NATIONAL PORK BOARD
Request for Proposals
General Call 2019

**DEADLINE:** Tuesday, October 16–5:00 pm CST

Writing Research Proposals for the NPB
Want to learn more about the National Pork Board’s research proposal process? Could you use a few tips to make your research proposal more competitive? Regardless of whether you are an established investigator or a new faculty member, you will find benefit in the webinar entitled “Writing Research Proposals for the NPB”. Please visit [http://www.pork.org/pork-checkoff-research](http://www.pork.org/pork-checkoff-research) If you have questions, please feel free to contact Dr. Chris Hostetler by phone (515)223-2606 or email (chostetler@pork.org).

The National Pork Board is soliciting research proposals dealing with these categories:

- **ANIMAL SCIENCE** – Animal Science
- **ANIMAL SCIENCE** – Swine Nutrition
- **ANIMAL WELFARE**
- **PORK QUALITY**
- **PORK SAFETY** – Pre-Harvest
- **SUSTAINABILITY** – Air
- **SWINE HEALTH** - Foreign Animal Disease
- **SWINE HEALTH** – General Swine Disease

**Staff Members:**

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Principal Investigators (PIs) must follow all instructions according to the Instructions and Format document and submit research proposal in the required format through the Application Website in order to be considered. A link to this document containing this information and the Application Website can be found at [http://www.pork.org/research](http://www.pork.org/research)

Proposals that do not directly address the listed priorities will be rejected without consideration of funding.

Newly submitted, multi-year proposals should provide a clear overall vision and objectives for the entire project with a detailed plan of work and budget outline for each of the proposed years. If proposed projects are seeking second-year funding of a previously funded project, the proposal must include a discussion of progress and accomplishments realized from the research efforts to date toward success of the overall research effort. This may be accomplished by including copies of interim or final reports from previously funded research efforts as appendices to the proposal submitted.

Scientific peers will evaluate submitted proposals for scientific merit. Pork producers will evaluate the proposal for application to and impact on the pork production industry. The overall research plan and individual objectives contained within the proposal must meet the standards of scientific rigor and statistical validity expected of National Pork Board research grants. Proposals may be returned to the PI with suggested/requested revisions prior to final funding decision. Final funding decisions will be made by producer-led committees.

**NOTES:**
Proposal selection will occur in January 2019.
Notification of grant awards will be done by March 2019.
Project funding may begin April 1, 2018.
Requests for second-year funding must be resubmitted.
Title: Novel Technologies to Identify and Monitor Indicators of Pig Health, Welfare and Productivity

Statement of Problem:
Monitoring individual animals within groups of animals is challenging for even the best herdsmen. Additionally, once an at-risk animal is identified, deciding on a resolution to mitigate the issue requires substantial knowledge and specific training. Technology has advanced to the point where it may provide advanced notification of problems that affect animal health, wellbeing and productivity more quickly than even the most highly trained animal caretakers. Ultimately, improving these areas of pork production improves pig livability. Developing novel or adapting existing technologies for this purpose is the focus of this request for proposals.

Scope:
Developing new or adopting existing technologies that remotely monitor individual pig health, wellbeing and/or productivity of individual animals has the potential to alter the way pigs are managed and, ultimately, improve production efficiency and therefore sustainability. Monitoring of individual animals within groups of animals occurs at all phases of production and ages of pigs. The ability to remotely monitor behavior or measure physiologic status is key to timely initiation of interventions for at risk animals. While it may be easiest to document the economic impact of reducing mortality, improving animal welfare, increasing productivity, documentation of employee job satisfaction, caretaker attitudes, labor efficiencies and public/marketplace perception ultimately impact the pork production enterprise. Ideally, taking a systems-approach will consider all aspects: enhanced pig health, welfare and productivity, economic trade-offs and the less tangible. Technologies that can be adopted with minimal cost and disruption to normal animal movements within facilities are of particular interest.

Request for Proposals:
The National Pork Board is soliciting proposals from investigators to develop novel or adapt existing technologies to identify and monitor indicators of pig health, wellbeing and productivity with the overall goal of improving pig livability. While this RFP is not specifically seeking proposals from a consortium of investigators, the best approach will likely result from cross-discipline collaborations. This RFP could support several researchers with differing areas of expertise who wish to collaborate on research by pooling their talents and resources to focus on identifying and monitoring indicators of pig health, wellbeing and productivity. Depending on the proposed objectives, this may mean that the group is comprised of representatives from multiple departments and/or institutions and private industry. In this way, this RFP represents a synergistic approach designed to achieve results not attainable by researchers working independently. Cross-disciplinary approaches that encompass animal science, biological sciences, engineering, computer science, data science and/or other fields are highly encouraged. In addition, use of technology for monitoring individuals or groups of pigs, big data analytics, machine learning and visualization or development of algorithms for making management decisions based on collected data are encouraged.

Research:
The overall research plan should be organized around a set of closely related projects focused on improving the monitoring capabilities and providing real-time feedback to the herdsman related to pig health, wellbeing and productivity with the end goal of improving pig livability. The research plan may include, but is not limited to, research in the following areas:

- **Welfare:**
  - Early detection of lameness in late finishing and/or in sows. For example, use of gait analysis or other analysis to identify lame animals or document recovery from lameness.
  - Monitor groups of animals for aggressive or damaging behaviors, welfare during transportation, and/or identification of animals for which euthanasia is necessary.
  - Monitoring sow and piglet behavior during the peripartum period to identify at risk animals and improve piglet survival

- **Productivity:**
  - Real-time monitoring of growth rate of individual pigs including identifying animals that reach target weight in order to reduce sort loss.
  - Technologies that assist in estrus detection as well as ovulation so that insemination can be better timed.
• Monitoring animals for normal behaviors such as walking, standing, drinking, laying, eating, so that anomalies can be identified.
  • Monitoring facility ventilation and feed delivery system function, or real-time barn environment.
  • Developing technology to easily and accurately count animals in groups whether that is in pens, on trucks, being loaded, etc.

• Health:
  • Development of novel or adaption of existing technologies to identify and monitor early physiologic or behavioral indicators of disease outbreaks or changes in health status within pens of animals as well as within entire facilities.
  • Monitoring of physiologic or behavioral indicators to monitor the spread of illness within pens, facilities and among farms.
  • Methods for documenting recovery from illness once mitigation has been initiated.
  • Comprehensive mechanism to digitally capture and assimilate real-time data relative to antibiotic use, drug withdrawal periods of individual animals and/or drug inventory.

• Predictive Modeling:
  • Utilization of novel technologies to capture high throughput data on economically important phenotypes
  • Develop, on a large scale, tools such as software, web applications, etc. to aid in the process of building, testing and deploying of models focused on predicting economically important phenotypes in real time. Input data points may come in many forms including but not limited to images, movement, feeder/water visits, body temperature, etc.
  • Predictive models may include but are not limited to supervised (random forests, logistic/linear regression, support vector machines, k-nearest neighbors, etc.) or unsupervised (k-means clustering, hidden markov models, hierarchical clustering, etc.) machine learning algorithms
  • The expectation would be for these models to be used to help herdsmen improve decisions made pertaining to health, welfare and productivity using data within the environment and system in which the data are captured

Proposal Review: The expertise of the researcher and/or research team, the resources brought to bear, scientific merit and industry applicability of the research plans will be the basis for evaluation. Peers will evaluate the proposal for scientific merit and pork producers will evaluate the proposal for application to and impact on the pork production industry. The overall research plan and the individual projects contained within the overall proposal must meet the standards of scientific rigor and statistical validity expected of National Pork Board research grants.

Funding: We anticipate making several awards to researchers presenting proposals that have potential to have an immediate and sizeable impact on the swine industry. There is an upper limit of $400,000 for the entire project period which may be up to 2 years. While these may be multiyear projects, we are seeking proposals that rapidly and effectively address one or more of these issues on a cost-effective platform. The National Pork Board will return applications that exceed this funding level without review. Applicants should not interpret the maximum allowable amount as a suggestion to expand their anticipated budget to this level. Reasonable budgets that are necessary to obtain the stated objectives will be viewed favorably. Budgets that are not commensurate with proposed work or poorly justified will likely have a negative impact on the overall evaluation of the proposal. It is allowable to request salary and fringe benefit support for faculty, graduate students, undergraduate students, post-doctoral fellows and technicians; however, be aware the National Pork Board does not allow overhead.

Inquires:

Please direct all inquiries to: Dr. Chris Hostetler, chostetler@pork.org, (515) 223-2606
The Animal Science Committee of the National Pork Board is soliciting proposals in the area of **Feed Efficiency**. Proposals must be submitted in the attached format to be considered. Projects may cover multiple-years for completion of an entire project. However, proposals for multi-year projects are expected to detail project deliverables and budgets on a year-to-year basis. If proposed projects are for completion of multi-year efforts already in-progress, the proposal must include a narrative of progress and accomplishments to date of the overall research effort. This may be accomplished by including copies of interim or final reports from previously funded research efforts as appendices to the submitted proposal. Proposals will be reviewed by panels of experts for scientific soundness and by pork producers for industry application. Proposals may be returned to the investigator with suggested/requested revisions prior to final funding decisions. Funding for accepted projects will follow final approval by the National Pork Board.

**Proposals are solicited in these areas only. Proposals submitted that do not adhere to these areas will not be considered further.**

**Feed Efficiency**

Feed accounts for over 60% the cost of raising a pig. Feed being the most expensive component of raising a pig, the Animal Science Committee of the National Pork Board has determined the Feed Efficiency research RFP should focus on improved energy and amino acid utilization. Submitted proposals must bring fundamental knowledge and application to improve feed efficiency. Achievement of these priorities will require a variety of disciplines including but not limited to nutrition, nutritional physiology, biochemistry, immunology, mathematical modeling and ingredient chemistry. Proposals utilizing a multidisciplinary approach are highly encouraged. Proposals should reference key concepts such as caloric efficiency, digestive physiology, ingredient value, dynamic or predictive estimates of nutrient value and disease-related diversion of nutrients. Applied growth assays should be conducted in commercial-like conditions and with sufficient replication to make statistically appropriate conclusions. Nursery trials will be given higher consideration when subsequent finishing performance is monitored and carcass data collected. In order to be considered for funding, submitted proposals must show evidence of sufficient statistical power in relation to primary project objectives, clearly define the role of the study in meeting the objective to deliver cost effective technology for **improved energy and/or amino acid utilization, preferably on a carcass weight basis**.

Research projects are encouraged in the following areas:

1) Synthetic amino acid use: Use of synthetic amino acids in growing and finishing diets or efforts that lead a better understanding of the place synthetic valine and isoleucine have in swine diets
2) Development of optimal feeding strategies during times of disease challenge
3) Enzyme technologies that enhance nutrient availability

Submitted proposals must bring fundamental knowledge and application to improve swine nutrition by focusing on improving feed efficiency. Because this is a multifactorial issue, successful investigation in this area will likely require a variety of disciplines so proposals utilizing a multidisciplinary approach are highly encouraged. Preference will be given for research trials conducted under commercial-like conditions and with sufficient replication to make statistically appropriate conclusions. The committee strongly encourages collaboration with industry partners. Submitted proposals must show evidence of sufficient statistical power in relation to primary project objectives and clearly define the role of the study in meeting the objective to deliver cost effective technology.

**Further Information**

- Preference will be given to projects that involve academic and commercial collaboration, except where discovery is needed to establish principles necessary for additional research
- Projects spanning more than one year are not discouraged so that a project is provided sufficient time to deliver desirable outcomes. However, funding of a multi-year project must be justified, with second and third year funding being dependent on sufficient progress of the prior year
- Preference will be given to projects addressing priorities of highest value and/or spanning more than one priority
A description of methods to assess the economic impact of the research on the swine industry must be included in each proposal. This may necessitate the inclusion of an agriculture economist on the research team.

For information regarding this solicitation, please contact Chris Hostetler by Email (chostetler@pork.org) or by phone at (515) 223-2006.
ANIMAL WELFARE

The Pork Checkoff Animal Welfare Committee is requesting proposals on issues impacting the welfare of swine. Specific research areas of interest are listed below. All proposals submitted must address at least one of the specific research subtopics of interest described below.

All submitted projects should be multidisciplinary in their approach and should include neuroscience, performance, physiology, and behavior when applicable. Experimental designs must have all the appropriate controls to be considered for funding. Proposed methodologies need to be described in detail and behavioral methods and physiological assays used in the study need to be validated. Proposals need to also include power calculations to validate the proposed sample size. Proposed research may be conducted in commercial farm or research farm settings. However, regardless of location, proposed research should be applicable to commercial production. Projects that have cooperative arrangements with industry are strongly encouraged and will be prioritized. All approved projects using animals in research for any purpose must be reviewed by an Animal Care and Use Committee (ACUC) or equivalent. An ACUC approval is not only required for future publication of results in a peer reviewed journal, it also ensures a high standard of care for animals used in research in accordance with federal regulations and policies.

The Animal Welfare Committee has $300,000 to fund swine welfare related research. There is no exact funding limit for submitted proposals but the budget request should be appropriate and justified for the work that is being proposed. Researchers are encouraged to find matching funds or in-kind contributions to the project.

1. Improved Survivability Across All Life Stages
   - Transport Injury and Loss:
     o Explore ways to reduce transportation injury and loss, especially for market hogs. The focus of the research could include, but is not limited to: loading, transportation between facilities, and/or unloading.

   - Justification of the Use of Antibiotics/Pain Management for the Benefit of Animal Welfare:
     o Assess the needs for pain management/antibiotics to prevent and/or mitigate animal welfare issues within production systems.

   - The Use of Technology to Increase Animal Welfare and Survivability:
     o Identify and validate technology to improve survivability in all life stages. These could include, but are not limited to: individual animal identification and evaluation, remote monitoring and intervention, identification of aggressive behavior, piglet management, herd level environmental monitoring, identification of lameness, and genetic selection.

2. Management of Compromised Pigs and Timely Euthanasia
   - Identify and characterize barriers that lead to caretakers not performing on-farm euthanasia in a timely manner.

   - Quantify the possible psychological impact to caretakers when performing on-farm euthanasia. Identify methods or interventions for minimizing this impact resulting in positive caretaker mental health and job satisfaction.

   - Identify and validate new and novel methods of or equipment for euthanasia of mature, older adult swine. Key elements for determining if a method is humane include minimal pain and distress to the pig during administration, rapid loss of consciousness, and death occurs quickly and consistently. Proposals
focusing on agents or methods of euthanasia considered unacceptable as outlined in the AVMA Guidelines on Euthanasia (2016) will not be considered for funding.

- Determine optimal management, transport fitness and conditions for cull or compromised pigs to minimize stressors associated with end of production handling, mixing and transportation.
- Evaluate treatment pen design and management practices for typical U.S. wean-to-finish production. This includes novel ways for identifying and tracking animals receiving treatment.

3. **Painful Procedures and Pain Management**
   - Identify and validate alternative methods or practices to tail docking that effectively and reliably eliminate tail-biting behavior.
   - Develop and evaluate potential castration procedural alternatives or modifications that provide for the pig’s well-being and maintain acceptable pork quality.
   - Identify methods to reduce or eliminate pain associated with castration and tail docking. Methodology must directly assess the applicability and economic impact of commercial implementation.

4. **Aggressive and Damaging Behaviors (ear/flank/vulva/tail biting)**
   - Explore the impact of genetic influence on the incidence of aggressive and damaging behaviors. This includes inter- and intra-line variation.
   - Determine causation factors for ear or flank biting behaviors, including potential links with animal health.
   - Explore novel strategies to reduce aggression during mixing of sows or breeding age pigs.
   - Review the benefits of enrichment and their impact on preventing aggressive and damaging behaviors in various housing environments and on overall production.

5. **Farrowing Housing**
   Housing systems used during farrowing and lactation must accommodate for the well-being of the sow and her litter. The focus of this priority is to optimize the environment of a farrowing housing system for the sow and piglets and prevent pre-weaning mortality rather than comparing housing designs. Please note that proposals should evaluate behavior, physiology and productivity of the sows and piglets.

   - Explore ways to adapt current farrowing stall designs to provide more space for larger sows, litters and piglets given fixed space assets of the building.
   - Determine creep space requirements to accommodate at least 30 to 35 pigs/sow/year. Calculations for space requirements must account for changes in weaning age and litter sizes.
   - Explore novel ideas that can accommodate nesting behaviors & promote sow comfort that are bio-secure, animal friendly, caretaker friendly, manure management friendly, and sustainable.
   - Explore ways to create and manage optimal microclimates for the sow and for the piglets throughout lactation.
PORK SAFETY and PORK QUALITY

The Pork Safety, Quality, and Human Nutrition Committee of the National Pork Board is requesting research proposals in the following areas only. Specific pork quality and pork safety research topics are listed below, not in priority order. All proposals submitted must address at least one of the specific research topics of interest described. Proposals are solicited in the following area only. Proposals submitted that do not relate to these areas will not be evaluated, scored, or considered for funding.

There is no exact funding limit for submitted proposals, but the budget request should be appropriate and justified in detail for the work that is being proposed. Researchers are encouraged to find matching funds or in-kind contributions to the project. Novel approaches, concepts Multi-disciplinary and multi-institutional proposals are encouraged.

Detailed justification on sample size and treatment size must be included to determine statistical significance. Proposals may be returned to the investigator with suggested/requested revisions from the Committee prior to making a final funding decision. Further inquiries regarding this solicitation can be directed to Laura Bachmeier, Director of Pork Safety and Quality, by email at lbachmeier@pork.org or by phone at 515-223-2764.

PORK SAFETY- Pre Harvest:

1) Predictor of Emerging Pathogens of Interest
Pork Safety is a top priority for U.S. pork producers. The pork industry continually takes a proactive approach in addressing and dealing with food safety pathogens. The Committee is requesting research in order to develop methodologies that can identify pathogens before they become an emerging issue. Using existing data, researchers should develop a proposal to help recognize and identify emerging pathogens before they can become an industry wide issue.

PORK QUALITY:

1) Meta-analysis on U.S. pork carcass composition changes over the past 20 years
The Committee is interested in an accurate depiction of how the pork carcass composition have changed over the past 20 years. Below is a list of important topics for researchers to consider when developing a proposal:
   A. Investigate change or trends over the past 5, 10, 15, 20 years
   B. Metrics should be focused on the whole carcass and broken into primals
   C. Measurements should include:
      1. Weight measurements:
         i. Live weights, carcass weights, dressing percentage, and other important measurements (primal composition and weights)
      2. Loin eye area
      3. Firmness
      4. Important fat quality attributes:
         i. firmness, color, stability, fatty acid profile, fat separation and maturity
      5. The Committee is open to other measurements that are suggested and justified

2) What emerging technologies are available to predict spatial distribution and cellular gene expression within the pork carcass?
The Committee is interested in better understanding technologies that are available to predict gene expressions that regulate cellular processes. Below are a list of topics (not in priority order) for researchers to consider when developing a proposal:
a. Whole carcass and primals to consider- loin, ham, shoulder, belly
b. Cellular mechanisms
c. Genetics
d. Design the study with sufficient statistical power to provide scientific understanding of points a, b, c, and/or d.
**SUSTAINABILITY**

The National Pork Board Sustainability Committee is seeking proposals in the following areas:

1. Practical and cost effective mitigation and control of airborne emissions from commercial swine barns to include particulate matter as well as ammonia, hydrogen sulfide and methane gasses.

2. Practical and cost effective mitigation and control of odor emissions from commercial swine operations to include odor emissions from swine barns and manure storage structures and manure application practices.
SWINE HEALTH – Foreign Animal Disease

Introduction

The National Pork Board’s Strategic Plan for 2015 – 2020 identifies building consumer trust, driving sustainable production and growing consumer demand as goals and the focus for the National Pork Board’s work. A key objective for the Swine Health Committee under the goal for driving sustainable production is, by 2020 the National Pork Board will build the capacity to detect and prepare for foreign, non-regulatory swine production diseases, to rapidly respond to non-regulatory and regulatory foreign animal diseases and to facilitate pork producers business continuity. This objective is the basis for the Foreign Animal Disease call for proposals for 2018.

Important details

Proposals must be submitted in the required format provided with the RFP in order to be considered. Proposals that do not directly address the listed priorities will NOT be considered for funding. All eligible proposals will be reviewed by a panel of peers for scientific soundness and validity. Final funding decisions will be made by the National Pork Board Swine Health Committee. Further enquiries regarding this solicitation can be directed to Patrick Webb (pwebb@pork.org) 515-223-3441

Research Priorities for 2019

Priority diseases include Foot-and-Mouth Disease, Classical Swine Fever and African Swine Fever.

FAD Diagnostics:

1. Methods to improve antigenic matching between vaccines and field isolates (e.g. antigenic cartography) that better anticipate the direction of antigenic drift from current vaccines.
2. Development or validation of antibody detection tests with increased diagnostic sensitivity and specificity that complement DIVA capable vaccines.
3. Improvement of diagnostic sensitivity of PCR tests for FMD, CSF, and ASF.
4. Development or improvement of tests for the detection of antibody, antigen, and/or nucleic acid in meat juice, neonatal processing fluids, oral fluids, or other aggregate samples.
5. Comparison of analytic sensitivities of commercially available PCR diagnostic kits (FMD, CSF, and ASF) to the standardized protocols approved for used in the National Animal Health Laboratory Network for FAD diagnostics using oral fluid specimens. Comparisons must be expressed as probability of detection by concentration of target, e.g., genome equivalents per volume (uL) of the specimen expected to be tested.
6. Evaluation or improvement of diagnostic performance characteristics (diagnostic sensitivity and specificity over time post inoculation) for commercially-available CSF, FMD, and ASF tests.

Novel Technologies for Disease Mitigation

1. Inactivation of airborne pathogens in modern swine production environments

Biosecurity / Transmission of FAD’s:

1. Fomites, including survivability & transmissibility through:
   a. Transportation of live swine
   b. Germplasm
1. Determination of minimum infectious dose of FMDV in boar semen
   c. Fresh or processed meat products and variety meats
   d. Other plausible fomites and cross-contamination threats in the pork production chain, including the feed ingredient sourcing chain
2. Biocontainment of FAD’s in harvest channels

**Cleaning / Disinfection / Inactivation**

1. Transport Vehicles, Personnel, and Farm Equipment
2. Reassessment of facility downtime requirements post-cleaning and disinfection
3. Swine and Packing Facilities / Equipment including lairage areas
4. Comingling points (fairs, buying stations, exhibitions.)
5. Disinfectants and/or practices for the decontamination of the environment and biomaterials exposed to ASF, CSF and FMD
6. Inactivation of FAD’s in pork, pork products and variety meats
7. Susceptibility of FMDV virus to available treatment options used to ensure water quality in swine production systems

**Feed Risk**

1. Mitigations and/ or preventive controls for animal food, to test and verify product safety prior to shipment from a foreign country
2. Develop methods for active monitoring of imported feed components for FADs or other transboundary pathogens at ports of entry or before shipping from source countries
3. Minimum and median infective dose of CSF, PRV and FMD in feed during normal feeding behaviors

**Other**

1. Risk of FMDv infection due to semen movement from premises located in regulatory disease control areas
2. Surveillance sampling methods for optimizing detection of trade limiting foreign animal diseases within pens, barns and sites
3. Vaccine strategies / protocols and priorities in a FMDv and/or CSFv outbreak in the United States
The National Pork Board recently established a Strategic Plan for 2015 – 2020. As part of that Strategic Plan, specific goals were determined to be the main focus for the National Pork Board: Build Consumer Trust; Drive sustainable Production; and Grow Consumer Demand. The goal, “Drive Sustainable Production” is of high priority to and can be directly impacted by the Swine Health Committee. Therefore, as part of the efforts to address this goal, the key target listed below will be the basis for the General Swine Disease call for proposals for 2019. The key target is:

By 2020, the National Pork Board will develop, with key stakeholders, the identification and diagnostic tools, surveillance and mitigation strategies for the potential elimination of the top domestic swine diseases.

Endemic diseases of swine can negatively impact producer profitability by reduced feed efficiency and average daily gain, by increased death loss or by increased cost of production to manage diseases. The National Pork Board Swine Health Committee is requesting proposals on issues that directly address the goals of the 2015 Strategic Plan. Specific research areas for the General Swine Disease call are listed below. All proposals submitted must address at least one of the specific research subtopics of interest described below or they will not be considered for funding.

Investigators are encouraged to leverage their research efforts by including additional relevant swine pathogens in the experimental design if the experiment can accommodate it and it is appropriate to do so. Researchers are also encouraged to work with veterinarians in the field to address the entire clinical picture of disease challenges.

Proposals must be submitted in the required format provided with the RFP in order to be considered. Proposals that do not directly address the listed priorities will NOT be considered for funding. All eligible proposals will be reviewed by a panel of peers for scientific soundness and validity. A total of $500,000 is available for the call for proposals. Final funding decisions will be made by the National Pork Board Swine Health Committee. Further enquiries regarding this solicitation can be directed to Dr. Lisa Becton by email lbecton@pork.org or by phone: 515-223-2791.

Research priorities for 2019:

- Enteric Diseases of Swine
- Mycoplasma hyopneumonia
- Influenza A virus in swine
- Strep suis

**Enteric Diseases of Swine:**

1) SECD: Much has been learned about SECD in a short amount of time. Additional questions remain about gilt development, potential long term effects of exposure and why some herds break back to active infection following a period of stability.
   a) Does age at initial exposure affect level and length of effective immune response?
   b) What is the post-epidemic epidemiology of herds that still experience outbreaks?
      i) What is the underlying mechanism/reason for subsequent outbreaks of PEDV at the same farm after the initial outbreak?
      ii) What is the immune status of herds experiencing recurrent outbreaks? Are there differences that exist in immunity within the herd vs. individual sows that permit additional outbreaks?
   c) What characteristic or property of the virus allows for persistence after active immune response?
**Mycoplasma hyopneumonia:**

1) Development of methods and protocols for the elimination of the disease
   a) What is/are the most effective method(s) to introduce negative gilt replacements into a positive sow herd to minimize the subsequent shedding of Mycoplasma to the offspring of primiparous gilts? Do those methods vary by production type?
      i) Improve on methods and validate techniques for natural exposure of negative gilts prior to entering a positive herd.
         (1) Develop methods that producers and veterinarians could use to create/secure an infectious culture to provide exposure for the “seeder” gilts.
         (2) Refine methods of exposing “seeder” gilts to build better immunity in the naïve replacement population.
         (3) Is the use of “seeder” pigs effective for consistent exposure?
            (a) Is there a protocol that can provide for the consistent inoculation of “seeder pigs”?
            (b) Development of rapid and accurate diagnostic testing to confirm gilt exposure.
   b) In commercial production determine the impact of sow and piglet vaccine strategies and timing of administration (age) as part of a protection strategy: i.e. single dose vs. two dose vs. three-dose vaccine regimens.
      --Does the number of antigens or type(s) in the combination vaccines impact subsequent immunity?
   c) Establish sensitivity and specificity levels of different sampling techniques for early detection.

**Influenza A Virus – Swine (IAV-S):**

Key questions need to be answered for effective management and control of influenza in swine. 1) How can neonatal pigs remain influenza free as long as possible after birth?; 2) What is the best way to immunize neonatal pigs that have maternal antibodies from positive sows to keep them influenza free for the longest period as possible?; and 3) Are there improved IAV-S vaccines for optimum efficacy? Therefore, in order to address these questions the current research priorities for influenza are listed as follows:

Influenza (continued):

1) Priority 1: Develop strategies to stabilize the sow herd to minimize shedding of the virus in gestation and in farrowing (i.e., reduce virus shed to suckling or ready-to-wean pigs).
2) Priority 2: Develop novel influenza control plans for piglets with maternal immunity to produce influenza A negative weaned pigs (i.e., overcoming maternal antibody interference).
3) Priority 3: Develop novel IAV-S vaccine prototypes.

**Strep suis:**

Note: For all proposals, it is strongly encouraged to have collaboration with other entities that are working with Strep suis (i.e. England, Netherlands, Asia).

1) Priority 1: Determine what is the best sample type and source for optimal detection: Is there another sample type that can be easily obtained other than or in addition to brain (i.e. other sample type or organ/organ system)?
2) Priority 2: Identification of relevant virulence genes or markers that differentiate commensal and virulent S. suis isolates in the US, with the end goal of selecting an isolate that can be used for intervention strategies.
   a) Identification of multilocus sequence types (MLST) and/or clonal clusters associated with commensal vs virulent S. suis strain
3) Priority 3: Develop a consistent challenge model for *Strep suis* infection in pigs.
4) Priority 4: What is the best method for detecting subclinical disease in pigs?