In 2017, we opened our Bridgewater Innovation Center in Bridgewater, New Jersey (USA). The facility is distinct in the industry, with nearly 27,000 square feet of laboratory facilities, state-of-the-art research tools and a cleanroom. Here, customers can collaborate with biopharma researchers to address current and emerging upstream and downstream development and process issues.
Avantor’s Dr. Ashish Kulkarni, Executive Vice President and Chief Technology Officer, and Dr. Nandu Deorkar, Vice President, R&D, recently provided an informative update on the Center’s growth, key accomplishments and plans for the future.

The Bridgewater Innovation Center has been operational for about two years now. What can you tell us about the facility and the scientists who work there?

Ashish: Avantor’s Bridgewater Innovation Center was designed to provide customers with data-driven answers to biopharmaceutical, biologic and cell and gene therapy challenges—from gene to protein to final formulation.

Our first goal was to develop a technology-driven research and collaboration environment where we work closely with customers to help solve their bioprocessing problems, using our unique innovation framework that supports solutions for their most difficult challenges.

But our most important goal was to combine Avantor’s talent and capabilities with customer insights to drive big, strategic projects that we know will have major impacts on the future. Bringing advanced products like cell and gene therapies to market will address the challenges that life sciences companies face.

Our entrepreneurial-minded scientists have the drive, skill and tenacity to set science in motion and overcome obstacles to success. They are open to learning, building their skills and making things happen. The customers we serve here at Bridgewater value this mindset when they see Avantor’s scientists ready to drill down to understand problems impacting the world and find viable solutions.

Nandu: Because we seek to solve practical, real-world problems, scientists with entrepreneurial skills and a tenacity for solving problems are ideal for us. One of our most important capabilities is how we conduct research and model our customers’ challenges from the smallest scale through pilot and production scale. We can directly replicate what customers do in their facilities to determine the exact root cause of the issues they’re having and demonstrate the improvements we’re making, which is something customers really value.

Has anything changed since the opening?

Nandu: When we first opened, we had lab-scale fermentation and cell culture capacity. Now, our capabilities have been enhanced, allowing for scale-up studies, bioanalytical characterization and simulations needed to meet evolving requirements of our biopharma customers.

Beyond life sciences, is the Bridgewater Innovation Center involved with other specialty areas?

Ashish: We now have enhanced nanometer scale filtration and purification solutions for customers in the semiconductor industry who need help dealing with ultra-high purity materials. As they work on issues such as trace metal limits, customers expect us to stay on top of these challenges. We are able to drive state-of-the-art filtration and purification solutions for semiconductor customers.

In addition, more and more biopharma and bioprocessing customers are also giving significant attention to the impact of trace metals on their process outcomes, so our expertise in this area is beneficial for life sciences applications.
How have customers embraced your work at Bridgewater?

Ashish: Customers actively rely on us to help solve their challenges. We’ve helped customers improve the delivery of dry materials into bioproduction systems for several important biologic drugs by solving common challenges. For example, clumping is a common problem that can not only cause delays, but also impact cost and quality of a project. Our team’s innovative thinking and our lab capabilities help customers solve problems like this every day. Currently, we have several strategic projects in the works.

Why did Avantor choose to place an innovation center in Bridgewater?

Ashish: The location in central New Jersey is incredibly important. It’s located within the New Jersey Center of Excellence, a 110-acre life sciences campus in the heart of the northeast U.S. bioscience technology corridor. It’s an easy drive for many of our current and prospective customers, and it’s accessible from major transportation routes to top university research facilities, from Boston to Washington, D.C.

Nandu: This makes in-person collaboration with our customers much easier, enabling faster results. It’s also much easier to attract top talent since they will work within the heart of one of the key centers of the global biopharma industry.

Both of you are shaping the innovation process for Avantor, but also within the industry. What is required for successful innovation in biopharma?

Ashish: First, the way research is currently being conducted will change in the future, with modalities and sciences evolving very rapidly. The digitalization of science is creating many new opportunities given the amount of data being generated. That means that Avantor and the Bridgewater Center must have state-of-the-art analytical tools. We keep up with data sciences trends and use rapid attrition and experimentation to close gaps and reach useful findings faster. In fact, there is a rise in the prominence of data generation and digital channels across the life sciences industry. We can provide advanced data integration and analytics-enabled solutions for scientific development.

Nandu: At Bridgewater, we can collaborate with customers working on advancing cell and gene therapy programs, whether they are in the start-up stages of research and development or at the point of scaling up to commercial manufacturing. Our expertise ranges across the biopharma industry and is coupled with our offering of customizable single-use platforms, chemical packaging and other solutions. All these help these companies succeed in bringing their therapies to market.

What do you see as the main challenges facing biopharma manufacturers today?

Nandu: As far as antibody and protein-related drugs are concerned, improving productivity and managing costs will continue to be increasingly important. Simplifying processes and making changeovers easier and more efficient are clear examples of ongoing improvement efforts for biopharma manufacturers. We all must combine this with other capabilities and areas of investment to improve productivity and reduce biologic drug costs. There is a need to strengthen abilities in data science, introduce new analytical tools and launch new services, so manufacturers continue to show our value and deliver solutions to further sustain biopharma innovation.

Ashish: When we look at cell and gene therapies, we also start to look ahead for new RNA-based therapies that may help different challenges. A major challenge with these therapies is how they scale up. These therapies involve personalized medicine by using a patient’s own cells.
So, the questions to ask are: how do you mass produce personalized medicines from a small to large number of patients? How do you manage raw materials, supply chain, quality, regulatory requirements and documentation? And how do you handle the data integration, which will be much more important for these kinds of therapies?

We’re asking ourselves these same questions and working to implement resources that will provide answers.

**We’re hearing a lot about innovations within cell and gene therapy today. What other exciting developments can we expect to see in the biopharma industry in the next five to ten years?**

**Ashish:** In the past, labs were filled with a number of scientists and instruments that helped their productivity. With the future levels of data that will be generated combined with intelligent automation, machines will be much more needed in the lab of the future. People will have to organize around them - machines, not instruments - to ensure work is much more effective. In the lab of the future, artificial intelligence, natural language processing and machine learning are all going to change the way science is done. And we can be right there at the forefront of this innovation with our customers.

**Nandu:** Another field which will begin moving from theoretical research to practiced science is regenerative medicine. As your arteries weaken, scientists hope to be able to replace them with gene-engineered arteries. Plus, there’s the xenotransplantation field, which focuses on replacement organs for humans and is another area to watch for the future. We’re not there yet, but these various technologies are evolving because of the explosion of start-ups worldwide.

**Ashish:** Whatever the future brings, Avantor is ready to bring innovation to where science leads and help companies commercialize their technologies. Our innovation framework enables us to provide customized solutions to our customers’ unique and complex challenges, and our Bridgewater Innovation Center is a key element of this framework.

Ashish Kulkarni, Ph.D., is Executive Vice President and Chief Technology Officer at Avantor. In his current role, Dr. Kulkarni is responsible for incubating new technologies and building a strong pipeline to support future growth at Avantor.

Nandu Deorkar, Ph.D., MBA, is Vice President of Bioprocess Research & Development at Avantor. Dr. Deorkar is responsible for strategy, planning, development and commercialization of new product and technologies within Avantor’s biopharma production business unit.