Rachit Shrivastava

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Specialization:
Dual Degree (B.Tech + M.Tech), Department of Energy Science and Engineering (IIT Bombay)

M. Tech Thesis :
Forecasting and Analysis of Wind in Maharashtra

Current Designation:
Engineer (Technology Development)

Organization:
Power Grid Corporation of India Ltd.
(Central Transmission Utility of India)

Career Statement

Renewable energy resources, especially wind and solar, experience intermittence, a combination of Non-Controllable Variability and Partial Unpredictability, and are Location Dependent. I have been dedicatedly working on these aspects and challenges created by them for past few years and wish to continue further to gain a deeper understanding to resolve them.

Education

Qualification	University/ Board	Institute	Year	CGPA / %
Dual Degree (B.Tech + M.Tech)	IIT Bombay	IIT Bombay	2013	7.94/10
Intermediate/+2	MPBSE	Brilliant Public School, Vidisha	2008	86.67
Matriculation	CBSE	Vatsalya Sr. Sec. School, Vidisha	2006	85.00

Publication

Article title: Understanding the impact of lifestyle on individual carbon footprint
Journal title: Procedia - Social and Behavioral Sciences
Published by Elsevier Ltd. in May-2014
URL: http://www.sciencedirect.com/science/article/pii/S187704281403078X

Academic Achievements, Awards & Recognition

- Secured an All India Rank of 1161 (among over 0.35 million students) in IIT-JEE, one of the most competitive exams in India, for admissions to the prestigious IITs, in the year 2008
- Ranked among the top 0.1% of the 0.8 million students who had appeared for the All India Engineering Entrance Exam (AIEEE) in the year 2008
- Received M.P. Govt. State scholarship (awarded to students admitted to elite institutes of India) for securing admission in IIT Bombay
- Selected for fully funded research internship at Aarhus University, Denmark
- Scored either AA or AB (Top 2 grades) in all the lab courses during undergraduate curriculum
- Elected General Secretary (student representative of over 400 students) of Department of Energy Science and Engineering, IIT Bombay for year 2011-12
- Stood 1st (among more than 80 Students) in school in Standard XII Examination

Professional Experience

Engineer (Technology Development) - Power Grid Corp. of India Ltd. [Aug'13-Present]
POWERGRID is a Govt. Organisation and also the Central Transmission Utility of India. Technology Development is a team of 20 individuals who are responsible for its R&D activities.

Establishment of 1200 kV National Test Station (Approx. Budget USD 30 Million)
(Transmission at this voltage level is one of the highest in the world)

- Part of the team responsible for establishing one-of-its-kind test station through a Public Private Partnership model with 35 switch-gear equipment manufacturers
- Actively involved in engineering, troubleshooting, and commissioning of the test station
- Successfully charged one 1200kV switchyard bay with 1200kV test transmission line
- Currently developing Design Intent Memorandum, a benchmark for commissioning of UHVAC system in the future and working with IEC[1] for standardisation of the technology

Highlight *– This prestigious project has been praised world-wide by transmission industry luminaries and the team has contributed several papers on UHV[2] transmission technology*

Establishment of POWERGRID Advanced Research Centre (Budget USD 30 Million)

- Part of the core team responsible for developing world class R&D Centre of POWERGRID
- Responsible for setting up state-of-the-art Design, Simulation and Validation lab
- Lab aims at simulation & design validations of transmission system and its components

Research Projects Undertaken

Forecasting and Analysis of Wind in Maharashtra [Jun'12-May'13]
M. Tech Thesis, Indian Institute of Technology, Bombay Prof. Rangan Banerjee

- Designed a fast & accurate tool for wind velocity and wind power forecasting
- Arduously gathered wind generation and velocity data from SLDCs[3] and wind farms
- Predicted wind velocity and power at various time scales using many **Auto-Regressive Moving Average** models and with a **Mean Average Error of 0.2-0.7 m/s**
- Evaluated various models using **Akaike and Bayesian Information Criterion**
- The developed tool is advantageous for wind farms for making operational decisions

Understanding the Impact of Lifestyle on Carbon Footprint [Mar'11-Dec'11]
Voluntary Project, Indian Institute of Technology, Bombay Prof. Anand B. Rao

- Compiled a detailed report comparing average per-capita carbon footprint of rural and urban areas with similar socio-economic status to identify the emission patterns in India
- Interviewed 150 households across various socio-economic sectors in rural and urban areas near Mumbai analysing the relation between lifestyle and carbon footprint
- Co-authored a research paper with suggestions of an equitable distribution and reduction of per capita carbon footprint

Highlight *– Paper presented in ICTMS[4] - 2013 & Published in International Journal Procedia – Social and Behavioral Sciences under Elsevier in May 2014*

Modelling of Continental Scale Renewable Energy System [June & July'11]
Research Internship at Aarhus School of Engineering, Denmark Prof. Martin Greiner

- Developed a wind speed to wind power conversion tool using python language
- Mapped annual wind velocity and power data and its power with 6 minute time horizon
- Conducted a thorough survey of 34 commercial wind turbines
- Studied prominent wind turbine models for deciding their location specific suitability

[1]IEC – International Electrotechnical Commission *[2]UHV – Ultra High Voltage*
[3]SLDC – State Load Dispatch Centre *[4]ICTMS – International Conference on Trade, Markets, and Sustainability*

Teaching Experience

- Teaching Assistant for EN305: Fluid Mechanics Course and EN309: Thermal and Fluid Engineering Lab in Autumn Semester - 2012
- Developed academic content & taught over 50 underprivileged students in a non-profit organisation 'Vidya' in the year 2008
- Voluntarily taught students towards their preparation for IIT-JEE in the years 2012 and 2013

Key Academic Projects

Designing of 20 kW Downdraft Gasifier [2012]
Energy Design Project [Prof. Anuradda Ganesh]

- Illustrated engineering drawings & optimized calculations for each part of the reactor
- Successfully and accurately modelled 20 kW downdraft gasifier using AutoCAD
- Devised new design for ash handling unit to overcome problems of poor ash discharge
- Received **AA Grade** (Highest Grade) in Energy Design Project

Designing and Fabrication of Green Gym [2011]
Energy Innovation Lab Project [Prof. Chetan Singh Solanki]

- Conceptualized a scheme to make gymnasiums energy-wise self-sustainable
- Identified the limitations of electricity generation from conventional gym equipment
- Designed and fabricated a prototype of an electricity generating shoulder press equipment of 200W rating and a budget of USD 400
- Received **AA grade** (Highest Grade) in Energy Innovation Lab

Mathematical Modelling of Continuous Stirred Tank Bioreactor [2011]
Energy System Modelling and Analysis Project [Prof. Rangan Banerjee]

- Studied the working and practical aspects of continuous stirred tank bioreactor
- Simulated the model in MATLAB to determine time variation of bioreactor yield
- Compared the model results with experimental results to evaluate 10% maximum error
- Designed Information flow diagram to find out optimum parameters for maximum yield

Leadership Experience

General Secretary, Department of Energy Science & Engineering, IIT Bombay [Aug'11-Jul'12]
(Elected representative of over 400 students in various decision making committees of dept.)

- Initiated and conceptualized **'Helios'**, Annual Department festival of DESE[5], IIT Bombay
- Founded the **'IIT Bombay - Energy Club'** to generate awareness about the challenging and exacting issues of energy
  - Assembled a team of energy enthusiasts across the institute for successful organization of 6 events including lectures and debates
  - Model United Nations, the flagship event of the club, got international outreach with participation from US, Europe and Pakistan
- Launched **'Wattsup?'**, student magazine of DESE, IIT Bombay
  - The Magazine Showcased interviews of research pioneers such as **Dr. Michael Gratzel,** father of dye solar cells
  - Distributed **over 1200 copies** to industry personnel as well as students across colleges in Mumbai

[5]DESE –Department of Energy Science and Engineering

- Organized third chapter of international conferences ICAER'11[6] and Globaltech
- Led the organizing team of 'Energy Day', a platform for intermingling of ideas among the academic world and the industry in the field of Energy

Overall Event Coordinator – Helios'12
(First & only of its kind platform aimed at attracting youth towards issues of energy crisis)

- Spearheaded a 3 tier team of 68 coordinators for the conceptualization and successful completion of 3 workshops, 6 guest lectures, 6 competitions and an exhibition
- Managed Budget of **USD 11000**, gathering media coverage worth **USD 38000**
- Effected a strong sense of interdepartmental relationship among coordinators and acted as a liaison between faculty, institute administration and team members

Highlight *- The Initiatives were covered in many leading national dailies providing the department a nationwide visibility and increased participation in the following years*

Miscellaneous

Skills
- Languages – Python
- Software – MATLAB, AutoCAD, HYPERSIM (Hydro-Quebec, Canada)

Sports
- Manager & highest scorer of silver medal winning team of Hostel 5 Football League'13
- Represented hostel in Hockey, Football & Basketball General Championships

Others
- Represented hostel in various fine arts general championships
- Highly Passionate about arts, specially music; travelling & an ardent football follower

Declaration

The information provided above is correct and true to the best of my knowledge.

[6]*ICAER'11 – International Conference on Advances in Energy Research - 2011*