Advanced Optical Probe for Early Detection of Pediatric Hemorrhagic Shock

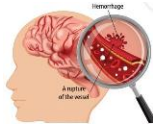
15

Emma Goodrow[1], Jess Schable[1], Josh Andrews[1], Tasmia Hasan[1]
Advisor: Dr. Kurtulus Izzetoglu[1,2]
[1]Drexel University School of Biomedical Engineering, Science and Health Systems, [2] Drexel University, CONQUER/ICONS Lab

DREXEL UNIVERSITY School of Biomedical Engineering, Science and Health Systems

NEED

Hemorrhagic shock is the leading cause of preventable death in **pediatric patients with traumatic injury.~60,000 (U.S)** deaths per year from hemorrhage

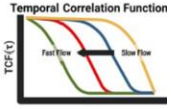


Objective

To develop a preclinical prototype probe for the measures of cerebral blood flow in pediatrics via Diffuse Correlation Spectroscopy

SOLUTION BUILD

DCS

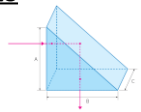


BFI = Blood Flow Index (cm^2/s)

DESIGN INPUTS

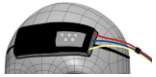
Constraints

Pediatric Head Measurement (1 mo – 1 year)

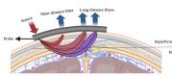


Right Angle Coated Prism (5 mm)

Requirements



Form Factor



Multi-distance source detector separation

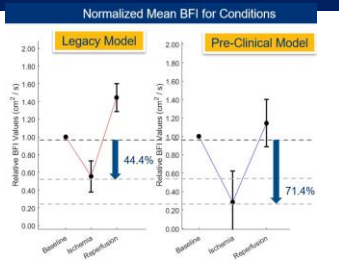
Photon count 1000kHz

TESTING RESULTS

Arm Cuff Occlusion Test for blood flow measures to compare legacy vs. pre-clinical models.

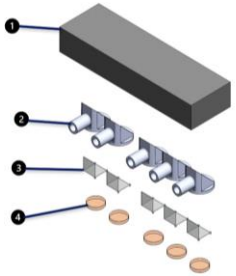
Repeated Measures of ANOVA

Probe	df	F	p
Legacy	2	37.8	<0.001
Pre-Clinical	2	134	<0.001



SOLUTION DESIGN

No.	Description
1	Silicone Housing x1
2	Probe Housing x5
3	5mm Right Angle Prism x5
4	1mm Linear Polarizer x5



FUTURE WORK

Test **first pre-clinical probe** in **animal models** of hemorrhagic shock and compare with **other clinical solutions,** such as ultrasound and laser doppler flow.