(DEEMED TO BE UNIVERSITY)

CATEGORY 1 UNIVERSITY BY MHRD, Govt. of India

KL ACCREDITED BY NAAC WITH A++ GRADE

nirf 2024 NATIONAL INSTITUTIONAL RANKING FRAMEWORK RANKED 22 AMONG ALL UNIVERSITIES

45 YEARS OF EDUCATIONAL LEADERSHIP

DEPARTMENT OF CHEMISTRY

CENTER FOR BIOSESING RESEARCH

CENTER FOR BIOSESING RESEARCH

About the Research Centre

The Centre for Biosensing Research focuses on developing cutting-edge sensor technologies for healthcare, environmental monitoring, and industrial applications. Our research emphasizes fabricating nanomaterial-based biosensors and immunosensors for detecting disease biomarkers and toxins. With state-of-the-art facilities and expertise in electrochemical sensing, we drive innovation in early disease diagnostics, including Vitamin D deficiency and cancer biomarkers. Collaborations with academic and industry partners ensure impactful solutions to global challenges. Join us to explore next generation biosensing advancements.

Vision:

To be a global leader in biosensing research, advancing innovative sensor technologies for improved healthcare, environmental sustainability, and industrial applications. We aim to drive impactful discoveries, foster interdisciplinary collaborations, and translate research into real-world solutions for a better future.

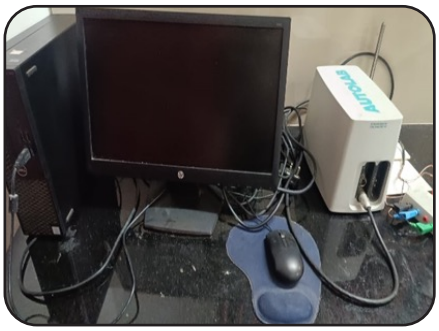
Mission

To pioneer the development of cutting-edge biosensing technologies that address critical challenges in health, environment, and industry. We are committed to fostering innovation, promoting interdisciplinary research, and delivering impactful solutions through collaboration, education, and sustainable practices.

Key Research Areas

- Electrochemical Sensors and Biosensors: Development of advanced sensors for detecting disease biomarkers, environmental pollutants, and toxins.
- Nanomaterial Fabrication: Designing and synthesizing nanomaterials for high-performance sensing applications.
- Point-of-Care Diagnostics: Creating portable and affordable diagnostic devices for early disease detection.
- Immunosensors: Fabrication of label-free sensors for detecting proteins, pathogens, and biomarkers.
  Environmental Monitoring: Developing sensors for tracking pollutants and ensuring ecological sustainability.
- Energy Applications: Exploring electrocatalysts for fuel cells and renewable energy systems.

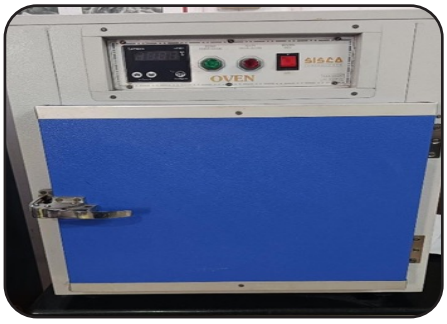
EQUIPMENT DETAILS/ PHOTOS



Electrochemical Workstation

Double Distilled Water

UV-Lamp



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OUR TEAM

Dr. Pradeep Kumar Brahman
Associate Professor
drpkt@kluniversity.in

Dr. Tummala Anuha
Assistant Professor
tanusha@kluniversity.in

RESEARCH TEAM

COLLABORATORS

Prof. Alessandra Bonanni
Division of Chemistry and Biological Chemistry, NTU-Singapore

Dr. Mihaiela Stuparu
NTU-Singapore

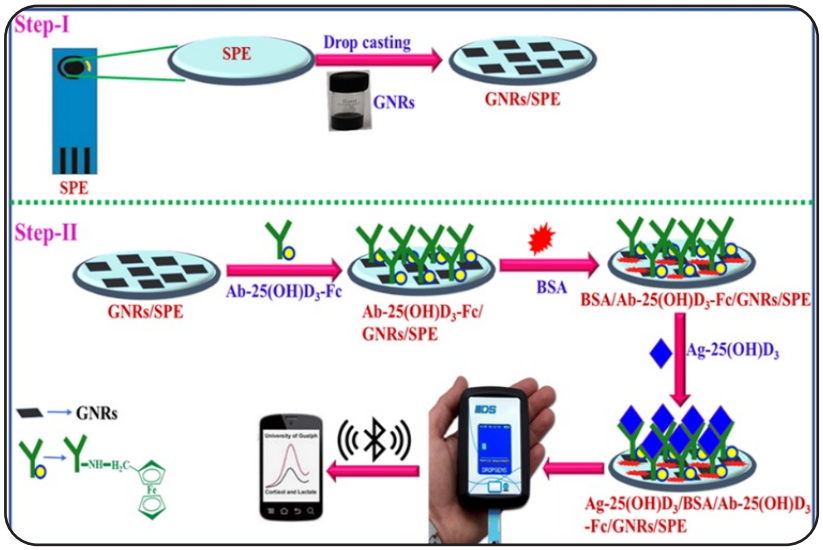
Prof. Rabeay Y.A. Hassan,
Biosensors Research Laboratory, Zewail City of Science and Technology 6Th October City, Giza, 12578, Egypt

Scholars Information

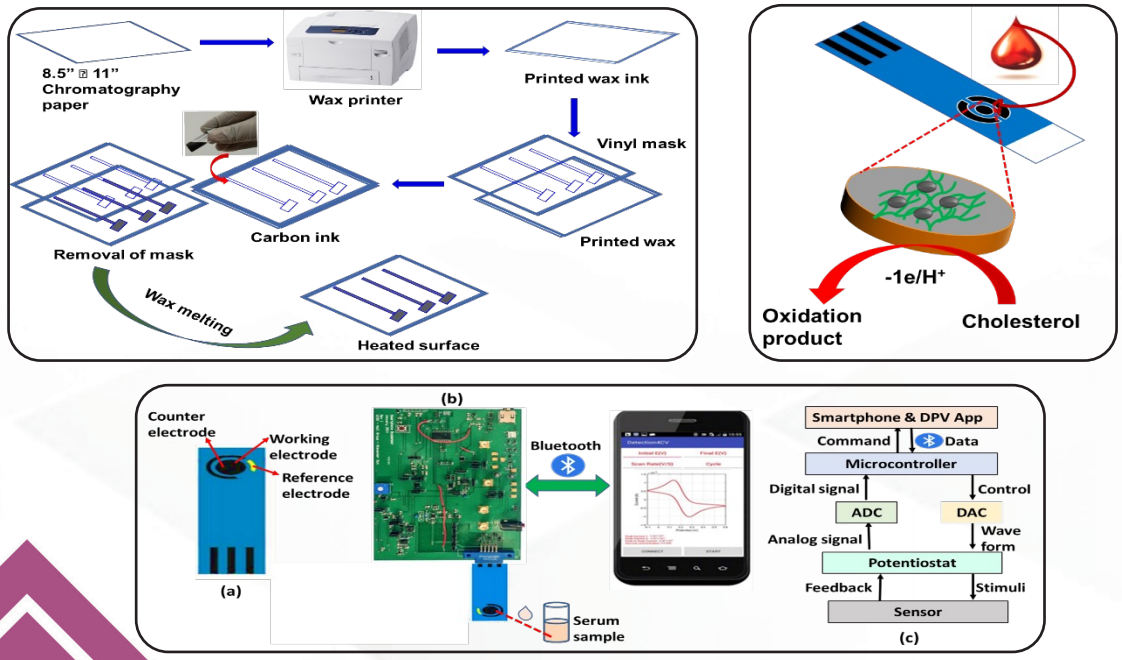
- Ph.D.'s Awarded – 3. Members (Full Time)
- Ph.D. ongoing- 3. Members (Full Time)

HIGHLIGHTS OF RESEARCH CENTRE WORKS

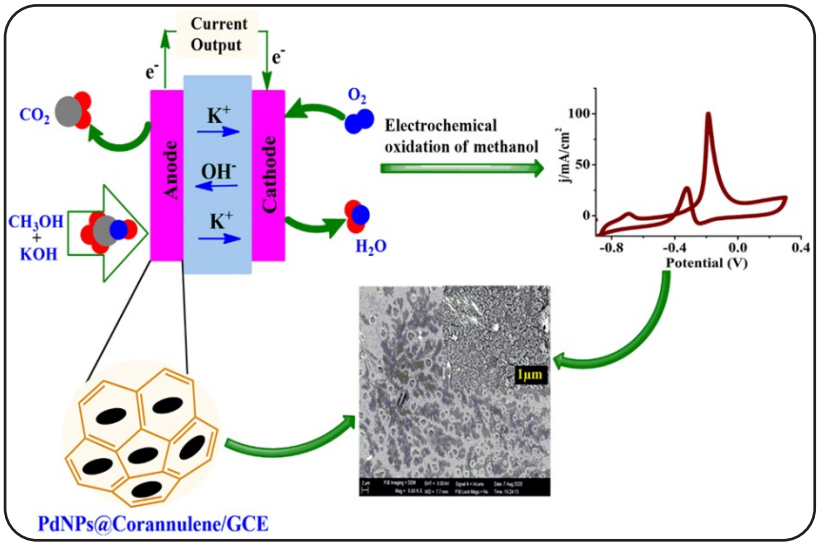
Development of Vitamin D paper Strips and diagnostic device



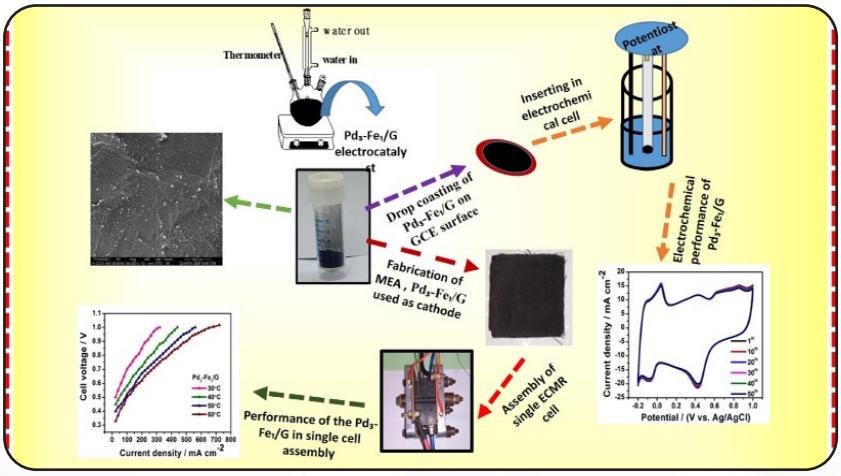
Development of POC for Cholesterol



Corannulene as novel support material for direct oxidation of methanol in fuel cell



Development of Corannulene based electrocatalysts for HER and ORR



STARTUP COMPANY

Name: Chemsens Technologies Private Limited
Directors: Dr. B. Pradeep Kumar
Dr. T. Anusha
Date of Incorporation: 16/09/2021

Dedication, Trust, Innovation

Objectives:

- To research, design, provide, manufacture, import, export, develop reliable and affordable sensing technologies and devices for the detection and quantification of chemical and biological molecules of interest in health care and to provide solutions for a variety of clinical and health problems such as testing for vitamin D deficiency, prostate cancer, and other diseases.

- To carry out ancillary, incidental, complementary and other necessary activities to achieve above - mentioned objects.

PUBLICATION ANALYTICS – INCLUDING SDGS

13 Documents | 3 Documents | 9 Documents

PROJECTS – SPONSORED, AGENCIES

Projects Ongoing:

Year of Funding	Sponsoring Agency	Title of the Project	Grant Amount (Lakhs)
2021	DST	Development and fabrication of electrochemical nanostructured immunosensing strips for Point-of-Care biomedical testing of vitamin D deficiency	65
2021	DST	Development of POC for Cholesterol	30
2024	MSME	Design and development of affordable biomedical device for vitamin D testing	15

Completed Projects:

Year of Funding	Sponsoring Agency	Title of the Project	Grant Amount (Lakhs)
2014	SERB	Development of Electrochemical Immunosensor as a Prostate cancer Diagnostic Tool	20
2015	UGC	An Electrochemical Immunosensing Platform for the Early Detection of Prostate Cance	15
2020	DST	Development and fabrication of electrochemical nanostructured immunosensing strips for Point-of-Care biomedical testing of vitamin D deficiency	30

COLLABORATIVE PUBLICATIONS

- Kalli Sai Bhavani, Tummal Anusha, Mihaiela C. Stuparu, Pradeep Kumar Brahman, Synthesis and characterization of palladium nanoparticles-corannulene nanocomposite: An anode electrocatalyst for direct oxidation of methanol in alkaline medium, Journal of Electroanalytical Chemistry, 900 (2021) 115654. IF: 4.5

- Tummal Anusha, Kalli Sai Bhavani, J. V. Shankumkh Kumar, Pradeep Kumar Brahman, Rabeay Y. A. Hassan, Fabrication of electrochemical immunosensor based on GCN-(β)CD/Au nanocomposite for the monitoring of vitamin D deficiency, Bioelectrochemistry, 141 (2022) 107935. IF. 5.3.

- Tummala Anusha, Kalli Sai Bhavani, J.V. Shanmukha Kumar, Alessandra Bonanni, Pradeep Kumar Brahman, Fabrication of handmade paper sensor based on silver-cobalt doped copolymer-ionic liquid composite for monitoring of vitamin D3 level in real samples, Microchemical Journal 161 (2021) 105789. IF. 4.821

PATENTS

- LABEL FREE ELECTROCHEMICAL PAPER BASED IMMUNOSENSOR FOR THE DIAGNOSIS OF VITAMIN D DEFICIENCY, Grant Patent number: 502020, Date of Grant: 23/01/2024

- NOVEL NANOSTRUCTURED CATHODE ELECTRODE FOR HYDROGEN PRODUCTION FROM METHANOL REFORMATION". Application no.202241035993, Date of publication, 01/07/2022.

ACHIEVEMENTS (AWARDS)

- Fast Track Young Scientist Awarded by Department of Science & Technology (DST), Govt. of India.
- UGC-Research Award for Teachers.
- Awarded Best Poster Award in 104th Indian Science Congress 2017.
- APAS Young Scientist Award 2017
- ICC-Young Scientist Award 2017
- Best Researcher Award by K L University, Guntur, Andhra Pradesh

TOP 10 PUBLICATIONS

- Nagalakshmi Pennada, Subhakaran Singh Rajaputra, Pradeep Kumar Brahman, Development of ternary Pd-Co-Ir metal nanoparticles decorated on graphene-CNTs hybrid support: An efficient electrocatalyst for hydrogen production from methanol reformation, Electrochimica Acta 432 (2022) 141229. IF: 7.3

- Kalli Sai Bhavani, Tummala Anusha, Mihaiela C. Stuparu, Pradeep Kumar Brahman, Electrochemical synthesis of PdNPs@MnO2-PPy nanocomposite and its electrocatalytic application towards glycerol oxidation, Electrochimica Acta, 399 (2021) 139394 IF: 6.9.

- Lakkavarapu Suresh, Bondili J.S., Pradeep Kumar Brahman, Development of proof of concept for prostate cancer detection: An electrochemical immunosensor based on fullerene-C60 and copper nanoparticles composite film as diagnostic tool, Materials Today Chemistry, 16 (2020) 100257 IF: 8.3

- K. Sai Bhavani, T. Anusha, Pradeep Kumar Brahman, Platinum nanoparticles decorated on graphitic carbon nitride-ZIF-67 composite support: An electrocatalyst for the oxidation of butanol in fuel cell applications, International Journal of Hydrogen Energy 46 (2021) 9199-9214. IF: 7.1

- Tummala Anusha, Kalli Sai Bhavani, J. V. Shankumkha Kumar, Pradeep Kumar Brahman, Rabeay Y. A. Hassan, Fabrication of electrochemical immunosensor based on GCN-(β)-CD/Au nanocomposite for the monitoring of vitamin D deficiency, Bioelectrochemistry, 141 (2022) 107935. IF. 5.7

- Harisankar Khuntia, Kalli Sai Bhavani, Tummala Anusha, Thota Trinadh, Pradeep Kumar Brahman, Synthesis and characterization of corannulene-metal-organic framework support material for palladium catalyst: An excellent anode material for accelerated methanol oxidation, Colloids and Surfaces A: Physicochem. Eng. Aspects. 615 (2021) 126237. IF: 5.53

TOP 10 PUBLICATIONS

- K. Sai Bhavani, T. Anusha, Pradeep Kumar Brahman, Platinum nanoparticles decorated on graphitic carbon nitride-ZIF-67 composite support: An electrocatalyst for the oxidation of butanol in fuel cell applications, International Journal of Hydrogen Energy 46 (2021) 9199-9214. IF: 7.1

- Akkaraboyina Lakshmi Lavanya, K. Gowri Bala Kumari, K.R.S. Prasad, Pradeep Kumar Brahman, Development of pen-type portable electrochemical sensor based on Au-W bimetallic nanoparticles decorated graphene-chitosan nanocomposite film for the detection of nitrite in water, milk and fruit juices, Electroanalysis, 33 (2021) 1096-1106. IF: 3.5

- Tummala Anusha, Kalli Sai Bhavani, J.V. Shanmukha Kumar, Alessandra Bonanni, Pradeep Kumar Brahman, Fabrication of handmade paper sensor based on silver-cobalt doped co-polymer-ionic liquid composite for monitoring of vitamin D3 level in real samples, Microchemical Journal 161 (2021) 105789. IF. 5.3

- Thota Trinadh, Harisankar Khuntia, Tummala Anusha, Kalli Sai Bhavani, J. V. Shanmukha Kumar, Pradeep Kumar Brahman, Synthesis and characterization of nanocomposite material based on graphene quantum dots and lanthanum doped zirconia nanoparticles: An electrochemical sensing application towards flutamide in urine samples, Diamond and Related Materials 110 (2020) 108143. IF: 3.8

LIST OF PUBLICATIONS – IEEE, SCI, SCIE, WOS AND SCOPUS

- S. Kundu, S. Tabassum, R. Kumar, A perspective on sepsis pathogenesis, biomarkers and diagnosis: A concise survey. Medical devices & Sensors, (3) (2020) 4.

- A.S. Tanak, S. Muthukumar, S. Krishnan, K.L. Schully, D.V. Clark, S. Prasad, Multiplexed cytokine detection using electrochemical point-of-care sensing device towards rapid sepsis endotyping. Biosensors and Bioelectronics, (171) (2020) 112726.

- C.A. Akdis, Therapies for allergic inflammation: refining strategies to induce tolerance. Nature Medicine, 18(5) (2012) 736–749.

- T. Chan, F. Gu, Early diagnosis of sepsis using serum biomarkers. Expert Review of Molecular Diagnostics, 11(5) (2011) 487–496.

- Y. Wang, G. Ming, F. Mi, G. Pengfei, G. Chen, Combining multisite functionalized magnetic nanomaterials with interference-free SERS nanotags for multi-target sepsis biomarker detection, (1272) (2023) 341523.

- Kundu, R. Rani, A. Ahmad, K. Ajay, R. Mamta, G. Tanya, K. Rehan, S.H. Kiran, Ultrasensitive and label-free detection of prognostic and diagnostic biomarkers of sepsis on a Ag NP-laden black phosphorous-based SERS platform, (1) (2022) 449-459.

- Z. Z. Guo, Y. Hanhui, X. Ruijia, D. Jingjing, J. Cheng, L. V. Xiao, J. R. Nicole, Y. Lin, L. Xu, An ultra-sensitive electrochemical biosensor for the detection of procalcitonin in sepsis patients' serum, using a Cu-BHT-based thin film, Talanta, 268 (1) (2024) 125325.

- Russell, A.C. Ward, V. Vezza, P. Huskisson, D. Alcorn, D. P. Steenson, D. K. Corrigan, Development of a needle shaped microelectrode for electrochemical detection of the sepsis biomarker interleukin-6 (IL-6) in real time, Biosensors and Bioelectronics, (126) (2019) 806-814

- F. Battaglia, V. Baldoneschi, V. Meucci, L. Intorre, M. Minunni, S. Scarano, Detection of canine and equine procalcitonin for sepsis diagnosis in veterinary clinic by the development of novel MIP-based SPR biosensors, Talanta, (230) (2021) 122347.

LIST OF PUBLICATIONS – IEEE, SCI, SCIE, WOS AND SCOPUS

- L. L. Sun, Y. S. Leo, X. Zhou, T. I. Wong, J. Deng, Localized surface plasmon resonance-based point-of-care system for sepsis diagnosis. Materials Science for Energy Technologies, (3) (2020) 274–281.

- S. Kundu, S. Tabassum, R. Kumar, Plasmonic Point-of-Care Device for Sepsis Biomarker Detection, IEEE SENSORS JOURNAL, 21 (17) (2021) 18837 – 18846.

- G. Neha, C. Nidhi, J. Utkarsh, K.D. Sujata, S. S. Hari, R. Chandra, Ad vancement in biomarker based effective diagnosis of neonatal sepsis, Nanomedicine, and Biotechnology, 51 (1) (2023) 476–490.

- Sapna, C. Nidhi, R. Chandra, U. Jain, Molecular imprinting based electrochemical biosensor for identification of serum amyloid A (SAA), a neonatal sepsis biomarker, International Journal of Biological Macromolecules, (195) (2022) 589-597

- M.H Kim, J.H. Choi, An Update on Sepsis Biomarkers. Infection & Chemotherapy, 52(1) (2020) 1.

- V. Enrique, K. Victoria, A.M. Jankelow, J. Heredia, A. Y. Kim, T. W. Cowell, C. L. Chen, K. White, H.S. Han, B. Rashid, Electrochemical point-of-care devices for the diagnosis of sepsis, Current Opinion in Electrochemistry, (39) (2023) 101300.

- J. M. Lim, M.Y. Ryu, J.H. Kim, C.H. Cho, T.J. Park, J.P. Park, An electrochemical biosensor for detection of the sepsis-related biomarker procalcitonin. RSC Advances, 7(58) (2017) 36562–36565.

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