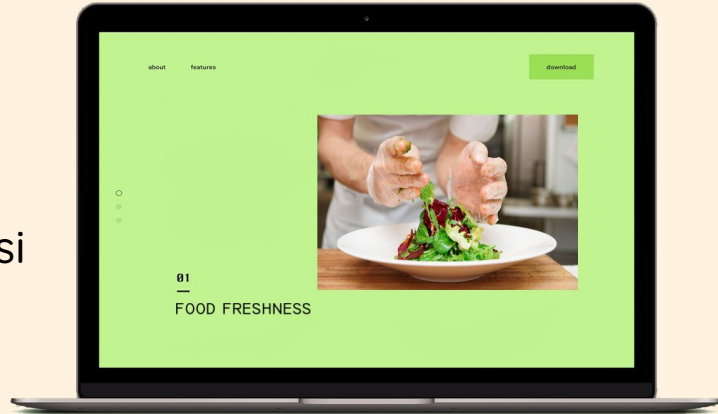


# Design Review 1: Food Freshness Team

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16 February 2022



# WHY?

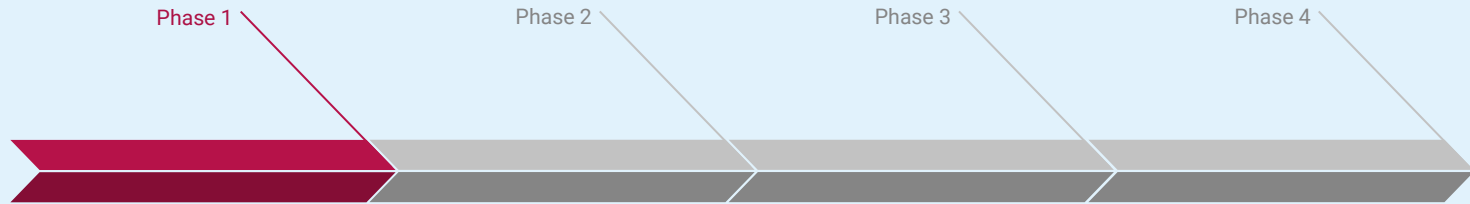
- Food takes up more space in US landfills than anything else
- More than 80 percent of Americans discard perfectly good food because they misunderstand expiration labels
- At least one third of the 5,000 deaths each year from foodborne illness can be attributed to meat and poultry
- CDC estimates Salmonella bacteria cause about 1.35 million infections, 26,500 hospitalizations, and 420 deaths in the US annually

# Problem Statement

A way to accurately and efficiently determine the level of freshness of meat products to improve sanitary and health concerns for at-home cooks and ultimately reduce food waste.



# Project Plan (v1.0) Overview



## Brainstorming/User needs

- Discover and characterize a specific user need.
- Conduct user interviews and market research.
- Create project plan for entire semester.

## Design Input & Concept

- Design brainstorming, selection, and conceptualization.
- Write up design inputs, conduct targeted user interviews.
- Finalize acceptance criteria.
- Sketch and play!

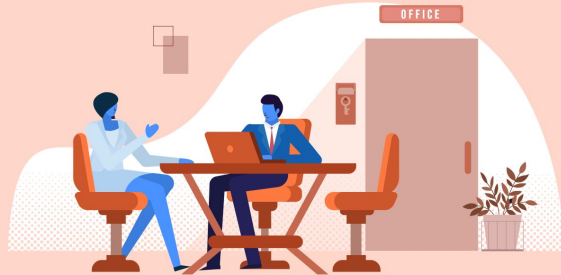
## Designing and Revising

- Prototype blueprint and construction.
- Usability, risk, and regulation analysis.
- Prototype testing, verification, and revision.

## Final Product

- Design validation on prototype/improved prototype.
- Designing and constructing final prototype.
- Housekeeping stuff.

# Highlights of Progress



Diverse and open minded user interviews  
=> **Discovered an unmet need**

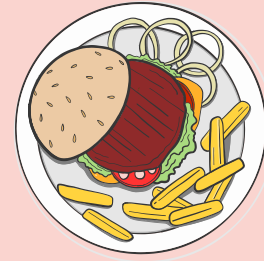


Market research on existing  
solutions & challenges  
=> **Discovered what works and what doesn't**

# User Needs: Interviews

## Tufts Hodge & Food Rescue

- Concerns: spoiled chicken
- Difficult to monitor freshness in various cooked meals



## College students

- Concerns: dairy, meat products, bread, fresh produce, Salmonella
- Lack knowledge to know if different foods are spoiled



## At home cooks

- Concerns: food waste
- Need indication of freshness without compromising food integrity



=> Intended Users: At-home everyday cooks

# Key User Needs

## Customer Requirements:

- Clear sign if food is fresh/starting to spoil/spoiled
  - Meat products
- Affordable
- Compact
- Easy to clean
- Easy and safe to use by people with color blindness & physical disabilities



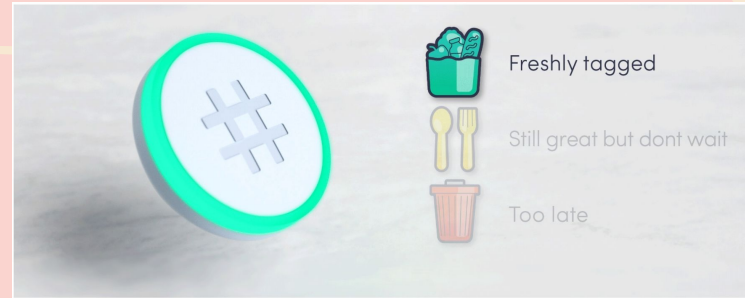
## Performance Requirements:

- Reusable
- Efficient
- Water & cold-resistant
- Minimally invasive to food product
- Non-toxic & food-safe



# Market Research

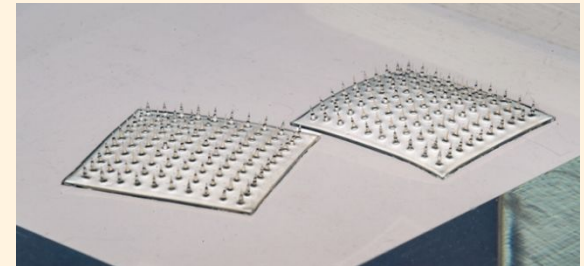
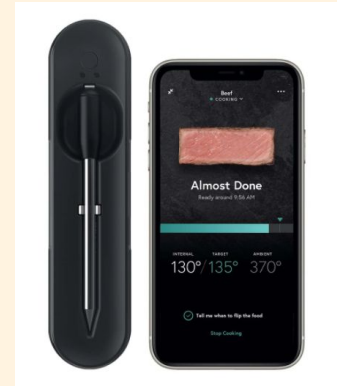
- Smarterware
  - Not on market yet (kickstarter)
  - Freshness reflected by color
  - Evaluation based on time alone
- FOODsniffer
  - Pork, beef, poultry, fish
  - Gathers emitted gases
  - Requires smartphone for results
  - Cost - initial and repair
  - Accuracy? - “Gas levels”
    - Public opinion
  - Discontinued :(





# Market Research

- What is actually available now?
  - Meat Thermometer - cooking duration only
  - Frozen - inconvenient defrosting process
  - Tupperware - no monitoring
- Recent innovations:
  - Bacteria sensing silk microneedle array from MIT
    - E. coli and pH sensitivity only
  - Colorimetric Sensor Array from University of Pavia
    - Extent of color change on sheet depends on pH and thiol levels



## Next Steps

- Concept Screening
  - What is our acceptance criteria?
- Design inputs
  - How to make user needs measurable?
- Continued user research/feedback





# Questions?

Thank you!