**INFONET business trip report**

**1. Personal information.**

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| name | Woong-Bi Lee |
| department/degree & class number  | School of electrical engineering and computer science/ Ph.D.  |
| country & institution | USA, SPIE |
| period | 2017. 01. 27 ~ 2017. 02. 03 |
| purpose | To attend SPIE Photonics West conference |

**2. The contents of business performance.**

 I attend the SPIE Photonics West conference as a second author of the paper titled as “A Method of incident angle estimation for high resolution spectral recovery in filter-array-based spectrometers”. I also attend the SPIE Photonics West exhibitions for recent commercial spectrometers and hyperspectral imaging and major components of them such as gratings, optical filters, and so on.

**3. Related research contents acquired from business performance. (If there are materials, please attach them)**

 1) Evaluation of computational endomicroscopy architectures for minimally-invasive optical biopsy

- Recently, fiber bundle is used for endomicroscopy. Higher fiber density is needed for high resolution. In this study, the idea of compressed sensing is applied to perform fiber bundle based imaging with more resolvable points than individual fibers within the bundle. By acquiring multiple images for random mask patterns, the object image can be efficiently reconstructed by solving the inverse problem.

2) LiFi: transforming fibre into wireless (Speaker: Harald Haas)

 - In future 5th communications, millimeter communications which have a frequency around 30 Ghz will be used. However, according to Friis equation, additional path loss is about 26 dB from 3 Ghz to 60 Ghz. Beamforming for additional gain is used but is very complex to implement. It is expected that 80 billion devices will be connected to the internet by 2024. With a development of solar cell and LED technologies, communicating with light will be feasible in near future world. For more information, read “What is LiFi”, JLT 34(6), Haas et al.

3) Projectors using DMD

 - Calibration for 3D imaging with a single-pixel camera is introduced. From the concept of single-pixel camera, different coded aperture is used by Hadamard sequence for optimal SNR.

4) Using Microsoft Kinect, volume measurement of leg is possible.

**4. In respect of the effects in my own future research direction, obtained contents from business performance.**

 - After discussion with Dr. Kim Soogeun, the necessity of hyperspectral analysis in endoscope is motivated. During the endoscope, simple surgery is often performed with observation by eyes of operators without any component analysis. Sometimes, the tumor becomes negative during the surgery. Thus, hyperspectral analysis is needed before any surgery.

**5. Seen and felt parts from business performance.**

 - SPIE conference, especially Photonics West is very huge and includes a wide variety of areas such as optics, bios, exhibitions, and so on. This conference is good in terms of making a connection with other guys who are studying similar fields and state-of-the-art trends

 date : 2017. 2. 6

name : Woongbi Lee