



## Prof. Kim Taegeun

(CUBIXEL Co., Ltd. and Sejong Univ., Rep. of  
Korea)



---

### Education

Virginia Tech. Electrical Eng. Ph.D. (1998.01.01 ~ 2000. 07. 31)

Virginia Tech. Electrical Eng. M.S. (1996.08.01 ~ 1997. 12. 31)

Kyung Hee University Electronics Eng. B.E.(1991.03.01 ~ 1996.02.28)

### Career

CEO, CUBIXEL Co., Ltd. (2016.09.01 ~ Present)

Professor, Sejong University (2001.03.01 ~ Present)

National R&D Program Director, Ministry of Culture, Sports and Tourism (2012.07.01 ~ 2013.06.30)

Researcher, Samsung Advanced Institute of Technology(2000.08.01 ~ 2000.12.31)



## Recent progress of display and semiconductor inspection using FSH (flying-over scanning holography)

*Taegeun Kim*

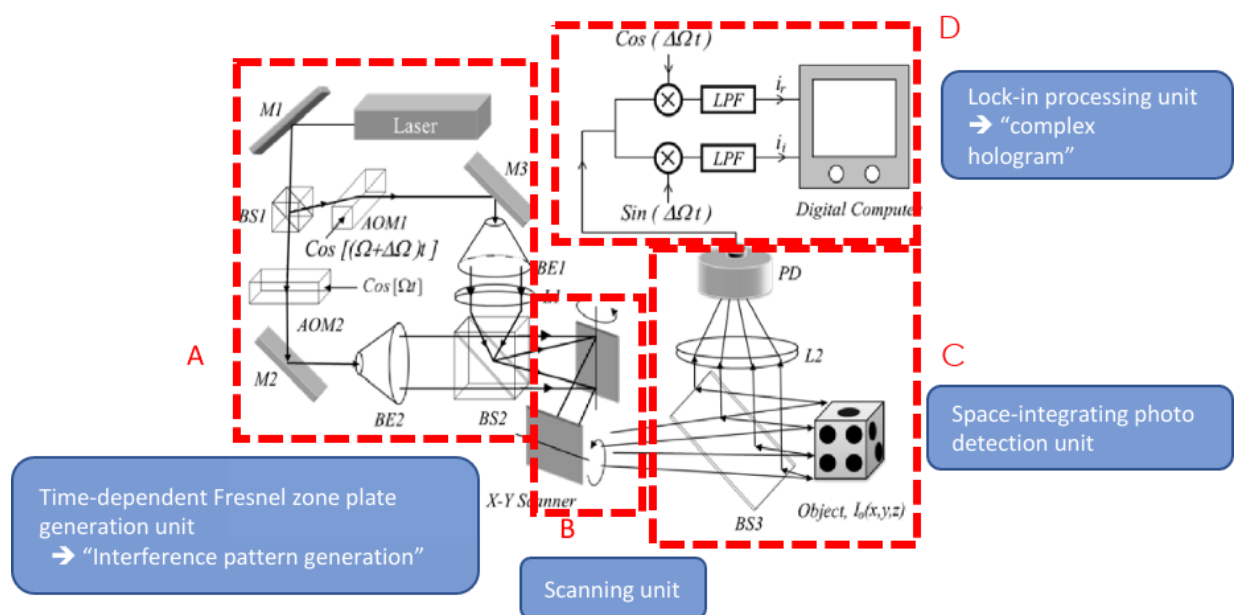
**Cubixel Co. Ltd., Seoul, Rep. of Korea**

Tel.: 82-2-3409-3392, E-mail: [takim@cubixel.co.kr](mailto:takim@cubixel.co.kr)

**Dept. of Electrical Eng., Sejong Univ., Seoul, Rep of Korea**

Recently, FSH-based display glass inspection equipment has been introduced to mass production lines, where inspections are now being carried out. This is believed to be the first instance of mass production inspection using holography technology in industrial mass production lines since its invention by Dennis Gabor in 1947. In this presentation, we will review the current status of display and semiconductor inspections using FSH and discuss the what different features of FSH have made mass production inspections on actual production lines possible. Additionally, we will address the recent progress in advanced packaging inspection and the potential applications of this technology in future industrial inspections.

As shown in Figure 1, FSH is a single pixel imaging system based on two-pupil heterodyne detection, characterized by its robustness to vibrations, high dynamic range, and high sensitivity, allowing for the acquisition of the object's hologram without speckle noise [1,2]. Utilizing a highly directional laser beam, it is possible to capture holographic information from the object without speckle noise, which enables imaging of the lower surface of objects with a width less than 10 microns and a depth greater than 100 microns, with a high aspect ratio. A distinctive feature of FSH, compared to conventional imaging systems, is its ability to eliminate mirror reflections from interfaces like glass or mirrors, making it particularly effective in detecting particles, scratches, and defects on or within polished surfaces such as glass. Furthermore, as holographic information is captured in one shot, it enables ultra-fast 3D inspection with microscopic resolution within the millimeter range.



**Fig. 1. Flying-over scanning holography**



## References

1. Y.S. Kim and et.al. Optics Express Vol. 21, Issue 7, pp. 8183-8189 (2013)
2. G. Indebetouw and et.al., Journal of the Optical Society of America A Vol. 17, Issue 3, pp. 380-390 (2000)