

## Resolution Limit of Spectrometers has been Overcome Now!

### Making Spectrometers Smarter!

When it comes to modern miniature spectrometers, resolution is everything. At INFONET Labs, GIST, KOREA, Professor Heung-No Lee and his research team J. Oliver, Woong-Bi Lee, and Sang-Jun Park has been able to develop a new digital signal processing technique with which they can improve the resolution limit of a spectrometer multiple times, much beyond the conventional limit. Their finding, which will be published in February 2012 in a highly referred top journal in Optics, Optics Express, is now available for a wide spectrum of applications in industries and academia.

Spectrometers, especially handheld ones, are key instruments in the field of Optics for the assessment of lamps, in Chemistry for analysis of chemicals, in Ocean engineering for oil-spill identification, etc. A spectrometer provides a graph or “spectrum” which reveals fine/precise information about the object under study. The spectrometer’s ability to discern fine details of the object being observed is called resolution. Thus, the resolution of a spectrometer specifies how fine in details the spectrometer can tell about the object. Therefore, improving resolution has been a laboratory curiosity for more than several decades.

Recently, the research team led by Prof. Lee has revealed a new prototype to face the challenges of the modern spectrometer industry and the demanding market. This team shows how to make better use of existing spectrometers--not by inventing new hardware—but by attaching a small piece of inexpensive software to them. They demonstrate, in their research finding, that their new-generation instrument surpasses the existing spectrometers in terms of resolution improvement beyond the conventional limit believed to be unbreakable for the past several decades. They claim that their invention will be a boost to the demanding spectrometer industry. Prof. Lee’s team is working on several applications of this newly devised signal processing technology, including improving resolution of lenses, spectroscopes, and ultra-sound imaging systems. For further details, one can contact Prof. Lee at [heungno@gist.ac.kr](mailto:heungno@gist.ac.kr) or feel free to call him at +82-10-4946-4710.

Their research work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korean government (MEST) (Do-Yak Research Program, N0. 2011-0016496).