



## 光學繞射元件測距工業用內視鏡

**發明人：**駱遠 副教授

**單位：**國立臺灣大學醫學院醫療器材與醫學影像研究所

**簡歷：**

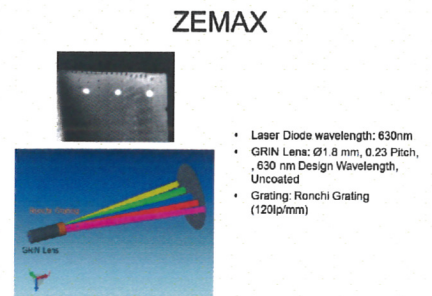
國立臺灣大學醫療器材與醫學影像研究所 副教授 2015.08-迄今

國立臺灣大學光電生物醫學研究中心 助理教授 2011.08-2015.07

Visiting Scholar, Biosym Laboratory, Singapore-MIT Alliance for Research and Technology (SMART) Centre, 2011.01-2011.05

Postdoctoral Associate, Mechanical Engineering, MIT, USA, 2009.01-2011.07

PhD, College of Optical Sciences, University of Arizona, 2004.08-2008.08



**市場及需求：**該報告研究了全球內窺鏡設備市場 2015 年的預測期至 2020 年，該市場預計當 2020 年，市場產值預計會達到 USD 238 億元，從 2015 年的 33.6 億美元，以 6.1% 的複合年成長率。

由於全球各地的政府機構不斷增加的投資金，和不斷攀升醫院的投資，促進內視鏡系統的擴張與成長，再加上病人對微創手術的偏好，技術的進步，偏好的公費的支持，推動膠囊內視鏡的市場，上漲老年人口和流行疾病的診斷需要內鏡的檢查增加是推動內視鏡設備市場的主要因素。

**技術摘要(含成果)：**本發明是一種光柵與內窺鏡結合到測量目標物和內視鏡頭之間的分離。光柵經由定期間隔開的平行的垂直線，吸收或反射入射光或改變入射光的相位。所發射的光通過對目標的光柵和形式幾個光點之後將被衍射成若干衍射級。目標距離可以從光學衍射現象來計算。

**優勢：**我們的技術只需要添加一些額外的組件，例如一個光柵，和一準直透鏡到一般的內視鏡鏡頭。這是很容易以低成本來實現我們的用內視鏡技術，並提供了一個精確的距離測量。

**競爭產品：**在全球內視鏡設備市場的一些主要參與者包括 Ethicon, Inc. (U.S.), Olympus Corporation (Japan), Fujifilm Holding Corporation (Japan), Boston Scientific Corporation (U.S.), Pentax Medical Corporation (Japan), Stryker Corporation (U.S.), KARL STORZ GmbH (Germany), Smith & Nephew plc (U.K.), Medtronic plc (Ireland), Richard Wolf GmbH (Germany), CONMED Corporation (U.S.), and Cook Medical Incorporated (U.S.)

**專利現況：**公司正在評估，並將申請正式專利。

**聯絡方式(請不用填)：**

臺大產學合作總中心

Tel: 02-3366-9945, E-mail: ntuciac@ntu.edu.tw



## Endoscope with an embedded grating for target distance measurement

**PI :** Prof. Yuan Luo, Institute of Medical Device and Imaging, National Taiwan University.

### Experience:

Associate Professor, Institute of Medical Device and Imaging, National Taiwan University, Aug. 2015 - current

Assistant Professor, Center for Optoelectronic Biomedicine, National Taiwan University, Aug. 2011 – Jul. 2015

Visiting Scholar, Biosym Laboratory, Singapore-MIT Alliance for Research and Technology (SMART) Centre, Jan. 2011 - May 2011

Postdoctoral Associate, Mechanical Engineering, MIT, USA, Jan. 2009 – Jul. 2011

PhD, College of Optical Sciences, University of Arizona, Aug. 2004 - Aug. 2008

Lab website: <http://optics.mc.ntu.edu.tw/>

**Market Needs:** This report studies the global endoscopy equipment market for the forecast period of 2015 to 2020. This market is expected to reach USD 33.6 Billion by 2020 from USD 23.8 Billion in 2015, at a CAGR of 6.1%.

Rising investments, funds, and grants by government bodies worldwide, rising number of hospitals and growing hospital investments in the expansion of endoscopy instruments, growing patient preference for minimally invasive surgeries, technological advancements, favorable reimbursement coverage in selected countries slated to propel the capsule endoscopy market, rising geriatric population, and rising prevalence of diseases that require endoscopy procedures are major factors driving the endoscopy equipment market.

**Our Technology:** The present invention is to combine a grating with an endoscope to measure the separation between the target and endoscopic head.

A grating consists of regular spaced parallel vertical lines which, absorb or reflect the incident light or change the phase of the incident light. The transmitted light would be diffracted into several diffraction orders after passing through a grating and forms several light spots on the target. The target distance can be calculated from the optical diffraction phenomenon.

**Strength:** Our technique only requires adding a few extra components such as a grating, and a collimating lens to the conventional endoscopic head. It is easy to implement our technique with a endoscope at a low cost and provides a precise distance measurement.

**Competing Products:** Some major players in the global endoscopy equipment market include Ethicon, Inc. (U.S.), Olympus Corporation (Japan), Fujifilm Holding Corporation (Japan), Boston Scientific Corporation (U.S.), Pentax Medical Corporation (Japan), Stryker Corporation (U.S.), KARL STORZ GmbH (Germany), Smith & Nephew plc (U.K.), Medtronic plc (Ireland), Richard Wolf GmbH (Germany), CONMED Corporation (U.S.), and Cook Medical Incorporated (U.S.)

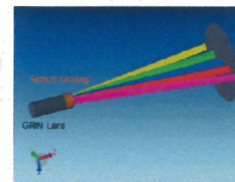
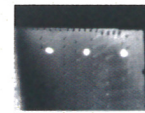
**Intellectual Properties:** Mitcorp. Inc is evaluating our current provisional US patent, and plans to further apply official US patent

### Contact (do not need to fill out):

Center for Industry-Academia Cooperation, NTU

Tel: 02-3366-9945, E-mail: [ntuciac@ntu.edu.tw](mailto:ntuciac@ntu.edu.tw)

ZEMAX



- Laser Diode wavelength: 630nm
- GRIN Lens: Ø1.8 mm, 0.23 Pitch, 630 nm Design Wavelength, Uncoated
- Grating: Ronchi Grating (120lp/mm)

This information herein is intended for potential license of NTU technology only. Other usage of all or portion of this information in whatever form or means is strictly prohibited. Kindly contact us and we will help to achieve your goal the best we can.