

Extending the Resolution of Microscopes Beyond the Diffraction Limit

Track Code: 2012-WERE-66167

Categories:

- Mechanical Engineering

Keywords:

- Electrical Engineering
- Mechanical Engineering
- Optics

The resolution for microscopes and other optical devices is limited by the diffraction limit, which is a result of the scattering of light at the aperture. Techniques have been developed that provide resolution greater than the diffraction limit, but they require complex illumination schemes, specialized fluorescent molecules, or complex optics. These requirements add to the price and limit the applications of the techniques.

Researchers at Purdue University have developed a novel solution to achieve super resolution by inserting a set of optics between the microscope and camera. The choice of optics is flexible and used to create interference patterns that allow for localization of light sources at resolutions greater than that of the base microscope. This technique could be used to locate and image fluorescently tagged cell organelles or track microscopic fluorescent particles in fluid. Telescopes could also benefit from this technology by increasing their resolution of faint targets.

Advantages:

- Library of existing MEMS devices
- Increased productivity
- Easy to use

Potential Applications:

- Microscopes
- Telescopes

People:

- Wereley, Steven Truitt (Project leader)
- Snoeyink, Craig A

Intellectual Property:

Application Date: December 9, 2013

Type: Utility Patent

Country of Filing: United States

Patent Number: 9,494,785

Issue Date: November 15, 2016

Application Date: December 7, 2012

Type: Provisional-Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Contact OTC:

Purdue Office of Technology Commercialization

The Convergence Center

101 Foundry Drive, Suite 2500

West Lafayette, IN 47906

Phone: (765) 588-3475

Fax: (765) 463-3486

Email: otcip@prf.org