

# Sensors & Diagnostics

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### Cover

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## EDITORIAL

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### Introduction to 'Paper-Based Point-of-Care Diagnostics'

Daniel Citterio, Thiago R. L. C. Paixão and William Reis de Araujo



## CRITICAL REVIEW

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### Artificial intelligence (AI) in healthcare diagnosis: evidence-based recent advances and clinical implications

Jay Bhatt, Sweny Jain and Dhiraj Devidas Bhatia\*

Convolutional Neural Network (CNN)	A deep learning architecture designed for spatial data analysis, using convolutional layers to detect hierarchical features, especially effective in image-based diagnosis.
Large Language Model (LLM)	AI models trained to understand text inputs to understand, generate, and manipulate human language, supporting tasks like summarization and report generation.
Generative AI	AI systems developed for generating new content, such as text or images, by learning the underlying data distribution, including GANs and LMs.
Natural Language Processing (NLP)	AI techniques for automated understanding and generation of human language, applied to clinical notes and medical literature analysis.
Medical Imaging AI	Application of AI algorithms to analyze and interpret medical images for diagnostic support, often achieving high accuracy in tasks like anomaly detection.
Multi-modal Learning	An approach that integrates multiple data types (e.g., images, text, lab results) to enhance analysis and diagnostic accuracy.
Agentic AI	Autonomous AI systems capable of independent data interpretation and decision-making, reducing the need for direct human oversight in clinical workflows.
Artificial General Intelligence (AGI)	Hypothetical AI with the ability to comprehend and perform a various types of tasks at or above human-level competence.
Artificial Immune System (AIS)	Computational models inspired by biological immune mechanisms, used for anomaly detection and pattern recognition in biomedical informatics.



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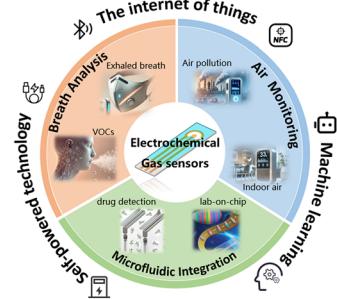
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## Advancements in smart electrochemical gas sensors: bridging IoT, self-powering, and machine learning for healthcare

Hongyang Guo, Zhuoru Huang, Xiaojing Zhang, Haoting Zhang, Jiaying Sun, Yuzi Zeng, Yanjie Hu, Yong Zhou, Hao Wan\* and Ping Wang\*

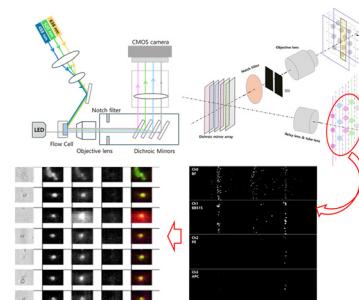


## COMMUNICATION

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## Simple and fast detection of CD4 and CD8 cells: integration of image flow system and acoustophoresis

Enjian Jin, Anna Go and Min-Ho Lee\*

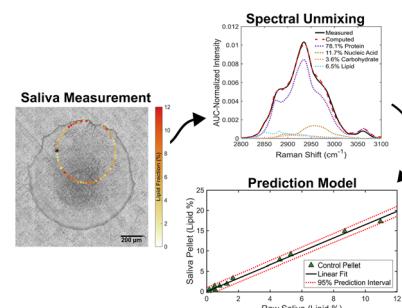


## PAPERS

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## High-wavenumber Raman spectroscopy for the detection of *Mycobacterium tuberculosis* in saliva

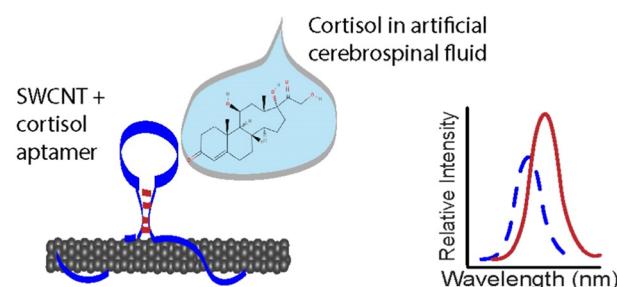
Alec B. Walter, Luke Whitehead, Amelia L. Taylor and Andrea K. Locke\*



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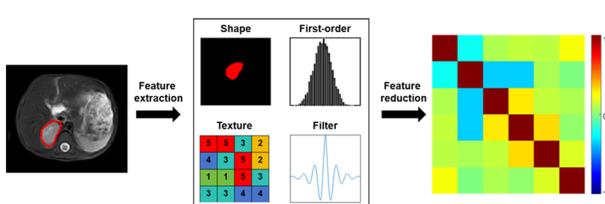
## A near-infrared fluorescent aptanosensor enables selective detection of the stress hormone cortisol in artificial cerebrospinal fluid

Jessica Kretli Zanetti, Maria Celina Stefoni, Catarina Ferraz, Amelia Ryan, Atara Israel and Ryan M. Williams\*



## PAPERS

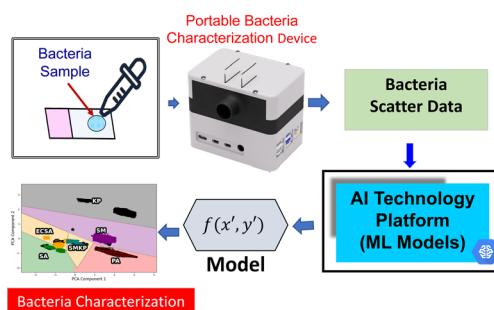
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### MRI-based radiomic signature for MYCN amplification prediction of pediatric abdominal neuroblastoma

Xuan Jia, Junjie Wen, Jiawei Liang, Xiaohui Ma, Wenqi Wang, Jinhua Wang\* and Yi Zhang\*

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### Pathogenic bacteria characterization through portable optical scatter device and machine learning

Ramana Pidaparti,\* Sanjay Oruganti, Naveen Kurra, Patrick Maffe, Everett Grizzle,\* Arnab Mondal, Rebecca Johnson, Hitesh Handa and Rao Tatavarti