



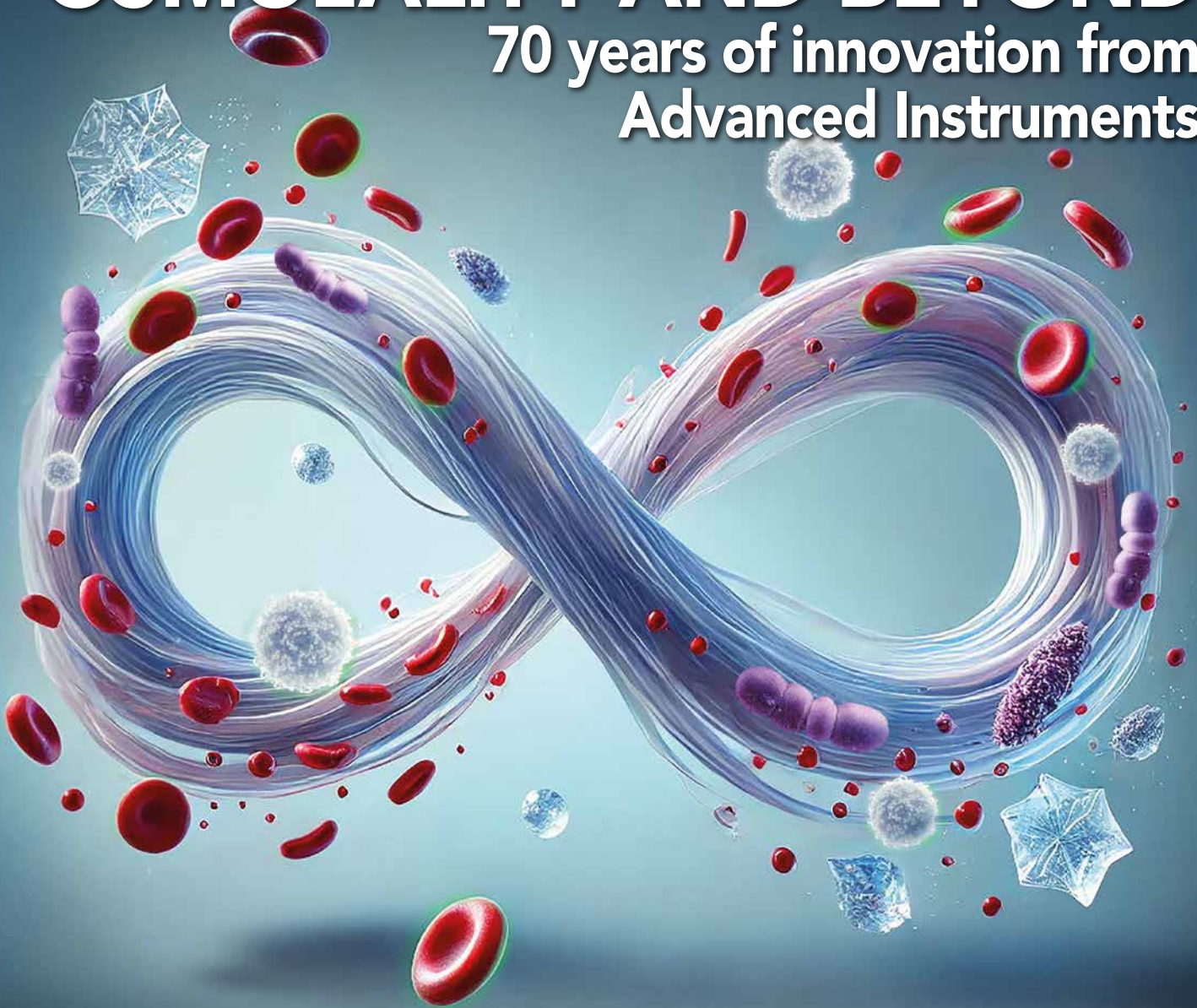
**MEETING HEALTHCARE NEEDS:
AN MSc FOR POINT-OF-CARE TESTING**

RETHINKING EMERGENCY CARDIAC CARE:
CHALLENGING THE STATUS QUO

UTILISING GENETIC RISK SCORES
TO PREDICT TYPE 1 DIABETES

OSMOLALITY AND BEYOND

70 years of innovation from
Advanced Instruments



Osmolality and beyond: delivering innovation for nearly 70 years

Building innovative solutions to common laboratory challenges has been Advanced Instruments' mission since 1955, a time when electronic automation was just beginning to be applied to laboratory methods. Throughout its 70-year history, Advanced Instruments' osmometers have helped global clinical laboratories revolutionise workflow efficiency on the chemistry bench. Over the last two decades, this mission has expanded to microbiology, haematology, and beyond.

In 1955, Bud Wiggin set out to bring advanced functionality to the clinical and dairy markets from his home's basement office and first coined the term 'osmometer'. The first products commercialised freezing point depression technology. Freezing point was a classical method for solute concentration studies in dairy testing.

Advanced Instruments helped establish the method with nephrologists, making it a staple of laboratory medicine. From there, the company has grown to be the market leader in osmolality testing, now a standard test in hospital laboratories around the world.

Since the first Advanced Instruments' osmometer, the company has committed to scrutinising clinical laboratory processes and collaborating with customers to understand the challenges that better technology and customised services can help laboratories overcome. This feedback loop is what inspires constant product development and product improvement.

Osmolality benefits

Currently, Advanced Instruments' Osmo1 Single-Sample Micro-Osmometer and OsmoPRO Multi-Sample Micro-Osmometer deliver the most user-friendly features demanded by hospital

laboratories to ensure they stay productive.

Mobo Laniyan, Laboratory Manager, Blood Sciences Biochemistry, at Cambridge University Hospitals NHS Foundation Trust is just one of many users in the NHS. He comments: "The staff love using the OsmoPRO because it is so easy

to use and allows them to plan ahead. Unlike our older equipment – where staff would have to load, then sit and wait, to complete one run after the other – the OsmoPRO allows them to 'load and go' and it completes a full batch by itself.

"From my point of view the greatest satisfaction has been seen in our



The OsmoPRO Multi-Sample Micro-Osmometer delivers the most user-friendly features demanded by hospital laboratories to ensure they stay productive.



The Anoxomat anaerobic jar system is able to quickly create optimal conditions for the growth of anaerobic, microaerophilic, and capnophilic organisms.

improved turnaround time (TAT) in our osmolality service with the biggest benefit in an improved resilience around the way testing is performed, thus ensuring maximum and efficient staff utilisation allowing them to be more productive and resourceful."

Another NHS Trust where the OsmoPRO is highly valued is Nottingham University Hospitals (NUH), where Specialist Biomedical Scientist in Clinical Chemistry, Hayden Powell has this to say: "Across our sites at Queens Medical Centre and Nottingham City Hospital, we receive approximately 450 serum and 320 urine osmolality requests on a monthly basis. Previously when analysing samples, we utilised two different osmolality instruments between the sites, and both required a manual transcription step prior to release.

"So, when the opportunity came available to replace our current osmometers, I gladly volunteered to take part in the validation and verification (V&V) of the new OsmoPRO from Advanced Instruments. To do this, I was tasked with calibrating the instrument ready for use, collecting trueness and precision data for the V&V, and creating a plethora of new documentation. Since its introduction,

I and many others within the laboratory would agree that the OsmoPRO has many benefits and improved workflow with the department greatly. The OsmoPRO has ensured a consistent and continued osmolality service for our users, as well as improved our daily workflow and minimised the risk of errors."

Streamlining microbiology workflows

In 2007, Advanced Instruments began offering anaerobic systems. Responding to an increasing demand for process optimisation in clinical laboratories, Advanced Instruments acquired Mart Microbiology in 2007, marking the entrance onto the microbiology bench with the anaerobic jar system, Anoxomat.

Patient outcomes rely on accurate isolation and identification of microorganisms promptly from microbiology laboratories. This is why hospital and research laboratories value Anoxomat's ability to quickly create optimal conditions for the growth of anaerobic, microaerophilic, and capnophilic organisms. The latest version of this system, Anoxomat III, helps laboratories automatically and easily create exact and repeatable

environments for bacterial cultivation and offers important advantages for laboratory managers over conventional technologies, including the anaerobic chamber and the gas-generating sachet system.

"The Anoxomat has been extremely useful in the growth and care of anaerobic cultures in my laboratory," comments Scott Connolly, Microbiology Supervisor at VA Boston Healthcare. He continues: "It allows for advanced patient care when it comes to cultures that grow a variety of microbiological organisms. At the push of a button, we are able to simulate anaerobic conditions ideal for their growth."

Standardising CSF cell counts

In 2016, Advanced Instruments received 510(k) clearance from the US Food and Drug Administration (FDA) to market its GloCyte Automated Cell Counter System and GloCyte Low and High Level Controls.

Cerebrospinal fluid (CSF) cell counts have traditionally been performed by haemocytometer chamber counts. As with other manual microscopic techniques, this method is subject to high interobserver variability and poor reproducibility. Body fluid (BF) cell counts are now widely performed on various haematology analysers in automated laboratories. However, positive bias at very low cell counts has limited implementation of automated CSF cell counting to the same extent as for other body fluid cell counts.

Advanced Instruments recognised the difficult nature of accurate CSF cell counting as a key priority for haematology laboratories and took on the GloCyte as a key priority in its clinical product portfolio.

The GloCyte uses fluorescence microscopy and two reagents to enumerate total nucleated cells (TNCs) and red blood cells (RBCs) in under five minutes. A nucleic dye specifically stains the nucleus of TNCs and an antibody stain tags antigens on the surface of RBCs making it easy for staff of all skills levels to obtain accurate results. Stained samples are deposited onto test cartridges and vacuum is applied to capture cells on a membrane. An image of the membrane is captured by a digital CCD camera and processed via a sophisticated algorithm eliminating errors associated with manual counting.

The accuracy of CSF cell counts is critical in clinical practice. Bristol Royal Infirmary has implemented the GloCyte Automated Cell Counter for CSF because it is the only reliable automated CSF cell counter solution available for budget-constrained hospitals, so explains Alexander Macphie, Senior Biomedical

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Hayden Powell, Specialist Biomedical Scientist
in Clinical Chemistry, Nottingham University Hospitals

Scientist in Haematology, University Hospitals Bristol and Weston NHS Foundation Trust. He comments: "We all disliked using the old technology; you could literally see the red cells dying in front of your eyes. So you just knew as a scientist these counts were inaccurate. For us, the GloCyte is ideal. We're using minimal amounts of sample, and the medics are getting the count they need to drive their clinical decisions for the patients. So I'm happy to sing its praises. I imagine many places may be in the same boat as we were, doing manual counts and if that's the case the GloCyte is a no-brainer."

Verification and calibration

Advanced Instruments joined forces with Artel in 2022, adding accurate, precise, and easy-to-use verification and calibration systems to the portfolio. The growing pressure to process workloads faster, while facing workforce shortages, should not compromise patient safety or professional care. Wherever they're based medical laboratories must follow local regulations and directives to show that their devices are performing according to those regulatory standards and accreditations. Among the most robust ways to adhere to compliance regulations is to have a built-in system for verifying that laboratory instruments and their operators are performing to spec.

The Artel Pipette Calibration System (PCS) offers an easy-to-use volume verification system that simplifies single-channel pipette calibration, interim volume verification, and

pipette user/operator training and competency assessment. Paired with the included ArtelWare Software, the PCS allows users to manage their pipette inventory with calibration and interim verification scheduling, email notifications, pipette and pipette operator status, and comprehensive, auditable documentation.

Leslie Chaparro, Medical Laboratory Scientist at Parkview Regional Medical Center has first-hand experience of how the Artel system is quick and easy to use. "We were shopping for new pipettes and our sales rep had never seen this calibration system," she explains. "He was very impressed with the ease of operation and we liked that we could quickly test the deviation amongst repetitive pipetting."

"When our technician trained for performing calibrations was out on an extended pandemic leave, we were forced to do an emergency send out of validations to a commercial validation company. We quickly realised the benefits of having an Artel system in house; the system allows for a much quicker and cost efficient means of validating pipettes."

We have always aimed to reduce the burden on laboratory scientists, enabling them to do more with walk-away operation, freeing them up to prioritise other tasks

Julie MacKenzie, VP, Clinical Business, Advanced Instruments

Looking to the future

Currently, the Advanced Instruments portfolio spans the chemistry, microbiology, and haematology bench.

While the emphasis on workflow efficiencies and faster turnaround times have been the primary drivers of Advanced Instruments' product development, quality control and data management have also been pain points that the team strives to address, aiming to reduce transcription errors, minimise paperwork, enhance flexibility, and save personnel time. Built-in software features across the portfolio help improve the ease of obtaining sample traceability and enhance data management.

"We recognise that our customers work hard, and that their challenge is to maximise uptime and minimise downtime because their laboratories operate around the clock. And in developing the Advanced Instruments portfolio, we have aimed to provide them with instruments that can be powered 24/7 as well," comments Julie MacKenzie, VP, Clinical Business, Advanced Instruments.

"We have always aimed to reduce the burden on laboratory scientists, enabling them to do more with walk-away operation, freeing them up to prioritise other tasks. The end-goal is to do more than just improve accuracy and precision," confides MacKenzie. "It is to provide results in the shortest turnaround time in a manner that integrates seamlessly into the laboratory's workflow, while also being suited to technician and physician needs, ultimately enabling timely patient treatment."



The GloCyte Automated Cell Counter System uses fluorescence microscopy and two reagents to enumerate total nucleated cells (TNCs) and red blood cells (RBCs) in under five minutes.

Advanced Industries
To learn more, get in touch, visit the website, or scan the QR code.



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