

## Agricultural Autonomy Institute

Mississippi State University recently launched the Agricultural Autonomy Institute (AAI), whose chief goal is developing Mississippi's economy by forming an industry in autonomous systems for agriculture. Generous seed funding from the Robert M. Hearin Foundation was used to establish AAI as the first institute in the U.S., likely the world, dedicated strictly to autonomous systems for agriculture. Over the long term, AAI intends to position Mississippi as the Silicon Valley of agricultural autonomy. ABE's department head, Dr. Alex Thomasson, serves as the founding Director, and Madison Dixon as Associate Director. Over the last three years, Thomasson led a collaborative Agricultural Autonomy Working Group of roughly 40 faculty members across two MSU colleges and several of its centers and institutes, all while conducting his own research in the field.

At a time when the world's population is still growing fast and the climate and unpredictable events like wars dictate high production that can be shipped to areas in need, the main driver behind agricultural autonomy is the unavailability of farm labor. Workers are lacking in part because many jobs on the farm are "dull, dirty, and/or dangerous," particularly the kinds of tasks that autonomous systems are ideal for. AAI's scope of research and development includes applications in production agriculture, post-harvest processing, and tools and methods for agricultural research. In farm production, one might imagine a manager in an office overseeing a fleet of harvesting machines in various fields around the farm; in processing, a robotic cutting device carefully cutting catfish and mitigating the dangers associated with manual cutting; and in research, a drone collecting plant-height data on 1,000 corn plots in 30 minutes, whereas a group of graduate students would require a day to do the same job.

AAI has three key objectives: (a) to conduct research and to develop intellectual property for licensing and entrepreneurial startups; (b) to recruit corporations to Mississippi in terms of contracted research and creation of new facilities for research, manufacturing, distribution, and service; and (c) to build the needed workforce through educational programs at MSU and in collaboration with community colleges in Mississippi. A secondary driver behind agricultural autonomy is the need to maximize precision and efficiency on farms in order to maximize farmer benefit and minimize environmental risk. For example, fertilizer should ideally be placed only where needed in the field and in the appropriate amount. Historically this idea has been referred to as Precision Agriculture (PA). Autonomous systems can improve upon PA because they have the potential to identify plant needs very precisely. In addition to growing Mississippi's economy, providing advanced farm-related jobs and equipping workers for these jobs, and maintaining food security, AAI is committed to advancing sensing and analytical capacities of autonomous machinery systems, thus enabling decisions and actions at the level of a square meter or even a single plant.

