

Anindita Roy

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Professional Profile

- Ph.D from Department of Energy Science and Engineering, IIT Bombay
- 9 years of teaching and 1 year industrial experience
- Reviewer for reputed international journals
- Taught subjects in Mechanical Engineering and Energy Engineering at UG and PG level
- Presented papers in International Conference and publication in International Journals
- Coordinated and conducted several training courses in Solar and Wind Energy Technology at various engineering colleges

Education

Ph.D. (Energy Science and Engineering), IIT Bombay, 2011.

Thesis Title: Optimal Design of Wind-battery Systems for Isolated Application

(Under the guidance of Prof. Santanu Bandyopadhyay and Prof. S.B. Kedare, Department of Energy Science and Engineering)

M. Tech. (Energy Management), School of Energy & Environmental Studies, DAVV, Indore, 2001 with 88.4%.

Thesis Title: WA^SP Modeling of Jamgodrani area

(Under the guidance of Dr. R. L. Sawhney, School of Energy and Environmental Engineering, Indore and Dr. E. Sreevalsan, Centre for Wind Energy Technology (C-WET), Chennai).

B. Tech. (Mechanical Engineering), Shantilal Shah Engg. College, Bhavnagar University, Gujarat, 1999 with 73.5 %.

Work Experience

- Associate Professor in Mechanical Engineering at Pimpri Chinchwad College of Engineering, Pune from 16th June 2014 till date.
- Associate Professor and HOD-PG in Mechanical Engineering Department in G.H. Raisoni College of Engineering and Management, Pune from 3rd August 2012 to 14th June 2014.
- Assistant Professor in School of Energy Studies, University of Pune, from May 2011 to May 2012.
- Senior Research Associate at World Institute of Sustainable Energy (WISE), Pune from August 2011 to Apr 2012.
- Faculty in Mechanical Engineering, at MANET from Sept 2004 to Nov 2005, Pune, India.

- Faculty in Mechanical Engineering, at S.V. National Institute of Technology, Surat from Jul 2002 to Aug 2004.
- Faculty in Mechanical Engineering at Shantilal Shah Engineering College Bhavnagar, Gujarat from Jan 2002 to July 2002.

Honors & Awards

- C.R Mehta Prize for highest marks in Maths in SSC 1992-93 Gujarat board examination.
- Holder of Fellowship from Ministry of Non-conventional Energy Sources (MNES), Govt of India, for post-graduate study in Energy Management, 2000.
- Selected for Internship to University of Tokyo, Japan from IIT Bombay, 2008.
- Selected for “Indo-Scottish exchange program for research scholars in Wind Energy” by Ministry of New and Renewable Energy (MNRE) to Glasgow, Scotland, U.K, 2011.

Publications

Book Chapter:

Anindita Roy and Santanu Bandyopadhyay, Design of an optimal standalone wind power generation system, in Green Energy and Technology, Bentham Science Publishers, 2012.

Refereed International Journal:

1. **Roy A.**, Kedare S.B. and Bandyopadhyay S, Application of design space methodology for optimum sizing of wind-battery systems. *Applied Energy*, 86(12): 2690-2703, 2009.
2. **Roy A.**, Kedare S.B. and Bandyopadhyay S, 2009, Optimum sizing of wind-battery systems incorporating resource uncertainty, *Applied Energy*, 87(8), 2712-2727, 2010.
3. **Roy A.**, Kedare S.B. and Bandyopadhyay S, 2011, Physical Design Space for Isolated Wind-battery System Incorporating Resource Uncertainty, *Journal of Power and Energy: Proceedings of the Institution of Mechanical Engineers*, Part –A. 2011,225:421-442.
4. **Roy A.**, Kedare S.B. and Bandyopadhyay S, 2011, On the Existence of Non-convexities in the Design Space of Isolated Wind-battery Systems, *Wind Engineering*. 2011, 35(2):223-245.
5. **Roy A.**, Kedare S.B., and Bandyopadhyay S. Design and optimization of isolated wind-battery systems incorporating multiple wind generators, *Wind Engineering*. 2014, 38(3):191-216.
6. **Roy A** and Kulkarni G.N. Analysis on the feasibility of a Photovoltaic-Diesel Generator Hybrid System without Energy Storage for off grid electrification in India, *Clean Technologies and Energy Policy*, 2016, Springer.
7. M K Chaudhary and **A Roy**, Design and optimization of a small wind turbine blade for operation at low wind speed, *World Journal of Engineering*, Multi Science Publishers 12(1), 83-94, 2015.

Refereed National Journal:

8. **Roy.A**, Arun P. and Bandyopadhyay S., Design space for isolated power systems-a deterministic approach, *SESI Journal*, 17(1-2), 54-69, 2007.

Presented at International conference:

9. Dhona S and **Roy A**, 'Numerical Investigation of flow over variable length wind turbine blades' accepted for publication in IET Renewable Power Generation Conference, Beijing from Sept 21-23rd 2016.
10. **Roy A**, Rathod A and Kulkarni G.N., Challenges to the diffusion of small wind turbines in India, IET Renewable Power Generation Conference, Beijing from Sept 9-11th 2013.
11. **Roy A**, A methodology for design of isolated multiple wind turbine –battery systems using design space approach. Proceedings of International Conference on Advances in Mechanical Engineering, May 29-31, 2013, COEP, Pune, Maharashtra, India. ISBN: 978-81-927125-0-5
12. **Roy A.**, Kedare S.B. and Bandyopadhyay S, Uncertainty based design of isolated wind-battery power systems, International Conference on Advances in Energy Research (ICAER,), Organized by Department of Energy Science and Engineering, IIT Bombay, Mumbai, India, 2009.
13. **Roy A.**, Kedare S.B., and Bandyopadhyay S., Design of wind power generation systems for industrial applications incorporating resource uncertainty. In Klemes J, Editor. 12th International Conference on Process Integration, modeling and optimization for energy saving and pollution reduction (PRES), 10-13th May Rome, Italy, Volume 18, Chemical Engineering Transactions, 2009:p.647-651.
14. **Chakraborty A**, Sawhney R.L. and Sreevalsan E., WA^{SP} modeling of Jamgodrani Wind Monitoring Station, International Conference on Energy and environmental Technologies, Jaipur, India, October, 2003.

Talks delivered:

1. 'Wind machine analysis and operation' at Continuing Education Programme on Wind Energy Technology, April 15-18th 2008.
2. 'Wind turbine fundamentals, operation and characteristics' at Staff development programme on Solar and Wind Energy Technology, MANIT, Bhopal, Feb 27-Mar 12, 2009.
3. 'Wind Energy Systems' at Entrepreneurship Development Programme on Non-conventional Energy Sources (Sponsored by Department of Science and Technology, GOI), MITCON Udyog Prabodhini, 30-31st Dec, 2011.
4. 'Wind and Hybrid Energy systems' at Staff Training Programme at G.H. Raisoni College of Engineering and Technology, 25th of May, 2012.
5. 'Design of hybrid energy systems' at MNRE sponsored Workshop on Green Energy Technology: Solar Wind hybrid energy system' conducted by Dyanganga College of Engineering & Research, Pune, on 30th Jan, 2013.
6. 'Wind Energy Technology' at Workshop on 'Renewable Energy' conducted by H.V. De
7. 'Design of wind-based hybrid energy systems' STTP on Recent Trends in Non-conventional Energy with focus on Solar and Wind Energy at Government College of Engineering, Karad, 26-29th May, 2015
8. "Design and Optimization of hybrid energy systems' in Renewable Energy: Challenges and Opportunities and at Sinhgad Institute of Technology, Lonavala 30th of October, 2015

Short-term Course/Workshop/Seminars etc. Organized

| Sr. No. | Name of Training | Duration | Year |
|---------|---|---|------|
| 1. | Continuing Education program in Solar Energy | March 13 th to 14 th | 2014 |
| 2. | Solar SparQ Student Certification Programme | 24-25 th August | 2015 |
| 3 | Proficiency Improvement Programme on Quality Management | 26 th to 27 th February | 2016 |
| 4 | Entrepreneurship Development Programme on Solar Energy | 7 th to 8 th April | 2017 |

Summer and Winter schools attended:

1. ISTE sponsored two week workshop on 'Computational Fluid Dynamics' conducted by IIT Bombay, from 12th June to 22nd June, 2012.
2. Three days CEP on 'Solar Energy for Industrial Process Heat and Power' held at IIT Bombay from 21st to 23rd April, 2015.

Professional Training Received

| Sr. No. | Name of Training | Conducted by | Year |
|---------|---|------------------------------------|------|
| 1. | Laboratory competence as per ISO/IEC 17025:2005 | STQC Directorate, Pune | 2011 |
| 2. | Training for Trainers and Assessors | School of Synergic Studies, Mumbai | 2004 |

Membership of Professional Bodies/Organizations

| Sr. No. | Name of the Professional Body | Membership Status (Life/Annual) |
|---------|--------------------------------------|----------------------------------|
| 1. | Solar Energy Society of India (SESI) | Life Membership No: LM/1718/2011 |
| 2 | Institution of Engineers India | Life member M-155048-3 |

Funding received

| Sr. No. | Title of project | Funding Agency | Amount | Year |
|---------|--|--|----------|---------|
| 1. | Setting up a weather monitoring system for assessing feasibility of wind power installation at PCCoE | Pimpri Chinchwad College of Engineering, Pune, India | 2,50,000 | 2014-15 |
| 2 | Travel Grant for Young Researcher | BCUD, Savitribai Phule Pune University, India | 32,000 | 2013 |
| 3 | Design and development of 2 kW wind-Photovoltaic hybrid system for low wind areas | BCUD, Savitribai Phule Pune University, India | 2,20,000 | 2016 |

Industrial Experience/ Interaction/ Consultancy

| Sr. No. | Beneficiary | Nature of Work | Period | Year |
|---------|---------------------------------------|--|-----------|------|
| 1. | World Institute of Sustainable Energy | Project feasibility analysis, Preparation of DPR, Project financial approval | 1 year | 2011 |
| 2 | SKF , Pune | Joint project on “Investigation on heat dissipation at bearing housing using TEG integrated with brake pad” | Completed | 2016 |
| 3 | GreenerXia Corp Ltd | Installation of wind –photovoltaic hybrid project at Rajgurunagar, Peth, Pune for off grid lighting and water pumping applications | Completed | 2017 |

Post Graduate Thesis Supervision

| Sr. No. | Name of student/ research scholar | Title of Thesis | Doctorate/ Master's | Year of Completion | Co-guide (If any) |
|---------|--|---|---------------------|--------------------|--------------------|
| 1. | Nilesh Borgave and Prabhjit Singh | Design of isolated Wind-Photovoltaic-biomass hybrid system | Masters | 2012 | Prof.P.M Deshpande |
| 2 | Manoj Kumar Choudhary | Design, Analysis and Manufacturing of Wind Blade Using CFD Software | Masters | 2014 | - |
| 3 | Dholkawala Murtuza S. | Experimental testing of thermal performance in circular tubes using conical ring inserts | Masters | 2013 | Dr. R.S. Hingole |
| 4 | Kaustubh Chodankar Aniket Ghosh Neeraj Kumar | Design and development of a micro wind turbine | Bachelors | 2013 | - |
| 5 | Shruti Dhone | Design of flexible blade wind turbine | Masters | 2015 | - |
| 6 | Piyush Patil | Modeling and simulation of 1 TR adsorption refrigeration system using diesel engine exhaust | Masters | 2016 | Dr. H.U. Tiwari |
| 7 | Ramesh Vishwakarma | Experimental analysis of thermocline storage tanks | Masters | 2016 | - |
| 8 | Ravindra Gonjare | Design and Optimization of wind-photovoltaic hybrid system | Masters | 2016 | - |
| 9 | Monika Patil | Optimal design of PV-DG-battery hybrid system | Masters | 2016 | - |
| 10 | Mr Akash Dagade | Investigation of heat dissipation at bearing housing through the thermoelectric generator integrated with breaking system | Masters | 2017 | Dr. N R Deore |
| 11 | Ms Aarti More | Design and weight minimization a small wind turbine blade for operation in low wind area | Masters | 2017 | - |
| 12 | Mr Bhushan Patil | Design and development of 2kW wind PV battery hybrid system suitable for low wind speed area | Masters | 2017 | - |

Contributions (teaching) to Continuing Education Programmes:

- Coordinated and conducted training sessions in the Continuing Education Programme on ‘Wind Energy Technology’ held at IIT Bombay in April 2008 and 2009.
- Conducted Training sessions in the Continuing Education Programme on ‘Energy Management’ held at IIT Bombay in November 2009.
- Conducted training on ‘Wind turbine fundamentals, operation and characteristics’ at Staff development programme on Solar and Wind Energy Technology, MANIT, Bhopal, Feb 27-Mar 12, 2009.
- Conducted training session on ‘Wind Energy Systems’ at Entrepreneurship Development Programme on Non-conventional Energy Sources (Sponsored by Department of Science and Technology, GOI), MITCON Udyog Prabodhini, 30-31st Dec, 2011.
- Responsible for coordinating various events in the International Conference on Advances in Energy Research held at IIT Bombay, Dec 9-11th 2009.
- Served as a teaching assistant for various courses. Responsibilities include conducting laboratory sessions, assessing tutorials and assignments, etc.

Research Interests

- Energy Integration of renewable energy systems
- Design and optimization of hybrid energy systems
- Design of wind turbines for low wind speed regime
- Thermal energy storage systems using thermocline

Brief Summary of PhD Work:

Autonomous wind energy based power generation systems are an attractive proposition for supplying energy requirements of remote areas which cannot be connected to the electrical grid. The key concern in making any stand-alone power project economically feasible is to size different components so as to match the load to be served with the available resource while accounting for the inherent uncertainty of the wind resource. Optimum sizing of the wind-battery system is crucial for technological success and economic feasibility. *An overall mathematical model for design, analysis and optimization of battery integrated wind generator isolated power system considering the uncertainty of the wind speed has been developed.* The major contribution of the study lies in outlining the inter-relationships between the rotor diameter, generator rating, battery size and system reliability. It is found that there are upper and lower bounds to the design parameters viz., generator rating and rotor diameter in order to serve a given load at a specific location. The results of the proposed methodology have been validated with the results of a

sequential Monte-Carlo simulation. The developed methodology is generic and most importantly gives an insight to the system designer on all possible design alternatives much before the initiation of the actual design process. Therefore, in problems consisting of multiple and conflicting objectives, the developed approach is a strong tool which can foster fast system evaluation hence speeding up the entire design process.

Brief summary of M.Tech Project work

An accurate wind resource assessment is a pre-requisite for successful wind farm planning. The objective of the project was to carry out a detailed wind resource assessment study at and around Jamgodrani wind monitoring station located in Dewas district of Madhya Pradesh, India. It was shown from the study that the given site is a suitable candidate for the utilization of wind power. For this purpose a programme in C++ was developed to find the distribution function of wind power and other wind regime parameters. The output was further validated by employing a standard application software WA^SP (Wind Atlas Analysis and Application programme). From this project, the wind power potential of the region was assessed and validated. It was concluded from the results that WA^SP could be reliably used to predict the wind power potential at a candidate site.

Personal Details

Gender : Female
Date of birth : 3rd December, 1977
Age: 35 years
Marital Status : Married
Husband's Name : Sandip Roy
Languages known : English, Hindi, Bengali, Gujarati
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