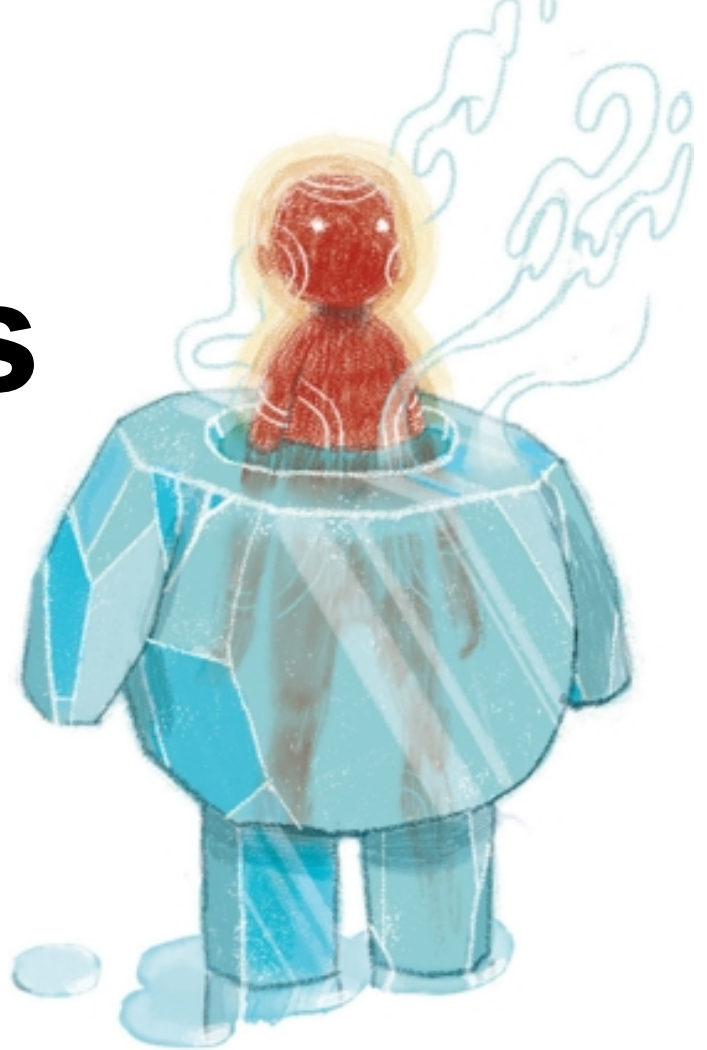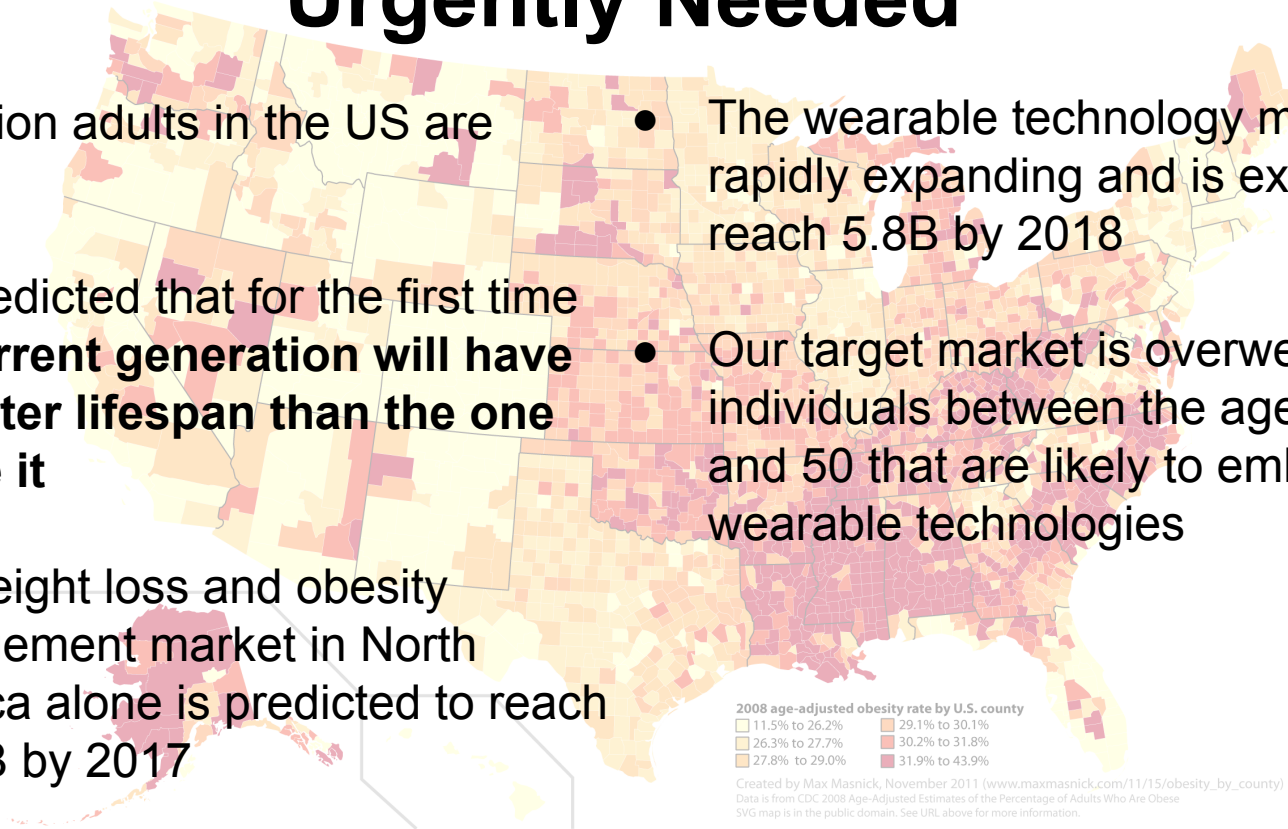# Applied Thermogenics

Ian Silverman
Matthew Harms PhD

Novel Treatments for Obesity are Urgently Needed

- 72 million adults in the US are obese

- It is predicted that for the first time the **current generation will have a shorter lifespan than the one before it**

- The weight loss and obesity management market in North America alone is predicted to reach 139.5B by 2017

- The wearable technology market is rapidly expanding and is expected to reach 5.8B by 2018

- Our target market is overweight individuals between the ages of 20 and 50 that are likely to embrace wearable technologies

2008 age-adjusted obesity rate by U.S. county

11.5% to 26.2%	29.1% to 30.1%
26.3% to 27.7%	30.2% to 31.8%
27.8% to 29.0%	31.9% to 43.9%

Created by Max Masnick, November 2011 (www.maxmasnick.com/11/15/obesity_by_county)
Data is from CDC 2008 Age-Adjusted Estimates of the Percentage of Adults Who Are Obese
SVG map is in the public domain. See URL above for more information.

# Skin temperature is a novel predictor of brown fat activity

- Humans have 2 kinds of fat: white and brown
- In response to cold, brown fat burns energy to produce heat
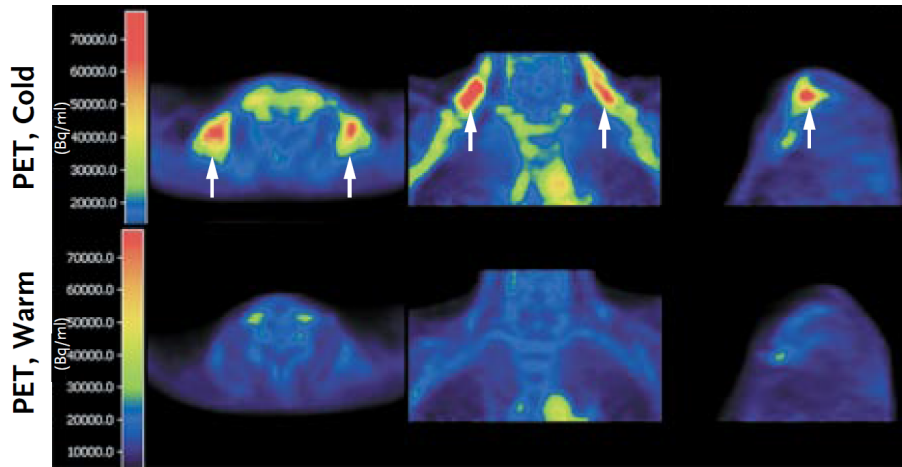
Activating brown fat can promote weight loss

- Skin temperature is a readily accessible measure of the bodies response to cold

- Therefore by monitoring skin temperature we can accurately predict brown fat activation

- We are using pre-clinical models to evaluate skin temperatures required for brown fat activation

- Thus a device that reads skin temperature can help individuals lose weight and improve many metabolic maladies

Virtanen *et al.* 2009, NEJM; Yoneshiro *et al.* 2014 JCI

Applied Thermogenics will help wearers lose weight

34°C

45 % Completed
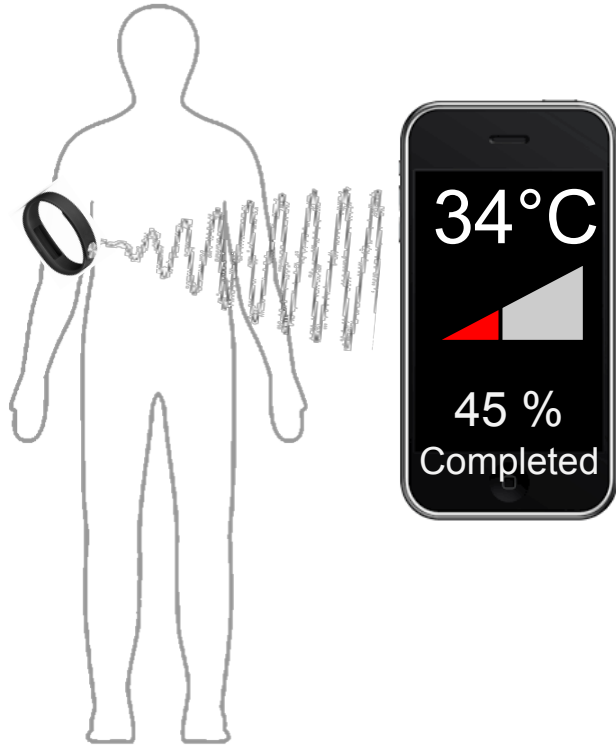
- A temperature reading band is worn around the bicep

- The device interfaces with a smartphone to track the amount of time spent at brown fat activating temperatures

- The app will learn user preferences, to create an individualized training program that optimizes brown fat activation while minimizing cold discomfort

- The device can be worn while performing day-to-day activities - not requiring an additional time

Applied Thermogenics Execution Plan

- The technology to create the device already exists
- Comparable technology costs consumers $70-100. The components cost ~$10
- The development costs for months 1-3 are ~$2K Months 4-6 ~$10K

Months 1-3

- Using comparable technology we will ascertain the skin temperatures required for brown fat activation
- We will begin development of product prototypes
- Identify software developers
- Refine target market via Google AdWords and other primary research

Months 4-6

- Hire a software developer for beta version of application
- Focused product testing within our refined market
- Engage investors to seek additional funding for launch

Richie Pope
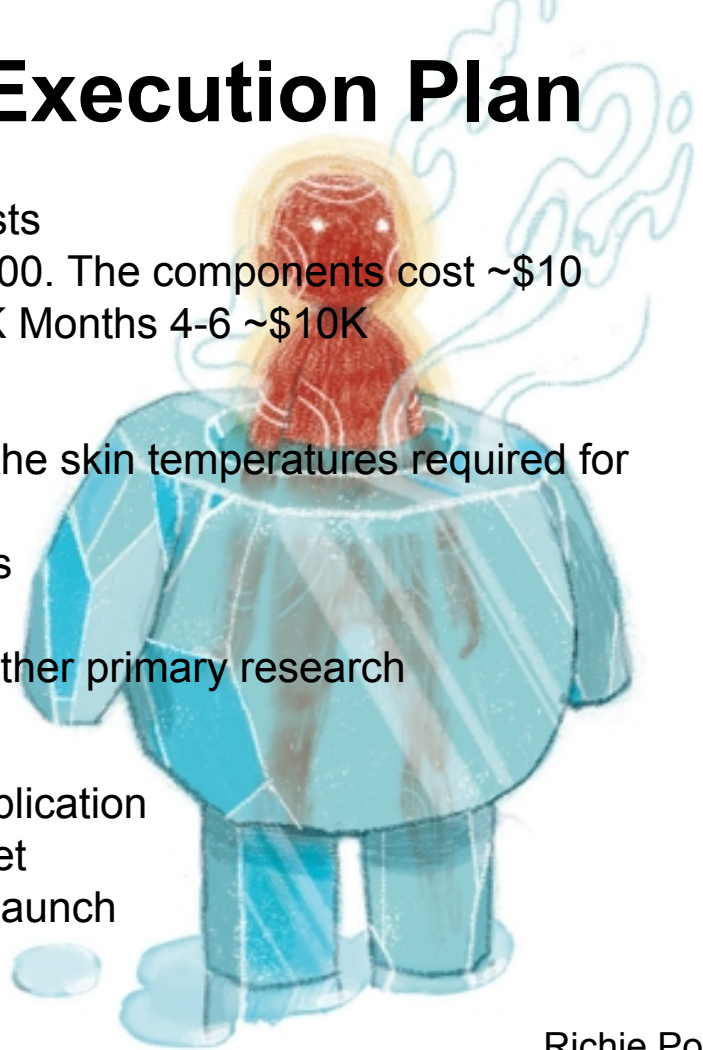
Team and Roles

Ian Silverman is completing his PhD at Penn developing novel computational methods to study gene regulation. He will be responsible for leading the device and application development, overseeing business development and acquiring IP.

Matt Harms PhD is an expert in brown fat biology. He is responsible for designing and interpreting the studies related to the activation of brown fat and skin temperature as well as devising the training program.

Scientific Advisory Board

Mitchell Lazar MD, PhD the Chief of the Division of Endocrinology, Diabetes, and Metabolism, and the Director of the Institute for Diabetes, Obesity, and Metabolism at the University of Pennsylvania.

Patrick Seale PhD, a brown fat specialist and member of the Institute for Diabetes, Obesity, and Metabolism