



## Depth-Resolved Reflectance Instrument

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**WARF: P05015US**

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**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an improved instrument that can be used to collect and analyze optical information from a pre-cancerous or cancerous target in epithelial tissue or other turbid medium.**

### Overview

Physicians often use microscopic visual inspection followed by biopsy to detect cancer; however, this method is limited in many ways. Optical techniques are a promising alternative that allows clinicians to quickly and nondestructively measure properties of tissue layers *in vivo* that are associated with pre-cancer and cancer.

Diffuse reflectance spectroscopy involves illuminating surfaces and measuring diffusely scattered light from the same surface. It has been shown that absorption and scattering in pre-cancerous and cancerous tissues vary with depth and differ from those of healthy tissues. However, current methods of analyzing scattered light function only in one-layered tissue and are not appropriate for squamous epithelial tissues, which have a multi-layered structure.

### The Invention

UW-Madison researchers have developed an improved reflectance instrument and method to collect and analyze optical information from a pre-cancerous or cancerous target in a turbid medium, such as epithelial tissue. The instrument uses a smart fiber-optic probe to deliver a selected wavelength of light to tissue and sense the reflected light from specific layers. Altering the angles of illumination and detection relative to the tissue surface and the source-detector separation allows the clinician to probe at various depths beneath the surface of the tissue. Specially designed modeling for two-layered tissue enables the user to extract information from each individual layer for diagnosis.

### Applications

- Cancer detection

### Key Benefits

- Adaptable to current endoscopic optical imaging systems without significantly increasing complexity or cost
- Reduces the need for biopsy
- Non-invasive, i.e., does not physically damage tissue or biological molecules
- Allows user to probe at varying depths within the tissue
- Enables rapid, non-invasive examination of human tissues

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Additional Information

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### Related Technologies

- [See WARF reference number P02039US for a depth-resolved instrument that uses fluorescence, rather than light scattering, to examine tissue.](#)

### Tech Fields

- [Medical Devices : Diagnostics & monitoring tools](#)
- [Medical Imaging : Other diagnostic imaging](#)

For current licensing status, please contact Jeanine Burmania at [jeanine@warf.org](mailto:jeanine@warf.org) or 608-960-9846

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