

# LEMELSON-MIT

Celebrating invention, inspiring youth



**Kale Rogers, Michael Farid, Braden Knight and Luke Schlueter**  
**Massachusetts Institute of Technology (Cambridge, Mass.)**  
**\$10,000 Lemelson-MIT “Eat It!” Undergraduate Team Winner**  
*The World’s First Completely Automated Restaurant*



**The Challenge:** Quick-service restaurants spend about 30% of revenue on ingredient costs, compared to about 50% of revenue on labor and other overhead. High overhead costs cause quick-service restaurants to compromise on ingredient quality, in order to remain competitive. Consumers looking for nutritious, freshly made meals on-the-go find that healthy options are often unavailable, inconvenient or expensive. Additionally, while there are many existing machines and technologies that help automate food cooking and packaging, these machines are generally used in factories and are designed to accomplish one task in high volumes. The market is missing an integrated solution that cooks full meals from raw ingredients without the need for direct human involvement.

**The Solution:** The world’s first completely automated restaurant. The team invented the Spyce Kitchen, which cooks and serves delicious meals from fresh ingredients in less than five minutes with absolutely no human involvement. The team’s invention includes a refrigerator, dishwasher, stovetop and chef, all in one machine, uses an array of sensors to accurately control temperature and quality when cooking and is self-cleaning.

First, a meal is ordered and the ingredients are dispensed from hoppers that sit at the top of a refrigerated portion of the Spyce Kitchen machine. The dispensing mechanism delivers the ingredients into the transport system, which accurately controls ingredient quantity by weight. The transport system in turn then takes the ingredients to one of four cooking modules.

The heated cooking modules cook and mix the ingredients simultaneously, with accurate temperature control. The whole machine will then repeat the process cooking the remaining ingredients. Once complete, the meal will dispense onto a plate and the pot rotates to another position and washes itself.

**Application and Commercialization:** The Spyce team believes its invention will revolutionize the fast food industry by operating with extremely low overhead and serving high quality, nutritious meals at fast food prices. The invention only occupies 20 square feet of space, which allows it to be located in places that a traditional fast food restaurant couldn’t fit. While the space is significantly smaller, the team has found a Spyce Kitchen is able to produce half of the throughput of a full-sized fast food restaurant. While designing and building the Spyce Kitchen, the team found that universities and corporate offices were especially interested in having Spyce Kitchens in their buildings because they have large amounts of people, but limited dining resources. Currently, the team has received interest in piloting the invention in the dining services at multiple schools in the greater Boston area once the Spyce Kitchen receives USDA and FDA approval.