# Boaz Berhanu Tulu

Ph.D. Candidate
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## RESEARCH INTERESTS

Generative AI, Diffusion Models, Computer Vision, UAV and Satellite Remote Sensing, Thermal, Multispectral, and Hyperspectral Imaging, Precision Agriculture

## EDUCATION

- **Ph.D.**, Agricultural and Biological Engineering, University of Florida, USA, Expected Dec. 2026
  Dissertation: Multi-Scale Precision Agriculture via Generative AI-Enhanced UAV and Satellite Remote Sensing
  Advisors: Dr. Haimanote K. Bayabil (Chair) and Dr. Yiannis Ampatzidis (Co-Chair)
- **M.S.**, Computer Engineering, Jimma University, Ethiopia, Nov. 2021
  Focus: Computer vision for smart video classification and analysis
- **B.S.**, Electrical and Computer Engineering, Jimma University, Ethiopia, Jul. 2017

## PROFESSIONAL EXPERIENCE

- **Graduate Research Assistant**, Dept. of Agricultural and Biological Engineering, University of Florida, Aug. 2023 - current
  Focus: AI and computer vision for agriculture and water management, including diffusion-based super-resolution and RGB-to-thermal translation of UAV imagery for crop water stress assessment
- **CTO and Co-founder**, Debo Engineering PLC, Jimma, Ethiopia, Feb. 2019 - current
  Focus: AI-based coffee disease detection (web, mobile, and desktop) serving over 4 million smallholder coffee farmers in Ethiopia; nationwide data collection, budget management, and daily operations
- **Director**, Artificial Intelligence Center, Jimma University, Ethiopia, Jun. 2022 - Jun. 2023
  Focus: Created and led the university AI Center spanning 12 departments; research projects, international collaborations, and workshops with NGOs and private companies
- **Senior Researcher**, Dept. of Electrical and Computer Engineering, Jimma University, Ethiopia, Jul. 2018 - Jun. 2023
  Focus: Real-time deep learning for crop monitoring, object detection, and quality assessment; generative models to synthesize agricultural datasets and mitigate data scarcity
- **Co-founder and General Manager**, Omishtu Joy AgriTech PLC, Addis Ababa, Ethiopia, Dec. 2020 - May 2022
  Focus: AI-based soil classification and crop recommendation device for farmers, leading both model and hardware development

## AWARDS AND HONORS

- TopoDOT Users Conference (TUC) Scholarship, TopoDOT, Orlando, FL, 2026
- B4U University Mentoring Program Cohort, Bayer, 2026 (one of twelve doctoral candidates selected at the University of Florida)
- ABE Departmental Fellowship Top-Up, University of Florida, 2024-2025
- Mandela Washington Fellowship for Young African Leaders, U.S. Department of State, 2022
- Coffee Innovation Award ($50,000), German Development Cooperation (GIZ), Ethiopia, 2022
- Sankalp World Bank Innovation Winner ($25,000), World Bank, Nairobi, Kenya, 2022
- KOICA MinT Innovation Award, Korea International Cooperation Agency and Ministry of Innovation and Technology, Ethiopia, 2021
- Best Innovation from All Ethiopian Universities, Ministry of Education, Ethiopia, 2021
- Bruh UNDP Competition Award ($5,000), United Nations Development Programme, Ethiopia, 2021
- MEST Africa Community Vote Winner, Meltwater Entrepreneurial School of Technology, 2020
- Green Innovation Award, German Development Cooperation (GIZ), Ethiopia, 2019
- Best Final-Year Project Award, Jimma University, Ethiopia, 2017

## TEACHING/MENTORING EXPERIENCE

1. **Teaching Assistant**, Department of Agricultural and Biological Engineering, University of Florida

(1) ABE 3652C - Physical and Rheological Properties of Biological Materials (undergraduate)

2. **Instructor**, Dept. of Electrical and Computer Engineering, Jimma Institute of Technology, Jimma University, Ethiopia

(1) ECEG 4182 - Data Structures and Algorithms Analysis (undergraduate)

(2) ECEG 4193 - Artificial Intelligence (undergraduate)

(3) ECEG 4181 - Database Systems (undergraduate)

3. **Mentoring**

(1) Chair, Undergraduate Research Evaluation Committee: supervised undergraduate research projects and chaired capstone evaluations, Dept. of Electrical and Computer Engineering, Jimma University, Nov. 2021 - Dec. 2022

## PUBLICATIONS

### Peer-reviewed journal articles

8. **Tulu, B. B.**, Teshome, F. T., Ampatzidis, Y., Li, C., Pavan, W., Golmohammadi, G., and Bayabil, H. K., 2026. “RGB-to-synthetic-thermal image translation using generative AI to support crop water stress assessment.” *Computers and Electronics in Agriculture*, 241, 111273. doi: 10.1016/j.compag.2025.111273

7. **Tulu, B. B.**, Abdurahman, F., Sisay, E., and Fante, K. A., 2026. “AmharicScrib-Diff: A class-conditional denoising diffusion probabilistic model for the synthesis of handwritten Amharic Fidel characters.” *IEEE Access* (Early Access). doi: 10.1109/ACCESS.2026.3711451

6. **Tulu, B. B.**, Asfaw, T., Beyene, M. T., Endalamaw, E. T., Tulu, A. B., and Adege, A. B., 2026. “EthioDance-ViT: A video vision transformer for classifying Ethiopian traditional dances.” *Vector:*

*The Journal of Engineering*, 2027(1), e70251. doi: 10.1049/tje2.70251

5. Kibrete, F., Woldemichael, D. E., Gebremedhen, H. S., Feisa, T. T., **Tulu, B. B.**, Çakar, O., and Çelik, E., 2026. "A literature-based comparative study of human intelligence and artificial intelligence in fault diagnosis of industrial machines: Moving toward augmented intelligence." *Signals*, 7(4), 82. doi: 10.3390/signals7040082
4. Kibrete, F., Yadav, S. K., **Tulu, B. B.**, Feisa, T. T., Ferede, K. A., Mekonnen, B. G., Nega, T., and Sintie, Y. T., 2026. "Smartphone-based vibration signal measurement and analysis: Capabilities, limitations, and applications." *Measurement*, 292, 123291. doi: 10.1016/j.measurement.2026.123291
3. **Tulu, B. B.**, Teshome, F., Ampatzidis, Y., Hailegnaw, N. S., and Bayabil, H. K., 2025. "AgriSenAI: Automating UAV thermal and multispectral image processing for precision agriculture." *SoftwareX*, 30, 102083. doi: 10.1016/j.softx.2025.102083
2. Hussain, S., Teshome, F. T., **Tulu, B. B.**, Awoke, G. W., Hailegnaw, N. S., and Bayabil, H. K., 2025. "Leaf area index (LAI) prediction using machine learning and UAV-based vegetation indices." *European Journal of Agronomy*, 168, 127557. doi: 10.1016/j.eja.2025.127557
1. Adege, A. B., Admas, M. F., Tehone, Y., **Tulu, B. B.**, and Endalamaw, E. T., 2025. "AI-powered human activity detection and tracking in dense crowds using YOLOv8-DeepSORT." *IET Image Processing*, 19(1), e70227. doi: 10.1049/ipr2.70227

## SOFTWARE AND INTELLECTUAL PROPERTY

- **AgriSenAI**: an end-to-end UAV imagery processing platform for precision agriculture with integrated diffusion-based image super-resolution and learned RGB-to-thermal image translation. The University of Florida has exerted its rights to the work product and its original source code (© 2026 University of Florida Research Foundation, Inc., All Rights Reserved), in support of software licensing and commercialization.

## PRESENTATIONS

### Invited presentations

- 2026: "Engineering On-Farm Solutions: How AI is Driving the Fourth Agricultural Revolution", U.S. Embassy Addis Ababa Alumni Speaker Series (virtual), Mar. 24.
- 2024: "Streamlining Precision Irrigation: A Decision Support Tool", 9th UF Water Institute Symposium, University of Florida, Gainesville, FL, U.S., Feb. 20-21.

### Other presentations

- 2026: "PID-LDM: Physics-Informed Latent Diffusion for RGB-to-Thermal Image Translation in Precision Agriculture", Florida Section of ASABE 2026 Annual Meeting, Fort Myers, FL, U.S., Jun. 10-12 (Oral).
- 2026: "Satellite Image Super-Resolution Using Drone Imagery with GANs and Diffusion Models", AI in Agriculture Conference, North Carolina State University, Raleigh, NC, U.S., Mar. 31 - Apr. 2 (Oral).
- 2026: "AgriSenAI: Streamlined End-to-End UAV Imagery Processing for Precision Agriculture", AI in Agriculture Conference, North Carolina State University, Raleigh, NC, U.S., Mar. 31 - Apr. 2 (Poster).

- 2026: “AgriSenAI: Streamlined End-to-End UAV Imagery Processing for Precision Agriculture”, 10th Biennial UF Water Institute Symposium, University of Florida, Gainesville, FL, U.S., Feb. 24-26 (Oral).
- 2024: Strawberry pruning robot, ASABE 2024 Robotics Competition, representing the University of Florida, Anaheim, CA, U.S., Jul. (Competition).
- 2024: “Enhancing Agricultural Water Management: A Desktop Application Integrating UAV Imagery and Ground Sensing for Precision Irrigation”, AI in Agriculture Conference, Texas A&M University, College Station, TX, U.S., Apr. 15-17 (Oral).
- 2024: “IrrigSense: A Decision Support Tool to Streamline Precision Irrigation”, North Florida Research and Education Center 2024 Spring Showcase, Quincy, FL, U.S., Apr. 5 (Poster).
- 2024: ABE Department Annual Student Poster Presentation, University of Florida, Gainesville, FL, U.S., Mar. (Poster).
- 2022: “Application of Artificial Intelligence for Multidisciplinary Research”, Bahir Dar University, Bahir Dar, Ethiopia, May 20 (Oral).
- 2022: “Introduction to Python Programming for Artificial Intelligence”, Jimma American Corner, Jimma, Ethiopia, Mar. 13 (Workshop).
- 2021: “Data Science Using Python: Techniques and Applications”, Jimma University, Jimma, Ethiopia, Nov. (Oral).

## PROFESSIONAL AFFILIATIONS AND SERVICES

### Professional members

- American Society of Agricultural and Biological Engineers (ASABE), Graduate Student Member, 2024 - current
- American Society for Photogrammetry and Remote Sensing (ASPRS), Student Member, Jan. 2026 - current

### Peer reviewer of journals

53 reviews for 7 journals (recorded on ORCID):
*Engineering Applications of Artificial Intelligence* (27); *Computers and Electronics in Agriculture* (10); *IEEE Access* (6); *SoftwareX* (6); *Smart Agricultural Technology* (2); *Agricultural Systems* (1); *International Journal of Applied Earth Observation and Geoinformation* (1)

Graduate Student Reviewer, *University of Florida Journal of Undergraduate Research*, Center for Undergraduate Research, University of Florida

### University services

- President, Global Connection at UF (student organization), University of Florida, Jan. 2026 - current
- Treasurer, University of Florida Mayors’ Council, Jan. 2026 - current
- Service Chair, Graduate Student Organization, Dept. of Agricultural and Biological Engineering, University of Florida, Jan. 2026 - current
- Member, Proposal Review Committee, Dept. of Electrical and Computer Engineering, Jimma University, Jun. 2022 - Jun. 2023
- Member, Exam Review Committee, Dept. of Electrical and Computer Engineering, Jimma

University, Jun. 2022 - Jun. 2023

**Charity and community service**

- Director of Technology, Purpose Rising Inc., Gainesville, FL
- Volunteer, North Florida Sewing Center, Gainesville, FL
- Member, Ethiopian Red Cross Society, Jimma, Ethiopia
- Volunteer Teacher, taught high school students in Jimma during summer breaks, Ethiopia
- Awareness Creation, Jimma, Ethiopia
- Technology Volunteer, Sew Le Sew Charity Organization, Jimma, Ethiopia

## CERTIFICATES

- Mandela Washington Fellowship for Young African Leaders, Certificate of Completion, U.S. Department of State, West Lafayette, IN, Jul. 2022
- Leadership in Agricultural Business Track, Mandela Washington Fellowship, Certificate of Completion, Purdue University, 2022
- Fundamentals of Accelerated Computing with CUDA Python, NVIDIA Deep Learning Institute
- Fundamentals of Deep Learning, NVIDIA Deep Learning Institute
- Generative AI with Diffusion Models, NVIDIA Deep Learning Institute
- Intellectual Property for Innovators, University of Florida
- Agent Certification: Foundations, Knowledge & Training, Workflow Automation & Orchestration, Agent Ownership & Management, raia