

## Results

Adding a new organization method to the materials and consumables in the storage center we will decrease the time workers spend retrieving and putting materials back. We will also increase efficiency by moving the supplies closer to the workers' stations.

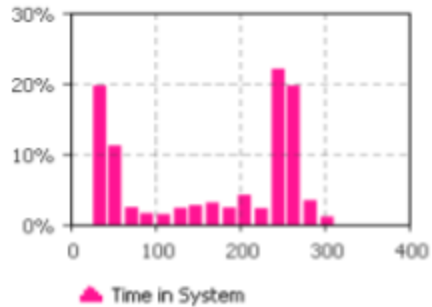


Figure 4: Current Time in Motion Study

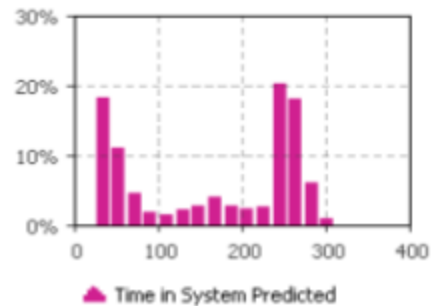


Figure 5: Predicted Time in Motion Studies

## Conclusion

L'Oreal requested our team target the flow of raw materials within their DemiGrand but our solution is also a great tool for supply chain management. Our innovative modeling strategy can be applied to an assortment of companies who have inefficiencies in their supply chain network. Our team can utilize the same technology and techniques to analyze the flow of materials, the movement of workers, machinery, or the shipping of products from one location to another.

## About Us

**Michele Meade** will be graduating in December 2017 with a Bachelor of Engineering in Engineering Management with a concentration in Systems Engineering. After graduating she will be joining Builders First Source as a leader in the engineering department.



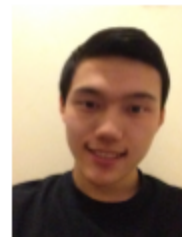
**Gina Salmins** will be graduating with a Bachelor of Engineering in Engineering Management with a minor in Economics. After graduation she will be joining Johnson & Johnson's IT Leadership Development Program.



**Robert Sarrow** will be graduating with both a Bachelor of Engineering in Engineering Management and Master of Engineering in Systems Engineering with a focus on Data Exploration and Visualization for Risk and Decision-Making. After graduation he will be joining the firm Protiviti as an Internal Audit and Financial Advisor Consultant.



**Peter Yeung** will be graduating with a Bachelor of Engineering in Engineering Management with a minor in Economics. After graduation he will be pursuing a role in project management.



# L'ORÉAL USA

## Raw Material Flow Optimization

Using lean and kaizen manufacturing philosophies and simulation software to assess and optimize the flow of raw materials in the L'Oreal Research and Innovation Development Facility.



**STEVENS**  
INSTITUTE of TECHNOLOGY  
THE INNOVATION UNIVERSITY

# Project Background

L’Oreal is a French based beauty company with a research and innovation development facility located in Clark, NJ.

L’Oreal has determined that the flow of raw materials in their DemiGrand, or pilot plant, should be analyzed for opportunities that would lead to simplification and optimization of the flow, as well as overall waste minimization. The Senior Innovation Team has employed lean and kaizen manufacturing philosophies, simulation, and visualization to tackle the project.

## Mission

Our mission is to enable L’Oreal to perform at a high efficiency by analyzing the current flow of raw materials from beginning to end with the goal of saving on cost, storage and waste.

## Methodologies

The team conducted several site visits and interviewed the employees to learn their current processes and identify pain points. A simulation model was determined to be the best approach. This would allow the team to run test cases of current versus recommended layouts in the DemiGrand. We could then analyze the different run times for improvements.

AnyLogic, a discrete event simulation software, has been used to model the sequence of events involved in receiving and preparing a material to be delivered to its respective lab. As shown in the figure to the right, every movement of the material, such as unpacking and testing, is timed down to the minute and inputted as parameters in the model. The reception of materials in 2015 and 2016 has been utilized as historical data to portray a realistic day-by-day simulation of the DemiGrand.

The team also employed lean and kaizen manufacturing philosophies to improve the layout of the DemiGrand. The first step in 5S lean management is Sort. The main objective of this S is to keep only necessary items in the workplace. To start the team recommends reorganizing the storage areas to make sure there are no obstructions. This is important because there is an abundance of space inefficiently used.



The second S is set in order. The objective is to arrange items to promote an efficient workflow. This is done by arranging all the items in the DemiGrand so they can be easily selected for use. For example, due to safety regulations the top shelf is unable to be used to store chemicals. Therefore to utilize the empty space, the team has recommended that supplies be moved to the top shelves so they are closer to the work stations.

For the shine step, our focus is directed towards the labs. In order to prevent cluttering, hoarding, and misplacing materials everyone should have a clean work space.

Standards should be documented for each process and easily referenced throughout the facility. This will ensure everyone is aware of them and on the same page, as well as make sure all equipment and tools are being used to the maximum efficiency.

The final S is sustain. The team is aware that many of the processes are already performed. It is imperative that they continue. Monthly feedback is key in order to determine if the new methods are making a positive impact.

## Solution

The model has been analyzed for bottlenecks and the recommendations made by the team will be applied to it for evaluation. Before making permanent changes in the DemiGrand, our model will be used as a risk management tool. We will use it to test the outcome and benefit of our recommendations, which involves a new organization method in the storage center as well as an updated forecasting model that determines the ideal quantities and frequency of ordering materials.

