



Dr. GAURAV SAINI

Department of Center of Excellence for Green Energy and Sensor Systems,

Indian Institute of Engineering Science and Technology
Shibpur, Howrah West Bengal, India-711103

Email: gaurav161990@gmail.com

Contact No: +91-7042079775



AREA OF INTEREST

- ✓ **Small Hydro power-** Equipment design, selection and performance evaluation
- ✓ **Hydrokinetic Energy-** Site Selection and resource assessment, Technology selection and design, Installation strategies, Performance evaluation and O&M issues.
- ✓ **Wind Energy-** Sites selection and resource assessment, optimal selection of equipment, performance testing and installation.
- ✓ **Computational Fluid Dynamics (CFD)** - Numerical Modelling and Roto-dynamics analysis, Fluid Structure Interaction, Multiphase flow analysis.
- ✓ Modeling of various renewable energy resources viz. Wind, wave, solar and hydrokinetic energy for rural applications

EDUCATION

Ph.D. (Hydropower)

2016-2020

Department of Hydro and Renewable Energy, Indian Institute of Technology Roorkee, Uttarakhand India

- **CGPA- 8.857/10**
- **Thesis Title:** Performance Investigations of Hybrid Cross Flow Hydrokinetic Turbine
- **Principal Supervisor:** Prof. R.P. Saini
- **Summary:** In the present doctoral thesis work, an extensive numerical and experimental investigations have been performed to develop an efficient hydrokinetic turbine suitable for riverine applications. A hybrid model of hydrokinetic turbine was designed and developed and then fabricated for experimental investigations in the hydrokinetic testing laboratory in the Department of Hydro and Renewable Energy, IIT Roorkee. Based on the experimental investigations, the best values of systems parameters were obtained by numerical simulations. The developed hybrid hydrokinetic turbine model was found to have better performance as compared to conventional Hydrokinetic turbine rotors.

M. Tech., (Energy Systems)

2012-2014

Department of Hydro and Renewable Energy, Indian Institute of Technology Roorkee, Uttarakhand India

- **CGPA- 8.515/10**
- **Dissertation Title:** Development of Savonius Type Hydrokinetic Turbine
- **Principal Supervisor:** Prof. R.P. Saini

Dr. Gaurav Saini



- **Summary:** In the Master's Dissertation work, a new model of Savonius hydrokinetic turbine is proposed for a channel having variable discharge conditions. The proposed design of hydrokinetic turbine was analyzed in terms of Power coefficient and operating range and it has been found that the proposed rotor has better energy generation capacity and more operating hours as compared to conventional Savonius hydrokinetic rotor. The numerical investigations were performed in the Computational Fluid Dynamics Laboratory, Department of Hydro and Renewable Energy, IIT Roorkee.

B. Tech., Mechanical Engineering,

2007 -2011

Department of Mechanical Engineering, Gautam Buddha Technical University (Formerly Uttar Pradesh Technical University) Lucknow, India

- **Percentage- 73.46/100**
- **Project Title:** Speed Breaker Energy Generation with rack and pinion arrangement
- **Supervisor:** Prof. Sanjeev Singh

Summary: In the graduation final year project work, a new model of speed breaker was proposed and fabricated for energy generation. The proposed speed breaker was tested and deployed in college campus for its uses and performance evaluation. The model was found to be suitable for various applications due to its simple structure and better absorbance of thrust for energy generation.

AWARD & HONORS

- **Suri Travel Grant** for International Travel 2019
- MHRD Fellowship (During Doctorate) 2016-2020
- MHRD Fellowship(During post-graduation) 2014-2016
- **GATE 2012** qualified with 96.39 percentile 2012
- Best paper presentation award at ICMMRE-2019, SMU Sikkim, India 2019

PUBLICATIONS

PEER-REVIEWED SCI JOURNALS

- **Saini Gaurav** and Saini R.P., (2020), A computational investigation to analyze the effects of different rotor parameters on hybrid hydrokinetic turbine performance, *Ocean Engineering*, Elsevier, 199, Article No: 107019, DOI:10.1016/j.oceaneng.2020.107019 *Impact Factor: 3.068, SCImago Journal Rank (SJR): 1.281.*
- Kumar Anuj, Saini, R.P., **Saini Gaurav**, Dwivedi Gaurav, (2020), Effect of number of stages on the performance characteristics of modified Savonius hydrokinetic turbine *Ocean Engineering*, Elsevier 217 Article No: 108090, DOI: 10.1016/j.oceaneng.2020.108090 *Impact Factor: 3.068, SCImago Journal Rank (SJR): 1.281.*
- **Saini Gaurav**, Kumar Anuj and Saini R.P., (2020), Assessment of hydrokinetic energy – A case study of eastern Yamuna canal, *Materials today: Proceedings*, (*Article in Press*) DOI: 10.1016/j.matpr.2020.08.595.



- Kumar Anuj and **Saini Gaurav**, (2020), Flow field and performance study of Savonius water turbine, Materials today: Proceedings, (*Article in Press*) DOI: 10.1016/j.matpr.2020.08.591.
- **Saini Gaurav** and Saini R.P., (2019), A review on technology, configurations, and performance of cross-flow hydrokinetic turbines, International Journal of Energy Research, pp. 43(13), 6639-6679,.DOI: 10.1002/er.4625, © 2019 (John Wiley & Sons) *Impact Factor: 3.741, SCImago Journal Rank (SJR): 0.84.*
- **Saini Gaurav** and Saini R.P., (2018), A numerical analysis to study the effect of radius ratio and attachment angle on hybrid hydrokinetic turbine performance, Energy for Sustainable Development, 47, December 2018, 94-106. DOI: doi.org/10.1016/j.esd. 2018.09.005, © 2018 Elsevier. *Impact Factor: 3.610, SCImago Journal Rank (SJR): 1.488.*
- **Saini Gaurav** and Saini R.P., Clearance and Blockage Effects on Hydrodynamic Performance of Hybrid Hydrokinetic Turbine, Submitted (Ocean Engineering), ***Under Revision.***
- Saini R.P., Singal S.K. and **Saini Gaurav**, Performance Investigations on a Cross Flow Hydro Turbine with Improvement in the Internal Flow Structure, Submitted (Energy), ***Under Revision.***

PEER-REVIEWED CONFERENCE PROCEEDINGS

- **Saini Gaurav** and Saini R.P., (2020). Study of Installations of Hydrokinetic Turbines and their Environmental Effects, AIP Conference Proceedings, 2273, 050022; <https://doi.org/10.1063/5.0024338>, 2nd International Conference on Mechanical, Materials and Renewable Energy (ICMMRE 2019) Sikkim Manipal University, Sikkim, India. (***Awarded for best presentation***)
- **Saini Gaurav** and Saini R.P., (2019). Comparative Investigations for Performance and Self-starting Characteristics of Hybrid and Single Darrieus Hydrokinetic Turbine, Energy Reports, vol. 6, (2), pp. 96-100, Proceedings of 6th International Conference on Power and Energy Systems Engineering (CPESE 2019) Okinawa, Japan. DOI: <https://doi.org/10.1016/j.egy.2019.11.047>.
- **Saini Gaurav**, Kumar Anuj and Saini R.P., (2019), Improvement of Starting Torque Characteristics of Darrieus Hydrokinetic Turbine, 11th International Exergy, Energy and Environment Symposium (IEEEES-11) 14 - 18, July 2019, , © SRM Institute of Science and Technology Kattankulathur, Tamil Nadu, India.
- **Saini Gaurav** and Saini R.P., (2018), Numerical Investigation of the Effect of Blade Profile of a Darrieus Hydrokinetic Turbine, 5th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON 2018), MMM Gorakhpur, Nov.2-4, 2018. DOI:[10.1109/UPCON.2018.8597073](https://doi.org/10.1109/UPCON.2018.8597073).
- **Saini Gaurav** and Saini R.P., (2018), Numerical Investigations for Performance Comparison of Savonius Hydrokinetic Turbine, 1st International Conference on New Frontiers in Engineering, Science & Technology (NFEST 2018), Delhi Technological University (DTU) New Delhi, India. pp. 395-400.



- **Saini Gaurav** and Saini R.P., (2018), Numerical Investigations on Hybrid Hydrokinetic Turbine for Electrification in Remote Area, All India Seminar on Renewable Energy for Sustainable Development, Institution of Engineers Ghaziabad Section(IoE), India.

BOOK CHAPTERS

- **Saini Gaurav.**, Saini R.P. (2021) Performance Study of Cross Flow Hybrid Hydrokinetic Turbine. In: Pandey A., Mishra S., Kansal M., Singh R., Singh V.P. (eds) Hydrological Extremes. Water Science and Technology Library, vol. 97. Springer, Cham. https://doi.org/10.1007/978-3-030-59148-9_17

COURSE/TRAINING/WORKSHOP ATTENDED

- GYAN course on 'Two Phase Flow and Heat Transfer' Sponsored by MHRD GoI/IIT Roorkee, 2017.
- Workshop on 'Numerical Modelling of Transport Phenomena in Fluid Flows for Engineering Applications' Department of Mathematics, IIT Roorkee, 2017.
- Authors Workshop on 'Book Publishing' MGCL, IIT Roorkee, 2016.
- Training at National Thermal Power Corporation Dadri Gautam Budha Nagar, Uttar Pradesh (India), 2010.

PROFESSIONAL EXPERIENCE

Faculty (Temporary)

November 06 2020- present

Department of Center of Excellence for Green Energy and Sensor Systems,
Indian Institute of Engineering Science and Technology Shibpur, Howrah West
Bengal, India

Responsibilities:

- ✓ Responsible for delivering theory and practical lecture for Post-graduate Students
- ✓ Supervising Master's and PhD Students
- ✓ Conduct Research on Wind Energy Technologies and Hydrokinetic Energy
- ✓ Working as Co-PI in sponsored/consultancy projects

Project Fellow

August 24, 2020- November 02, 2020

Department of Hydro and Renewable Energy, Indian Institute of Technology
Roorkee Uttarakhand (India)

Responsibilities:

- ✓ Prepare and develop comprehensive project report and submission
- ✓ Writing of research papers and submission in reputed journals.
- ✓ Assisted in various training course on solar and wind energy for working professionals.
- ✓ Computational investigations for on-going research projects and data analysis.
- ✓ Project proposal writing and submission.
- ✓ Hydrokinetic energy resource estimation and report preparation.



- ✓ Assisted in online course

Senior Research Fellow (SRF)

July, 2018- June, 2020

Department of Hydro and Renewable Energy, Indian Institute of Technology Roorkee Uttarakhand (India)

Responsibilities:

- ✓ Assist faculty members in classroom instruction, examinations, record keeping, and other miscellaneous projects.
- ✓ Assisted in the workshop on hydrokinetic technology.
- ✓ Assisted in various course on Hydro and solar energy for working professional.
- ✓ Assisted in various industrial and tour visits for students and participants.
- ✓ Conduct regular tutorials and laboratory demonstration.

Junior Research Fellow (JRF)

July, 2016- June, 2018

Department of Hydro and Renewable Energy, Indian Institute of Technology Roorkee Uttarakhand (India)

Responsibilities:

- ✓ Assist faculty members in classroom instruction, examinations, record keeping, and other miscellaneous projects.
- ✓ Involved in various workshops/conferences organization
- ✓ Conducted experimental and numerical modeling of the hydrokinetic turbine technology
- ✓ Conduct regular tutorials and laboratory demonstration.

Assistant Professor

July, 2014- June, 2016

Department of Mechanical Engineering, IMS Engineering College Ghaziabad (India)

Responsibilities:

- ✓ Responsible for delivering theory and practical lecture for graduate Students
- ✓ Supervised graduate Students for their final year projects
- ✓ Conducted research on various renewable energy resources
- ✓ Worked as team member in NAAC and NBA accreditation team.
- ✓ Worked as Departmental store in charge and class coordinator.

Graduate Research Assistant

July, 2012- June, 2014

Computational Fluid Dynamics (CFD) Laboratory, Department of Hydro and Renewable Energy, Indian Institute of Technology Roorkee India.

Responsibilities:

- ✓ Numerical Modeling and design of conventional and modified Savonius Hydrokinetic turbine.
- ✓ CFD simulations on modelled hydrokinetic turbine under variable system and operating conditions.
- ✓ Research paper writing and assisted laboratory classes.
- ✓ Assisted PhD students during experimental investigations.



EDITOR EXPERIENCE

Editor for the Book on 'Smart Cities: Concepts, Practices, and Applications' for CRC Press under Taylor and Francis Group.

REVIEWER EXPERIENCE

Journal	Publisher	Period
Energy	Elsevier	June 2019– <i>present</i>
Journal of Energy Research	Wiley	August 2020– <i>present</i>
Materials Today- Proceedings	Elsevier	August 2020– <i>present</i>
Journal of Engineering and Technological Sciences	Institut Teknologi Bandung	May 2020– <i>present</i>

SKILLS

Software Known: Computational Fluid Dynamics (CFD), ANSYS Fluent, HEC-RAS, CCHE2D Flow, CFX, Design Modeler, Simulation of rotating equipment (Moving Mesh/Sliding Mesh approach, Frame motion approach) Multiphase Flow, Pro-E 3.0.





LANGUAGES

English	Professional
Hindi	Native

REFERENCES

Dr. R. P. Saini Professor and MNRE Chair Professor Department of Hydro and Renewable Energy Indian Institute of Technology Roorkee Roorkee, Uttarakhand, India 247667 Email: rp.saini@hre.iitr.ac.in Tel: +91-1332-285841	Dr. M. P. Sharma Former Professor and Head Department of Hydro and Renewable Energy Indian Institute of Technology Roorkee Roorkee, Uttarakhand, India 247667 Email: mahendrapal.sharma@gmail.com Tel: + 91-9897041194
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ONLINE PROFILES

	https://scholar.google.co.in/citations?hl=en&user=gpMz9EoAAAJ
	https://orcid.org/0000-0001-9593-5180
	https://www.mendeley.com/profiles/gaurav-saini11/
	Vidwan-ID : 173317