# Sugandha Singla

CONTACT
INFORMATION

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EDUCATION

**Indian Institute of Technology Bombay**, Mumbai, India                Jul'10 -May'14
Bachelor of Technology in Chemical Engineering, CGPA: 6.74/10

PUBLICATIONS

**Prateek Maheshwari, Sugandha Singla, Yogendra Shastri - "Resiliency optimization of biomass to biofuel supply chain incorporating regional biomass pre-processing depots"** *Biomass and Bioenergy. 97: 116-131, 2017.*

CONFERENCE

**Indian Control Conference**                                                    Jan'17
- Arindam Bhattacharyya, Vivek Yogi, Sugandha Singla, Mani Bhushan, M.G. Kelkar and Madhu N. Belur "Adaptive and online models to detect and estimate gross error in SPNDs" In ICC at IIT Guwahati, paper number 117

**American Society of Agricultural & Biological Engineers Annual Meeting**      Jul'15
- Prateek Maheshwari, Sugandha Singla, Yogendra Shastri "Resiliency considerations in biomass to biofuel supply chain optimization" In ASABE Annual Meeting, paper number 152183808, New Orleans, LA

**United Nations Young Change Makers Conclave**                                    Apr'12
*Organised by United Nations Information Center & Consulate General of United States, India*
- Selected among top 200 under 25 from all over India to participate in discussions with eminent leaders US Consulate General, UNIC India Director, Mr Nitin Paranjpe CEO HUL

**Industrial Green Chemistry World Symposium**                                    Dec'11
- Invited among top 50 colleges & industries to showcase Biosynth - first students initiative to set up a Biodiesel Production Plant (250 L capacity) at an Institute level in India

RESEARCH
EXPERIENCE

**Resiliency Considerations in *Biofuel Production Supply Chain Design Optimization***
*Research Assistant*                        Department of Chemical Engineering, IIT Bombay
*Advisor:* Prof. Yogendra Shastri                                              Jul'14 - Mar'15

- Developed *Deterministic Optimization Model* using *Mixed Integer Linear Programming* in *GAMS*; provides post harvest supply chain network configuration for lignocellulosic biofuels produced in 289 farms located in thirteen county region of Southern Illinois, US

- Demonstrated a decrease of 11% in transportation costs by incorporating the concept of Regional Biomass Processing Depots to quantitatively show their role as efficient storage locations and in turn, mitigating losses incurred due to disruptions such as floods, droughts

- Developed *Stochastic Optimization Model* to incorporate disruption costs accounting for uncertainties by adding probable eventualities in the model; returns supply chain design network with quantized efficiency-resiliency trade-offs

- Comparative study between robustness of supply chains obtained from consideration and non-consideration of expected disruptions shows that substantial improvements in reliability can be made with marginal rise in operating cost without decreasing efficiency very much

**Data Reconciliation & Gross Error Analysis of Self Powered Neutron Detectors**

*Research Assistant*             Department of Electrical Engineering, IIT Bombay

*Advisor:* Prof. Mani Bhushan and Prof. Madhu Bellur           Apr'15 - Nov'15

- Grouped SPNDs with different dynamic characteristics into smaller clusters with higher correlation coefficients using *K-Means Clustering Algorithms* in MATLAB.

- Developed linear static models using Principle Component Analysis based on eigen decomposition of covariance matrix of measurement data of SPNDs in clusters. Analysis of the residuals arising from these models were used for fault detection and diagnosis in SPND

- Developed a Recursive Principle Component Analysis model to develop data driven, adaptive linear models to capture time varying relationships among the detectors which change due to significant variations in the neutron flux profiles in the reactor

- Reduced computational cost of adapting models in comparison to batch processing while updating models, making real time implementation possible by using recursion approach

PROFESSIONAL
EXPERIENCE

**Certus+ Management Consultancy**, US           Jul'16 - Present

*Senior Associate, Data Scientist*

- Developed provider-to-user recommendation API built on explicit & implicit collaborative filtering as well as logistic scoring of common preferences for a social food web application using tools: Python, Flask (API), Scikit-learn, Pandas, AWS (hosting of API)

- Built a robust pricing recommendation system based on location and name of food item using a hybrid of various clustering techniques in Python using public restaurants' data

- Developed a flight delay insurance smart contract decentralized web application on the Ethereum blockchain using Flask, jQuery, and Boostrap for the front end and Solidity for the dApp (distributed application) backend

**Nomura Services India Private Limited**           Aug'15 - Jun'16

*Counterparty Credit Risk Analyst, Risk Data Management & Control*

- Calculated exposure and movement numbers using Monte Carlo Simulation for OTC derivatives portfolio for major asset classes including Rates, FX, Credit, Equities under international regulatory framework for banks

- Analysed & Performed checks for validating Expected Peak Exposure numbers generated using Internal Model Method for traders and portfolio managers

- Expedited the turn around time by 50% by automating credit data & exposure monitoring checks using Excel VBA and Python

- Liaised with Trading, Operations, Legal & Technology departments to efficiently manage data integrity from credit risk perspective

INTERNSHIPS

**ITC Ltd., Kolkata**, India           May'13 - Jul'13

Summer Trainee, Food and Beverages Division

*Improvisation of Supply Chain Management & Logistics for 'Bingo'- Potato Chips*

- Benchmarked current supply chain process for potato chips *'Bingo'* against the process practised for *'Frito Lays'*- biggest market competitor in sector and proposed key changes at both heuristic and deployment levels

- Researched markets at retail and wholesale distribution level by interacting with owners and distributors to understand the market dynamics of both products

- Built *'Manual Demand Order'* and *'Estimate Fidelity errors'* structure and incorporated them in *'Shortage Tool',* the diagnostic tool for identifying the reasons for shortage between order quantity and the actual deliveries at the WSP to WDs

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| PROJECTS | **Optimisation of fantasy football team** | Apr'14 |
| | *Guide: Prof. Yogendra Shastri* | *Dynamic Programming* |

- Modeled optimum team selection problem for fantasy premier league in MATLAB by using a dynamic programming algorithm
- Performed multivariate sensitivity analysis on the optimal output to generate different solutions and determine the impact parameters and variables has on the optimal solution

**Biodiesel Production from waste vegetable oil**　　　　　　Jun'11 - Apr'12

*With the vision of meeting the campus energy needs, this project was initiated by a team of students to design and install a self-sustained biodiesel plant, with a capacity of 250 L/batch*
*Guide: Prof. Sanjay Mahajani*

- R&D - Performed experiments to maximize the conversion of triglycerides to biodiesel by optimizing the oil-methanol ratio in transesterication step.
- Plant Commissioning - Performed hydro- and pressure-testing of equipments and pipelines during the commissioning of biodiesel plant set up in campus
- Life Cycle Assessment - Prepared a detailed LCA report for comparison of biodiesel and diesel and found that net greenhouse gas emission from B20 blend of biodiesel is less than that from diesel.

COMPUTER SKILLS

*Programming*:　C/C++, Python, VBA, Scikit-Learn, Pandas
*Computing*:　GAMS, MATLAB

SELECTED COURSES

| Applied Multivariate Statistics | Optimization | Data Analysis & Interpretation |
|---|---|---|
| Differential Equations 1 & 2 | Numerical Analysis | Linear Algebra |

POSITIONS OF RESPONSIBILITY

**Manager of Publicity Department, Azeotropy**　　　　　　　　2013
Azeotropy is the Annual Symposium of Chemical Engineering Department, IIT Bombay
*Built & led a 2-tier team of 100 students to conceptualize and execute the entire Publicity Campaign across 250 Engineering Colleges all over India*

- Revitalized publicity by launching new mascot, logos, videos, several new events & competitions resulting in 50% growth in footfall & online social media outreach
- Established network of 100 ambassadors across nation to reach out to new colleges and ensure the efficient outreach of Azeotropy

**Convener, Rang & Pixels**　　　　　　　　　　　　　　　　2011
*Rang and Pixels are the Fine Arts and Photography Clubs respectively of IIT Bombay to provide a platform for 10,000 students*

- Pioneered 1st Fine Arts Classes and Digital Photography Lectures, Photowalks & 'Photographer of Week ventures in campus to inspire students leading to 50% increase in active engagements
- Organized the 9th edition of Kaladarshan, the Annual Photography & Fine Arts Exhibition, showcasing work of more than 100 artists and 150 photographers to 5000 visitors
- Continuous efforts led IIT Bombay to win several inter college festivals across the nation

EXTRA CURRICULAR ACTIVITIES

- Designed Mood Indigo Wall 2011 - The Cultural Festival of IIT Bombay which received major viewership and popularity on social media (Facebook)
- Conceptualized and executed 5 Fine Art competitions & workshops in Mood Indigo 2011 attracting, 500+ participants from all colleges across the country