**Position Title: Specialist in Precision Livestock and Poultry Farming**

**Position Description:** The focus of this statewide position is to provide organizational leadership on precision farming of livestock and poultry enterprises including the evaluation of emerging robotic and autonomous sensor technologies linked to novel machine learning based data analysis tools. This position will be supported by Veterinary Medicine Extension, School of Veterinary Medicine, UC Davis. A PhD, DVM, or equivalent degree is required in an appropriate discipline such as, engineering, bio-systems engineering, bio-statistics, bio-informatics, epidemiology and machine learning. The position would complement ANRs current efforts in engineering including the recently advertised CE position in [Agricultural Safety and Health Engineering](https://recruit.ucdavis.edu/apply/jpf00954) which focuses on ergonomics and engineering controls to facilitate healthy working environments and practices.

**Justification:** Emerging technologies are being introduced into the marketplace at an exponential rate. **Modern livestock and poultry operations are considering the adoption of various robotic, sensor and machine learning based precision technologies to improve management, welfare, production and profitability. However, before investing, producers are demanding non-biased information on** economics, applicability, maintenance requirements, data storage, technical support, and management of these technologies. **Examples of precision farming technologies include linked machine learning based sensors and software that capture and uses various neural network based approaches to monitor** water and feed intake, movement and lying behavior, weight and uniformity scales, milk yield recording systems, milk component and conductivity monitors, and heat detection monitors. **The benefits of using precision farming technologies and learning about individual animal performance include** increased efficiency, reduced production costs, minimized adverse environmental impacts, and improved animal health and well-being. The incorporation of precision farming on livestock operations will adress the following strategic initiatives (SI) *Endemic and Invasive Pests and Diseases (EIPD)* and *Sustainable Natural Ecosystems (SNE)*.

**Extension:** The new hire will provide an extension and outreach program within the ANR network (Specialists, Advisors, AES faculty) and across the state to serve diverse audiences including livestock and poultry producers, veterinarians, nutritionists, technical service providers, manufactures, entrepreneur agtech industry and other allied industry members. In addition, the candidate may build and maintain valuable interactions with regulatory agencies and legislative bodies that he/she will be responsible to maintain informed about the innovation occurring in the precision livestock and poultry agriculture to improve sustainability, animal-welfare, safety, and efficiency. The new hire will conduct an extension and outreach program on precision livestock and poultry farming via newsletters, lay publications, peer-reviewed articles, conferences, individual consultations, workshops, web-based programs and phone applications that would be accessible to a diverse audience.

**Research**: This Specialist will develop a scholarly applied research program evaluating the cost-benefit of adopting emerging technologies, developing hardware and software tools that translate into improved farming practices which include quantifying the animal-health and environment benefits of novel technologies. Areas of emphasis may include: robotics, sensor networks, data capture, storage and machine learning based approaches including but not limited to neural networks. The areas of emphasis will be based on a thorough evaluation of the needs of the California livestock industry, emerging technologies, and allied livestock organizations. Approaches toward the selected areas of emphasis are expected to be leading edge and transdisciplinary in nature. Strong publication role is expected in both peer-reviewed journals such as California Agriculture, ANR peer-reviewed 8000 series and timely lay publication outlets such newsletters, websites, newspapers, and social media with public access.

**ANR network:** ANR is deeply vested in moving forward the livestock industry of California through innovation. A CE Specialist must have the ability to work collaboratively as part of a team with CE Advisors, university researchers, and Division workgroups, and act as a non-biased CE liaison for agricultural animal industries, entrepreneur companies and the public.

**Network External to ANR:** The person hired for this position will collaborate on research and extension projects with I&R faculty focused on livestock production systems, bioinformatics, biostatistics, and machine learning to integrate new technologies with a focus on how best to adopt robust and technologies into precision livestock and poultry farming. Moreover, this specialist will establish a network of agency experts within California Veterinary Medical Association, California Department of Food and Agriculture, US Department of Agriculture, and US Animal Health Association and other relevant agencies as well as private nonprofit associations with interest in the environmental impact of livestock production and animal welfare.

**Support:** Veterinary Medicine Extension in the School of Veterinary Medicine, UC Davis, will provide administrative support for grants and contracts, office space, computing, and telephone support. Programmatic funds are provided annually to all specialists. The Department of Population Health and Reproduction will provide adequate laboratory space for applied research.

**Other support:** The Specialist is expected to successfully obtain intramural and extramural grants to support his/her program in precision livestock farming. Examples of intramural support include The Center for Food Animal Health (SVM-UCD) provides seed grants ($20,000/yr.) twice a year for projects related to disease prevention, control and surveillance and sustainable production systems. The Specialist is also expected to collaborate with scientists across campus and the US to engage in research with funding from state (California Dept. of Food and Agriculture) and federal agencies (US dept. of Agriculture, Bureau of Land Management), and private investors.

**Location:** This position will be located at UC Davis given the existing cadre of livestock and poultry health and production faculty at SVM and Dept. of Animal Science , Quantitative Epidemiology and Machine Learning faculty at SVM and Dept. of Animal Science, Biological and Agricultural Engineering faculty with interest in precision agriculture. This location will readily allow interaction with state and federal agencies in Sacramento that are involved with animal welfare issues and regulatory development (CDFA, USDA, California State Legislators).

**Developed and proposed by:** This position was initially drafted by Noelia Silva-del-Rio with input and revisions provided by SVM and Animal Science I&R Faculty, SVM and Animal Science CE Specialists, CE County Advisors, and ANR program teams and support from the Dairy Work Group, and California Veterinary Medical Association.