

# Flexible Data Collection and Analysis Systems for Precision Agriculture and Environmental Sensing

- PI: Mary Everett
- Grant EC7895: IGEM25-006
- Reporting Period:  
7/1/24 –12/31/24



# Summary of progress towards proposed milestones

Expand Data Gator Hardware and Communication Protocol	<ul style="list-style-type: none"><li>•Hardware has been added: Dendrometer now reporting on analog ports</li><li>•Currently testing Data Gator with 2 different LoRa gateway via Chirpstack</li><li>•Sensors Testing</li></ul>
Add Gateway Communication Protocols	<ul style="list-style-type: none"><li>•Looking into Chirpstack integration for Gateway specifically</li><li>•Slightly behind on this objective</li><li>•Have added Tempest Sensor which makes use of long range communication but currently reporting on UDP stream</li></ul>
Dashboard Farmer Analytics and Artificial Intelligence Integration	<ul style="list-style-type: none"><li>•Degree Day Modeling App Development</li><li>•Improved box plotting for seasonal rainfall</li><li>•Added better map integration</li><li>•Several AI integration projects but not yet on-demand</li></ul>
System Provisioning	<ul style="list-style-type: none"><li>•Schema identified for Data Gators, since sensors are sharing ports</li><li>•Working on Dashboard configuration file</li></ul>
Documentation	<ul style="list-style-type: none"><li>•Data Gator 70% complete – public github</li><li>•Gateway 50% complete – public github</li><li>•Dashboard, 10% complete – in progress</li><li>•Full tutorials not yet started</li></ul>

# Summary of expenditures and budget performance

- **Key Insight**

- Spending is ON TRACK with proposal.
- Major expenditures included:
- Personnel:
- 1 graduate student: Data Gator
- 5 undergraduate students part-time (Dashboard, Data Gator, AI)
- Supplies: LoRa equipment

- **Challenges/Changes**

- Compressed timeline: added more undergraduate students to meet progress goals
- Need to move tuition category to part-time help

	Budgeted	Spent	+/-
<b>10-SALARY (Graduate Student)</b>	47,708.84	12,040.80   11,030.40	24,637.64
<b>11-FRINGE</b>	3,723.26	1,264.66	2,458.60
<b>12-IRRHELP (Undergraduate Students)</b>	32,748.80	18,797.75	13,951.05
<b>30-OP EXP (Materials)</b>	6,549.55	686.11	5,863.44
<b>70-TUITION (Graduate Student)</b>	29,069.55	6,508.00	22,561.55
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# *Projection of work in next reporting period*

- Data Gator Full LoRa integration – soil moisture and CO2 sensors
- Gateway LoRa integration with soil moisture sensors
- Full Degree Day Modeling App Minimum Viable Product
- Separate complete codebases integrated into Dashboard:
  - QARM Frost Rules
  - Microclimate Automatic Clustering
  - (To be presented on in ECPA, Summer 2025)
  - Provisioning Schema for Data Gator
- Full codebase documentation and tutorials:
  - Build and Program a Gateway
  - Setup and Use the Dashboard

