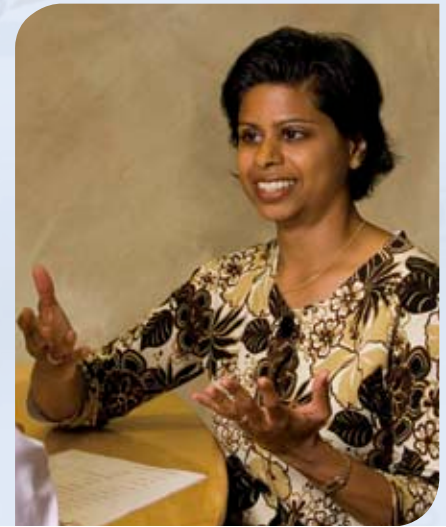


The Role of Simulation in Product Development

An interview with Anita Bestelmeyer, CAE Manager, BD

BD is a leading global medical technology company that is dedicated to improving people's health throughout the world. BD develops, manufactures, and sells medical devices, instrument systems, and reagents. The Fortune 500 company, founded in 1897 and headquartered in Franklin Lakes, New Jersey, employs approximately 28,000 people in 50 countries throughout the world. In recent years, BD has boosted the pace of its R&D spending to focus on growth through innovation, and has begun implementing a company-wide product development system. The company's use of computer-aided engineering (CAE), as part of these efforts, is enabling it to accelerate the development and delivery of high-quality, robust products.



BD has been using Abaqus FEA software for over two decades. CAE Manager Anita Bestelmeyer joined the team 17 years ago and has been its head for five. She leads the simulation group in supporting product development and also works toward integration with BD's company-wide product development system, educating the customer base within the company about how her group can positively impact R&D efforts through simulation. Bestelmeyer recently talked to INSIGHTS about how collaboration and sharing of simulation results help drive design and business decisions at BD. A structural engineer with an aerospace background, Bestelmeyer finds the complexity of medical problems "a lot more interesting" than those in her previous field.

INSIGHTS: What are the major challenges in your industry right now, and how is BD evolving to meet them?

Bestelmeyer: There's a lot of competition to develop new, innovative medical applications using the latest technology advancements within the current economic environment. To maintain and grow BD's position, we have to ensure that our products are innovative and of the highest quality. To achieve this, it's critical to ensure robust performance despite inherent product variations, and maintain functionality throughout the product shelf life.

We are also dedicated to protecting product users and healthcare workers through safety devices. At BD, we are constantly exploring ways to optimize product and instrument designs and reduce costs. Simulation has an important role to play in that process.

"When you use simulation for concept, definition, and development of a product, you decrease product development costs and get to market quicker."

—Anita Bestelmeyer, CAE Manager, BD

INSIGHTS: What are the key groups/projects for which BD uses simulation?

Bestelmeyer: Our group receives the majority of requests for simulation (75%) from our BD Medical business segment, with the second largest number from our BD Diagnostics segment (20%) and the fewest from our BD Biosciences segment. These requests come from product development groups worldwide, although the largest number of requests comes from BD's headquarters in Franklin Lakes, New Jersey.

We are seeing an increased trend across BD toward using simulation earlier in the product development process as an integral part of product development instead of at the latter stages. We believe that this is due to ongoing education of our product development community about the value of simulation tools and our continued success stories, as well as the roll-out of Design for Six Sigma (DFSS) and the BD company-wide product development system process within the organization.

When you use simulation for concept, definition, and development of a product, you decrease product development costs and get to market quicker. Our BD units are increasingly internalizing this message and voluntarily coming to the simulation group more and more. Among the services we provide are tolerance stackup analysis, virtual design of experiments (DOE), and simulation of product shelf life to help identify the critical drivers that will ensure correct performance and robustness over time.

INSIGHTS: What types of simulations does your team perform, and what simulation challenges do you face?

Bestelmeyer: Our core BD CAE Analysis Services group performs simulations in three focus areas. The first and largest area is structural analysis to optimize part

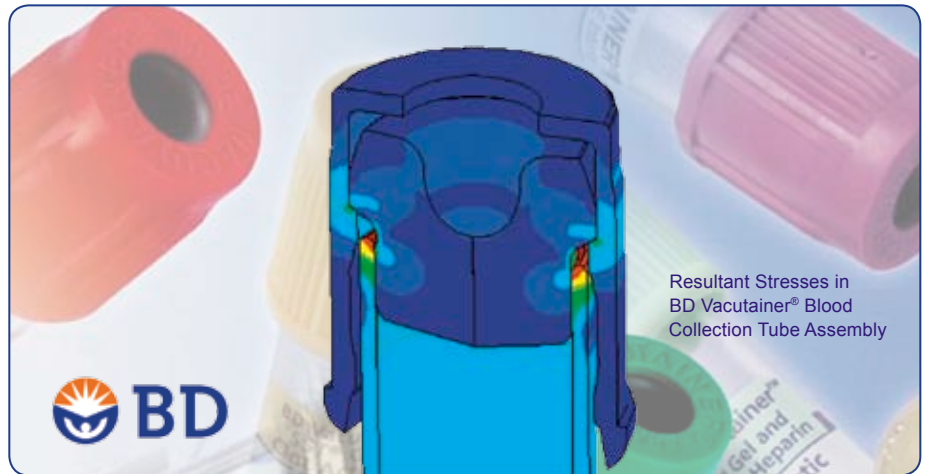
performance and structural integrity. The second area is injection molding simulation to predict part manufacturability and ensure the highest part quality.

The third area is computational fluid dynamics, where we can use our simulation capabilities to optimize fluid flow and product packaging; these are probably the most complex simulations we do. An example of this would be modeling fluid flow through an entire catheter, from the IV bag to the point where a drug is infused into the body.

Recently we have received requests that explore untapped or newly developed capabilities in the software codes. This involves frequent communication with our software partners to understand their product's features. We also collaborate with them to develop new capabilities, improve efficiency, or extend code functionality. For example, we are working with SIMULIA to investigate problems such as device interaction with biological tissue which require coupling of analysis capabilities for multiphysics simulation. These are challenging technology development initiatives for cutting-edge applications.

INSIGHTS: You've been using Abaqus for almost 20 years. How has the software evolved along with your technical needs? What are the main advantages of using it?

Bestelmeyer: The Abaqus software code has evolved quite significantly over the last 20 years; we are now performing difficult and complex simulations that would not have been possible previously. We also utilize Abaqus/CAE for setting up and postprocessing our structural analysis requests. The new functionalities in contact, material models, and the Abaqus/Explicit solver, among other improvements, have enabled us to simulate many more applications and grow the use of simulation within the organization. We believe that the long-term relationship is important, and we will continue to work together to develop additional capabilities that are of specific value to BD.



INSIGHTS: How do you currently manage your simulation processes, data, and workflows?

Our simulation requests have been managed through an IBM® Lotus Notes® CAE Jobs database for over 10 years, and we have recently upgraded this by launching a new web-enabled CAE Jobs database.

Our CAE Analysis Services group keeps all information associated with a simulation request in the database on the job profile form. Pertinent information regarding the simulation request, including related analysis approach and process, important data, and workflow, is all kept in one place. Our group uses this database for weekly meetings to discuss new requests and prioritize workflow to meet critical project timelines effectively.

BD's product development community can use the web-enabled database to upload their simulation requests and related files and also specify the simulation objective, material, and geometry, for example, to initiate a new request. BD associates worldwide have their own dashboard that provides a customized view of information regarding their simulation requests and those of their business unit. They can also search all of the BD requests to obtain information about past and ongoing requests to learn from previous experiences and encourage collaboration within the organization.

At the end of each month, a detailed summary of ongoing project work is automatically generated to update key BD R&D heads on the individual usage for their business unit and information on ongoing requests for the entire organization.

INSIGHTS: What is your future vision for managing simulation collaboration? In what ways does partnering with SIMULIA facilitate your work?

My future vision for managing simulation collaboration includes continuing to share and enable access to key initiatives of importance within the organization. Our CAE website has recent case studies that help BD users understand new ways to utilize simulation, and we hold ongoing information sessions to provide an overview of CAE capabilities, as well as understand changing R&D challenges.

As simulation is rolled out to more distributed BD sites, we plan to organize forums to share methodologies and best practices and provide technical guidance based on past experience and learning. We are also investigating the possibility of using Simulation Lifecycle Management or Product Lifecycle Management to accelerate the sharing of information and tying the simulation directly to the native solid model geometry.

Working with SIMULIA is important to our future vision since we use the Abaqus structural analysis code and are investigating multiphysics capabilities for actual BD applications. Our long history using the Abaqus code effectively and working with key SIMULIA representatives will enable us to develop simulation technology capabilities that address future BD challenges.

For More Information
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