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# P12-29 Development of a bioinspired polarized skylight based “navigation sense” for humans

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Our presentation will discuss the development of a bioinspired polarized light based MEMS navigation device to provide “navigational sense”” neurochip for disable people. This neurochip is built in miniaturized Micro-electromechanical system (MEMS) technology. Disable people such as Alzheimer patient that equipped with this additional navigational sense could navigate without being dependent on GPS technology. The principle of this neurochip is polarization navigation sensor that are inspired by the insects. In biology, insects like desert ants could navigate a hundred meters away from their hive by using their tiny brain without assistant from GPS. Insects have special organ and brain which is analyzing the polarized skylight pattern to be used as an information cues for their navigation. The bioinspiration of this desert ants into a polarized skylight sensor is invented by Lambrinos and co-workers (and developed further by Chu and co-workers and Sarkar et al.). The navigation sensor developed in previous work is implemented for mobile robot application. To be applied for the human application, the device size, key component, material and power consumption become very important. To be implemented in the human, the small size device is required to avoid the load to

the human. The existing polarized skylight based navigation sensor has large size electronic components such as photodiodes, polarizers, blue transmitting filters and log ratio amplifiers, and additionally needs a computer as controller. Miniaturization and integration of these existing devices need to be performed through MEMS. To be placed or implanted in the human body, the device should be constructed using the biocompatible material such as Polydimethyloxane (PDMS). The existing device that uses the silicon based material has high performance in receiving and transmitting the signal. As compare to the existing one, using the PDMS may become the question mark. This question would initiates scientists in respective discipline to formulate the suitable material that could give the high performance and high sensitivity without giving hazardous to the human body. The development of a small MEMS device represents an emerging future area of growth in the field of advanced materials science and engineering.