

Statement of Purpose

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My interest in agriculture began at home, in a Ugandan family and community where farming was not an abstract subject but daily life. Growing up around that work, I saw both its importance and its fragility: how much depended on land, weather, and labor, and how little margin there often was for error. That early, close connection to farming is what first pulled me toward agriculture as a field of study, long before I understood it as a place where engineering and technology could make a difference.

I chose to pursue my undergraduate degree at EARTH University in Costa Rica specifically because of its hands-on, sustainability-focused model. Rather than studying agriculture from a distance, EARTH places students directly into farms, labs, and community projects, training engineers who understand both the science and the practical realities of production. That model shaped how I think about research: not as an end in itself, but as something that must eventually reach real farmers and real systems.

My BSc thesis on estimating crop biomass variability using machine learning and remote sensing grew out of this same orientation toward applied, data-driven solutions. Working with UAV multispectral imagery, I came to understand that the same biological variability shaping crop production also fundamentally influences postharvest quality and nutritional outcomes. This reframed my focus from optimizing production alone toward understanding the complete food system, from field to consumer, where data-driven insight can safeguard both food security and nutritional quality. I am particularly drawn to developing generalizable predictive models that capture how environmental, biological, and management factors interact across diverse contexts to determine final outcomes, and I value systems-level thinking that recognizes quality and productivity as the product of many interacting factors rather than any single variable.

My technical foundation supports this direction. My thesis developed Python-based machine learning models, including random forest, support vector machines, and gradient boosting, to quantify how pre-harvest factors influence crop traits, building my proficiency in statistical analysis, model development, and data interpretation. I work confidently with QGIS, Pix4D, and Agisoft Metashape for geospatial and UAV data processing, and I hold a European A1/A3 drone pilot licence. During a 2025 research internship at Aarhus University under Dr. Eusun Han, I gained hands-on experience building data pipelines, processing multidimensional datasets, validating model predictions, and communicating technical findings across disciplines and cultures. Having lived and studied across Uganda, Costa Rica, and Denmark, and being bilingual in English and Spanish, I bring an international, adaptable perspective to collaborative research environments.

My motivation is rooted in something I have seen directly: smallholder farmers in my own community managing real agronomic decisions with very little data or technological support, often bearing the cost of that gap in lost yield or compromised food security. That experience convinced me that the tools I am learning to build, remote sensing, predictive modelling, and data-driven decision support, are not simply academic exercises. They are tools that, applied well, can narrow exactly that gap. My long-term goal is to contribute to global food security and nutrition through digital innovation in food systems, working at the intersection of research, industry, and policy to translate scientific findings into practical tools that farmers, processors, and consumers can actually use.

I approach research with a strong work ethic, intellectual curiosity, and commitment to rigor. My thesis demonstrated my ability to manage a complex, multidisciplinary project from data collection through to analysis and communication, while my international experience in Denmark developed my capacity to collaborate across diverse research environments. I am ready to bring this combination of technical skill, field-level understanding, and personal motivation to graduate study, and to keep building research that improves food quality, security, and sustainability for the communities that need it most.