

Taking a Fluent® approach to genetic screening

Clinical diagnostics company Ambry Genetics focuses on the identification of germline mutations, detecting large deletions and duplications primarily by next generation sequencing. Automation holds the key to efficient high throughput assays, ensuring optimum productivity.

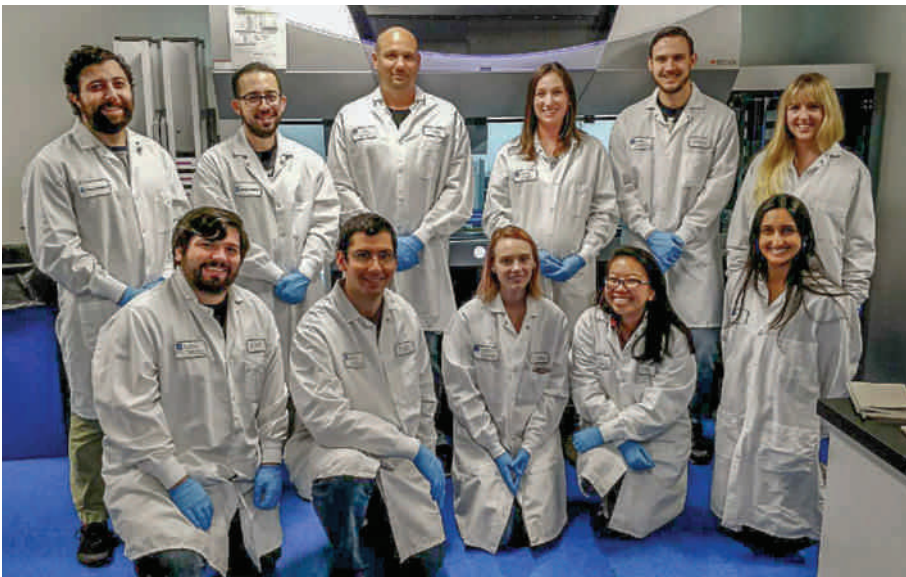
Ambry Genetics, based in Aliso Viejo, California, specializes in genetic clinical diagnostics, offering services such as screening for familial cancers and exome testing to identify previously undetected mutations. In addition, the company collaborates with universities and other research groups via the AmbryShare™ program, sharing its large disease database of aggregated anonymous data from 11,400+ human genomes. Fast and flexible liquid handling workstations are essential in this high throughput environment, as Director of Assay Automation Joy Rae-Radecki Crandall explained: “Automation is vital for our work, and we are long-term users of Tecan’s liquid handling platforms, with more than 30 Freedom EVO® systems.

With the business growing rapidly, we recently expanded into the adjacent building, known as the Ambry Superlab, and this led to the acquisition of 16 Fluent Automation Workstations to increase our capacity, speed and flexibility.”

Joy continued: “The Superlab was designed to be as efficient and high throughput as possible, with a capacity of thousands of samples per run, and the flexibility to swap out different assays and chemistries. I looked at a range of liquid handling platforms for the new facility, evaluating them for their speed, capacity and flexibility – we wanted to be able to customize the systems – and the outstanding

capabilities of the Fluent quickly became clear. As we were already using the Freedom EVO platform, we were also familiar with the liquid classes, making the transition to the Fluent easier. Validation of our workflow scripts was quicker and simpler too, as the systems use the same worklist file formats.”

“Each of our systems has been tailored to our specific requirements, whether it is a large Fluent 1080 with a carousel and stacker, or a medium-sized, dual arm Fluent 780 platform. We customized every system for an individual assay, with different liquid handling arms and integrated third-party devices where necessary, and took advantage of the Multiple Channel Arm’s capability to switch pipetting heads on-the-fly, changing between 96- and 384-channel formats depending on the assay. Combined with the large deck capacity, this tripled our throughput for these assays. Fluent’s ‘teach-free’ feature also proved very useful with so many workstations to set up, and within six months we had transferred all of our current methods and completed the validation. Critically, the Fluent system’s design gives us the flexibility to easily change the deck layout. Not only does this provide built-in redundancy – switching from a layout customized for NGS to a microarray set-up is quite straightforward – it also allows new chemistries and assays coming onto the market to be explored without major time and cost implications.”



Members of the Ambry Genetics automation team (left to right): Omar Alwatter, Chris Ramirez, Muaeen Obadi, Parker Sankey, Chris Yenzler, Emily Greene, Joy Rae-Radecki Crandall, Nina Do, Andrew Haling, Aarani Arulmoli and Sinead Hawker

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“We are benefitting from time and cost savings as well as the increased capacity. We run numerous hit-picking scripts for PCRs, and a 96-well plate that previously took around eight minutes to complete can be done in about five minutes on the Fluent, trimming at least an hour off our overall preparation time for that step. The parallel arm movements are a great advantage, allowing the Robotic Gripper Arm™ to dispose of a used tip box while the Multiple Channel Arm simultaneously picks up new tips, saving about 15 seconds of time, which adds up when you are running numerous plates per day. We have also been able to miniaturize some assays, changing from a 96- to a 384-well format, reducing the amount of sample and reagent used and decreasing the number of tip mounting and disposal movements from four to one. This saves time and decreases waste, providing considerable additional cost savings.”

“FluentControl™, with its TouchTools™ interface and ‘wizard-like’ guidance, simplifies user management and the day-to-day operation of the systems. Sample security and integrity is our number one priority and, with more than 30 users per instrument, we rely on the user management feature to assign individual permissions and access to scripts. Operators can only see and run those scripts that they have been certified competent for. Automated barcode reading enables sample tracking and eliminates the potential for human error, identifying plate loading errors and notifying the user to take corrective action. To help avoid accidental click-through errors, we even have the option

to include a ‘Confirm’ button on the opposite side of the screen to the rest of the commands. It’s a small thing, but it’s had a big impact. The video feature is useful too; we can make instructional videos showing the user how to set up the deck, troubleshoot a run, and perform infrequently used protocols, avoiding the need for hands-on refresher training.”

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“We write all our scripts in house, and people really like using the FluentControl software. They find it logical and easy to use, and can usually start writing scripts after about a week’s worth of training. There are a lot of variables to set for each script, and the way that they are displayed makes troubleshooting very easy. It’s a clear, linear thought process, which makes the software very powerful. Operators also enjoy having the option to personalize scripts, changing the color of the indicator lights, and even including background music to indicate which step of the protocol is being performed! They are really engaged with the system,” Joy concluded.

To find out more about Tecan’s Fluent Automation Workstation, visit www.tecan.com/fluent

To learn more about Ambry Genetics, go to www.ambrygen.com