

Photo	Speaker	Hirotsugu Okuno
	Talk Title	A wearable phosphene vision simulator for cortical visual prosthesis
	Institution	Osaka University
	Department	Graduate school of engineering
	E-mail	h-okuno@eei.eng.osaka-u.ac.jp
	Webpage	

1. Tentative Abstract

Electrical stimulation delivered to the visual cortex evokes spot-like visual perceptions of light, called phosphenes. Artificial prosthetic vision is based on the concept that patterns of phosphenes can be used to convey visual information to blind patients. In this talk, I will introduce a wearable phosphene image generator that was developed to show simulated phosphene images evoked by electrical stimulation to a freely moving subject. The phosphene image generator is composed of a silicon retina, a field-programmable gate array, a single board computer, and a head-mounted display. Examining phosphene images generated by the generator could help understanding what level of vision can be restored to blind patients employing electrical stimuli, as well as designing an appropriate prosthetic system.

2. Brief Biography

Hirotsugu Okuno received the B.S. (in 2001) and the M.S. (in 2003) degrees in electronic engineering from Osaka University, Osaka, Japan. After he worked for Kansai Electric Power, Osaka, Japan, he received the Ph.D degree in electrical, electronic and information engineering from Osaka University, in 2008. He is currently an Assistant Professor in the Division of Electrical, Electronic and Information Engineering, Osaka University. His research interests

include visual information processing in biological systems and their applications to robotics and visual prosthesis.

3. List of Representative Publications

H. Okuno, J. Hasegawa, T. Sanada, and T. Yagi, "Real-Time Emulator for Reproducing Graded Potentials in Vertebrate Retina," *IEEE Transactions on biomedical circuits and systems*, vol. 9, pp. 284-295, 2015.

T. Kawasetsu, R. Ishida, T. Sanada, and H. Okuno, "A hardware system for emulating the early vision utilizing a silicon retina and SpiNNaker chips," in *Proc. of the IEEE Biomedical Circuits and Systems Conference 2014*, pp. 552-555, 2014.

H. Okuno and T. Yagi, "Image sensor system with bio-inspired efficient coding and adaptation," *IEEE Transactions on biomedical circuits and systems*, vol. 6, pp. 375-384, 2012.

H. Okuno, T. Fehervari, M. Matsuoka, S. Kameda, and T. Yagi, "Portable phosphene image generator simulating cortical visual prosthesis," in *Proc. of the IEEE Biomedical Circuits and Systems Conference 2012*, pp. 188-191, 2012.

H. Okuno and T. Yagi, "A mixed analog-digital vision sensor for detecting objects approaching on a collision course," *Robotics and Autonomous Systems*, vol. 57, pp. 508-516, 2009.

H. Okuno and T. Yagi, "A visually guided collision warning system with a neuromorphic architecture," *Neural Networks*, vol. 21, pp. 1431-1438, 2008.