Team NutrAfrica – Injerama

Overview
Injera is the staple flatbread for the people of Ethiopia. It is made by hand everyday and cooked over a wood fire, which has caused mass deforestation in the country. NutrAfrica has decided to build a mass production injera assembly line in Ethiopia to help offset this problem. The team has been tasked with developing a device to integrate the heating elements for a machine to cook injera batter continuously.

Objectives
To design and prototype a heated drum for the continuous cooking of the Ethiopian flatbread known as injera. Previous LF teams have successfully designed depositor prototypes, which may relate to the mode of integrating the heating elements to a continuous cooking machine. The basic design is a heated, rotating drum to continuously bake the Injera from one side only. Deliverables will include a basic design, parts list, and prototype with a drum diameter of approximately two (2) feet.

Approach
- Analysis of provided proof of concept
- Relevant industry research and patent search
- Concept generation
- Concept selection based on concept weighting formulas
- Trip to Reading Bakery Systems (RBS) to finalize prototype selection
- Developed detailed design analysis
- Chose to prototype the rotating drum concept over the oven and conveyor concepts
- Modified the initial design from RBS
- Fabricated an alpha prototype of the machine
- Conducted initial testing
- Provided a list of recommended revisions for a beta prototype

Outcomes
Outcomes of the project:
- Developed a successful alpha prototype of a continuous, rotating drum cooker
- Further advanced the design from the originally provided proof of concept

Recommendations for further refinement and development:
- Build a beta prototype
- Develop improved method and/or material for more uniform heat distribution on plate
- Research and test application of tube motor for desired, continuous rotation
- Add additional plate after successful cooking to counterweight drum