323 Optimized decisions using big data analytics in dairy farms. M. Ferris*, A. Christensen, and S. Wangen, *University of Wisconsin, Madison, WI.*

Management decisions can be informed by real-time data streams to not only improve the economics of the farm but also positively benefit the overall health of a dairy herd or the larger environment. Decision support tools can provide data management services and analytics to exploit data streams from farm and other economic, health and agricultural sources. We will describe a decision support tool that couples an optimization model to underlying cow, herd and economic data with an easy to interpret user interface. This interface allows the user to operate the optimization model and understand the impacts of different decisions. Specific examples related to ketosis and to culling will be described, along with some discussion of security of information and control of uncertainties in mathematical modeling approaches. The proposed analytical capabilities will utilize several tools from the data mining, simulation, machine learning, and optimization disciplines. Broadly, these tools will form the basis of the Dairy Brain decision support system, which will provide management suggestions to farmers that might affect a single animal or they could broadly affect a farm's overall business portfolio (i.e., large capital expenditures, outsourcing opportunities, and interactions with entities that have regulatory control). All of the analytical tools are operationalized in a way that allows them to accept near real-time data updates from the farm to our agricultural data hub that gathers and disseminates multiple data streams relevant to dairy operations.

Key Words: optimization, data science, decision support