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Designing Medical Technology for the Developing World

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Authors

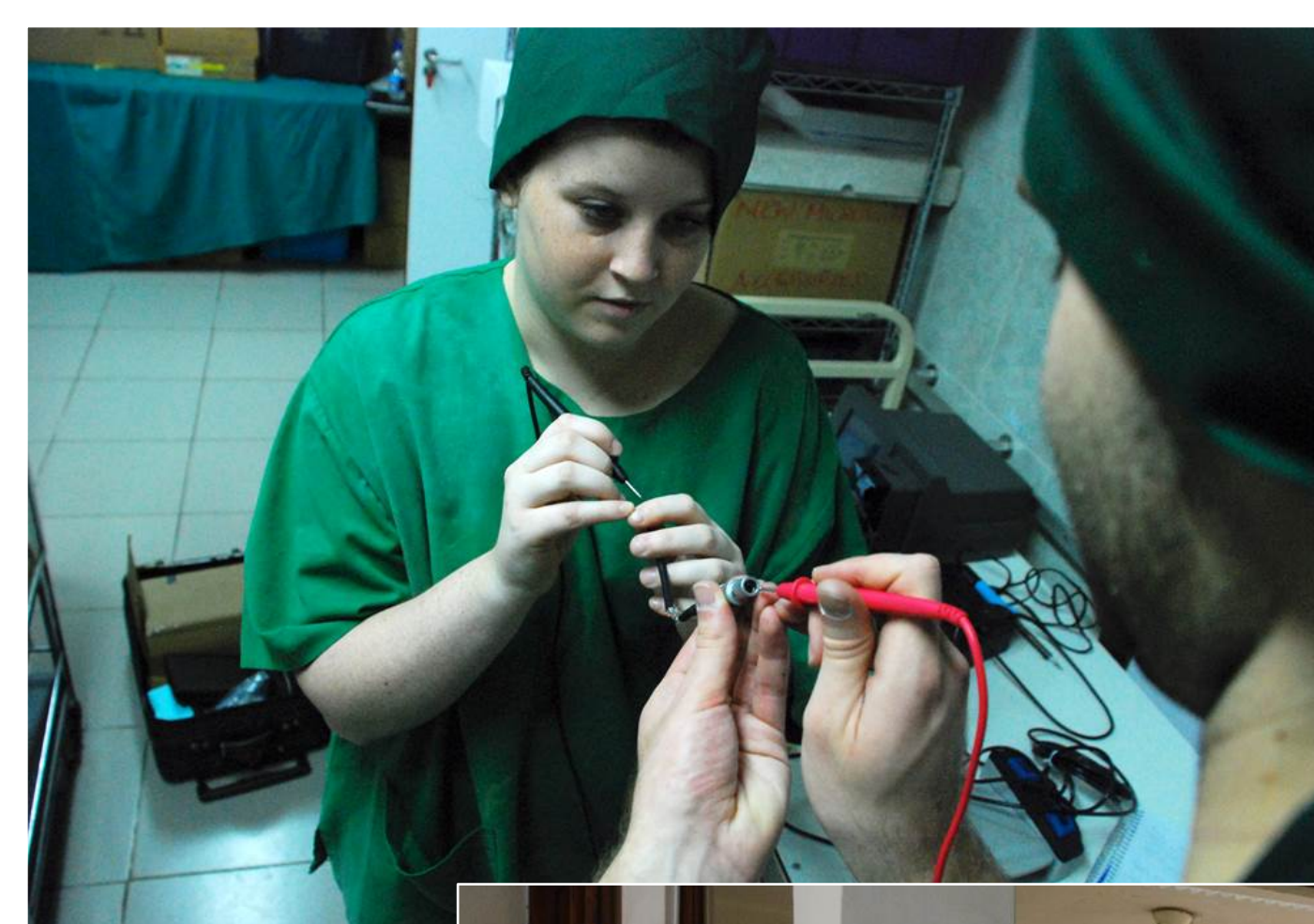
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Introduction

Our Creative Inquiry team works to improve global health through the following activities:

- ◆ **Outreach:** groups of students visit hospitals in Tanzania to research need areas, help repair equipment, and conduct equipment surveys.
- ◆ **Medical Device Design:** students work to design sustainable and affordable devices that can be produced and repaired locally.

Below: Students inspect surgical equipment.



Right: Students and collaborators from Madaktari Africa presenting their designs to clinicians and nursing staff in a NICU



Above: An ENT examination console which students repaired during a trip in January 2014



Global Outreach

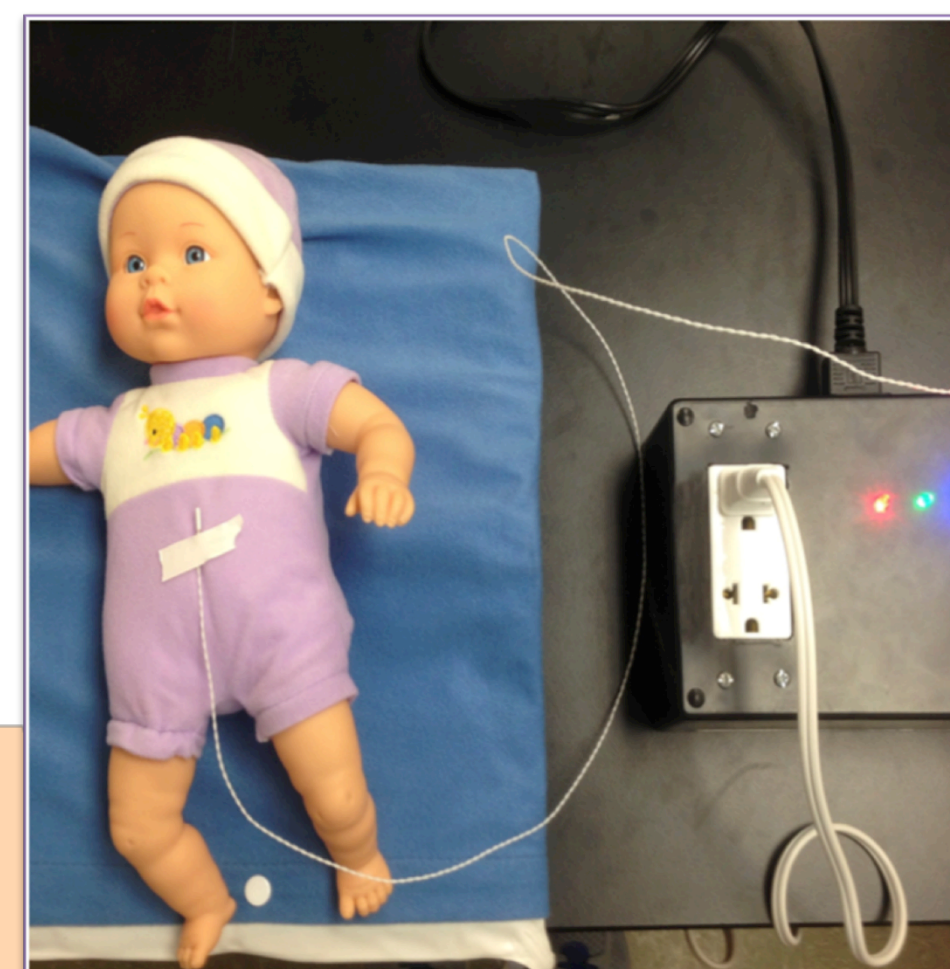
- ◆ During our trips to Tanzania, students have visited Arusha Technical College along with many of the area's hospitals.
- ◆ The group has gained first-hand insight into the needs of hospitals in a variety of settings.
- ◆ We partnered with clinicians to help advise and adapt our designs to fit their needs and resources.
- ◆ Additionally, we have conducted equipment-breakdown surveys in order to better understand why equipment failed, how long it remained inoperable, and what effect it had on the hospitals' operations.

Current Projects

Incubasic: Life Blanket (Infant Monitor)

Need: Temperature monitoring and warming for neo-natal infants.

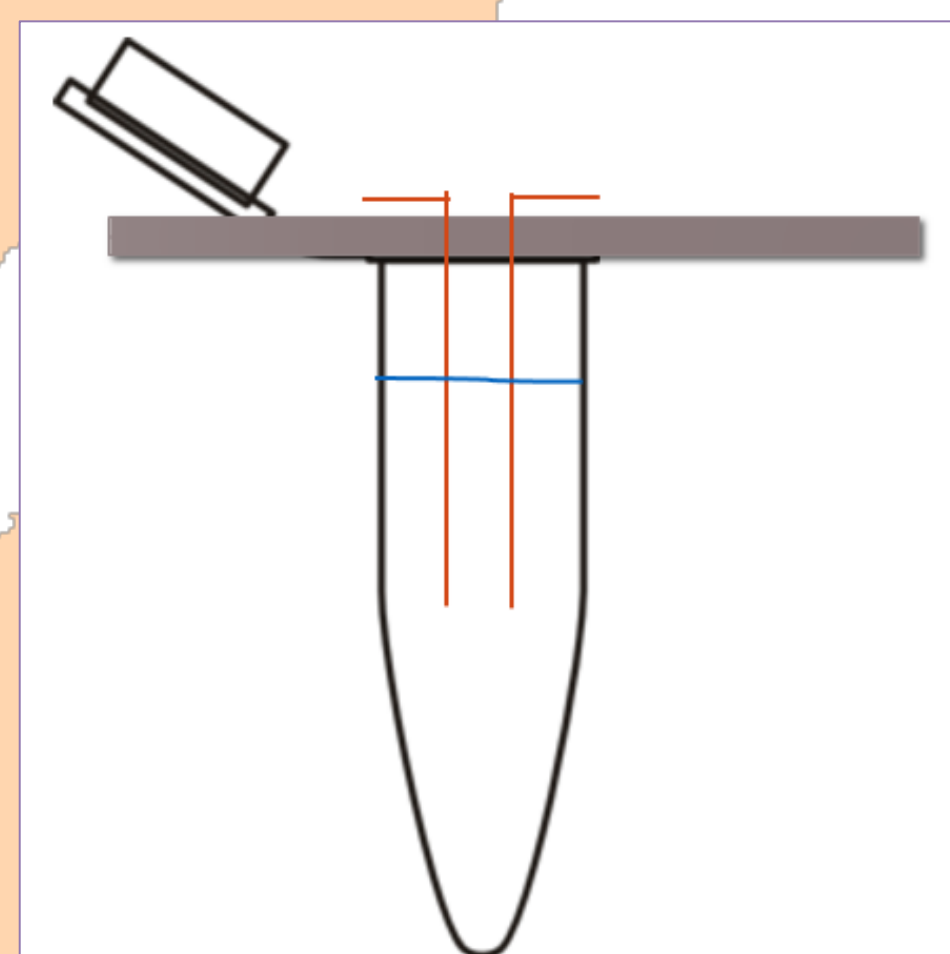
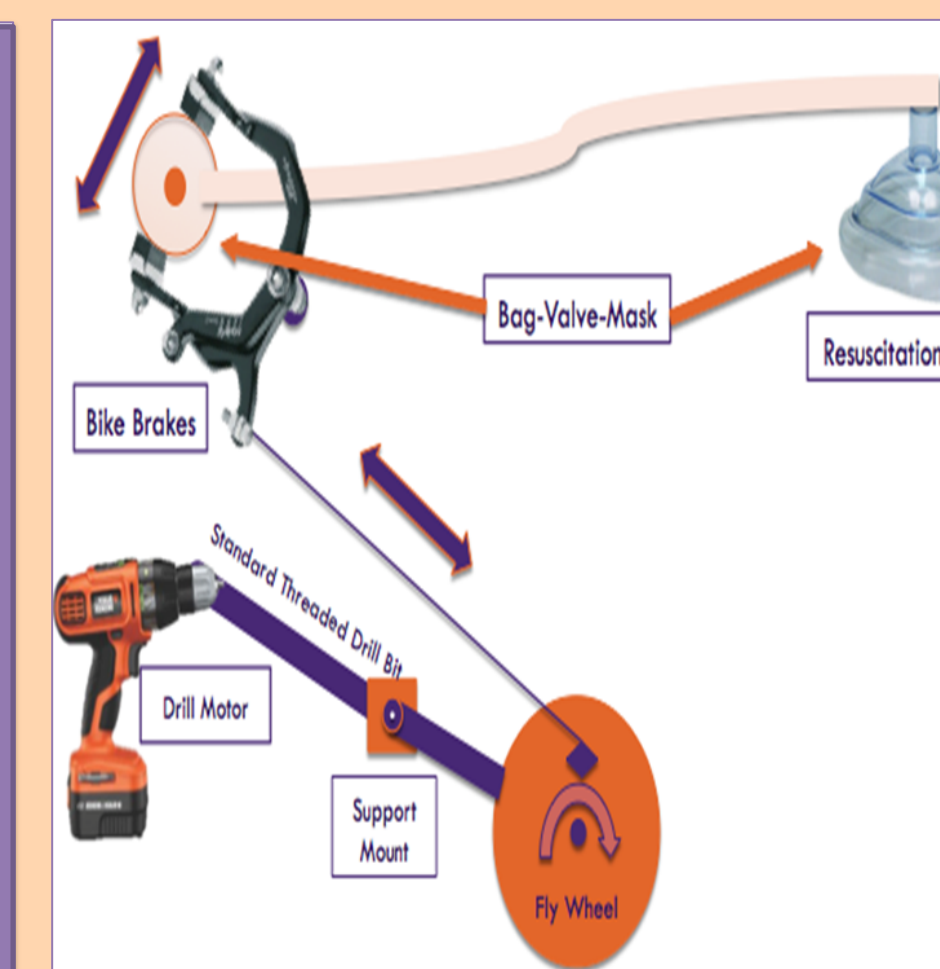
Solution: A sensor on the infant monitors body temperature. A microcontroller indicates temperature with a 3-light system and turns on a heating blanket when the infant is hypothermic.



Respire (Infant Breathing)

Need: Controlled and automated method to pump air into newborns to support breathing.

Solution: Using locally available parts, the device pumps air into the infant to support breathing to prevent family members from having to manually hand pump air.



Rapid Bacteria Sensor

Need: Rapid test for bacterial infections and contamination without the need for time- and material- intensive cultures

Solution: Impedance-based sensor that can quickly determine the presence of bacteria in a patient's sample.

Previous Projects

Woven Neck Collar

Need: Neck stabilization for injured patients

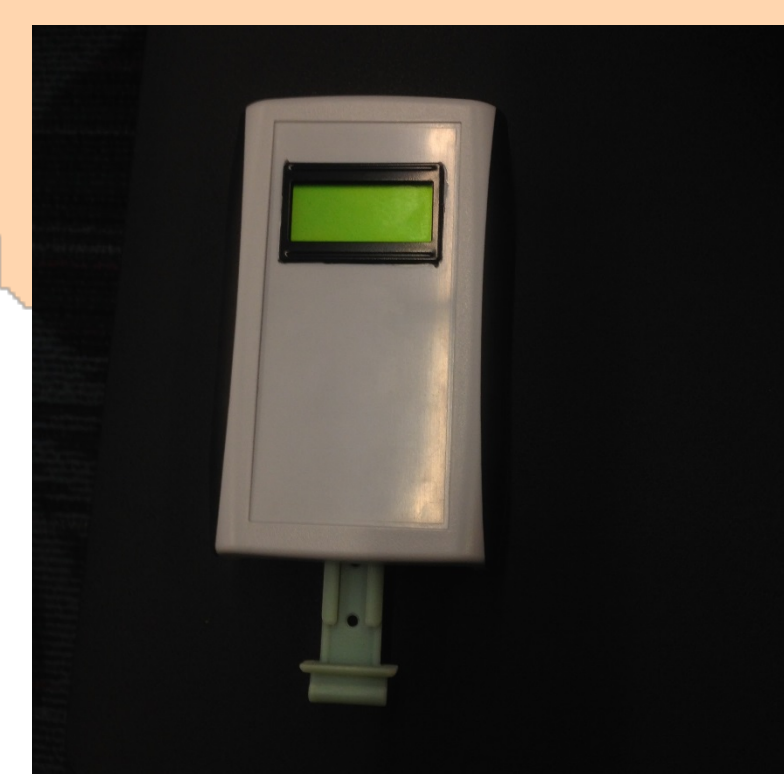
Solution: Collar woven from African plains grass. It can be produced by local basket weavers from readily available materials



Glucometer

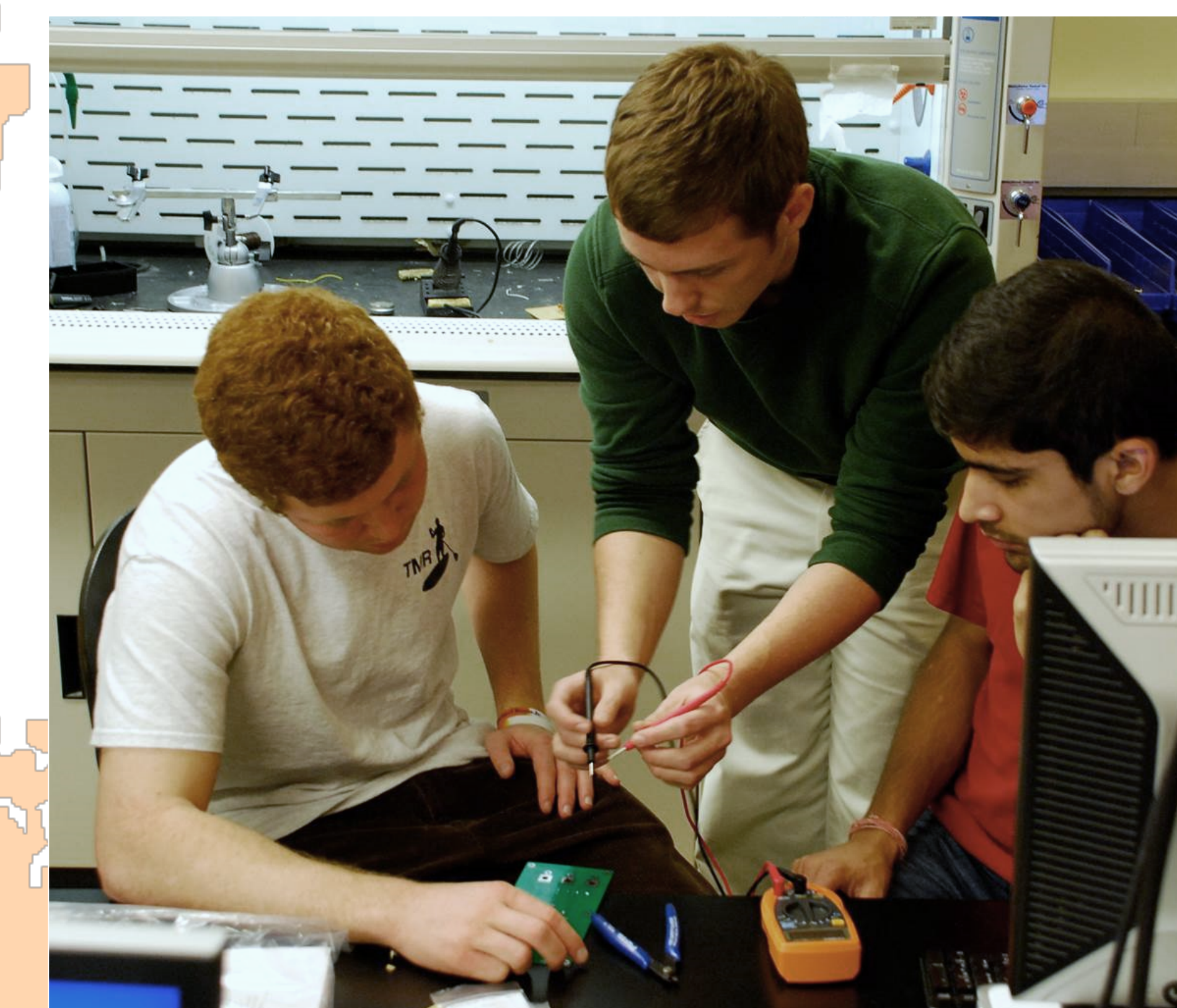
Need: Low-cost test strips for diabetics to measure glucose levels in their blood.

Solution: Test strips that can be printed from an ink-jet printer. They are inexpensive and can be produced locally, which excludes the high cost of shipping.



Kit Building

- ◆ Developing countries lack equipment to test whether or not their medical devices are functioning properly.
- ◆ Engineering World Health (EWH) has designed kits that can be used for testing medical equipment and for teaching tools. The club raises money to purchase these kits and then assembles them so they can be sent to developing countries.



Future Collaborations

- ◆ In addition to our partners in Tanzania, our group is working on practical applications to expand with other groups working in Haiti, Mexico, and India.

Learn More!

To find out more about our Incubasic Project, including our new crowdfunding page, visit <https://www.indiegogo.com/projects/incubasic-the-life-blanket>

If you would like to know more, please visit our website at www.clemson.edu/ci/sites/ewh or scan the QR Code.

