MICROBiome-based biomarkers to PREDICT decompensation of liver cirrhosis and treatment response and printed electronics research infrastructure

The healthcare big data including medical history, Physician reports, prescription, parents and family historical diseases, laboratories, and scan reports can help in disease detection and prediction process. The discussion also presents how current technologies can be used to employ streaming data and biosensors for healthcare applications. Big medical data analysis is a big area of research, and the discussion shows some advanced analysis impact on disease detection and predictions.

Biosensors are defined as analytical devices incorporating a biological material, a biologically derived material or a biomimic intimately associated with or integrated within a physicochemical transducer or transducing microsystem, which may be optical, electrochemical, thermometric, piezoelectric, magnetic or micromechanical. Biosensors & Bioelectronics is the principal international journal devoted to research, design, development and application of biosensors and bioelectronics. It is an interdisciplinary journal serving professionals with an interest in the exploitation of biological materials and designs in novel diagnostic and electronic devices including sensors, DNA chips, electronic noses, lab-on-a-chip and μ-TAS. Biosensors usually yield a digital electronic signal which is proportional to the concentration of a specific analyte or group of analytes. While the signal may in principle be continuous, devices can be configured to yield single measurements to meet specific market requirements. Examples of Biosensors include immunosensors, enzyme-based biosensors, organism- and whole cell-based biosensors. They have been applied to a wide variety of analytical problems including uses in medicine, biomedical research, drug discovery, the environment, food, process industries, security and defence. The design and study of molecular and supramolecular structures with molecular biorecognition and biomimetic properties for use in analytical devices is also included within the scope of the journal. Here the focus is on the complementary intersection between molecular recognition, nanotechnology, molecular imprinting and supramolecular chemistry to improve the analytical performance and robustness of devices.

The emerging field of Bioelectronics seeks to exploit biology in conjunction with electronics in a wider context encompassing, for example, biological fuel cells, bionics and biomaterials for information processing, information storage, electronic components and actuators. A key aspect is the interface between biological materials and micro- and nano-electronics.

Using the integration of microfluidics, LOC micro- and nanotechnologies, electrochemical and optical detection, and electronic devices as the convergence of various knowledge areas, this paper describes the state of the art in paper-based analytical devices (PADs). The paper design/architecture plays an important role in improving the performance of sensor devices. The discussion is based primarily on PADs as the next generation of paper-based (bio)sensors. We provide data about the scientific publication ranking of PADs, which illustrates their growth as experimental research topics in recent years. In addition, an analysis of the simultaneous evolution of PADs in academic lab research and industrial commercialization highlighting the parallelism of the technological transfer from academia to industry is displayed. A general overview of the market behaviour, the leading industries in the sector and their commercialized devices is given. Finally, personal opinions of the authors about future perspectives and tendencies in the design and fabrication technology of PADs are disclosed.

1. Introducing students and participants to the range of research methods, analytical approaches, and emerging technology
2. Deepening students' and participants' understanding of principles of electrochemical and biomedical data, sensing technology, and engineering devices
3. Helping students and participants learn how to develop good questions and choose methods to tackle research challenges.
4. Encouraging the development of critical thinking, experimental observation, and literature review skills.
5. It also opens opportunities to collaborate with Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC, BIST, Campus UAB, 08193, Bellaterra, Barcelona and ICREA, Institució Catalana de Recerca I Estudis Avançats, Barcelona, Spain. This will be beneficial for our PSU. We expect to have a joint journal publication resulting from the collaboration.