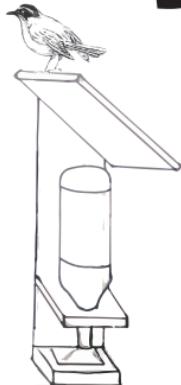
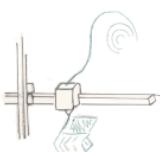
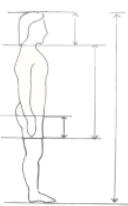
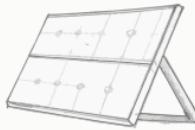
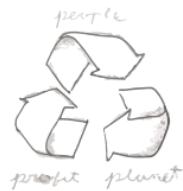


Sam Lapp

a field guide to my projects



-Hope-



My name is Sam Lapp. This design portfolio serves as a field guide to some of the projects and experiences from my time in a Masters in Engineering Design program at Penn State. Please reach out if you want to know more about me or my work.

Skills

For each project, I mark the most important skills with these symbols

 social entrepreneurship

 human-centered design

 community

 music

 prototyping

 teamwork

 modeling

Projects

Gait Measurement

for aligning lower-limb prosthetics

Enabling Farmer-Market Connections

for rural small-holder farmers in Kenya

Cognitive Style in Teamwork

an agent-based model of collaborative problem solving

Backyard Projects

Bird Feeders

Sunrise Lamp

Design Toolkit

from graduate degree classes and research

Leading a Co.Living Community

to shape and inspire young changemakers

Suna Ansuna

Promoting conservation through outdoor music sessions

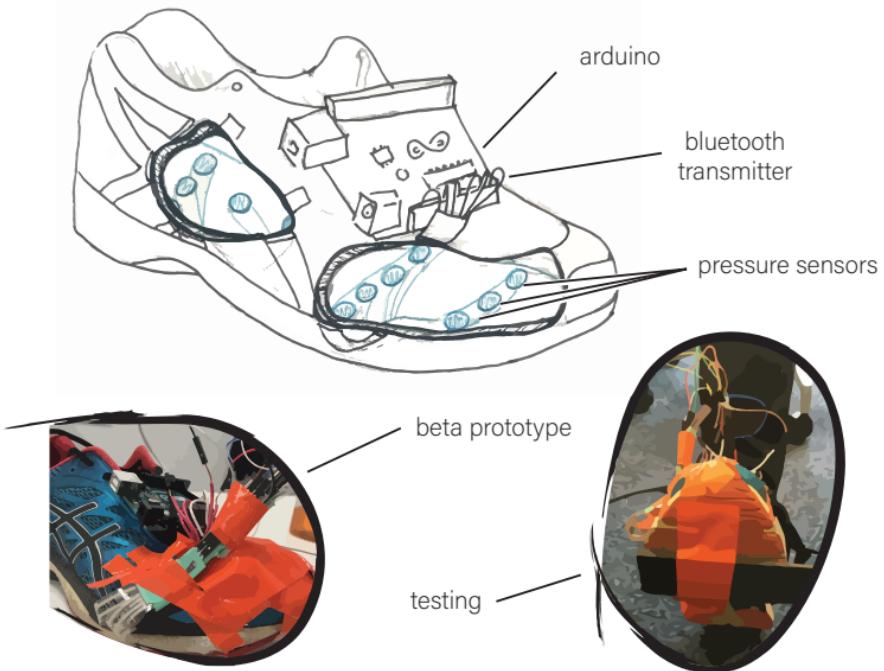
Gait Measurement

for aligning lower-limb prosthetics

Sept 2017 - March 2018

- ❖ prototyping
- ❖ teamwork
- ❖ human-centered design

I worked with a team distributed across three continents to design and test a device to measure a person's gait. We collected and analyzed pressure data of a person walking. I also developed an image processing script to tracked points on the leg from a video capture. Rapid prototyping was the key to success for this project.



By the end of the project, our prototypes could collect and process data that would help a prosthetist align a prosthetic limb correctly. Our sponsor Amparo then began development to launch a product based on our work.

Enabling Farmer-Market Connections

for rural small-holder farmers in Kenya

January - December 2018

-  social entrepreneurship
-  human-centered design
-  teamwork

Small-holder farmers in rural Kenya feed their nation, but struggle to feed their families. Variable prices at local markets create financial instability. Produce Solutions is a social venture that connects farmers to markets across the country, improving profits and income stability.

Mama Carol



Sande



Meet Users and Empathize

Our team spent May of 2018 in Kisumu, Kenya, learning from farmers like Sande and market distributors like Mama Carol.



Develop and Test

I developed and tested business models for connecting farmers to markets. Those established our first user base and core partners.



Pitch and Partner

I pitched the venture at events in State College and Kisumu, which led to new partners on the ground in Kenya.



Cognitive Style in Teamwork

an agent-based model of collaborative problem solving

June 2018 - May 2019

 prototyping

 modeling

For my Masters thesis at Penn State, I studied how people's individual problem solving styles could impact a team's success. I used the Adaption-Innovation spectrum to measure problem-solving style.

Adaptive

Incremental change
Make improvements
Stay within bounds
Find group unity



Innovative

Radical change
Disrupt the norm
Ignore bounds
Diverge from group

I created an agent-based model that simulated human teamwork. The agents imitated four important human behaviors:

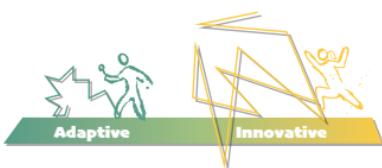
Problem Solving



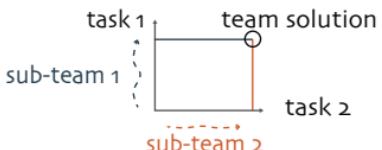
Communication



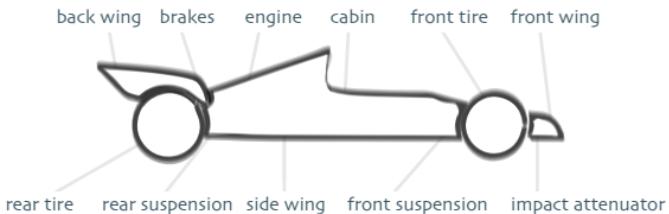
Cognitive Style



Specialization



I modeled a 56-variable car design problem broken into eleven tasks.



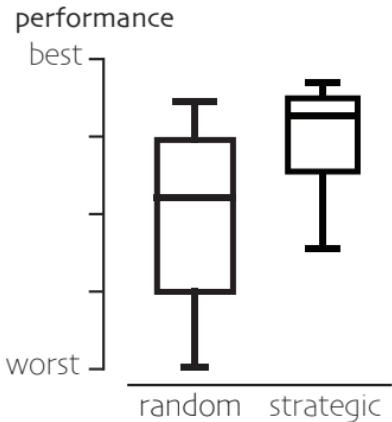
Different Adaption-Innovation styles were best suited for different tasks.

rear suspension
 Adaptive Style performs best

engine
 Mid-range style performs best

impact attenuator
 Innovative style performs best

Teams performed better when the team members were assigned to tasks that matched their style.



Sharing my work

paper submissions
Journal of Design Science
IDETC 2019 Conference

poster presentation
CERS 2019 at Penn State

open-source code
github.com/THREDgroup/kaboom

open-source thesis
thesiscommons.org/cdsyr

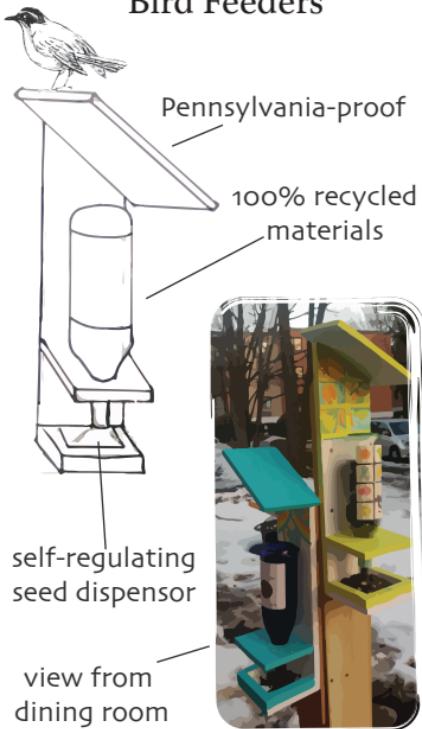
Backyard Projects

getting hands-on with design and build



I love building with my hands. Whenever possible, I step away from the computer for the weekend for and tinker with a new project.

Bird Feeders



Birds populations can indicate ecosystem health. By building feeders and reporting counts, I am practicing ornithology and contribute to citizen science.

Sunrise Lamp

Like 3 in 10 Americans, I feel the effects of seasonal depression.



Using Arduino, I built a sunrise lamp that gradually brightenes my room before my alarm to help treat the winter blues.



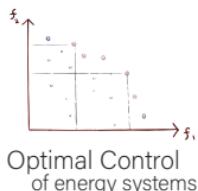
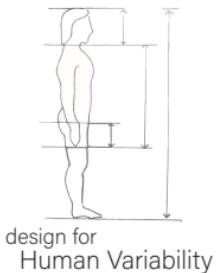
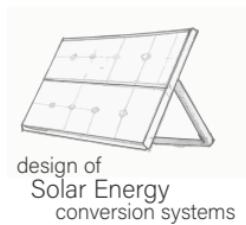
Using the lamp made my winter mornings much happier and more productive.

Design Toolkit

from graduate degree classes and research

Sept 2017 - May 2019

At Penn State, I took incredible classes and conducted research with world-class professors across many disciplines. Those classes added a variety of tools to my design toolkit.



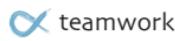
Leading a Co.Living Community

to shape and inspire young changemakers

August 2018-July 2019



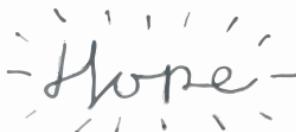
community



teamwork

As a house manager of the cospace, a co-living house for young changemakers in State College PA, I dedicated myself to developing a safe, strong, and inspiring community.

I played many roles. Any day, my job could include....



facilitating meaningful conversations



programming inclusive events

creating powerful experiences

resolving interpersonal conflicts



guiding changemaking journeys

investing in community

celebrating diversity

uncovering passions



Suna Ansuna

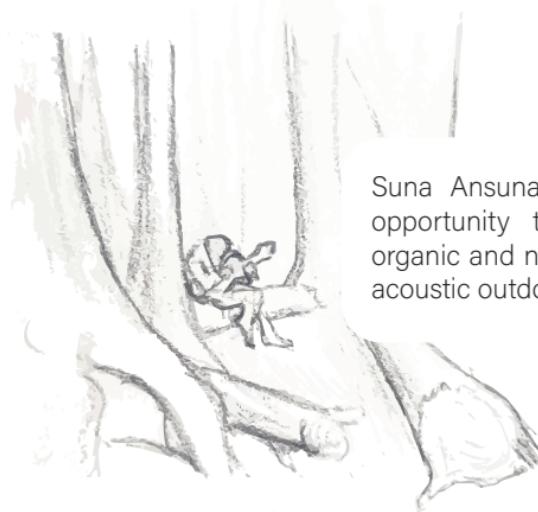
Promoting conservation through outdoor music sessions

June 2018 - May 2019

 social entrepreneurship

 music

Suna Ansuna means "heard, unheard" in Hindi. This project is about voicing the unheard stories of music and nature.



Suna Ansuna gives musicians an opportunity to share their most organic and natural voice by filming acoustic outdoor sessions.

I then work with ecological experts, conservation activists, and artists to tell the unspoken stories of conservation in those areas.



sunaansuna.com



