

NATIONAL PORK BOARD

Request for Proposals

General Call 2018



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". This FREE webinar will be hosted by Dr. Chris Hostetler on October 10th, 2017 at 2:00 PM. The purpose of this webinar is to provide information to investigators so that their proposal gets the best chance of a competitive review. To register for the webinar, please follow this link: [Register Here](#) or visit <http://www.pork.org/pork-checkoff-research/research-request-proposal/>. If you have questions, please feel free to contact Dr. Chris Hostetler by phone (515)223-2606 or email (chostetler@pork.org).

DEADLINE: Tuesday, November 14th– 5:00 pm CST

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

ANIMAL SCIENCE – Swine Nutrition

ANIMAL WELFARE

PORK QUALITY

PORK SAFETY – Post-Harvest

PORK SAFETY – Pre-Harvest

PUBLIC HEALTH – Antibiotic Use & Resistance

PUBLIC HEALTH – Influenza

PUBLIC HEALTH – MRSA

PUBLIC HEALTH - Other

PUBLIC HEALTH – Other Zoonotic Diseases

SUSTAINABILITY – Other

SWINE HEALTH - Foreign Animal Disease

SWINE HEALTH – General Swine Disease

STAFF MEMBERS:

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NOTES:

Proposal selection will occur in February 2018.

Notification of grant awards will be done by April 2018.

Project funding will begin May 1, 2018.

Requests for second-year funding must be resubmitted.

ANIMAL SCIENCE

Call for Proposals – Feed Efficiency

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. Thus, 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
- 2) Enzyme technologies
- 3) Novel technologies or approaches to improve energy and/or amino acid utilization.
- 4) Optimal feeding strategies during times of disease challenge.

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 should 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) 223-2606.

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. 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 \$200,000 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.

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.

Proposals must be submitted in the attached format to be considered. 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. Further enquiries regarding this solicitation can be directed to Sherrie Webb by email swebb@pork.org or by phone: 515/223-3533.

1. 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 (2013) 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.

2. 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.

3. 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.

4. 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 QUALITY AND SAFETY

The Pork Safety, Quality, and Human Nutrition Committee of the National Pork Board is requesting research proposals in the following areas only. Specific 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 below. Novel approaches and concepts to the research topics are encouraged.

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. Multi-disciplinary proposals are encouraged.

Proposals must be submitted in the designated available format to be considered. Projects may cover multi-year efforts. For multi-year efforts, project expected deliverables and budget should be broken down by year. Expert panels will review submitted proposals for scientific soundness and industry priority. **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. Funding for accepted projects will follow final approval by the National Pork Board. Further inquiries regarding this solicitation can be directed to Laura Bachmeier, Director of Pork Safety, by email at lbachmeier@pork.org or by phone at 515-223-2764.

Proposals are solicited in the following area only. Proposals submitted that do not relate to this area will not be evaluated, scored, or considered for funding.

The topics below are NOT listed in priority order:

PORK SAFETY:

Understanding Shiga-toxin producing Escherichia coli (STEC) O157:H7 and Non-O157 in Pork Products

- 1) The Committee is interested in better understanding the ecology of E coli. O157:H7 and Non- O157:H7 STEC Research should include the areas of epidemiology, pathogenesis, prevalence, risk factor management, monitoring and measurement, and intervention or control strategies. Specific research topics to consider are outlined below: (please note that these are not in priority order)
 - a. Prevalence of STEC in U.S. swine populations
 - b. Investigate the ecology/ evolution of STEC
 - c. Determine STEC serotypes and Shiga-toxin gene subtypes
 - d. Risk assessment models/studies to assess the relationship between on-farm STEC prevalence and the risk to human illness
 - e. **Design the study with sufficient statistical power to provide scientific understanding of points a, b, c, and/or d.**

Interventions for Salmonella in Pork Trim

- 1) As part of the National Pork Boards 2020 Strategic Plan, one of the objectives is to reduce the prevalence of Salmonella in pork trimmings (by 10 percentage points). A previous funded National Pork Checkoff study has identified the prevalence of Salmonella in head meat and trim intended for ground pork, isolates, and antimicrobial susceptibilities of Salmonella isolates. Further research is required to identify interventions for Salmonella in pork trimmings. The Committee is requesting proposals in this research area. Below is a list of topics for researchers to consider when developing a proposal:

- a. Testing Interventions
- b. Duration of Interventions
- c. Cost associated with the intervention
- d. Sampling scheme
 - i. Sample type
 - ii. Where are the samples going to be taken from and why
 - iii. Define the population that will be represented in the project and why
- e. Testing methodology
- f. **Design the study with sufficient statistical power to provide scientific understanding of interventions for Salmonella in pork trim.**

Prevalence of Hepatitis E in U.S. Swine Herds

- 2) In Europe, Hepatitis E has become an emerging pathogen in the swine industry. The Committee would like to better understand the scope and impact of Hepatitis E in U.S. swine herds and pork supply chain. Specific research topics to consider are outlined below: (please note that these are not in priority order)
 - a. Prevalence of Hepatitis E in U.S. swine populations
 - b. Investigate the ecology/ evolution of Hepatitis E
 - c. Determine Hepatitis E genotypes in U.S. and compare them to those causing human illness in Europe
 - d. Risk assessment models/studies to assess the relationship between on-farm Hepatitis E prevalence and the risk to human illness
 - e. **Design the study with sufficient statistical power to provide scientific understanding of points a, b, c, and/or d.**

PORK QUALITY:

Intramuscular Fat Variation Throughout the Loin

Various studies have reported how to predict intramuscular fat of the loin through live evaluation. However, there is limited research on the development of IMF in the loin. Thus, the Committee is interested in better comprehending how, when, and where intramuscular fat is deposited specifically throughout the loin. Below is a list of topics for researchers to consider when developing a proposal:

- a. Cellular mechanisms
- b. Genetic lines
- c. Nutrition
- d. Seasonality
- e. **Design the study with sufficient statistical power to provide scientific understanding of points a, b, c, and/or d.**

PUBLIC HEALTH

Public Health – Antibiotic Use & Resistance

The Producer/Public Health and Workplace Safety (PPHWS) Committee is soliciting proposals in the areas of **Antibiotic Use and Resistance**. The priorities (not listed in order of priority) and key concepts listed below were developed by a joint committee taskforce with producer and subject matter expert representation from each of the National Pork Board's Science and Technology Committees. The Board has dedicated \$600,000 to this effort in 2017; however, there is no limit set for the amount of funding requested for individual proposals.

Proposals must be submitted in the attached format in order 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. Regular interim reports are required for both single year and multi-year proposals. Inclusion of preliminary data and evidence of cooperative funding is highly encouraged. 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. *For information regarding this solicitation, please contact Dr. Heather Fowler by Email (hfowler@pork.org) or by phone at (515) 223-2633.*

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

Below is a list of research areas to be addressed by the **Antibiotic Use and Resistance** research RFP. Submitted proposals must bring fundamental knowledge and application for continuous improvement of antibiotic use best practices in the pork industry. Research in these areas will require a variety of disciplines and therefore proposals utilizing a multidisciplinary approach are highly encouraged. Proposals should reference which priorities and key concepts listed below are being addressed. Animal studies should be conducted in commercial-like conditions and with sufficient replication to reach industry applicable results/conclusions. Additionally, proposals should provide a power analysis to document and ensure sample size is adequate. 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 outcomes technology, and address one or more of the following research priorities:

- 1) ***Alternatives to Antibiotics (Please Note: This is NOT solicitation for product development)***
 - Evaluate alternative interventions to define therapeutic options in the weaning phase.
 - Assess the comparative efficacy (prevention, control, treatment) of products that may be used as substitution to antibiotics under controlled disease challenge. The current industry equivalent should be specified in the study.

- 1) ***Antibiotic Administration***
 - Evaluate the amount of antibiotics used and route of administration in the nursery phase in terms of antibiotic efficacy and likelihood of selection for antibiotic resistance.
 - Assess the use of injectable antibiotic regimens in preweaned piglets on ultimate antibiotic need and potential impacts on the development immunity.
 - Evaluate or compare efficacy of current treatment regimens of water antibiotics or injectable antibiotics during coinfections.

2) *Mitigations*

- Demonstrate the value of prevention uses of antibiotics versus treatment uses.
- Evaluate basic mechanisms for bacterial vaccine development. **It is important to understand that this is NOT solicitation for product development.**
- Identify and characterize genetic markers for diseases of importance in swine production that currently require antibiotic treatment, directly, or indirectly due to coinfection.

Further Information

- Preference will be given to projects that involve multi-disciplinary approaches that may include academic and commercial collaborations, 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
- A description of methods to assess the potential economic impact of widespread adoption of the research conclusion on the swine industry should be included in each proposal. This may necessitate the inclusion of an agriculture economist on the research team.

PUBLIC HEALTH - other

The Producer/Public Health and Workplace Safety (PPHWS) Committee is also requesting proposals **in the area of worker health and safety and zoonotic diseases**. Specific research topics are listed below, not in priority order. All proposals submitted **must** address at least one of the specific research subtopics of interest described below. **Novel approaches and concepts are encouraged.**

The Producer and Public Health Committee has \$200,000 to fund producer/public health, worker health and safety and zoonotic diseases 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. Trans-disciplinary proposals are highly encouraged.
- Proposals that include provisions for analysis of the economic impact of the research to the swine industry are encouraged. This may be accomplished by inclusion of an agriculture economist on the research team.
- **To clearly differentiate from proposals addressing swine health issues**, proposals submitted in the area of producer/public health, workplace safety and zoonotic disease should explain for the Producer/Public Health and Workplace Safety Committee (which will make funding decisions), **how the study will impact/protect public health**. Applicants should use non-scientific language for this purpose.

Projects may cover multiple-year efforts, but, for multi-year projects, project expected deliverables and budgets must be broken down by year. If proposed projects are for completion of a multi-year proposal already in-progress, the proposal must include a discussion of progress and accomplishments realized from 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.

Proposals will be reviewed by panels for scientific soundness and for industry priority. Proposals may be returned to the investigator with suggested/requested revisions prior to making a final funding decision.

Funding for accepted projects will follow final approval by the National Pork Board. Further enquiries regarding this solicitation can be directed to Karen Hoare by email at khoare@pork.org or by phone: 515-309-6131 or to Heather Fowler by email at hfowler@pork.org or by phone: 515-223-2633

The research topics below are NOT listed in priority order:

PUBLIC HEALTH – Influenza

1. Influenza
 - a. Studies to determine the **bi-directional** interspecies transmission of influenza virus (i.e. from people to pigs and pigs to people).
 - i. Studies may assess viral ecology, risk factors associated with infection (e.g. what is the potential risk of transmission from barn workers to pigs and/or from pigs to barn workers), host susceptibility and/or host restriction for interspecies transmission.
 - b. Studies to assess the impact of interventions on reducing **bi-directional** interspecies influenza transmission and/or or studies to identify potential **new** interventions for mitigation of bi-directional interspecies transfer of influenza virus in pork production facilities.
 - i. Studies may assess vaccination policy/vaccine use in people and pigs, worker sick leave policy, worker temperature monitoring, hand washing and other physical barriers on the interspecies transmission of influenza in pork production facilities.
 - c. Studies, surveys or other methods to characterize influenza dynamics in exhibitors and their pigs through the show pig/exhibitor lifecycle (e.g. at purchase, on-farm, in exhibition settings).
 - i. Studies may focus on identifying epidemiologic links to increased or decreased risk of infection for humans or pigs and address strategies to reduce the potential for transmission between human and pigs and pigs and human.

PUBLIC HEALTH – MRSA

1. Methicillin-resistance *Staphylococcus aureus* (MRSA) and multi-drug resistance *Staphylococcus aureus* (MDRSA)
 - a. Studies to advance knowledge of staphylococcal biology (not limited to MRSA) in the swine production environment.
 - b. Studies to better understand the pathways of swine worker occupational exposure to *Staph aureus* (including MDRSA and MRSA) susceptibility to colonization, factors prolonging carriage/colonization in both humans and pigs, and feasible interventions to reduce the risk of *S. aureus* colonization of workers in pork production facilities.
 - c. Studies to better understand the health impacts of swine worker occupational exposure to *S. aureus* (including MDRSA and MRSA)

PUBLIC HEALTH – Other Zoonotic Diseases

1. Other Zoonotic Diseases
 - a. Studies of the prevalence, diagnosis, epidemiology and/or human health risk for emerging and re-emerging zoonotic diseases associated with pigs.
 - b. Studies to evaluate intervention methods in pork production to protect humans from zoonotic agents that they may be exposed to in pork production facilities.

Note: Proposals for other zoonotic diseases should justify why the topic is relevant to the swine industry and how the study will impact/protect producer, public health, or worker safety.

PUBLIC HEALTH – Worker Health and Safety

2. Research that improves systems for monitoring existing and changing injury and illness burden, including
 - a. Studies designed to identify ways to reduce worker injury and illness burden.
 - b. Studies that integrate prevention of worker injury and illness with improved production practices.
 - c. Studies that evaluate the return on investment of workplace health and safety programs that include direct and indirect costs.
 - d. Programs to improve worker health and safety training that incorporate animal welfare with worker health and safety.
3. Novel interventions
 - a. Evaluation of exposure interventions (*e.g.*, engineering, work/production practices, worker training or personal protective equipment) that mitigates or eliminates the impact of workplace hazards on worker and animal health. Characterizing the impact of the intervention on current production practices is required. This may be accomplished by performing cost/benefit analyses of the intervention and itemizing annual costs. Using a quantitative approach to evaluate the effectiveness of the intervention practice(s) is highly desirable.
 - b. Novel approaches to training workers that integrate good production practices with worker health and safety.

SUSTAINABILITY

The Sustainability Committee solicits proposals in the following areas. There is no funding limit for submitted proposals but the budget request should be appropriate and justified for the work proposed. Researchers are encouraged to find matching funds or in-kind contributions to the project. 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 by including copies of interim or final reports from previously funded research efforts as appendices to the proposal submitted.

Proposals must be in the attached format. A science review panel will be evaluate proposals for scientific soundness and validity. The National Pork Board Final will make final decisions on funding proposals. Prior to making a final funding decision, the National Pork Board may be return proposals to the investigator with suggested/requested revisions. Direct questions regarding this solicitation to Allan Stokes by email astokes@pork.org or phone: 515/223-3447.

Meta-analysis, life cycle assessment, laboratory and/or field research on carbon, water, air and land impact of:

- Use of alternative swine feed ingredients and sources.
- Use of alternative swine production systems.
- Employing environmental mitigation technology and/or practices.

SWINE HEALTH

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 main 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

Principal Investigators (PIs) must follow all instructions and submit research proposal in the required format in order to be considered. A link to a document containing this information can be found at Pork Board's request for proposal webpage.

Proposals that do not directly address the listed priorities will NOT be considered for funding.

Newly submitted single or 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.

Projects seeking second-year funding for a previously funded project must include a discussion of progress and accomplishments realized from the research efforts to date toward success of the overall research effort.

Proposals that delineate clear, practical outcomes and leverage additional matching funds are encouraged.

All eligible proposals will be reviewed by a panel of peers for scientific soundness and validity. A total of \$310,000 is available for the call. 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

FAD Research Priorities for 2018

The National Pork Board's (NPB) Swine Health Committee seeks Principal Investigators (PIs) to submit research proposals that address the research priorities listed below. 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) Evaluation or improvement of diagnostic performance characteristics (diagnostic sensitivity and specificity over time post inoculation) for commercially-available CSF, FMD, and ASF tests
- 4) Comparison of analytic sensitivities of commercially available PCR diagnostic kits (FMD, CSF, and ASF) to the standardized protocols approved for use 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.
- 5) Improvement of diagnostic sensitivity of PCR tests for FMD, CSF, and ASF.
- 6) Antibody, antigen and nucleic acid detection in meat juice, neonatal processing fluids, oral fluids, or other aggregate samples utilizing moderate to virulent FMD, CSF, and ASF strains
- 7) Development of a simple, rapid pen side / point of care diagnostic tool for sensitive detection of FMD virus and/or differentiation of other diseases that cause vesicular lesions in swine.

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 and germplasm
 - b. Fresh or processed meat products and variety meats
 - c. 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

Risk Analysis (Swine Specific):

- 1) Agent-specific aerosol transmission risk (area spread) from and to modern large production populations
- 2) Risk analysis of FAD spread to and from points of concentrations where swine are routinely commingled (e.g. sale barn, consolidators, lairage, fairs, etc.)

Modeling

- 1) Disease spread and consequences to the pork chain post introduction of an OIE listed trade limiting FAD's of swine (FMD, ASF, CSF) into the U.S. domestic swine herd. All proposals should include the use of real time or near real time data when modeling interstate and intrastate movements of swine for breeding, feeding and slaughter purposes.

SWINE HEALTH – General Swine Disease

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 2018. The key target is:

1. 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.**

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. For projects 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.

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 \$600,000 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 2018:

Enteric Diseases of Swine
Mycoplasma diseases
Influenza A virus in swine
Senecavirus A (SAV)

Enteric Diseases of Swine:

- 1) **Ecoli:** *Producers are concerned about increased E coli activity in growing pigs as a result of management practices in farrowing such as pig holding on-farm and long duration transport. Mitigation strategies such as vaccination, medication, and management are all important topics worth additional investigation.*
 - a) Identify the mechanism of action for oral E coli vaccines and how to take advantage of that for implementation of vaccines.
 - b) Identify production protocols that alter and/or reduce the colonization and proliferation of E. coli (diminish or eliminate clinical disease) that can be incorporated into daily production practices.

- 2) **Rotavirus:** *Science today allows us to better understand this virus. Greater predictive control may lie within better understanding of the virus and its epidemiology.*
 - a) Develop Group specific (A, B & C) assays that can measure the change in immune response and antibody levels following vaccination/exposure to help ensure maximum efficacy of the intervention.
 - b) Do certain factors (dam/pig immune status, parity, and P&G serotype) vary the herd level disease/pathogenesis of Group C in young pigs?
 - c) Develop the mechanism/format to collect P&G serotype/genotype data for the creation of a database of sequences for Rotavirus A, B, & C and track the dissemination around the US.

- 3) **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 acclimatization 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 that allows for persistence after active immune response?

Mycoplasma diseases:

- 1) **Mycoplasma hyopneumonia:**
 - 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) Are there differences between continuous flow sites vs All-In/All-Out production flow?
 - ii) Develop methods to effectively provide natural exposure for 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”?
 - (4) How many positive pigs per negative gilts are needed for effective exposure?
 - (5) Development of rapid and accurate diagnostic testing to confirm gilt exposure.
 - b) In commercial production determine the impact of 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 sow herd vaccination status impact vaccination strategy and subsequent immunity of progeny?

- Does the number of antigens or type(s) in the combination vaccines impact subsequent immunity?
 - c) What management practices, treatment options, and/or antimicrobial alternative interventions exist for Mycoplasma-caused pneumonia in herds raised without antibiotics?
 - d) Establish sensitivity and specificity levels of different sampling techniques for early detection.
 - i) What is the PCR prevalence in oral fluids and is there a correlation of PCR results from oral fluids and clinical signs?
 - ii) How best can PCR oral fluid testing be utilized as part of a plan to control clinical disease in W/F populations?
 - e) What is the most effective method to reduce the shedding and transmission of a M. hyopneumoniae to piglets during lactation? Points to consider include:
 - i) Is there a parity effect of shedding during lactation: i.e. gilt vs. sow?
 - ii) Does cross-fostering alter shedding patterns of Mycoplasma?
 - iii) Does the amount of shedding correlate to colonization and subsequent risk of clinical disease in the piglets?
 - iv) Determine the impact of parity on maternal immunity (P1s vs. older parities) for piglet vaccination effectiveness.
- 2) **M. hyosynoviae and M. hyorhinis:**
- a) Develop differential antibody assays for M. hyorhinis and M. hyosynoviae.
 - b) Identify the pathogenesis of disease for these organisms.
 - c) Are there genetic markers to help identify pathogenic organisms through whole genome or partial sequencing methods?
 - i) Development and evaluation of effective vaccines of pathogenic isolates.
 - d) What treatment options or antimicrobial alternative interventions exist for Mycoplasma-caused lameness in herds raised without antibiotics?
- 3) **M. suis: (old classification = Eperythrozoonosis suis)**
- a) What is the clinical relevance of PCR positive test result?
 - b) What interventions are effective for treatment within the current VFD guidelines?

Influenza A Virus – Swine (IAV-S):

- 1) Epidemiology
 - a) Understand the mechanisms of influenza virus transmission and maintenance within herds and develop strategies to decrease transmission among gilts and sows with the goal to minimize shedding of the virus in gestation and in farrowing (reduce virus shed to suckling or ready-to-wean pigs).
 - i) Develop an effective gilt acclimatization method(s) to maintain stability for IAV-S in herds.
 - b) Understanding virus migration/transportation between herds as a mechanism of virus spread and evolution
- 2) Vaccinology
 - a) Investigate novel adjuvants or immune-modulatory agents that result in robust clinical protection (mucosal delivered, long lived, broadly cross-protective and/or reduce the number of vaccine boosters).
 - b) Develop novel influenza control plans for piglets with maternal immunity (e.g. overcoming maternal antibody interference, vaccination in the face of maternal antibodies) to produce influenza A negative weaned pigs.
 - c) Develop novel IAV-S vaccine prototypes

d) Investigating the effectiveness and response to vaccines given to pigs with prior exposure and immunity to homologous or heterologous strains/subtypes.

3) Genetics

a) Identify IAV-S genetic changes important for antigenic drift or increased virulence in swine. Identify genetic changes contributing to human-to-swine spillover and adaptation of H3N2 and H1N1 viruses.

Senecavirus A (SVA):

- 1) Understand the epidemiology of the virus and transmission dynamics within a herd and between herds.
 - a) Determine risk factors with clinical breaks of the disease.
 - b) Determine ability for transmission to occur through feed and the oral infectious dose.
 - c) Identify other potentially viable modes of transmission (i.e. airborne, insects, fomites, semen)

- 2) What is the underlining immunology and immune status of swine following natural exposure to the virus.
 - a) Determine length of time of presence of neutralizing antibody.
 - b) Effect of immune status and the potential for latent virus.

- 3) Biosecurity and Disinfection
 - a) Determine disinfectants that will inactivate the virus.
 - b) Do disinfectants exist that will inactivate the virus in the presence of organic material?
 - c) Determine viable protocols for disinfection at points of animal concentration and in market channels.

- 4) National study on prevalence of the virus in U.S. swine.
 - a) Investigate the prevalence and geographic distribution of SVA antibodies in veterinary diagnostic laboratory oral fluid submissions.