

THE *AUTOMATION* GAME 2023 – AND BEYOND

THE AUTOMATION GAME IS ON...

... And the rules are simple:

To propel labs forward and give them the power they need to deal with the challenges we face as a society.

Who is Automating?

Most laboratories across the world are beginning to automate with the main market segment being:

- ✓ Biotechnology- and pharmaceutical companies
- ✓ Hospitals
- ✓ Diagnostic laboratories & CROs
- ✓ Research- and academic institutes

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What's Driving Automation
Growth





WHAT'S DRIVING AUTOMATION GROWTH

Automation is not exactly new. In fact, it has been around for quite some time. What is new, however, is the growing demand for automation.

As we enter 2023, the global lab automation market has reached a value of USD 5.3 Billion and is expected to grow to USD 8.51 Billion by 2031 with a forecasted CAGR of 6.1%.

But what is driving this enormous growth?

Fundamentally, automation goals are driven by the needs in the labs. Especially pharma and biotech industries are expanding rapidly and creating new opportunities and new innovators.

This development will challenge what automation can do and push the market

towards easy automation for all labs to ensure accuracy, reproducibility, and efficiency.

The COVID-19 pandemic changed lab demand for good, and we experienced a new sense of urgency for getting fast results but also an increased desire to get diagnosed and vaccinated for other diseases as well.

This is something that has heavily affected what labs need to live up to in the future. Automation has proved its worth, so to speak, in labs of all shapes and sizes.

Let's take a look at some of the major circumstances that are changing the game for lab technologies

CIRCUMSTANCES THAT ARE CHANGING THE GAME

1 Physical Lab Space

Lack of lab space is already a massive challenge for many.

The new automation movement is only expanding, and labs' physical space needs to accommodate that. As more instruments move in, labs must be designed to hold space for them.

A trend we will see in the future is therefore new ways of designing labs and perhaps even creating spacious labs that are designed to be automated from the get-go.

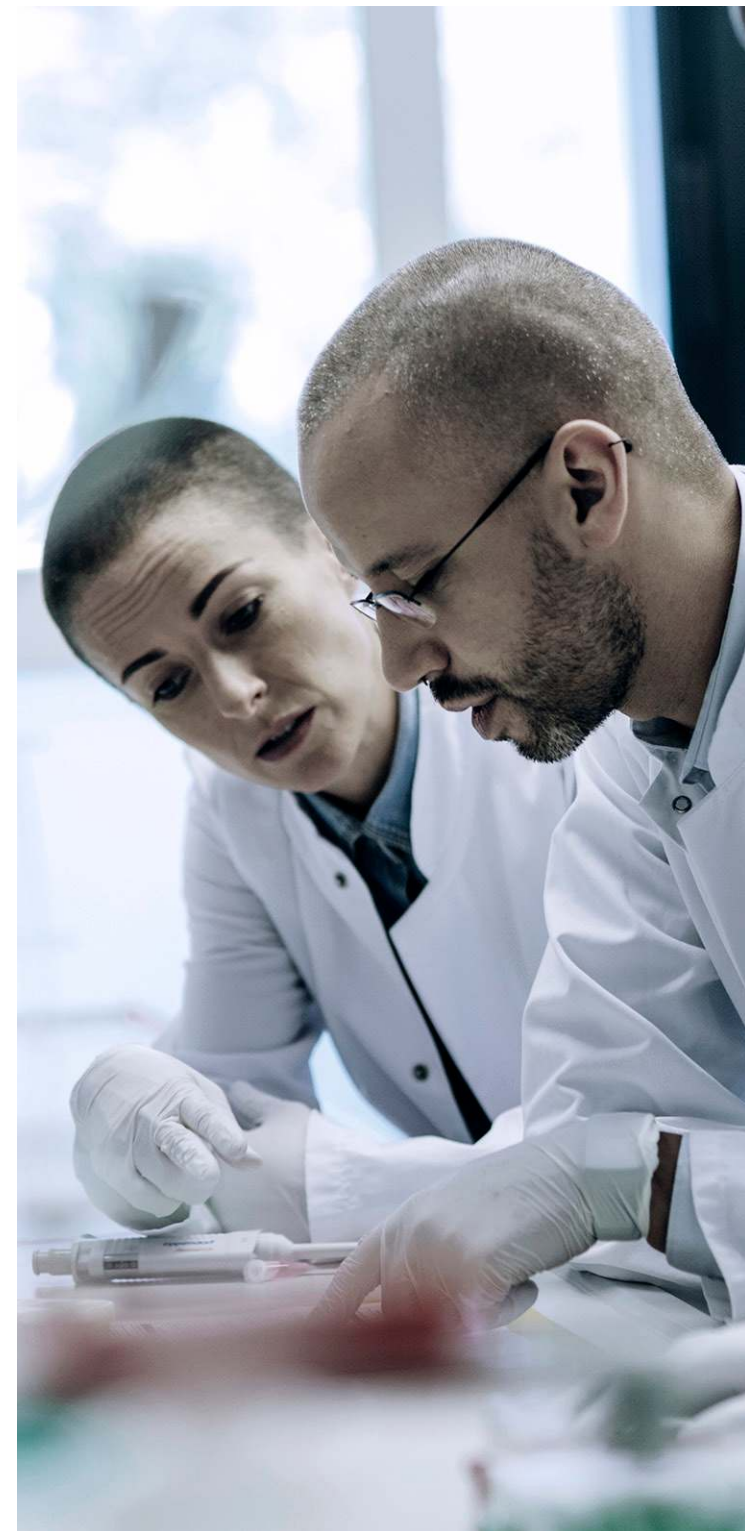
But it also goes the other way around – automation solutions must be designed to fit neatly into even small labs. A table-sized robot in the corner will for example mean more floorspace to work.

2 Strategic Partnerships and Collaborations

During the last couple of years, we have seen silos collapsing everywhere, and collaborations are now at the center of how we operate.

We are already seeing more collaborations between laboratory users, laboratory suppliers and robotics developers. We are also seeing more strategic partnerships between different robotics developers with the goal of e.g., providing end-to-end automation systems together.

Partnerships allow companies to be more versatile in the application of advanced technology and working together to achieve the highest impact can really change the game.



CIRCUMSTANCES THAT ARE CHANGING THE GAME

3 Hybrid Work

Labs throughout the world experienced some degree of working remotely during the pandemic, mostly due to social distancing. Many workplaces are continuously open to hybrid work. This is possible mainly due to automation and new digital technologies.

We expect to see more cloud-based technologies that allow users to work remotely with data. We also expect to see more end-to-end automation that requires fewer hands on deck. This can be done smoothly by integrating liquid handlers with robot arms that can change its plates automatically.

4 Increased awareness of all infectious diseases

COVID-19 will continue to affect clinical labs. While the demand for tests and vaccines are no longer as urgent as, say, 2020-2021, the virus will still have

an impact on labs and both tests and vaccines will continue to take up both space and time.

As in the wake of all disasters, they will affect the way society acts as a whole going forward.

Therefore, we also expect to see an increase in people wanting to get vaccinated for other infectious diseases, such as influenza. Especially as experts predict that 2023 will see a heavy increase in serious influenza cases. Moreover, there is a larger desire to get tested and gain knowledge about which specific virus you are infected with and exactly what it does.

Another thing that emerged in the wake of COVID-19 was an increased vigilance of other potential pandemics as well as new infectious diseases. We have already seen this in the case of monkeypox and increased numbers of Ebola in Africa.

5 Staff Shortage

Clinical labs are severely challenged by staff shortage.

It is estimated that there are only 335,500 active medical laboratory professionals in the United States, serving a population of just over 330 million people. In addition, the unemployment rate of lab technicians in life science labs is under 2 percent.

If this continues, robots will become not just a convenience but a necessity to keep up with the increasing workload.

Especially automated liquid handlers and robot arms can take a lot of pressure off the staff.

Source: <https://clpmag.com/diagnostic-technologies/10-clinical-laboratory-predictions-for-2023/>

Source: <https://www.bls.gov/ooh/healthcare/clinical-laboratory-technologists-and-technicians.htm>

CIRCUMSTANCES THAT ARE CHANGING THE GAME

6 The Energy Crisis

The energy crisis has increased the already large demand for green energy and sustainable solutions. It's a very tangible catalyst for urgent action. As we attempt to combat the crisis, we can utilize existing technologies in new ways.

Data from solar panels, wind farms, geothermal, and hydroelectric power can be streamed, stored, monitored, enriched, and analyzed in the cloud. Machine learning can be used to analyze all energy data to predict usage.

Now, let's take a look at some of the technologies that support this.

Source: Tech predictions for 2023 and beyond | All Things Distributed



TECHNOLOGIES THAT ARE CHANGING THE GAME

Liquid Handling Automation

Liquid handling automation systems are already the must-haves within lab automation. But the systems are constantly getting more user-friendly, flexible, and easy to implement.

This shift towards making automation accessible in every lab changes the industry and makes heavy and rigid machines a thing of the past – except in very high-throughput labs that only run the same protocol over and over.

Consequently, we will see much more of it in a wide range of labs. They will continue to change the game in the years to come as they prove their worth in new methods such as NGS and the fully automated workstation.

End-to-end Automation

The fully automated workstation will set the precedence for the lab of the future

and be a huge game changer. We will see a much larger tendency of robots working with other robots to provide end-to-end automation.

Even now, amazing integration systems are being developed to make automation solutions independent of hands-on work.

For a liquid handling instrument this might mean integrating a robot arm to change the racks and, thus, enabling the staff to use their full talents elsewhere.

Robot Arms

Robot arms will become a much more common device to have in labs. They are able to work seamlessly with other robots, such as liquid handling instruments, and will be an indispensable part of the fully automated workstation.

Robot arms can operate effortlessly alongside humans and have a huge

impact on how things are done and what can be achieved.

Laboratory Information Management System (LIMS)

In the effort to e.g., diagnose patients as accurately as possible, LIMS is key. LIMS software allows you to effectively manage samples, test results and associated data. This is great for speeding up the diagnostics process and reducing errors.

You can integrate instruments such as liquid handlers with your LIMS through API integrations or CSV files to create an automated solution. This allows the handoff of information and data from one application to the next automatically and without human interference.

Many labs embrace this technology to ride the wave of the data-driven revolution.

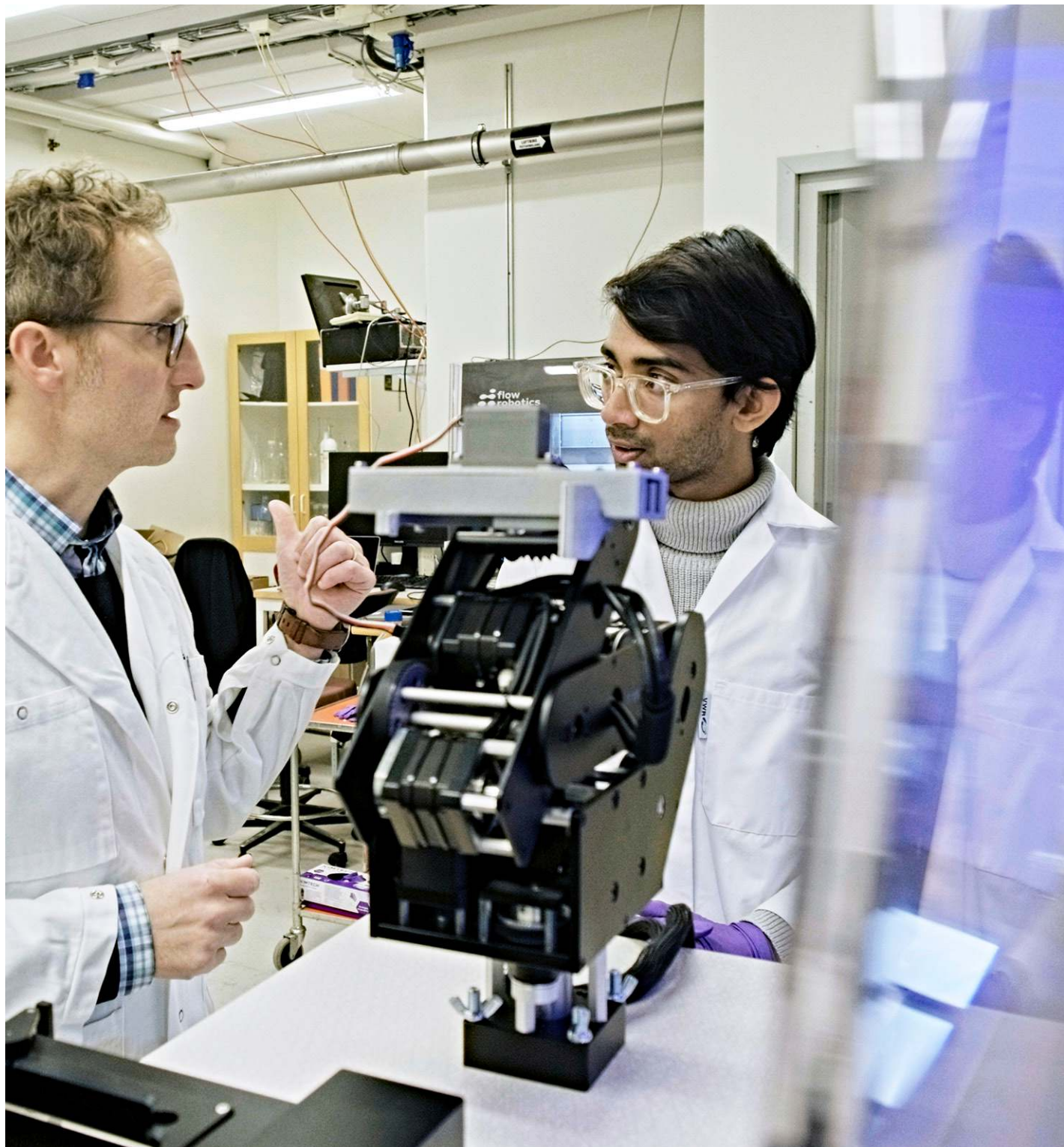
Artificial Intelligence & Machine Learning

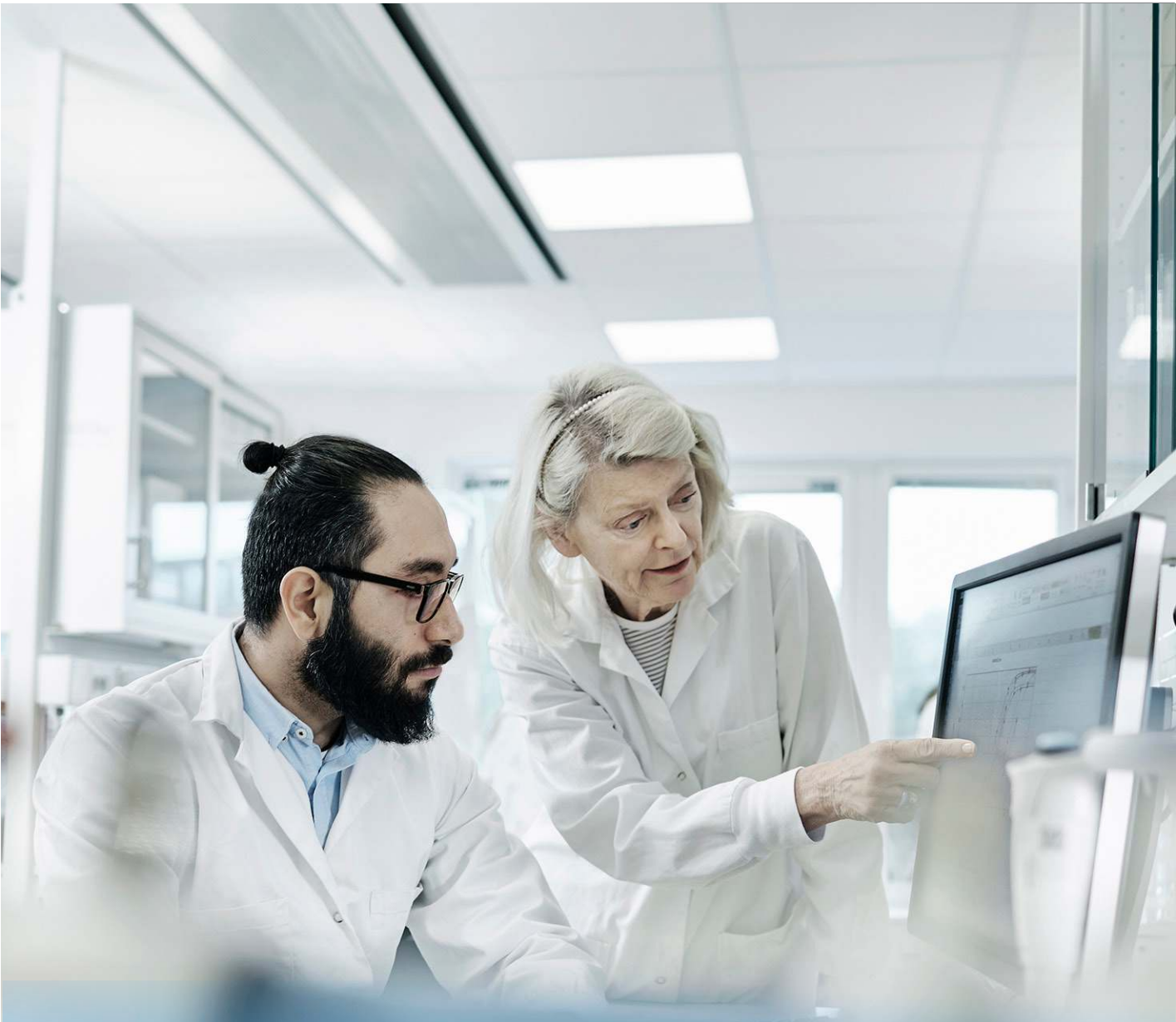
You cannot talk about game changers without accounting for Machine Learning as it enables machines to communicate with each other and perform tasks that humans cannot.

Also, sub-sets of machine learning such as AI and machine vision can become invaluable in the lab of the future. In most laboratories, for example, there is a huge amount of data that must be recorded, stored, and analyzed and nothing is as smart as AI for doing those jobs.

In addition, machine vision has the huge benefit of being able to observe things, such as small defects and minor changes, that human eyes cannot.

Together these technologies can both open up new opportunities while simultaneously eliminating human errors.





BEHIND THE GAMES

Of course, not everything will play out as the experts predict. But one thing seems pretty certain: the needs in the labs will continue to change alongside society and so will the technologies that support them.

As the world moves, society moves, and the labs will follow closely. Going forward, these technologies will all become much more accessible. But a prerequisite for implementing intelligent technologies is having complete trust in the machines. Therefore, there is a human aspect to account for as well.

It is important to cultivate a culture where humans and robots can work effortlessly side-by-side. A culture that's agile, flexible, and collaborative.

You can go about that by making sensible strategies and preparing the staff through good communication, training, and inclusion.

NEED
ADVICE?



Get our E-Book on how
to bridge the gap between
people and robots

OUR SOLUTION

It's safe to conclude that user-friendliness and flexibility are key to implementing liquid handling automation.

Around 10 years ago, a Danish robotics professor asked himself the question: why are companies making automation harder than it should be?

And then he developed the pipetting robot, flowbot® ONE, to offer another option: an easy-to-use and flexible robot that can stand alone or be part of a modular setup.

Today that robot is assisting laboratory staff across the world with a wide range of applications and protocols.

flowbot® ONE is a simple 12 deck position plug & play solution that is developed for immediate adjustment and doesn't require a programmer or super-user.

Its intuitive user interface can be accessed in almost any browser, and

whenever a procedure changes in your lab there is no need for complicated programming.

This makes it ideal for future-proofing your lab and taking it to the next level.



BOOK A DEMO



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demo

SPOTLIGHT

UPPSALA UNIVERSITY BRINGS LAB 4.0 INTO THE CLASSROOM

In Sweden, the Department of Pharmaceutical Biosciences at Uppsala University features a setup of 5 pipetting robots, flowbot® ONEs, in integration with robot arms and digital fluorescent microscopes.

"The flowbot® ONE is one of the main parts of the course because we know that

liquid handling is key for lab automation. The students learn to translate a manual protocol into an automated one, which gives them a deeper understanding of how the robot and software work," says Assoc. Prof. Jordi Carreras Puigvert and explains that they are having a lot of fun and learning it quickly.

It is essential to teach students about the labs of the future, on top of the more traditional laboratory work. This realization was what made the University of Uppsala create this pioneering course.

"The flowbot® ONE is a great teaching tool because it is an easy-to-use, precise instrument with unique features such as liquid level detection. It is also a high-quality and robust instrument that students feel comfortable with and that can handle quite a lot," says Assoc. Prof. Jordi Carreras Puigvert.

"The flowbot® ONE was the easiest instrument to integrate because of its very simple API. It works flawlessly in collaboration with a robot arm and has a super high precision which helps us with the millimetre-scale moves that are required," explains Rikard Nyström, MSc lecturer at Uppsala University, who has designed and created the integration.

As this course draws to a close, Uppsala University will continue to pioneer the education of tomorrow's scientists with the flowbot® ONE.

