

# Sreenath Chalil Madathil

## Contact

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## Skills

### Research Methods

Linear Programming  
Combinatorial Optimization  
Mathematical Modeling  
Discrete Event Simulation  
Heuristics and Meta Heuristics  
Techniques  
Supply Chain Analysis & Design  
Design of Experiments  
Multi-Criteria Decision Making  
Game Theory  
Sensitivity Analysis  
Agent-based Simulation

### Software Programs

Expert  
Julia | Matlab  
JuMP | Gurobi | Arena  
Access | Visio  
VBA in Excel  
  
Intermediate  
C++ | C | Anylogic | Latex  
OptQuest | Process Analyzer  
COBOL | DB2 | SQL | JCL  
HTML5 | Adobe Dreamweaver  
Adobe Photoshop | Indesign  
  
Beginner  
SAS | MiniTab  
Turbo Architecture

## Resume

## Experience

- 2017 - Current **Binghamton University** Binghamton, NY  
*Research Scientist at the Watson Institute for Systems Excellence*
- 2011 - 2017 **Clemson University** Clemson, SC  
*Graduate Research Assistant | Graduate Teaching Assistant*
- 2015 - 2016 **Los Alamos National Lab** Los Alamos, NM  
*Graduate Research Intern at Center for Non - Linear Studies*
- Summer 2014 **BMW Manufacturing Inc** Greer, SC  
*Research Scholar for Planning, Plant Design and Simulation Team*
- 2006 - 2011 **Cognizant Technology Solutions** Multiple Locations in USA and India  
*Software Consultant and Client - side Analyst*
- First Data Corporations *Omaha, NE*
  - WellPoint Inc *New Haven, CT*

## Education

- 2013 - 2017 **Doctor of Philosophy in Industrial Engineering** Clemson University  
**Dissertation:**  
Modeling and Analysis of Remote, Off-grid Microgrids
- 2011 - 2013 **Master of Science in Industrial Engineering** Clemson University  
**Thesis:**  
Improved Photolithography Scheduling in Semiconductor Manufacturing
- 2002 - 2006 **Bachelor of Technology** Mahatma Gandhi University  
College: Federal Institute of Science and Technology (FISAT)  
Department of Electrical and Electronics Engineering

## Honors & Awards

- August 2016 **Best Poster Award for "Celebrating Student Achievement"**  
University of New Mexico - Los Alamos campus
- 2015 - 2016 **Automated Storage Retrieval Systems Honor Scholarship (\$4000)**  
Material Handling Education Foundation, Inc
- 2013 - 2014 **Outstanding Graduate Teaching Assistant Award** Clemson University  
Department of Industrial Engineering
- 2012 - 2013 **Outstanding Teaching Assistant of the Year Award** Clemson University  
Department of Industrial Engineering
- Fall 2010 **Associate of the Quarter** Omaha, NE  
Cognizant Technology Solutions

## Academic & Professional Activities

2016 - 2017	<b>Clemson Graduate Student Government</b> Clemson University	Senate Clerk
2013 - 2017	<b>Clemson Graduate Student Government</b> Clemson University	Senator
2013 - 2017	<b>Academic Integrity Committee</b> Clemson University	Student Representative
2013 - 2014	<b>Reviewer - International Journal of Production Research</b> Clemson University	
2013 - 2014	<b>Alpha Pi Mu Honor Society</b> Industrial Engineering Honor Society, Clemson University	President
2012 - 2017	<b>INFORMS, IISE, IEEE</b> Clemson University	Student Member

## Publications and Presentations

1. **Chalil Madathil, S.**, Yamangil, E., Nagarajan, H., Barnes, A., Bent, R., Backhaus, S., Mason, S. J., Mashayekh, S., & Stadler, M. (2016). Resilient Off-grid Microgrids: Capacity Planning and N - 1 Security. IEEE Transactions on Smartgrids, (Accepted).
2. Mashayekh, S., Stadler, M., **Chalil Madathil, S.**, & Nagarajan, H., (2017). Security - Constrained Design of Isolated Multi - Energy Microgrids. IEEE Transactions on Power Systems, (Accepted).
3. **Chalil Madathil, S.**, Nambiar, S., Mason, S. J., & Kurz, M.E. (2016). On scheduling a photolithography area containing cluster tools. Computers & Industrial Engineering, (Under review).
4. **Chalil Madathil, S.**, Nagarajan, H., Bent, R., & Mason, S. J. (2017). Resilient Off-grid Microgrids: Topology Design, Capacity Planning and N - 1 Security. Applied Energy, (Working paper).
5. Cattaneo, A., **Chalil Madathil, S.**, & Backhaus, S., (2017). Microgrid Transient Dynamics and Survivability. Applied energy UNILAB Special Issue on "Distributed Energy & Microgrid", (Working paper).
6. **Chalil Madathil, S.**, Yamangil, E., Nagarajan, H., Barnes, A., Bent, R., Backhaus, S., Mason, S. J., Mashayekh, S., & Stadler, M. (2016, July). Resilient Off-grid Microgrids: Capacity Planning and N - 1 Security. Poster presented at the DTRA Basic Research Technical Review, Springfield, VA.
7. **Chalil Madathil, S.**, Yamangil, E., Nagarajan, H., Barnes, A., Bent, R., Backhaus, S., Mason, S. J., Mashayekh, S., & Stadler, M. (2016, August). Resilient Off-grid Microgrids: Capacity Planning and N - 1 Security. Poster presented at the Student Symposium at University of New Mexico - Los Alamos campus, Los Alamos, NM.

## Teaching Assistant

Course Number	Course Name	Semester
IE 2800	Methods of Operations Research I	Fall 2011
IE 4400/6400	Decision Support Systems in Industrial Engineering	Fall 2012 , Fall 2013
IE 8540	Fundamentals of Supply Chain and Logistics	Spring 2013 , Spring 2014
IE 4570/6570	Transportation and Logistics Engineering	Summer 2013
IE 4670	Systems Design II (Senior Capstone Design Projects)	Spring 2014 , Fall 2016 , Spring 2017
IE 8580	Case Studies in Supply Chain and Logistics	Spring 2015
IE 8590	Capstone Design Project	Spring 2013
MGT 8560	Business Fundamentals for Supply Chain Management	Summer 2017

# Research Projects

## **Design of Remote Off-grid Microgrids**

2015 - 2017

There are some remote communities in Alaska that are not connected to the national grid. To serve their power demand, they have diesel generators and hydroelectric power generators. When disruption happens to the power generation due to inclement weather or disrupted diesel supply chain, the whole community will lose power. We develop a nonlinear mathematical model to design the remote off - grid microgrid that can incorporate renewable power generation like solar and wind along with the existing generation capabilities. We also model a resilient design for these networks to ensure that the system can still generate power to meet the demand even when one of the generation sources fails to achieve their desired capacity. This research is currently under progress in partnership with Los Alamos National Lab.

## **Roll Size Analysis for a Fabric Manufacturing Company**

Fall 2014

A company with multiple distribution centers (DC) across the country has data about their current inventory as well as number of orders and the length of fabrics that were ordered for every month. Analysis of data revealed important insights regarding amount and length of fabric that they need to keep at each of their DCs in the future. We were able to identify locations where they are keeping more inventory than required and our analysis helped them to reduce their losses and wastage of clothes.

## **Model Allocation To Paint Shops With Varying Flexibility**

Summer 2014

A decision support system to assign various models of cars coming from body shop to paint shop is developed using VBA in Excel and Solver. Various objectives like utilization, idle time, and number of resources were considered while allocating models to the shops. The decisions are also made based on the level of flexibility of each of the paint shops. Various resources also need to be scheduled to account for the different shift schedules between the shops. A cost comparison of current schedule with respect to the improved schedule proved efficiency of the model

## **Scheduling Systems For Semiconductor Industry**

2011 - 2013

Developed a mathematical mixed integer programming (MIP) model to solve a scheduling problem in semiconductor manufacturing industry that includes flexible flowshop system of cluster tools as well as stand - alone tools for the photolithography stage of semiconductor wafer fabrication. A permutation - based heuristic algorithm was also developed and the performance of the algorithm is compared with the mathematical model. The major observation from the results was that the heuristic algorithm found optimal or near - optimal solutions in a very short span of time.

## **Emergency Room Efficiency Analysis Using Simulation**

Fall 2012

Discrete event simulation technique was used to analyze the current operation and utilization of emergency rooms in a hospital. Based on the analysis of simulation model, a recommendation was made regarding the staffing schedule, and appointment slots for the patients. We also altered the model to perform a What - If analysis of the system when there is a forecast for busier patient arrivals and made recommendations to improve their current system. Various tools of Arena simulation software like OptQuest, process analyzer and output analyzer were used to model the forecasted scenarios.

## **Vehicle Routing Problem: Airlifting Patients**

Spring 2012

Developed a mathematical mixed integer programming (MIP) model to solve a vehicle routing problem for the specific case of airlifting. This project was done as a class project to model the patient pickup and delivery to minimize the total distance traveled by the helicopters. The initial locations for the helicopters are also decided by the model.

## **Course Development For Center For Workforce Development**

2012 - 2013

Clemson University Center for Workforce Development (CUCWD) is a NSF funded project to develop course works for the technical colleges and industries using virtual reality and simulation. We were part of the team that builds the course materials necessary for the basic education of the future workforce in technical colleges. As part of the course development, we created courses for Green supply chain, Green transportation, Renewable energy resources, and Sustainability. Various academic and industrial references were used to develop such modules that will be used in technical colleges as part of their e - learning part of the courses