trace minerals
- Alternative bedding material for broiler houses

Current Funded Projects (Source):

- Evaluation of Sorghum as an Alternative Bedding Material in Broiler Houses (Agri-Tech Producers, LLC)
- Oocysts shedding and immunity development in young chickens inoculated via oral route with 1 dose of Coccivac-B52 (Merck)
- Closed-loop manure-to-energy heating system (MIPS)
- Strengthening Experiential Learning, Recruitment, and Retention within the UMES Department of Agriculture, Food and Resource Sciences (USDA)
Dr. Roselina Angel
Professor
University of Maryland
College of Agriculture
Department Animal and Avian Sciences
rangel@umd.edu
301-76802159

Area of Expertise:

- Poultry nutrition and management
- Nutritional and management tools to increase nutrient availability in poultry

Focus of Research:

- Optimizing phosphorus needs and availability for poultry
- Ingredient calcium and phosphorus digestibility in poultry
- Optimizing use in poultry
- Minimizing nutrient excretion in poultry
- Understanding the negative impact of soybean trypsin inhibitors and how to minimize them

Current Funded Projects (Source):

- Development of a calcium and phosphorus digestibility (broilers) in ingredients (Cargill/Dupont)
- Development of an in vitro system to predict limestone calcium digestibility in poultry in limestone (Cargill)
- Optimizing effectiveness of phytases (Dupont)
- Amino acid digestibility in soybean meals from the same batch of beans processed to contain different trypsin inhibitor and use of proteases to minimize negative impacts (DSM)
Area of Expertise:

- Ecology of natural, restored, and created wetlands
- Nutrient cycling and water quality functions of wetland ecosystems
- Vegetation development and dynamics

Focus of Research:

- Nitrogen and carbon cycling in restored and natural wetlands
- Soil and vegetation development in restored wetlands
- Emerald ash borer impacts on forested wetlands: laryngotracheitis, infectious bursal disease, infectious bronchitis virus and avian influenza
- Native plants for restoration and treatment wetlands

Current Funded Projects (Source):

- Emerald ash borer impacts on tidal forested wetlands (USDA)
- The role of organic matter amendments in restored wetlands (MAES)
Area of Expertise:

- Microbiology (bacteriology)
- Farm animal production
- Prevention of foodborne infections
- Animal gut microbiome and health
- Synbiotics

Focus of Research:

- Food safety and zoonotic infections
- Antibiotic resistance
- Alternative growth promoter for farm animal
- Animal vaccine against zoonotic bacterial colonization
- Animal disease prevention

Current Projects are funded by:

- USDA (United State Department of Agriculture)-ARS (Agricultural Research Service)
- Research Development TIER-1 (University of Maryland)
- Delmarva Foundation (DE, MD and VA)
Area of Expertise:

- Wildlife ecology
- Environmental Toxicology
- Water Quality and Water Quantity Issues
- Multi-jurisdictional Remediation of Water Quality
- Indicators of Water Quality

Focus of Research and Extension:

- Biosentinels as Ecosystem Levels of Water Quality
- Spatial and Temporal Trends in Contaminants
- Endangered Species Management
- Avian Toxicology and Health
- Wildlife Ecology

Current Funded Projects (Source):

- Using bald eagles to measure contaminants in Great Lakes (Michigan DEQ)
- Avian contaminant effects (USGS)
- Population dynamics of bald eagles in Michigan (US Fish & Wildlife Service)
- Monitoring of contaminants and populations of bald eagles at Voyageurs National Park, Minnesota (National Park Service)
Area of Expertise:

- Agricultural nutrient management
- Agroecosystem management
- Soil fertility and plant nutrition
- Agroecosystem policy development

Focus of Research:

- Fate and transport of phosphorus in agricultural systems
- Nutrient utilization in agronomic cropping systems
- Evaluation of potential risk for phosphorus losses from agricultural landscapes

Current Funded Projects (Source):

- Agriculture and Nonpoint Sources Program Support for the Chesapeake Bay Program Partnership (U.S. Environmental Protection Agency)
Area of Expertise:

- Poultry behavior and well-being
- Behavioral and Developmental neurosciences
- Brain-gut-microbiome axis

Focus of Research:

- Short- and long-term impacts of embryonic and early life environments on neural development and resulting behavioral phenotypes
- The effects of environment, including lighting and environmental enrichments, on poultry behavior and well-being during different life stages.
- Optimizing behavior, production and well-being through manipulation of the gut microbiome
- The plasticity of the sensory systems and how alterations to these systems can impact neurophysiology and behavior

Current Funded Projects:

- MAES Grant – “The effects of maternal tryptophan on chick development and well-being”
- Animal Welfare Institute Research Grant – “Effects of light spectrum on the well-being of birds used in research”
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Area of Expertise:

- Nutrient Fate and Transport
- Composting
- Waste Management

Focus of Research and Extension:

- Monitoring/Evaluating Fluidized Bed Poultry Litter waste-to-energy project
- Poultry Mortality Composting short course (for MACS)
- Effects of Composting on Poultry Litter

Current Funded Projects (Source):

- Providing 3rd Party Monitoring of BIOMASS HEATING SOLUTIONS USA, INC. project (source: MDA)
- Efficacy of an In-vessel Aerated Turned” (IVAT) Compost System to Mitigate Natural Estrogens in Biosolids and Poultry Litter (UMCP Foundation, Hughes Center for Agro-Ecology, Inc)
Area of Expertise:

- Soil physics related areas dealing with water movement and storage in soils; contaminant transport through soils; soil mechanical issues related to tillage, soil compaction, and infiltration; development of good agronomic management strategies that reduce water pollution while maintaining crop productivity; soil erosion and erosion mechanics; modeling soil, water, and contaminant behavior and movement; landscape-based environmental modeling; spatial and temporal variability of soil and water processes;
- Evaluation of climate change adaptations
- Nutrient management and phosphorus loss risk assessment software development

Focus of Research:

- Transport and survivability of *E. Coli* and *Enterococcus* bacteria in cattle manure
- Impacts of agricultural management adaptations to lessen the impacts of climate change in the Eastern United States
- Nutrient management and phosphorus loss risk assessment software development
- Collaborative research with scientists at Northwestern Agriculture & Forestry University in China

Current Funded Projects (Source):

- USDA-SARE assistantship to evaluate climate change adaptations for the Eastern United States
- USDA-ARS Cooperative Research evaluating and modelling the survivability and transport of *E. Coli* and *Enterococcus* bacteria through soil
- MDA-funded Nutrient Management Project to development nutrient management planning software dealing with the phased transition to using the Phosphorus Management Tool as the primary tool evaluating phosphorus loss risk assessment
**Area of Expertise:**

- Molecular Biology of economically important animal viruses
- Viral diseases of poultry
- Viral Vector development
- Vaccine development against animal and human viral diseases

**Focus of Research:**

- Molecular biology of Newcastle disease virus and different RNA and DNA viruses
- Studying the incidence, prevalence and control of infectious bronchitis virus in chickens.
- Vaccine development of Newcastle disease virus, infectious laryngotracheitis virus and other avian viruses.
- Use of Newcastle disease virus as a vaccine vector for viral diseases affecting birds, farm animals and humans.

**Current Funded Projects (Source):**

- Newcastle disease virus vectored vaccines for Porcine Epidemic Diarrhea Virus infection
- NIH/NIAID Simian Vaccine Evaluation Units (SVEU) contract 2015: Evaluation of immune responses in rhesus macaques after priming with Newcastle disease virus and boosting with trimeric gp145 proteins from Indian Clade C HIV-1 isolates
Area of Expertise:

- Pathogenesis of avian influenza viruses
- Development of avian influenza vaccine
- Newcastle disease virus vectored vaccine for avian influenza vaccine

Focus of Research:

- Evolution of antigenicity of avian influenza viruses
- Identification of molecular determinants of avian influenza virulence
- Evaluation of transmissibility of emerging avian influenza viruses
- Vaccine development against highly pathogenic avian influenza viruses for human and veterinary use
Area of Expertise:

- Veterinary virology (particularly avian virology) and immunology
- Designing and developing rapid test kits for the detection of infections, monitoring vaccination and epidemiological study of diseases of veterinary importance
- Profiling poultry health management commercial settings

Focus of Research:

- Rapid lateral flow & ELISA diagnostic kit development for poultry, dog, cat, swine and cattle diseases for commercial applications

Current Funded Projects (Source):

- Privately supported by investors
Area of Expertise:

- Waste to energy technologies
- Manure management
- Anaerobic digestion
- Gasification
- Enhanced nutrient treatment and recovery from manure
- Modeling
- Life Cycle Assessments (LCA)
- Low-cost sustainable technologies

Focus of Research:

- Anaerobic digestion of poultry litter
- Gasification of poultry litter
- Nutrient recovery after poultry litter digestion
- Nutrient modeling
- Antimicrobial fate and transport in manure management
- Hydrogen sulfide removal from biogas during anaerobic digestion

Current Funded Projects (Source):

- Monitoring poultry litter anaerobic digestion and nutrient capture in Maryland (MDA)
- Evaluation and Analysis of Fluidized Bed Combustion of Poultry Litter (MDA)
- The fate of emerging contaminants in poultry litter digestion (USGS - MWRRC)
- Ammonia removal from digested poultry litter (MIPS)
- Waste to energy: Gasification of poultry litter (MIPS)
- Use of Nanoparticles to Enhance Performance and Viability of Anaerobic Digesters (UMD - AGNR)
- Quantifying and demonstrating scrubbing H₂S from farm-based anaerobic digestion systems (USDA - SARE)
- Evaluating different manure management practices in controlling spread of antimicrobial resistance from dairy farms (USDA-AFRI)
Area of Expertise:

- Population and community ecology
- Entomology
- Integrated pest management
- Socio-ecological systems

Focus of Research:

- Socio-ecological determinants of watershed health
- Ecology and management of vector and pest mosquitoes

Current Funded Projects (Source):

- Novel ‘Attract and kill’ baits for disease vectors of Zika and Dengue (USDA-ARS)
- Effects of tire contamination on the invasion and spread of mosquitoes (Maryland Agricultural Experimental Station)
- Sustainable Community-Oriented Stormwater Management (S-COSM) (US-EPA)
- Watershed diagnostics for improved adoption of management practices: Integrating biophysical and social factors (USDA-NIFA)
- Urban disamenities and pests: Coupled dynamics of urban mosquito ecology and human systems across socio-economically diverse communities (NSF)
Area of Expertise:

- Poultry management
- Reproductive physiology
- Biosecurity

Focus of Extension Outreach:

- New & Existing Poultry Grower Training and Certification
- Biosecurity – Animal Health
- Nutrient Management
- Farm Safety
- Small Flock management

Focus of Research:

- Alternative uses for litter
- Disease prevention (both commercial and small flock)
- Alternative bedding
- Improving bird management practices

Current Funded Projects (Source):

- USDA-NIFA Special Needs projects #2015-09209 - Preventing Outbreaks of Avian Influenza Through Timely Dissemination of Practical Science-Based Information
- USDA-NIFA Agriculture and Food Research Initiative Competitive Grant no #2015-68004-23131 - A Novel Translation, Multidisciplinary Approach to Control Poultry Respiratory Diseases in the United States
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**Area of Expertise:**

- Nutrient cycling
- Soil ecology
- Forest and riparian zone ecology
- Ecosystem service assessment
- Science-based decision making

**Focus of Research:**

- Use of green infrastructure and low impact development to reduce nutrient loading in surface waters
- Role of urban forests and urban trees in reducing nutrient loading for the Chesapeake Bay
- Use of agricultural best management practices to improve soil quality
- Resilience of stormwater best management practices to climate change
- Ecosystem services of hybrid solar-agricultural and solar-grassland systems
- Use of water harvesting to mitigate environmental challenges in semi-arid environments

**Current Funded Projects (Source):**

- Using innovative practices to enhance soil quality for vacant lot afforestation (TREE Fund)
- Linking ecosystem services and governance of water resources in urbanized landscapes (NSF)
Area of Expertise:

- Cell Biology
- Molecular Genetics
- Plant Physiology
- Chemical Ecology
- Phytochemistry

Focus of Research:

- Flavonoid function in growth and development
- Oxidation and homeostasis in growth and development
- Invasive species
- Herbicide resistance, use and nutrient management
- Biofuels
- Nutritional enhancement of food

Current Funded Projects (Source):

- Soybean stover for direct catalytic conversion biofuels seed yield and mineral availability (Maryland Soybean Board)
- Modeling invasiveness potential of non-native plant species and trait identification (USDA)
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Area of Expertise:

- Poultry Physiology
- Poultry Genetics
- Poultry Growth
- Poultry Reproduction
- Poultry Heat Stress

Focus of Research:

- Regulation of growth and feed efficiency in broiler chickens
- Regulation of body composition in broiler chickens
- Regulation of reproduction in turkey hens
- Mitigation of heat stress in broiler chickens

Current Funded Projects (Source):

- Glucocorticoid induction of endogenous growth hormone in chicken embryos (USDA-NIFA)
- Identification of mechanisms and gene networks associated with differences in egg production in turkey hens (MAES)
- Mechanisms affecting posthatch growth following embryonic induction of growth hormone in broiler chickens (USDA-NIFA)
- Mitigation of heat stress in broiler chickens through early-life thermal conditioning (USDA-NIFA)
Area of Expertise:

- Poultry Production
- Risk Management
- Agriculture
- Natural Resources

Focus of Extension Outreach:

- New & Existing Poultry Grower Training and Certification
- Biosecurity – Animal Health
- Women in Agriculture
- Annie’s Project
- Agriculture Profitability
- Nutrient Management
- Grain Marketing
- Farm Safety

Current Funded Projects (Source):

- USDA-NIFA Special Needs Grant - Preventing Outbreaks of Avian Influenza Through Timely Dissemination of Practical Science-Based Information
- USDA Farm Service Agency - Women in Agriculture: Mid-Atlantic Outreach and Education
- Solicited Funds - UME Queen Anne’s County Educational Programs
Area of Expertise:

- Biology of economically important animal viruses
- Viral diseases of poultry
- Vaccine development

Focus of Research:

- Molecular biology of Newcastle disease virus
- Understanding the mechanisms how Newcastle disease virus causes disease in chickens
- Effective vaccine development of Newcastle disease virus, infectious laryngotracheitis, infectious bursal disease, infectious bronchitis virus and avian influenza
- Use of Newcastle disease virus as a vaccine vector for human diseases

Current Funded Projects (Source):

- Newcastle Disease Virus Vectored Vaccines for Poliovirus Infection (NIH)
- Newcastle Disease Virus Vectored Vaccines for Human Immunodeficiency Virus (NIH)
- Generation and evaluation of avian paramyxovirus vectored vaccine candidates for poultry pathogens ILTV, IBV, HEV and NDV (Elanco)
Area of Expertise:

- Developmental nutrition
- Tissue-specific stem cells
- Alternatives to conventional antibiotics

Focus of Research:

- Effects of early-life nutrition on lifetime growth performance
- Programming of mesenchymal stem cells and satellite cells
- Identifying alternatives to conventional antibiotics for intestinal pathogens

Current Funded Projects (Source):

- Improving Swine Growth via Nutritional Programming of Stem Cell Populations (USDA/AFRI)
Area of Expertise:

- soil fertility and nutrient management

Current Funded Extension Projects (Source):

- Agricultural Nutrient Management Program (Maryland Department of Agriculture)
- Agricultural Nutrient Management Enhancement Program (EPA via Maryland Department of Agriculture)
- Nutrient Management Planning Software (Maryland Department of Agriculture)
- Antietam Creek Water shed Project (EPA via Maryland Department of Agriculture)
Areas of Expertise:

- Epidemiology and disease outbreak investigation
- Poultry extension, education, and outreach
- Biosecurity and flock health management to prevent economically important poultry diseases such as avian influenza

Focus of Extension Activities:

- Develop practical science-based educational programs for various sectors of the poultry industry to prevent outbreaks of avian influenza and other economically important poultry diseases

Current Funded Projects (Source):

- Preventing outbreaks of avian influenza through timely dissemination of practical science-based information (USDA-NIFA Smith-Lever Special Needs Grant)
Area of Expertise:

- Early embryonic patterning
- Craniofacial genetics
- Cell adhesion, migration and communication during development

Focus of Research:

- Molecular mechanisms underlying neural crest and placode cell formation, and implications for craniofacial development and tissue repair and/or regeneration
- Modulation of cell adhesion during both the generation of migratory cells from immotile precursors and the formation of new tissues via intercellular interactions
- Molecular basis of cancer cell invasiveness (metastasis)
- Gap junction-mediated communication

Current Funded Projects (Source):

- Coordinated regulation of cadherins in the neural crest (American Cancer Society)
- Neural crest-placode interactions during cranial gangliogenesis (NIH)
- Cadherin endocytosis in the neural crest (NIH)
Area of Expertise:

- Nutrient management
- Movement of nitrogen and phosphorus from soils to waterways
- Sustainable farming practices

Focus of Research:

- Cover crops for nitrogen and water management
- Nitrogen and phosphorus cycling in Delmarva farms
- Effects of salt water intrusion of soil phosphorus release from farm soils

Current Funded Projects (Source):

- The Northeast Cover Crops Council: Building the network and online decision support tools (Northeast Sustainable Research and Education Grant)
- Developing sustainable soil management strategies to suppress strawberry *Anthracnose* & improve soil health (North American Strawberry Growers Assoc.)
- The effects of sea-level rise and saltwater intrusion on wetland nutrient transport and vegetation dynamics in the Atlantic Coastal Plain (National Socio-Environmental Synthesis Center)
- Decision support tool for cover crops: Crediting water and nitrogen conservation (United States Department of Agriculture)
- Evaluating cover crop for nitrogen recycling in Maryland Grain Crop Systems (Special Cooperative Agreement with USDA)
Area of Expertise:

- Soil Fertility
- Soil Ecology
- Agronomy and cropping systems
- Plant nutrition
- Soil-Plant Relationships
- Water Quality

Focus of Research:

- Innovative cover cropping systems
- Soil health impacts of crop and cover crop management
- Nitrogen capture, cycling and efficient utilization
- Phosphorus cycling, soil chemistry and management
- Sulfur cycling and management
- Soil organic matter and carbon management
- Efficient use of nutrient resources

Current Funded Projects (Source):

- Rapid Soil Information – SoilDoc (Columbia University/ DuPont, Inc.)
- Deep Soil Nitrogen: Resource for Sustainability in Mid-Atlantic Using Early Cover Crops (USDA- SARE)
- Deep Soil Nutrients - Neglected Resource for Profitability and Environmental Stewardship (Maryland Soybean Board)
- Sulfur to enhance quality and yield of soybean protein (Maryland Soybean Board)
- Priming for Production: Podcast on Soil (USDA- SARE)
- On-farm and isotopic evaluation of deep soil nitrogen capture and cycling by cover crop mixtures (USDA- SARE)
- Forest Soil Quality Monitoring Internships (DOI-Natl Park Service)
- High Yield Conservation (Farm Journal/Howard Buffett Fnd)
Area of Expertise:

- soil fertility and nutrient management
- cover crop management
- enhanced efficiency fertilizers

Current Funded Extension Projects (Source):

- Agricultural Nutrient Management Program (Maryland Department of Agriculture)
- Agricultural Nutrient Management Enhancement Program (EPA via Maryland Department of Agriculture)
- Nutrient Management Planning Software (Maryland Department of Agriculture)
- Antietam Creek Watershed Project (EPA via Maryland Department of Agriculture)
Area of Expertise:

- Soil microbial ecology
- Wetland soil microbial communities and function
- Carbon and nitrogen cycling in wetlands and agricultural lands
- Urban soil ecology

Focus of Research:

- Understanding the mechanisms for carbon storage in freshwater tidal wetlands
- Examining the effects of urbanization and land use change on microbial community composition and function
- Quantifying the impact of new sustainable agricultural practices on soil microbial ecology

Current Funded Projects (Source):

- Plant/soil microbe interactions and plant health in modern cropping systems (USDA)
- EAGER: Earthworm diversity at multiple scales: What can genetics tell us about the distribution of these important soil organisms? (NSF)
- Testing the effects of tire leachate on mosquito invasions (Maryland Agricultural Experiment Station)
- Can Bloom Improve Soil Health? (DC water)
- Visualization of soil microbial community spatial structure: Advancing soil printing technology (Maryland Agricultural Experiment Station)
- Can soil carbon amendments improve wetland restoration and jump-start microbial activity? (Maryland Water Resource Research Center)
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Area of Expertise:

- Environmental / Aquatic toxicology
- Aquatic endocrine disruption
- Legacy contaminants

Focus of Research:

- Abundance, fate and transport of poultry litter derived fecal estrogens
- Efficacy of composting at reducing/eliminating aqueously-extractable estrogens from poultry litter
- Efficacy of composting at reducing/eliminating antimicrobials residuals from poultry litter
- Implications of poultry litter agricultural application strategy (no-till, conventional tillage, turbo-till, and sub-surface injection) on estrogen transport in surface runoff
- Effects of pelletization on estrogenicity of broiler litter

Current Funded Projects (Source):

- Mussel Deployment, Monitoring and Sampling for Organic Constituents in Anacostia River Tributaries: 2016-2018 (DC DOEE)
- Toxicity Testing of Leachate from Maryland Coal Ash Management Facilities (NRG Energy, Inc.)
- Investigation into Molecular Effects of Contaminants on Wildlife (USGS)
- Efficacy of an In-vessel Aerated Turned” (IVAT) Compost System to Mitigate Environmental Contaminants-of-Concern in Biosolids and Poultry Litter (HCAE)
- Field Validation of Non-Lethal Laparoscopic Technique for Detection of Intersex in Regional Bass Populations (MWRRC)
- Analysis of Microplastics in Chesapeake Bay and Coastal Mid-Atlantic Water Samples (NOAA)
- The Environmental Concerns of Arsenic Additives in Poultry Litter: Literature Review
- Vegetable oils as a dietary lipid source for improvement of Omega-3 production in Nile tilapia (*Oreochromis niloticus*) (Egyptian Cultural and Educational Bureau)
Area of Expertise:

- Anatomic Pathology (including poultry)
- Virology
- Immunology

Focus of Research:

- Host-pathogen interactions
- Mechanisms that modulate the host immune system to favor viral persistence
- Immune-mediated diseases (hepatitis E - chickens)
- Inflammation
- Vaccine development

Current Funded Projects - Selected (Source):

- Zhang, C., T. Cecere Co-PI, Development of Recombinant Universal Vaccines Against PEDV. 2015 (1 yr) Smithfield Foods, Inc.
- Allen, C., T. Cecere (Co-I). Evaluating NLR Modulation of Canonical and Non-canonical NF-κB signaling in inflammatory bowel disease. 2015 (2 yr) NIAID / NIH / DHHS.
Area of Expertise:

- Hypothalamic regulation of appetite in birds

Focus of Research:

- Role of neuropeptides in appetite regulation of broilers during the early post hatch period
- Role of neuropeptides in behavior of broilers during the early post hatch period
- Role of neuropeptides in appetite regulation of anorexic and obese chicken models
- Role of neuropeptides in behavior of anorexic and obese chicken models

Current Funded Projects (Source):

- Mechanisms of Neuropeptide Y's effects on adipose tissue deposition in chickens (USDA)
- The effects of dietary fat quantity and α-melanocyte stimulating hormone on appetite regulatory mechanisms and adiposity in broiler chickens (John Lee Pratt Animal Nutrition Program)
- Effects of dietary macronutrient composition and exogenous neuropeptide Y on appetite regulation and adipose tissue development in broiler chickens (John Lee Pratt Animal Nutrition Program)
- Mechanisms of neuropeptide Y’s contribution to appetite and growth of chickens (USDA)
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Area of Expertise:
- Immunology and immune responses of poultry
- Enteric diseases of chickens and turkeys
- Gut health
- Drug alternatives
- In ovo applications

Focus of Research:
- Immune responses to coccidiosis and drug alternatives
- Understanding the mechanisms how probiotics and prebiotics impact gut development, integrity and immune function
- Necrotic enteritis mitigation methods
- *Salmonella* sp. and *E. coli* challenge models (chickens and turkeys)
- Development of avian immunological reagents, tools, and assays
- Cochlosoma in turkeys (with Dr. Bill Pierson)

Current Funded Projects (Source):
- Performance of broilers fed probiotics and phytogenic additives during a necrotic enteritis challenge (Industry)
- Effects of phytogenic additives on performance and response of broilers to a coccidiosis challenge (Industry)
- Using probiotics to reduce *Salmonella* and *E. coli* [APEC] colonization in broilers (various industry sources)
- Pierson et al. – Testing the efficacy of feed additives against *Cochlosoma anatis* infection in turkeys (industry support)
- Generation and evaluation of avian cytokines and receptors against the mucosal pathogens *Mycoplasma*, *Clostridium* and *Eimeria* (various sources)
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Area of Expertise:

- Molecular and Cellular Biology
- Broiler adipose tissue physiology
- Broiler nutrition
- Appetite regulation in broilers

Focus of Research:

- Role of appetite-regulating peptides in adipose tissue development and physiology in broilers and Japanese quail
- Identifying mechanisms through which neuropeptide Y and alpha-melanocyte stimulating hormone affect appetite and adipose tissue development in broilers
- Understanding how neuropeptides affect appetite regulation in broilers and quail
- Identifying novel regulators of appetite and adiposity in chickens
- Determining effects of dietary macronutrient composition (source and quantity of fat and protein) on appetite regulation and adipose tissue physiology in broilers
- Role of epigenetic regulation of gene expression in stress-induced appetite regulation in chickens from lines selected for low or high body weight.

Current Funded Projects (Source):

- Mechanisms of Neuropeptide Y's Effects on Adipose Tissue Deposition in Chickens (USDA)
- The effects of dietary fat quantity and α-melanocyte stimulating hormone on appetite regulatory mechanisms and adiposity in broiler chickens (John Lee Pratt Animal Nutrition Program)
- Effects of dietary macronutrient composition and exogenous neuropeptide Y on appetite regulation and adipose tissue development in broiler chickens (John Lee Pratt Animal Nutrition Program)
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Area of Expertise:

- Anatomic Pathology (including poultry)
- Microbiology
- Immunology

Focus of Research:

- Hepatitis E virus (Hepevirus – chickens)
- Molecular (real-time / farm-side) diagnostics
- Food Safety

Current Funded Projects - Selected (Source):

- **LeRoith, T. (PI).** FDA / CVM Vet-LRN Veterinary Diagnostic Laboratory Program Infrastructure Grant. 2012 (5 yr) FDA ($82,000).
- Meng, X.J., **T. LeRoith (Co-I)**, F.W. Pierson (Co-I), L Yuan, A Chicken Model to Study Hepatitis E Virus Pathogenesis, 2013 (5 yr), NIH, RO1AI050611-Renewal ($1,954,444).
- Meng, X.J., Y Huang, S Kenny, **T. LeRoith (Co-I)**. Mechanism of Hepatitis E Virus Replication and Pathogenesis. 2013 (5 yr) NIAID / NIH / DHHS ($1,995,000).
- Lahmers, K. T. **LeRoith (Co-PI)**, T Cecere. Use of Mobile Nanopore Sequencing to Detect and Genotype Porcine Reproductive and Respiratory Syndrome Virus. 2016 (2 yr) National Pork Board ($75,000).
- **LeRoith, T. (PI)**, W. Huckle, T Cecere. Defining the Molecular Events Triggered by PCV2 and PRRS Infection of Dendritic Cells. 2016 (1 yr) Internal Research Competition ($20,000).
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Area of Expertise:
- Virology - General
- Molecular virology
- Viral pathogenesis
- Vaccinology

Focus of Research:
- Hepatitis E virus (*Hepevirus* – Chickens)
- Vaccine development (circovirus, porcine reproductive and respiratory syndrome virus - PRSSV, Porcine Epidemic Diarrhea Virus - PEDV, Porcine Coronavirus - PdCoV)

Current Funded Projects - Selected (Source):
- **Meng, X.J. (PI)**, T. LeRoith, F.W. Pierson, L Yuan, A Chicken Model to Study Hepatitis E Virus Pathogenesis, 2013 (5 yr), NIAID / NIH / DHHS, RO1AI050611-Renewal.
- **Meng, X.J., (PI)**, Y. Huang, S. Kenny, T. LeRoith. Mechanism of Hepatitis E Virus Replication and Pathogenesis. 2008 (5 yr + 4 year extension) NIAID / NIH / DHHS.
- **Meng, X.J., (PI)** et al. Engineering PRRSV Vaccines that Confer Heterologous Protection. 2011 (6 yr) USDA / AFRI.
- **Meng, X.J. (PI)**, et al. Development of Piglet Diarrhea Orthoreovirus Vaccines. 2015 (3 yr) Boehringer Ingelheim.
- **Meng, X.J. (PI)**, et al. Broadly-protective Dendritic Cell-Targeting PRSSV Subunit Vaccines 2016 (3 yr) Zoetis, Inc.
Area of Expertise:

- Poultry nutrition
- Digestive health
- Nutrient utilization and management

Focus of Research:

- Energy metabolism and nutrient partitioning
- Impact of stress on nutrient utilization
- Using additives as antibiotic alternatives
- Emerging issues in the industry

Current Funded Projects (Source):

- Butyric acid as a broiler feed supplement (VA Ag Council)
- Effects of phytogenics on nutrient digestion and absorption in turkey poults (Industry)
- Vitamin D supplementation to laying hens (American Egg Board)
F. William (Bill) Pierson, MS, DVM, PhD, Dip. ACPV
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Area of Expertise:

- Poultry Health
- Biosecurity / Infection Control
- Agrosecurity / Agroterrorism Mitigation
- Microbiology
- Vaccinology
- Food Safety (poultry products)

Focus of Research:

- Hemorrhagic enteritis – turkeys (Siadenovirus, pathogenesis / vaccinology)
- Salmonella bioremediation (pre-harvest)
- Cochlosomiasis / Histomonosis (prophylaxis / treatment)
- Hepatitis E virus (Hepevirus – chicken, pathogenesis)

Current Funded Projects – Selected (Source):

- Meng, X.J., T. LeRoith, F.W. Pierson (Co-I), L Yuan, A Chicken Model to Study Hepatitis E Virus Pathogenesis, 2013 (5 yr), NIH, RO1AI050611-Renewal ($1,954,444).
- Pierson, F.W. (PI), G. El-Bagoury, Z. Aboezz. Transcriptional Analysis of the Turkey Hemorrhagic Enteritis Virus Genome. 2015 (2 yr) Egyptian Cultural and Educational Bureau, Egyptian Channel Program, Arab Republic of Egypt ($10,000).
- Pierson, F.W. (PI), H. Mahsoub, D. Lindsay, R. Dalloul, M. Persia. Testing the Efficacy of Feed Additives Against Cochlosoma anatis Infection in Turkeys, 2016 (1 yr) Butterball, LLC ($18,000).
Area of Expertise:

- Public veterinary practice
- Animal health surveillance
- Population health
- Disease control and eradication
- Veterinary capacity building

Focus of Research:

- Animal health surveillance
- Disease control and eradication
- Veterinary workforce in government, corporate and industry sectors

Current Funded Projects (Source):

- One Health Surveillance for Brucellosis in Armenia (Defense Threat Reduction Agency, Department of Defense)
Nammalwar Sriranganathan BVSc, MVSc, PhD, ECVG, Dip ACVM
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Area of Expertise:
- Bacteriology
- Food safety (poultry products)
- Vaccinology

Focus of Research:
- *Salmonella* Bioremediation (pre-harvest)
- Bacteriophage Felix O1 (*Salmonella* lytic phage)
- Nanoparticle delivery systems for vaccines and therapeutics
- Recombinant vaccine development

Current Funded Projects - Selected (Source):
- Evans, N.P., P. Karnezos, M. Sims, N. Sriranganathan (Co-PI), F.W. Pierson. Investigation of Medium Chain Fatty Acids for *Salmonella* Reduction in Poultry with the In-Vivo Imaging System. 2015 (1 yr) Land O'Lakes ($10,273.00).
- Sriranganathan, N. (PI), S. Boyle, R. Prater, S. Elswafi. Nanoparticles to deliver antisense nucleic Acid Constructs as Therapeutics for Intracellular Bacterial Infections, 2015 (2 yr) VMCVM-VCOM Center for One Health Seed Grant ($56,014).
Area of Expertise:

- Transport of nutrients
- Mucosal function and health
- Nutrient absorption

Focus of Research:

- Energy metabolism and nutrient partitioning
- Impact of stress on nutrient utilization
- Using additives as antibiotic alternatives
- Emerging issues in the industry

Current Funded Projects (Source):

- Ontogeny of intestinal stem cells in the embryonic and posthatch chick (USDA)
- Effects of phytogenics on nutrient digestion and absorption in turkey poults (Industry)
- Tissue distribution of digestive enzymes in broilers fed various methionine forms (Industry)
- Effect of Salmonella and Campylobacter infections on expression of nutrient transporters in broilers (various sources)
NOTES