

RAMANUJA PANIGRAHI

Visiting Research Scholar, CPES,
Virginia Tech.

140, Whittemore Hall, Virginia Tech,
Blacksburg, VA, USA, 24060
+1-520-449-6788

ramanuja@vt.ac.in
ramanuj.panigrahi@gmail.com

[Google Scholar](#)



RESEARCH INTERESTS

I am broadly interested in the area of power electronics. My current research interests are synthesis, design, and control of dc-dc converters, power electronics in EV charging Infrastructure, and design of energy harvesting circuitry.



EDUCATION

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| 2021 | Ph.D. Power Engineering
Indian Institute of Technology, Kanpur, India <ul style="list-style-type: none">Area of Specialization: Power ElectronicsDissertation: A general method of dc-dc converter synthesis and application to second-order convertersSupervisor: Prof. Santanu K. MishraCGPA: 8.4/10 |
| 2016 | M. Tech. Power Engineering
Indian Institute of Technology, Kanpur, India <ul style="list-style-type: none">Area of Specialization: Power ElectronicsDissertation: An Energy Harvesting Circuit for A Dielectric Elastomer GeneratorSupervisors: Prof. Santanu K. Mishra and Prof. Nandini GuptaCGPA: 8.85/10 |
| 2013 | B.Tech. Electrical Engineering
Biju Patnaik University of Technology, Odisha, India |



PROFESSIONAL EXPERIENCE

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| June 2022-
Present | Visiting Research Scholar
CPES, Virginia Tech., Blacksburg, VA, USA. |
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PUBLICATIONS

Journal Publications |

- J1. **R. Panigrahi**, S. K. Mishra, A. Joshi and K. D. T. Ngo, "Synthesis of PWM Converters from Conversion Ratios using Flux- or Charge-Balance Equations," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, doi: 10.1109/JESTPE.2022.3179318.
- J2. **R. Panigrahi**, S. K. Mishra, A. Joshi and K. D. T. Ngo, "Synthesis of DC-DC Converters From Voltage Conversion Ratio and Prescribed Requirements," in *IEEE Transactions on Power Electronics*, vol. 36, no. 12, pp. 13889-13902, Dec. 2021, doi: 10.1109/TPEL.2021.3085520. (Editor's Pick for the issue)

- J3. **R. Panigrahi**, S. K. Mishra and A. Joshi, "Synthesis of an Optimum Converter Topology for A Specified Voltage Conversion Ratio," in *IEEE Transactions on Industry Applications*, vol. 57, no. 4, pp. 3923-3934, July-Aug. 2021, doi: 10.1109/TIA.2021.3081401.
- J4. **R. Panigrahi**, S. K. Mishra and A. Joshi, "Synthesizing a Family of Converters for a Specified Conversion Ratio Using Flux Balance Principle," in *IEEE Transactions on Industrial Electronics*, vol. 68, no. 5, pp. 3854-3864, May 2021, doi: 10.1109/TIE.2020.2984450.
- J5. **R. Panigrahi**, S. K. Mishra, A. Joshi and K. D. T. Ngo, "DC-DC Converter Synthesis: An Inverse Problem," in *IEEE Transactions on Power Electronics*, vol. 35, no. 12, pp. 12633-12638, Dec. 2020, doi: 10.1109/TPEL.2020.2994044. **(2020 First Place Prize Paper Award for IEEE Power Electronics Letters)**
- J6. **R. Panigrahi**, S. K. Mishra, S. C. Srivastava, A. K. Srivastava and N. N. Schulz, "Grid Integration of Small-Scale Photovoltaic Systems in Secondary Distribution Network—A Review," in *IEEE Transactions on Industry Applications*, vol. 56, no. 3, pp. 3178-3195, May-June 2020, doi: 10.1109/TIA.2020.2979789.
- J7. S. S. Nag, **R. Panigrahi**, S. K. Mishra, A. Joshi, K. D. T. Ngo and S. Mandal, "A Theory to Synthesize Nonisolated DC–DC Converters Using Flux Balance Principle," in *IEEE Transactions on Power Electronics*, vol. 34, no. 11, pp. 10910-10924, Nov. 2019, doi: 10.1109/TPEL.2019.2898702.
- J8. **R. Panigrahi**, S. K. Mishra, A. K. Srivastava and S. Basu, "Analysis, Design, and Implementation of an Elastomer Generator Based Energy Harvesting Scheme," in *IEEE Transactions on Industrial Electronics*, vol. 66, no. 5, pp. 3507-3517, May 2019, doi: 10.1109/TIE.2018.2854562.
- J9. **R. Panigrahi** and S. K. Mishra, "An Electrical Model of a Dielectric Elastomer Generator," in *IEEE Transactions on Power Electronics*, vol. 33, no. 4, pp. 2792-2797, April 2018, doi: 10.1109/TPEL.2017.2749329.

Magazine Article |

- M1. **R. Panigrahi**, S. K. Mishra, S. C. Srivastava and P. Enjeti, "Microgrid Integration in Smart Low-Voltage Distribution Systems," in *IEEE Power Electronics Magazine*, vol. 9, no. 2, pp. 61-66, June 2022, doi: 10.1109/MPEL.2022.3169318.

Book Chapter |

- B1. **Panigrahi R.**, Mishra S.K., Joshi A. (2021) Inverse Problem of Converter Synthesis: Formulation, Complexities, and Solution. In: Mohapatro S., Kimball J. (eds) Proceedings of Symposium on Power Electronic and Renewable Energy Systems Control. Lecture Notes in Electrical Engineering, vol 616. Springer, Singapore.

Conference Presentations |

- C1. **R. Panigrahi**, S. K. Mishra and A. Joshi, "Synthesizing a Comprehensive Set of Converter Topologies for a Specified Voltage Gain," *2020 IEEE Energy Conversion Congress and Exposition (ECCE)*, 2020, pp. 955-961, doi: 10.1109/ECCE44975.2020.9235963.
- C2. **R. Panigrahi**, Y. Verma, S. K. Mishra, A. Sharma and A. Meghwani, "A Fiber Optic Communication Module to Interface RTDS with Power Amplifier for PHIL Simulations," *2020 21st National Power Systems Conference (NPSC)*, 2020, pp. 1-6, doi: 10.1109/NPSC49263.2020.9331899.
- C3. **R. Panigrahi**, S. K. Mishra and A. Joshi, "Synthesizing a Family of Converters for a Specified Conversion Ratio Using Flux Balance Principle," *2019 IEEE Energy Conversion Congress and Exposition (ECCE)*, 2019, pp. 4741-4746, doi: 10.1109/ECCE.2019.8912778.
- C4. **R. Panigrahi**, S. K. Mishra and S. C. Srivastava, "Grid Integration of Small-Scale Photovoltaic Systems—A Review," *2018 IEEE Industry Applications Society Annual Meeting (IAS)*, 2018, pp. 1-8, doi: 10.1109/IAS.2018.8544503.

- C5. **R. Panigrahi**, S. Mishra, A. K. Srivastava and S. Basu, "An energy harvesting scheme for dielectric elastomer generators," *2017 IEEE Energy Conversion Congress and Exposition (ECCE)*, 2017, pp. 4741-4746, doi: 10.1109/ECCE.2017.8096807.



INVENTION DISCLOSURES

- P1. **Electroporator**. Indian Patent Application number-**202111056568**. Publication date December 17, 2021. Patent pending.
- P2. **Switched-sink Bidirectional Power Amplifier**. Indian Patent Application number-**202111061395**. Publication date January 1, 2022. Patent pending.



AWARDS AND RECOGNITIONS

- Received **First Place Prize Letter Award** for **IEEE Transactions on Power Electronics**, 2020.
- Received **Outstanding Ph.D. Thesis Award** from **IIT Kanpur** in the year 2022.
- Received **Best Paper award** in PERESC 2020, organized by IIT Bhubaneswar.
- Received **MHRD scholarship** for the entire duration of Ph.D. program.
- Received **MHRD scholarship** for the entire duration of M.Tech. program.
- Achieved All India Rank 183 (**99.87 percentile**) in GATE-2014 among 140K candidates.



SKILLS

- Circuit Simulation using PSPICE, LTSPICE, PLEXIM, MATLAB
- Field Simulation using Ansys Maxwell
- PCB Design using Altium
- Hardware Prototyping and Debugging
- System Design in FPGA with Verilog HDL
- Proficient in Microsoft Office



CO-CURRICULAR ACTIVITIES

- **Reviewer**: IEEE Transactions on Power Electronics, IEEE Transactions on Industrial Electronics, IEEE Transactions on Industry Applications, IET Power Electronics, IEEE Consumer Electronics Magazine
- **Reviewer**: IEEE ECCE, IAS Annual Meeting, IEEE APEC
- **Student Member**, IEEE since 2016



TEACHING EXPERIENCES

Monson 2018, 2019, 2020: Power Converters for Consumer Electronics (Teaching Assistance)
Winter 2016,2017,2018,2020: Power Electronics (Teaching Assistance)
Winter 2015: Control Techniques in Power Electronics (Teaching Assistance)
2014: Electromechanical Energy Conversion Lab. (Teaching Assistance)

Date: 10th November, 2022

Place: Blacksburg, VA, USA