Instytut Technologii Elektronowej
Al. Lotników 32/46, 02-668 Warszawa
Division of Silicon Microsystem and Nanostructure Technology

Nano scale materials and sensors and microsystems for medical implants improving health and quality of life
Healthy Aims IST-2002-1-001837

COORDINATOR

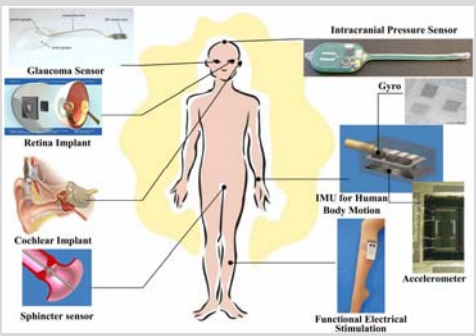
Diana Hodgins, European Technology for Business Ltd., Codicote, UK

PARTICIPANTS

- European Technology for Business Ltd, UK
- Assuta Medical Centers Ltd, Israel
- Campus Micro Technology, Germany
- Cochlear Europe Ltd, Belgium
- CEA/Liten, France
- Ecole Polytechnique Federal de Lausanne, Switzerland
- DINAMIC Technology Innovation Centre, Spain
- Finetech Medical Ltd, FTM, UK
- HSG-IMIT, Germany
- IIP-Technologies GmbH, IIP, Germany
- Instytut Technologii Elektronowej, Warszawa, POLAND
- Interuniversitaire Micro-Elektronica Centrum vzw, Belgium
- Medical University of Graz, Austria
- Mediplus Ltd, Mediplus, UK
- microTEC Gesellschaft fur Microtechnologie mbH, Germany
- NEXUS, France
- North Bristol NHS Trust, UK
- Queen Mary and Westfield College University of London, UK
- Saft, France
- Salisbury District Hospital, UK
- University College London, UK
- University of Freiburg, Germany
- University of Newcastle, UK
- University of Salford, UK
- Uniwersytet Jagieloński, Kraków, Poland
- Zarlink Semiconductor Ltd, UK

PROJECT DESCRIPTION

The partners of the Healthy Aims consortium will develop a range of medical products to help the ageing population and those with disabilities. The medical implants and ambulatory measurement systems that will be developed in this project include: Cochlear Implant, Retina Implant and Glaucoma Sensor, Functional Electrical Stimulation for upper and lower limbs, Sphincter Sensor, Implantable Pressure Sensor to monitor intracranial pressure, Inertial Measurement Unit for human body motion. Technologies of fabrication of microsystems necessary for these medical devices operation will be developed. Also methods of communication between implants placed in the body and external control/sensing systems will be developed.



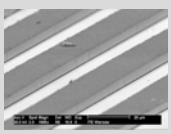
OUR ROLE IN THE PROJECT

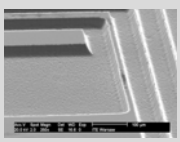
Within the frame of microelectrode workpackage IET will provide 2D and 3D microelectrodes for partners developing medical products. Our activity is focusing on manufacturing of the microelectrodes and needles used for cochlear and retina implants. We are also developing a piezoresistive sensing element for the Glaucoma Sensor.

RESULTS

Our activity mostly concerned: designing of the microelectrodes, computer modeling and electro-mechanical simulations of the structures, development of the technology required for electrodeposition of thick Pt tracks, deep plasma etching of biocompatible silicone rubber and fabrication of the test structures for cochlear and retina implant.

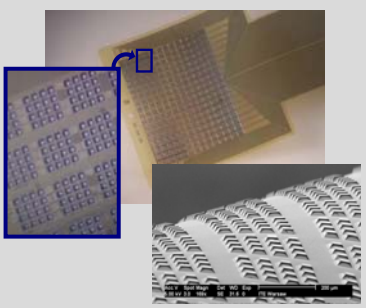
The microelectrode developed for retina implant consists of a planar polymer foil integrated with circuit paths, metal electrodes, and bonding pads. This structure serves as both the stimulation interface and the multilayer flexible circuit board for assembling of electronic components. Glaucoma Sensor is based on a soft contact lens in which a strain gauge sensor allows to evaluate the deformations of the eyeball due to variations of the intraocular pressure.

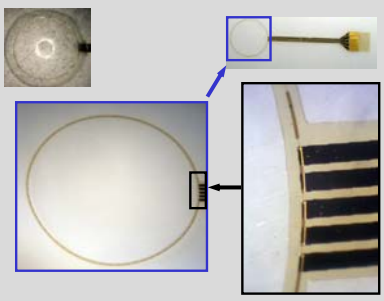

electrodeposited platinum tracks


plasma etched silicone rubber


microelectrodes for cochlear implant


modiolus microelectrode


microelectrode for retina implant


piezoresistive strain gauge for glaucoma sensor

Contact person: Krzysztof Domański
phone: +48 22 7165992, kdoman@ite.waw.pl