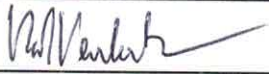## 2019 NERA Funding Support for Grant Applications

Project Title: Feeding and management of crossbred steers and the economic benefits

Team Leader Contact Information:

Name:	Kristen E. Govoni
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Phone:	860-486-2480
E-mail:	kristen.govoni@uconn.edu

Team Leader Signature: _____ **Date:** ___9-11-19___

Station Director Signature: _____ **Date:** 09/19/19

Team Members

Name	Institution/Agency/Organization
Tara Felix	Pennsylvania State University
Chad Dechow	Pennsylvania State University
Michael Baker	Cornell University
Albert DeVries	University of Florida

Narrative

Grant opportunity:

USDA-NIFA Foundational and Applied Science Program: Animal Growth, Nutrition, and Lactation (A1231); due March 12, 2020. Title "Feeding Management of Crossbred Steers and the Economic Benefits for Dairy Producers". Anticipated direct costs $350,000.

Prospective grant project abstract:

The majority of cattle in the Northeast are dairy cattle. Dairy producers are selling Holstein bull calves to be raised for meat, but carcass yield and efficiency of gain cannot compete with the native beef breeds. Because of this reduction in efficiency and carcass merit, the Holstein calves raised for beef are heavily discounted. To increase farm profitability and meet consumer demand for high quality, local beef, some dairy producers have shifted to breeding cows to beef semen to produce a beef x dairy crossbred calf.

Beef semen sales to dairy herds have nearly quadrupled in the past 15 years with much of that growth in 2018. Domestic dairy semen sales in 2018 were around 21.9 million units, down 1.8 million units from 2015. However, beef semen sales jumped 1.6 million units from 2017 to 4 million units in 2018 (Hoard's; April 29, 2019) with additional units being used on dairy cows. Dairies implement beef crosses for various reasons, including revenue enhancement. In the last four years, there has been a plethora of popular press articles (not scientific) regarding the use of the beef x dairy crossbred calf for beef production. Much of what has been circulating about crossbreeding Holstein cows to beef has been anecdotal. There is a dearth of information regarding growth performance, including feed efficiency, and economic return on crossbreeding dairy cows to beef sires. Many segments of the industry would benefit from consensus of professionals in this area. *The problem that will be addressed* in this proposal is the lack of scientific data about best feeding and management practices to enhance efficiency of production in crossbred steers, and marketing strategies to enhance the economic returns to the farm. Specifically, we will ask the *research questions*: 1) What are the best feeding practices to maximize feed efficiency and product quality? 2) What are the economic benefits for dairy producers in generating crossbred calves? The *key stakeholders* for this proposal are the dairy and beef producers who will benefit by understanding the economics and what crossbreeding their cows to beef sires returns to the operation, packers who will benefit from purchasing cattle with enhanced ability to grade and yield at the plant, and consumers who will benefit from better quality, locally sourced meat. *Our plan for the proposed project* will be to: 1) Evaluate feed efficiency of 2 to 3 diets in dairy vs. crossbred calves and quality of product. 2) Calculate the economic costs and benefits of using beef x dairy crossbreds versus Holstein steers for meat production. The broader impact of this work will be improved efficiency of production and reduced cost of meat from crossbred cattle, leading to increased quality protein from local sources for consumers.

To develop a proposal to address this problem in the Northeast, we will participate in the Northeast Section of American Society of Animal Science and Northeastern Branch of American Dairy Science Association meeting in conjunction with the Penn State Dairy Nutrition Conference this November 2019. This venue will not only bring together the key scientists involved in this proposal development, but also broaden the scope of information and interactions amongst scientists in the fields of beef *and* dairy nutrition and management. The timing of this meeting will allow for adequate time to develop a proposal for the USDA-NIFA RFA deadline of March 2020.

Team members:
Kristen E. Govoni, Associate Professor, Department of Animal Science, University of Connecticut. Dr. Govoni will lead the team effort in developing a proposal to USDA. For the proposed project, her expertise in growth and metabolism will be used for sample and data analysis in monitoring cattle growth and product quality.

Tara Felix, Assistant Professor, Department of Animal Science, Pennsylvania State University. Dr. Felix is a beef extension specialist with a background in beef cattle nutrition, metabolism, and management. She will be involved in the development of preliminary data and writing the proposal. Her expertise will be essential in performing the in vivo studies and connecting with industry partners and producers.

Chad Dechow, Associate Professor, Department of Animal Science, Pennsylvania State University. Dr. Dechow is an expert in dairy cattle genetics and will be involved in developing the final proposal. His expertise will also be necessary for the in vivo studies and role of genetics in crossbred production.

Michael Baker, Senior Extension Associate, Department of Animal Science, Cornell University. Dr. Baker's expertise in developing and implementing marking programs for small businesses in the Northeast will be necessary to ensure local farmers are successful in implementing crossbred dairy into their programs.

Albert DeVries, Associate Professor, Animal Sciences, University of Florida. Dr. DeVries has expertise in dairy management and economics, including modelling of strategies to increase dairy profitability with use of sexed and beef semen

Budget narrative:
Funding for this grant project will bring key researcher in the field together to share current data and allow open discussion with a focus on identifying the needs of industry partners. Not all participants would have attended the Northeast conference, so this provides an opportunity for the team to meet in person and share current research related to the proposal. The proposed meeting will incorporate a dinner of the team the night before the meeting and networking session for the team and trainees with other attendees which is critical for face-to-face interactions among scientists in the field. This will allow for development of a comprehensive and competitive proposal for USDA-NIFA.

Budget:

ITEM	AMOUNT
Meeting space for team meeting and reception, team dinner and food for networking reception, AV for team use.	$3,500 ($1,500 space, $1,500 food, $500 AV)
Travel expenses for speakers and team members to arrive early before the conference (airfare, hotel, registration)	$3,500 ($200/room/night (2 nights) + $100 food/person) + $1,000 (airfare for new participants in team – Baker and DeVries)

Biographical Sketch **KRISTEN E. GOVONI**

EDUCATION/TRAINING:

B.S.	1998	Department of Animal Science, University of Connecticut, Storrs, CT
M.S.	2002	Department of Animal Science, University of Connecticut, Storrs, CT
Ph.D.	2003	Department of Animal Science, University of Connecticut, Storrs, CT
Postdoc	2003 – 2008	Postdoctoral Research Associate, Musculoskeletal Disease Center, Jerry L. Pettis VA Medical Center, Loma Linda, CA

RESEARCH AND PROFESSIONAL EXPERIENCE
Positions

2015 – Present	Associate Professor, Department of Animal Science, University of Connecticut, Storrs, CT
2008 – 2015	Assistant Professor, Department of Animal Science, University of Connecticut, Storrs, CT
2003 – 2008	Postdoctoral Research Associate, Musculoskeletal Disease Center, Jerry L. Pettis VA Medical Center, Loma Linda, CA
2002 – 2003	Graduate Assistant, Department of Animal Science, University of Connecticut, Storrs, CT
1998 – 2002	Research Assistant II, Department of Animal Science, University of Connecticut, Storrs, CT

Professional Activities
- Section Editor, *Journal of Animal Science* (2013 – 2016)
- Editorial Board Member, *Journal of Animal Science* (2008 – 2013)
- Board of Directors, *American Society of Animal Science* (2016 – present)
- Director, Women in Science, Math and Engineering Learning Community (2016 – present)

Honors and Awards

2019 Petit Family Foundation Women in Science Leadership Award
2014 Donald M. Kinsman Award for Excellence in CANR/RHSA Undergraduate Teaching by Junior Faculty
2013 ASAS Northeast Section/ADSA Northeastern Branch Young Scientist Research Award
2006 Endocrine Society Travel Grant
2005 ASBMR Young Investigator Award
2005 Women in Endocrinology Abstract Award
2003 NACTA Teaching Award
2002 ASAS/ADSA Northeast Graduate Student Paper Competition, Second Place

Grants Received (Last 5 years)
2019 – 2023: Poor maternal nutrition across generations: Roles for oxidative stress, metabolism, and inflammation. USDA-NIFA-AFRI (Co-PD). $499,873. **Multi-PI award.**
2017 – 2020: The effects of nutrient restriction and realimentation on offspring liver and muscle growth and metabolism. USDA-NIFA-AFRI (PD). $489,800. **In collaboration with NDSU**.
2015 – 2017: The effects of poor maternal nutrition on pancreatic development of offspring. USDA-NIFA-AFRI Postdoctoral Training Grant (Maria Hoffman; PD). $133,689.
2016 – 2017: Effects of poor maternal nutrition on muscle progenitor cell function and metabolism. USDA-NIFA-AFRI Grant # 2015-06239 (Co-PD). $150,000
2015 – 2016: The Illumina MiSeq System: a critical tool for evaluating host-pathogen interactions and identifying genomic markers for livestock disease control. USDA-NIFA-AFRI (PD). $47,612 **Multi-PI award**
2014 – 2016: Use of a cell bioenergetics analyser to determine the effects of diet and bioactive food components on energy metabolism. USDA-NIFA-AFRI (Co-PD) $50,000

2014 – 2016: Effects of intrauterine growth retardation (IUGR) on fetal development in sheep. USDA-NIFA-AFRI (Co-PD) $150,000

2012 – 2017: W2112: Reproductive Performance in Domestic Ruminants USDA Storrs Agricultural Experiment Station Multistate Project (Co-PI)

2011 – 2013: Characterization Of Novel Pathways Mediating Plant-Derived Molecule Inhibition Of Staphylococcus Aureus Infection Of Bovine Mammary Cell. USDA-NIFA-AFRI (PD) $149,288 **Multi-PI award**

2008 – present: Undergraduate research awards (Mentor) – UConn; Total # of awards = 18; Total amount > $18,500

PEER-REVIEWED PUBLICATIONS (PAST 2 YEARS)

1. Pillai, SM, Jones, AK, SM, Hoffman, ML, McFadden, KK, Reed, SA, Zinn, SA, and **Govoni, KE.** 2017. Fetal and organ development at gestational days 45, 90, 135 and at birth of lambs exposed to under- or over-nutrition during gestation. Translational Animal Science. doi:10.2527/jas2016.0002.

2. Jones, AK, Gately, RE, McFadden, KK, Zinn, SA, **Govoni, KE**, and Reed, SA. 2017. Ultrasound during mid-gestation: Agreement with physical fetal and placental measurements and use in predicting gestational age in sheep. Reprod Domest Anim. 52:649-654. doi: 10.1111/rda.12961.

3. Hoffman, ML, Reed, SA, Pillai, SM, Jones, AK, McFadden, KK, Zinn, SA, and **Govoni, KE.** 2017. PHYSIOLOGY AND ENDOCRINOLOGY SYMPOSIUM: The effects of poor maternal nutrition during gestation on offspring postnatal growth and metabolism. J Anim Sci. 95:2222-2232. doi: 10.2527/jas.2016.1229. *Invited review.*

4. **Govoni, K**., Reed, S. A. 2017. How Mom's diet affects offspring growth and health through modified stem cell function. Animal Frontiers 7:25-31 https://doi.org/10.2527/af.2017-0125.

5. Zinn, SA, **Govoni, KE**, and Vonnahme, KA. (2017). Developmental Programming: What Mom Eats Matters. *Animal Frontiers* 7:3-4.

6. Jones, AK, Hoffman, ML, Pillai, SM, McFadden, KK, **Govoni, KE**, Zinn, SA, and Reed, SA. 2017. Gestational restricted- and over-feeding promote maternal and offspring inflammatory responses that are distinct and dependent on diet in sheep. Biol Reprod. Dec 20. doi: 10.1093/biolre/iox174.

7. Jones AK, Gately RE, Kellogg TD, Zinn SA, **Govoni KE**, Reed SA. 2018. Evaluation of the Nova Vet Meter for sheep-side monitoring of β-hydroxybutyric acid (BHBA) and description of ewe BHBA during late gestation in three flocks from the Northeastern U.S. Res Vet Sci. May 7;118:491-497. doi: 10.1016/j.rvsc.2018.05.002.

8. Duan JE, Zhang M, Flock K, Seesi SA, Mandoiu I, Jones A, Johnson E, Pillai S, Hoffman M, McFadden K, Jiang H, Reed S, **Govoni K**, Zinn S, Jiang Z, Tian XC. 2018. Effects of maternal nutrition on the expression of genomic imprinted genes in ovine fetuses. Epigenetics. 13(8):793-807. doi: 10.1080/15592294.2018.

9. Duan JE, Flock K, Jue N, Zhang M, Jones A, Al Seesi S, Mandoiu I, Pillai S, Hoffman M, O'Neill R, Zinn S, **Govoni K**, Reed S, Jiang H, Jiang ZC, Tian XC. 2019. Dosage Compensation and Gene Expression of the X Chromosome in Sheep. G3 (Bethesda). 2018 Nov 27. pii: g3.200815.2018. doi: 10.1534/g3.118.200815.

10. **Govoni KE**, Reed SA, Zinn SA. 2019. Poor maternal nutrition during gestation: Effects on offspring whole body and tissue-specific metabolism in livestock species. J Anim Sci. 2019 May 9. pii: skz157. doi: 10.1093/jas/skz157.

11. Martin DE, Jones AK, Pillai SM, Hoffman ML, McFadden KK, Zinn SA, **Govoni KE**, Reed SA. 2019. Maternal Restricted- and Over-Feeding During Gestation Result in Distinct Lipid and Amino Acid Metabolite Profiles in the Longissimus Muscle of the Offspring. Front Physiol. 2019 May 1;10:515. doi: 10.3389/fphys.2019.00515.