



# Reduce Manufacturing Cost for Regional Oximeter

## Team:

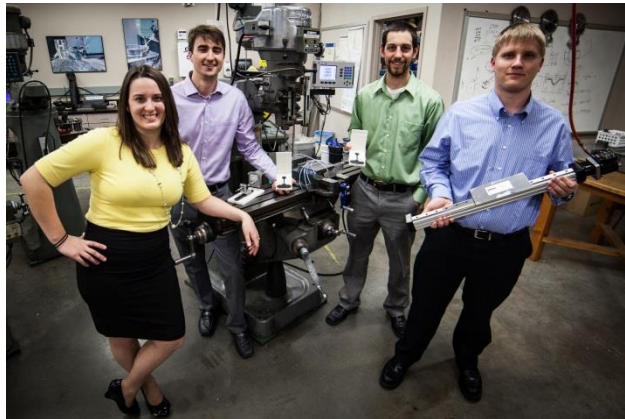
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## Advisor:

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## Industry Representative:

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## Project Summary:

Nonin Medical, a leading manufacturer of noninvasive monitoring devices, requested St. Thomas engineering students to design an automated fixture that is capable of facilitating the calibration processes of 100,000 fully assembled regional oximeter sensors per year. To improve productivity, a tray with a zero insertion force (ZIF) connector was also desired to hold the sensors within the automated fixture. The project entailed designing a system, fabricating and testing tray and ZIF

prototypes, and programming motors along with a camera to locating LEDs on the oximeter sensor. The fixture physically interfaces each sensor with a camera to locate the position of the LEDs and a spectrometer apparatus to measure the spectrum of the LEDs imbedded in the sensor. The temperature of the LEDs during calibration must be  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and is regulated by a temperature controlled enclosure. The fixture contains control software designed by UST that interfaces with calibration software designed by Nonin. Upon completion of the project, the fixture will be given to Nonin.



## Design Goal:

Reduce production cost by automating the calibration process during the manufacture of regional oximeter sensors. Develop ZIF and tray prototype to hold the oximeter sensor while in automated fixture.

## Design Constraints:

- Be able to handle 100,000 units per year
- Must interface sensors with calibration equipment within tolerances
  - Z-direction: 0.5 mm
  - X & Y-direction: 1 mm
- LEDs must be  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$  while being calibrated
- No force on electrical contacts when sensor is inserted into tray