The resort’s costuming operation is the largest in the world, with more than a million costumes in inventory at Walt Disney World alone. Not only does total garment demand vary by season, but the distribution of individual garment sizes also changes as the cast mix evolves over time. Unlike a traditional inventory system, garments are laundered and placed back on the shelf after cast members return the garments. The recycling nature of the garment inventory is further complicated by occasional garment retirements. This dynamic environment requires sophisticated forecasting models to have enough garments to meet cast member demand while not overspending on garments that sit on a shelf.

Another innovative way the resort uses forecasting is for attraction wait times. The most popular attractions utilize Disney’s FASTPASS system—a unique virtual queueing system that allows guests to receive a ticket with a designated one-hour window of time when they can return and skip the regular line. The virtual queue poses an extra challenge to forecasting the standby wait time since many FASTPASS guests will return before the guest entering the standby queue reaches the front of the line.

**Improving Guest Experience through Forecasting**

FORECASTING SERVES AS the analytical foundation for operations planning at the Resort. It all starts with the park attendance forecast, which lays out the expected attendance at each park. These predictions are strongly considered when setting park hours and performing other strategic planning. More granular forecasts are required for each individual area, such as guest arrivals at the hotel front desks. The company recently launched a new labor demand planning system, which generates transaction forecasts for every 15-minute period at many locations throughout the property, including park entry turnstiles, quick-service restaurants and merchandise locations. These forecasts help the resort plan labor effectively to ensure guest service standards are met.
The forecasts are posted at the front of the attractions to help guests choose whether to enter the line, take a FASTPASS ticket or return to the attraction later in the day.

From a central command center underneath the Magic Kingdom, forecasting models are executed every 5-10 minutes to project the return patterns of our FASTPASS guests based on a variety of factors, including entertainment schedules and the number of FASTPASS tickets that have been distributed. These forecasts are posted at the front of the attractions to help guests choose whether to enter the line, take a FASTPASS ticket or return to the attraction later in the day. As an added bonus, these projected wait times are also available on Disney’s Mobile Magic smart phone app, which shares real-time information about the parks throughout the day.

Making Smarter Decisions

While accurate forecasting is important, the results are only valuable when utilized to make smarter decisions. As Disney analysts understand more about guests and their preferences, they can utilize analytics to customize offerings and experiences that better match resort guests’ desires. As one example, data mining is used to understand what vacation packages are most appealing to different types of guests. This analysis, coupled with optimization models, allows the company’s Web site and our call center agents to present offers that provide a more customized vacation planning experience.

The resort’s table-service restaurant operation leverages optimization in unique ways. Statistical analyses help the company understand the patterns around party sizes, arrival times and table turn times. This knowledge is incorporated into mathematical models that determine the right mix of tables to best meet guest demand. Another set of models helps develop inventory templates that embrace the stochastic nature of the operation while maximizing the utilization of the restaurant. A recent update made these models dynamic in nature—accounting for the bookings already made while considering the projected reservations up until the actual day arrives.

Disney also applies analytics to streamline back-of-house operations. An on-site textiles facility handles nearly 300,000 pounds of laundry every day, servicing costumes from across the operation as well as linens from resort hotels. The resort leverages computer simulation to recreate the facility in a virtual environment. Simulation offers many benefits prior to making physical changes, including identifying potential bottlenecks and testing new concepts or designs that can increase the overall capacity of the facility. The resort has also utilized simulations in many other operational settings, including attractions, hotel front desks, restaurants and warehousing facilities.

An Emerging Analytical Culture

Over the past decade, analytics at Disney have emerged as a powerful means to bring even more magic to its resort guests.
Numerous departments across the company are leveraging enhanced tool sets to help solve its most challenging business problems, including forecasting, marketing, industrial engineering, revenue management and transportation, to name just a few. One result of this growth is the annual Disney Analytics & Optimization Summit. Taking place in the fall, it brings together cast members who have analytical roles throughout the company with other external O.R. professionals. Last year, nearly 300 cast members attended the summit – a true testament to the volume of analytical work being accomplished and how it is highly valued throughout the company.

While much of this work originated at Walt Disney World, the groups are also taking on projects throughout the broader Disney organization. Many of the successful analytical projects are subsequently implemented at our other parks and resorts around the world. In fact, Disney recently launched two new cruise ships into the Disney Cruise Line family, the Disney Dream and Disney Fantasy. Analytics were utilized throughout the planning process, including organizing the logistics around training the nearly 1,700 new crew members and planning crew rotations on and off the ship.

Disney also continues to look for ways to expand its analytical best practices to other segments of the company, including ABC, ESPN and Studios divisions. With more data becoming available in an ever-changing landscape, Disney’s need for analytics will continue to grow in the future.

**Pete Buczkowski** (peter.s.buczkowski@disney.com) is the manager of the Advanced Analytics team inside the Disney Industrial Engineering department, providing analytical insight to solve operational challenges at the theme parks and resorts. **Hai Chu** (hai.d.chu@disney.com) is the director of Decision Science and Support within the Revenue Management & Analytics department. His team builds mathematical models to optimize decision-making across the entire Walt Disney Company.