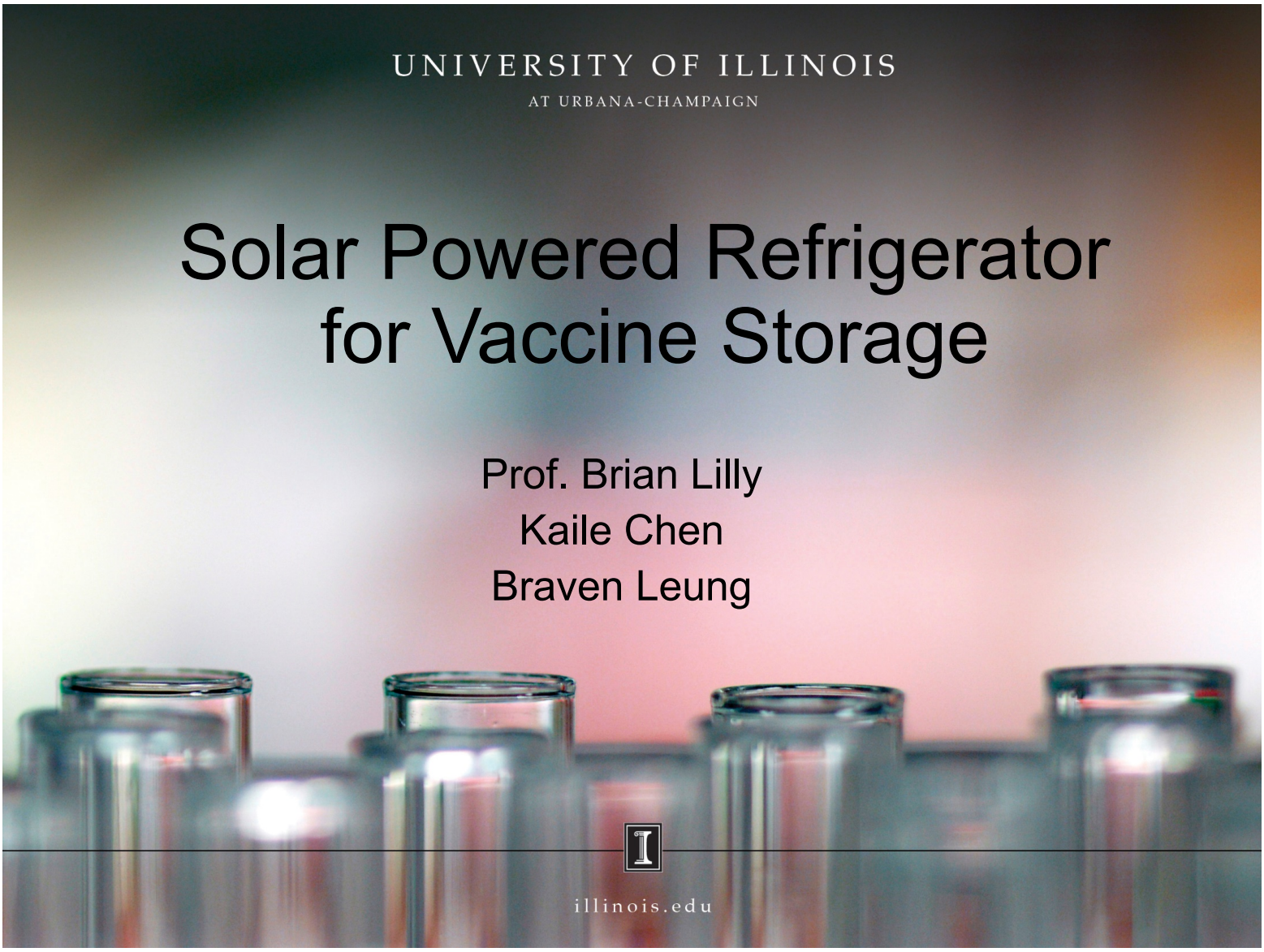
UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN
Solar Powered Refrigerator for Vaccine Storage
Prof. Brian Lilly
Kaile Chen
Braven Leung
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Outline

- Introduction
- Design and Objectives
- Data Acquisition
- Future Work

Introduction

- Vaccines and food refrigeration is an issue in areas where electricity does not exist or is extremely unreliable
- Conventional vaccine storage such as kerosene and battery refrigerators are not suitable for these conditions
- Solution: Solar powered refrigerator

Design and Objectives

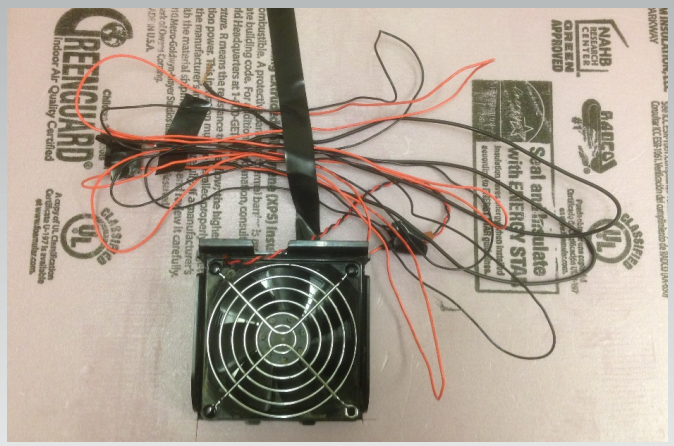
World Health Organization Guidelines:

- Temperature range 0°C to 8°C
- Must able to maintain cooling up to 4 days without power

Solar Powered Fridge Design:

- Solar panel, connected to the fridge, supplies the

Design and Objectives



Data Acquisition

- Power the fridge and record the time it takes to freeze all ice packs
  - Determines minimum energy [illegible] run the fridge
- Monitor and record the temperature change over time in 5 different areas
  - Ensure uniform temperature gradient
  - Find the most effective locations for ice packs
  - Determine maximum time
- Run the fridge solely on ice [illegible]

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Current Setup

- Battery powered
  - simulate solar power
- All ice packs are in top compartment
- Thermocouples are taking measurements
- Fan is used to facilitate the flow of cold air
- Wire compartments work better than glass compartments

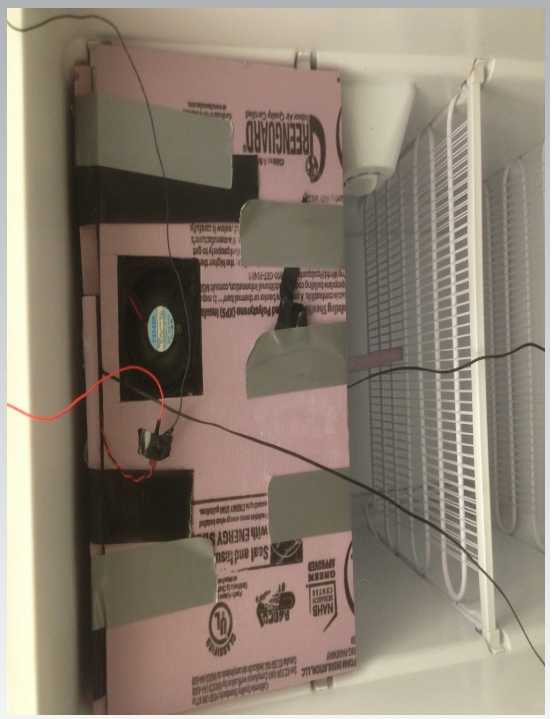
Future Work

- Program on LabVIEW to have all 5 thermocouples logging data
- Optimize fridge design and layout
  - Number of ice packs and their locations
  - Alternative ways to increase flow of cold air from freezer to fridge (currently using a fan)

Future Work

Tests to be run:

- Relocate the fan so it faces downwards
- Design a feedback loop to turn on/off the fan
- Use a hole at the bottom compartment instead of a fan
- Try the working design on Prof. Lilly's other fridge to ensure design fidelity



Thank You!