

# Simple All-in-One UV Waveguide Microscope with Illumination Sectioning for Surface Morphology and Fluorescence Imaging

Tech ID: 29012 / UC Case 2017-759-0

## ABSTRACT

Researchers at the University of California, Davis have developed an all-in-one microscope combining ultraviolet excitation light with a waveguide directly integrated onto a light microscope stage, capable of providing surface morphology and fluorescence information with minimal sample preparation.

## FULL DESCRIPTION

Histology is an important tool in biology for visualization of plant and animal cells and tissues. Cells can be visualized with white light or polarized light to allow for visualization of fluorophores. Although both methods are effective, each mode provides detailed information that the other does not. Traditional microscopes illuminate a sample from either the top or bottom at normal incidence, which greatly limits the amount of information that can be retrieved.

Researchers at the University of California, Davis have combined ultraviolet excitation light with a plastic LED waveguide, doubling the sample mount while successfully integrating it directly onto a light microscope stage. This waveguide can be fitted onto existing microscopes and is configured so that the excitation light is launched in from the side at an oblique angle to allow for the acquisition of images. By allowing the acquisition of images, this new method provides both surface morphology and general fluorescence information without the need for specialized lasers or separate imaging modes.

## APPLICATIONS

- ▶ High resolution, rapid histology
- ▶ Imaging of live plants
- ▶ Imaging of live animal cells
- ▶ Surface morphology and fluorescence all-in-one

## FEATURES/BENEFITS

- ▶ Able to retrofit existing regular microscopes
- ▶ Easier switch between lenses
- ▶ Ability to use with high-NA short-working-distance lenses
- ▶ No thin-sectioning required
- ▶ Minimal sample preparation
- ▶ Tissue can be stained in the cassette and can replaced with a UV transparent window for imaging
- ▶ Uses non-total internal reflection conditions for deeper tissue imaging penetration

## CONTACT

Andrew M. Van Court  
[amvancourt@ucdavis.edu](mailto:amvancourt@ucdavis.edu)  
 tel: .



## INVENTORS

- ▶ Fereidouni, Farzad
- ▶ Levenson, Richard M.

## OTHER INFORMATION

### KEYWORDS

surface illumination,  
 tissue, oblique incidence,  
 side launch geometry,  
 surface weighted, UV  
 light imaging, side  
 launched visible light  
 imaging, sharp  
 morphology, sensitive  
 detection

## CATEGORIZED AS

- ▶ **Imaging**
  - ▶ Medical
  - ▶ Molecular
  - ▶ Other
- ▶ **Medical**
  - ▶ Imaging

► Can add additional spectral ranges for increased immunofluorescence detections

► **Research Tools**

► Other

► **Sensors &**

**Instrumentation**

► Medical



Scientific/Research

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	<a href="#">11,982,622</a>	05/14/2024	2017-759
United States Of America	Issued Patent	<a href="#">11,774,361</a>	10/03/2023	2017-759
Patent Cooperation Treaty	Published Application	<a href="#">2018/204712</a>	11/08/2018	2017-759

RELATED CASES

2017-759-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- [White Dwarf: Cross-Polarized White Light Slide-Free Imaging](#)
- [Tissue Imaging Technique Using Reflectance Microscopy](#)

University of California, Davis

Technology Transfer Office

1 Shields Avenue, Mrak Hall 4th Floor,  
Davis,CA 95616

Tel:

530.754.8649

[techtransfer@ucdavis.edu](mailto:techtransfer@ucdavis.edu)

<https://research.ucdavis.edu/technology-transfer/>

Fax:

530.754.7620

© 2017 - 2024, The Regents of the University of California

[Terms of use](#)

[Privacy Notice](#)