Sugandha Singla

Contact Information

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Research Interest

International Economics, Macroeconomics, Optimization, Applied Statistics

Education

Indian Institute of Technology Bombay, Mumbai, India — July 2010 -April 2014
Bachelor of Technology in Department of Chemical Engineering

Publications

Sugandha Singla, Prateek Maheshwari, Yogendra Shastri
Resiliency Considerations in Biomass to Biofuel Supply Chain Optimisation, *Under Publication*
Paper will be presented at *ASABE Annual International Meeting* , New Orleans US, 2015

Conference

Young Change Makers Conclave — April 2012
Organised by United Nations Information Center & Consulate General of United States, India

- Selected among top 200 young entrepreneurs, professionals and students from all over India for dialogues with eminent leaders- US Consulate General and UNIC India Director

Research Experience

Resiliency Considerations in *Biofuel Production Supply Chain Design Optimization*
Research Assistant — Department of Chemical Engineering, IIT Bombay
Advisor: Prof. Yogendra Shastri — July 2014 - March 2015

- Developed *Deterministic Optimization Model* using *Mixed Integer Linear Programming* in *GAMS*; provides post harvest supply chain network configuration for lignocellulosic biofuels produced in 13 county region of Southern Illinois, US
- Incorporated the theoretical concept of Regional Biomass Processing Depots (RBPDs) to quantitatively analyse and show their importance in reducing transport costs, acting as efficient storage locations and in turn, mitigating losses incurred due to disruptions
- Developed *Stochastic Optimization Model* to incorporate disruptions costs accounting for uncertainties by adding probable eventualities in the model; returns supply chain design network with quantized efficiency-resiliency trade-offs
- Comparisons made 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 and Gross Error Analysis of Self Powered Neutron Detectors
Research Assistant — Department of Electrical Engineering, IIT Bombay
Advisor: Prof. Mani Bhushan and Prof Madhu Bellur — April 2015- Present

- Grouped SPNDs with different dynamic characteristics into smaller clusters of SPNDs with higher correlation coefficients using *K-Means Clustering Algorithms* in *MATLAB*.
- Developed models using Principle Component Analysis based on Eigen-Decomposition of Covariance matrix of measurement data of SPNDs in clusters. The models are used for fault detection and diagnosis in defective SPND

Computer Skills

Programming: C/C++, Python, MATLAB, SQL, HTML, GAMS
Publishing: LaTeX

Selected Courses

Applied Multivariate Statistics	Optimization	Economics
Differential Equations i& ii	Numerical Analysis	Linear Algebra
Data Analysis & Interpretation	Complex Analysis	

Internships

ITC Ltd., Kolkata, India — May-July 2013
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

Motilal Oswal Securities Private Ltd., Mumbai, India — December 2011
Research Analyst, Equity Research Division
Recent developments in Financial Markets & Sub Prime Mortgage crisis of 2008

- Studied and analyzed recent developments in financial markets, Causes and impact of Subprime Mortgage Crisis of 2008 on global economy.
- Examined the aftermath of Financial Crisis and the post crisis US policy's effect on Indian markets by analyzing the trend of growth and flow of Foreign Institutional Investments (FIIs) in Indian economy in the past two decades.

Projects

Optimisation of fantasy football team — April 2014
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

Biodielsel Production from waste vegetable oil — June 2011- April 2012
Part of 9 member core team to install the first-ever Student's Biodiesel Production Pilot Plant with a capacity of 250l at an Institute level in India
Guide: Prof. Sanjay Mahajani

- Coordinated with major project stakeholders to successfully commission plant within 2 months subsequently to produce 520 litres of Biodiesel in a year
- Analyzed the life cycle of biodiesel to characterize *economics & sustainability* of biodiesel which helped in reducing dependence of IIT Bombay on diesel by 5% through diesel substitution in generator sets
- 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.
- One amongst the 50 companies and colleges to be invited across the globe to showcase project in **Industrial Green Chemistry World Symposium'11**

Awards and Achievements

- Secured All India Rank 750 out of 474 000 students appeared for Undergraduate Engineering Entrance Exam for Indian Institutes of Technology 2010
- Awarded Certificate of Achievement by President, DAV College Managing Committee for exceptional performance in Academics at high school level 2007
- Secured All India Rank 172 in National Science Olympiad and All India Rank 301 in Interactive Maths Olympiad 2007

Positions of Responsibility

Manager- Publicity, 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 the 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 across the nation
- Pioneered deals with printing and courier partners to reduce expenditure by 20%

Convener, Rang & Pixels 2011

Rang and Pixels is the Fine Arts and Photography Club respectively of IIT Bombay to provide a platform for 10 000 students to nurture themselves

- Pioneered 1st Fine Arts Classes and Digital Photography Lectures, Photowalks & 'Photographer of Week' ventures in campus to inspire students leading to 50% increase in activities
- 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

- Secured 3-D Modeling Competition at Chaos, The Cultural Festival of Indian Institute of Management, Ahmedabad 2012
- 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