SESSION 19 – TAPA III
Sensor Microsystems

Friday, June 18, 3:25 p.m.
Chairpersons: T. Blalock, University of Virginia
M. Ikeda, University of Tokyo

19.1 — 3:25 p.m.

A Pixel-Level Color Image Sensor With Efficient Ambient Light Suppression Using Modulated RGB Flashlight and Application to TOF Range Finding, Y. Oike, M. Ikeda and K. Asada, University of Tokyo, Tokyo, Japan

We present a pixel-level color image sensor with efficient ambient light suppression using a modulated RGB flashlight to support a recognition system. Bidirectional photo integrators realize in-pixel demodulation of a projected flashlight with suppressing an ambient light at short intervals during exposure time to avoid saturation from ambient illumination. Every pixel has a capability of depth and color capture. A prototype chip has been designed using 0.35 um CMOS process and successfully tested.

19.2 — 3:50 p.m.

A Micro-Sized Photo Detectable Stimulator Array for Retinal Prosthesis by Distributed Sensor Network Approach, A. Uehara, Y.-L. Pan, K. Kagawa, T. Tokuda, J. Ohta and M. Nunoshita, Nara Institute of Science and Technology, Nara, Japan

In this paper, we propose a flexible retinal prosthesis device by a distributed sensor network approach. The novel point of the proposed device is that the flexible stimulator consists of micro-sized CMOS devices linked in network. The micro-sized CMOS device consists of single-wire serial interface, a photodetector, an image processing circuit, and a current stimulator. The device is fabricated in a 0.6um CMOS technology. The function of the prototype device is tested successfully.

19.3 — 4:15 p.m.

CMOS Monolithic Atomic Force Microscope, D. Barrettino, S. Hafizovic, T. Volden, J. Sedivy, K. Kirstein, A. Hierlemann and H. Baltes, Swiss Federal Institute of Technology, Zurich, Switzerland

A single-chip atomic force microscope fabricated in industrial CMOS-technology with post-CMOS micromachining is presented, which comprises an array of twelve cantilevers with integrated deflection sensors and actuators, digital proportional-integral-derivative (PID) deflection controllers, amplification stages, offset compensation circuitry, digital filters for sensor-actuator coupling compensation, A/D and D/A converters, dedicated serial lines (one percantilever) for fast data transfer, and an I2C serial interface for chip programming. Parallel scanning imaging evidenced a height resolution better than 10nm

19.4 — 4:40 p.m.

A New Input Switching Scheme for a Capacitive Micro-G Accelerometer, B.V. Amini, S. Pourkamali, M. Zaman and F. Ayazi, Georgia Institute of Technology, Atlanta, GA

The design and implementation of a new input switching capacitive microaccelerometer interface circuit is presented. The accelerometers were fabricated on 50um thick silicon-on-insulator (SOI) substrates using a two-mask, dry-release process and were interfaced with a new architecture switched-capacitor integrated circuit in a 0.25um N-well CMOS process with a chip size of 0.65mm2. The measured sensitivity is 0.45V/g and the output noise floor is 4.4ug/rtHz at 150Hz. The total power consumption is 5mW.

19.5 — 5:05 p.m.

A 2.2-mm^2 CMOS Bioassay Chip and Wireless Interface, T.S. Aytur, T. Ishikawa and B.E. Boser, Berkeley Sensor and Actuator Center, Berkeley, CA

A biological sensor and wireless interface have been implemented in a 0.25-um RF CMOS process. The device provides a bioassay platform based on an array of CMOS Hall-Effect sensors. The 2.2-mm2 chip is powered and interrogated by a wireless link and requires no additional packaging for use in biological fluids.