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## Department

Biomedical Engineering (BME)

## Publication(s)

## External Link(s)

- [From the lab of Dr. Nimmi Ramanujam](#)
- [From the lab of Dr. Thomas F. Kuech](#)

# Fiber optic probe with integrated photodetector capabilities

## Unmet Need

Light-based diagnostics is a non-intrusive procedure that can be used to monitor chemotherapy treatment efficacy. Optical imaging additionally has the capacity for roles in diagnosis and surgery guidance. Currently, many devices for optic based spectroscopy have a separate apparatus for the light detecting probe and the optical fiber. However, combining the probe with the photodetector can improve efficiency, reduce latency, and decrease costs. There is a need for fiber optic probes with integrated photodetector capabilities.

## Technology

Duke inventors have developed a medical probe with photodetector capabilities. This is intended to be used for diagnosis and treatment during spectroscopy applications. Specifically, the inventors have developed a fiber optic probe with integrated photodetector capabilities. Thin, flexible photodetectors have been integrated with the optical fiber. This results in a compact device for clinical use. This technology has the ability to be inserted in a biopsy needle. The technology has been demonstrated to be effective during diffuse reflectance spectroscopy of *in vivo* blood samples where hemoglobin light absorbance was monitored to reflect tissue oxygenation.

## Other Applications

This technology could find use in weather monitoring devices and other remote sensing applications. Fiber optics can already be used to sense temperature and pressure. This device could potentially add the ability to sense daylight time, length, etc. in research applications.

## Advantages

- Less costly device
- Structure is more compact compared to separate probe and photodetector
- Easier to use than previous devices

