



# Neonatal Asphyxia Project at the University of Michigan

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## ABSTRACT

The Neonatal Asphyxia Project (NAP) is a student project team at the University of Michigan aiming to design a device that applies hypothermia therapy to mitigate the effects of birth asphyxia in neonates born in low-resource communities.

## NEONATAL ASPHYXIA IN INDIA

Neonatal asphyxia is a condition resulting from oxygen deprivation during birth. It is a leading cause of infant death worldwide, and survivors are at risk for physical and neurological developmental delays. Hypothermia therapy (HT) is an innovative treatment that slows cell metabolism to mitigate neurological damage.



Fig. 1 (above): An inside look at the Hasya Clinic NICU

Fig. 2 (right): Neonate receiving HT at Hasya

We are partnered with the Hasya Newborn Care Centre (Fig. 1) in Gujarat, India. They currently cannot afford the costly HT devices on the market.



To apply HT, Hasya utilizes makeshift cold packs by freezing surgical gloves filled with water and placing them proximal to the neonate (Fig. 2).

## THE NEED

Develop a cost-effective solution that will properly apply hypothermia therapy to mitigate the neurological complications associated with neonatal asphyxia in low-resource communities.

## IMPLEMENTATION

### Prototype Testing & Improvements

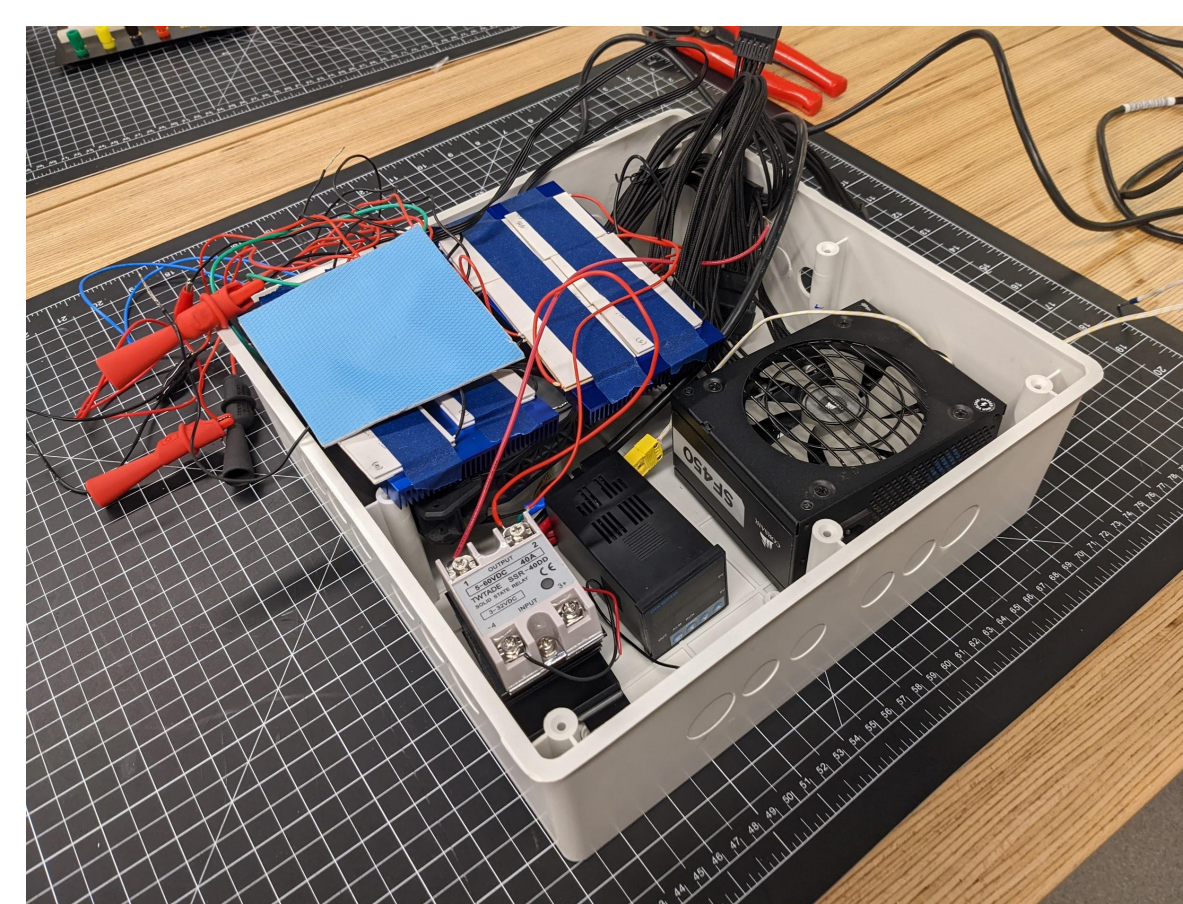
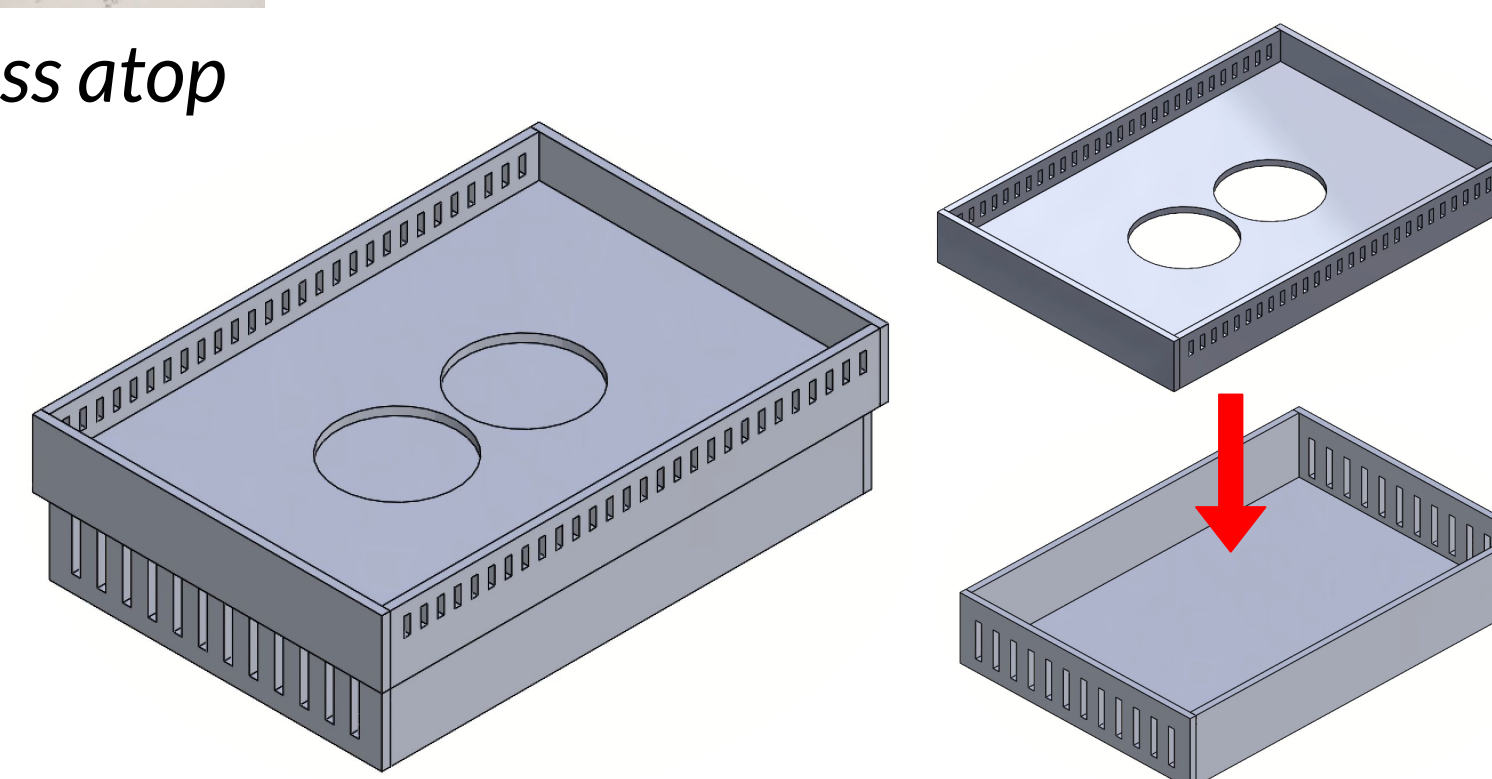


Fig. 3: Initial HT bed prototype



Fig. 4: Testing of gel mattress atop cooling system

Fig. 5 (right): Redesigned outer casing to house electrical hardware and hold mattress interface



We began the semester with a low-fidelity build (Figs. 3, 4) consisting of the electrical hardware contained in a project box.

After passing verification tests in clinic at Hasya, we designed an outer casing to contain the hardware isolated from the patient contact interface (Fig. 5). This allows for safe heat dissipation as heat is drawn from the neonate and into the environment.

### Visibility, Outreach, & Fundraising



• Semifinalists in Rice 360 Global Health Technologies Design Competition



• Made new mentors in UM Department of Global Health



• Received guidance from UM Center for Global Health Equity

• Compiled project-relevant grants and conferences to apply for

• Earned >\$10,000 in grant awards

## OVERCOMING CHALLENGES

### Training

Long process, limited times

- Delegated tasks across members to maximize individual bandwidth and availability

### Partner Contact and Outreach

Communication difficulty due to time zone difference, nonresponses

- Casted a wide net in the mentorship search
- Utilized personal connections and faculty pages
- Communicated text updates over WhatsApp in lieu of meetings
- Scheduled weeks ahead of time and followed up to ensure availability

### Leadership Transition

First massive leadership transition since 2021

- Began transition early (Spring 2023)
- Compiled best practices in leadership transition report for future team reference

## NEXT STEPS

Device Optimization and Testing

Increase Team Visibility

Implement and study impact!

## ACKNOWLEDGEMENTS

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