

Yin BAO, Ph.D.

Assistant Professor

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Department of Biosystems Engineering

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Education

Ph.D., Agricultural and Biosystems Engineering, Iowa State University (ISU) 2018

- Dissertation: “Automated Plant Phenotyping using 3D Machine Vision and Robotics”

B.E., Mechanical (Vehicle) Engineering, China Agricultural University 2012

Professional Experience

Assistant Professor, Biosystems Engineering Dept., Auburn University 2019.08 to date

Postdoctoral Research Associate, Ag & Biosystems Engineering Dept., Iowa State University 2018.05-2019.08

Graduate Research Assistant, Ag & Biosystems Engineering Dept., Iowa State University 2013.01-2018.05

Research Interests

Cyber-physical systems for smart agriculture and forestry. Specific elements include remote and proximal sensing, computer vision, robotics and machine/deep learning.

Teaching

Instructor for *BSEN 3610 Instrumentation and Controls for Biological Systems* Spring 2020

Guest lecturer and lab instructor for *TSM 465 Automation Systems (ISU)* Spring 2016 and 2017

Professional Affiliations

American Society of Agricultural and Biological Engineers (ASABE) 2014 to date

Association of Overseas Chinese Agricultural Biological Food Engineers (AOCABFE) 2014 to date

International Society of Precision Agriculture (ISPA) 2019 to date

American Association for the Advancement of Science (AAAS) 2018 to date

Honors & Awards

2020 New Faces of ASABE - Professionals

2018 Reverend P. T. Taiganides Award

2018 Iowa State Research Excellence Award

Service

Secretary of ASABE Robotics Student Design Competition Committee 2019 to date

Student Activity Committee Chair of AOCABFE 2016 to 2017

Invited Talks

- “Robotic Plant Phenotyping”. 2019 Plant Science Research Symposium, December 17, Auburn, AL, USA
- “High-Throughput Phenotyping: Plant Architecture”. 2019 Tree Improvement Program Contact Meeting, November 14, Tuscaloosa, AL, USA.
- “Robotic plant phenotyping”. 2019 ASABE Alabama State Section Meeting, April 12, Auburn, AL, USA.

Research Grants

- Development of a vision-based robotic seedling counting and geo-mapping system for bareroot pine seedling production (\$50,000). **Yin Bao**, Ryan Nadel, Timothy McDonald. Alabama Agricultural Experiment Station Production Agriculture Research Funding Program. 2020-2022.
- Development of improved evaporative cooling pad cleaning methods for broiler growers in Alabama and across the US (\$50,000). Jeremiah Davis, Jess Campbell, **Yin Bao**, John Linhoss, Joseph Purswell. Alabama Agricultural Experiment Station Production Agriculture Research Funding Program. 2020-2022. (not funded)
- Three-dimensional equine gait analysis using computer vision and deep learning for genomic mapping (\$49,800). Elizabeth Staiger, **Yin Bao**, Sonia Moisés, Reid Hanson. Auburn University Vice President for Research & Economic Development Intramural Grants Program (Interdisciplinary Team Research Grant). 2020-2022.
- Development of a terrain-following UAV-based precision phenotyping system for peanut breeding (\$20,000). **Yin Bao**, Alvaro Sans-Saez, Charles Chen. Auburn University Vice President for Research & Economic Development Intramural Grants Program (Early Career Development Grant). 2020-2022. (not funded)
- Development of a low-cost, cable-based mobile crop sensing platform on a center pivot (\$5,000). **Yin Bao**. Alabama Agricultural Experiment Station. 2019-2020.
- Rapid on-line characterization of southern pine residues for biomass conversion processes (\$2,146,958). Sushil Adhikari, Timothy McDonald, **Yin Bao**, Masoud Mahjouri-Samani, Brian Via, Brian Thurow, Oladiran Fasina, Tom Gallagher, Edmon Perkins. Department of Energy. 2019-2022. (not funded)

Education Grants

- Development of hands-on trainers in electrical systems and electronic control systems to strengthen electrical problem solving skills in poultry processing plants, feed mills, hatcheries, and on the farm (\$31,946). Jeremiah Davis, Jess Campbell, William Batchelor, **Yin Bao**, Dennis Brothers and Kelly Goneke. Alabama Poultry and Egg Association. 2019.

Technical Reviewer

Applied Engineering in Agriculture

Biosystems Engineering
Computers and Electronics in Agriculture
Plant Methods
Plant Phenomics
Precision Agriculture
Transactions of the ASABE
Agricultural Water Management

Patent

Lie Tang, Ji Li, **Yin Bao**, Jian Jin, Akash D. Nakarmi (2017). “Crop stand analyzer using reflective laser proximity sensors. Patent No.: US9804097B1

Peer-Reviewed Journal Publications

- Jinyang Zhang, Dongdong Du, **Yin Bao**, Jun Wang, Zhenbo Wei (2020). “Development of multi-frequency swept microwave sensing system for moisture measurement of sweet corn with deep-neural-network”. *IEEE Transactions on Instrumentation and Measurement* (early access). (IF: 3.1)
- **Yin Bao**, Scott Zarecor, Dylan Shah, Taylor Tuel, Darwin A. Campbell, Antony V.E. Chapman, David Imberti, Daniel Kiekhaefer, Henry Imberti, Thomas Lübberstedt, Yanhai Yin, Dan Nettleton, Carolyn J. Lawrence-Dill, Steven A. Whitham, Lie Tang, Stephen H. Howell (2019). “Assessing plant performance in the Enviratron”. *Plant Methods*, 15(1): 117. (IF: 3.2)
- Matthew W. Breitzman, **Yin Bao**, Lie Tang, Patrick S. Schnable, Maria G. Salas-Fernandez (2019). “Linkage disequilibrium mapping of high-throughput image-derived descriptors of plant architecture traits under field conditions”. *Field Crop Research*, 244. (IF: 3.9)
- Lirong Xiang, **Yin Bao**, Lie Tang, Diego Ortiz, Maria G. Salas-Fernandez (2019). “Automated morphological traits extraction for sorghum plants via 3D point cloud data analysis”. *Computers and Electronics in Agriculture*, 62, 951-961. (IF: 3.2)
- **Yin Bao**, Lie Tang, Srikant Srinivasan, and Patrick S. Schnable (2019). “Plant architectural traits characterization for maize using time-of-flight 3D imaging”. *Biosystems Engineering*, 178, 86-101. (IF: 3.0)
- **Yin Bao**, Lie Tang, Matthew W. Breitzman, Maria G. Salas-Fernandez, and Patrick S. Schnable (2018). “Field-based robotic phenotyping of sorghum plant architecture using stereo vision”, *Journal of Field Robotics*, 36(2), 397-415. (IF: 4.3)
- **Yin Bao**, Dylan S. Shah, and Lie Tang (2018). “3D perception-based collision-free robotic leaf probing for automated indoor plant phenotyping”. *Transactions of the ASABE*, 61(3), 859-872. (IF: 1.1)
- Maria G. Salas-Fernandez, **Yin Bao**, Lie Tang, and Patrick S. Schnable (2017). “A high-throughput, field-based phenotyping technology for tall biomass crops”. *Plant Physiology*, 174(4), 2008-2022. (IF: 5.9)
- **Yin Bao** and Lie Tang (2016). “Field-based robotic phenotyping for sorghum biomass yield component traits characterization using stereo vision”. *IFAC-PapersOnLine*, 49(16), 265-270.