
SUMMARY OF RESEARCH

My current research focuses on the design of power electronics and signal conditioning circuits for high-precision electromagnetic actuators. During my PhD, I focused on developing a novel solution to address voltage-balancing issues in a ship's bipolar DC grid.

EDUCATION

PhD in Electric Engineering, Delft University of Technology, The Netherlands 2020 - 2025

- PhD thesis title: *Bipolar DC Grids on Ships: Challenges and Solutions for Voltage Balancing.*
- Project: *NEON Research*, NWO Grant No. 17628.
- Research topics:
 1. Designed a 1.5 kW, 99.4 % efficient balancing converter based on series-resonant topology.
 2. Developed and patented modulation methods for the series-resonant balancing converter to minimize switching losses.
 3. Developed and patented a novel 1.5 kW, 98.4 % efficient balancing converter based upon series multi-resonant topology.
 4. Designed a 2.5 kW, 98 % efficient series-connected MOSFET switch balancing converter.
 5. Proposed methodologies of multiple converter operation in a ship bipolar DC grid.

MSc in Sustainable Energy Technology, Delft University of Technology, The Netherlands 2017 - 2019

- Master thesis title: *Modeling and Control of a Solid State Transformer and verification with Controller Hardware in the Loop.*
- Project: *FLEXstation.*
- Research topics:
 1. Developed a model for a cascaded H-bridge-based Solid State Transformer for MV to LV grid voltage transformation.
 2. Developed a closed-loop control algorithm for H-bridge capacitor voltage balancing.
 3. Proposed a control scheme to reduce the H-bridge capacitor sizing by up to 10 times.
 4. Developed a controller hardware in the loop platform to validate the control model.

Bachelor in Electrical and Electronics Engineering, Birla Institute of Technology, India 2009 - 2013
GPA 7.8/10

WORK HISTORY

R&D Electrical Engineer at Silicon B.V., Wateringen, The Netherlands 2026 - present (0.6 FTE)

- Research and development focus: *New generation Welder development.*
 1. Propose alternatives for electrical components to save bills of material costs by upto 90 %.
 2. Development of PLC platform to replace the legacy.
 3. Development of power electronics for a welder with a peak power of 80 kW.

Postdoctoral researcher at Delft University of Technology, The Netherlands 2024 - present

- Project: *Graceful Equalising of Mechatronics Students (GEMS).*
 1. Created tutorials and course content for the edX GEMS MOOC.
 2. Assisted bachelor's student thesis.
- Project: *Beat the heat: Zero heat dissipation and energy efficient electromagnetic actuator (BTH).*
 1. Development of signal conditioning circuits for the electromagnetic actuator.

2. Development of power electronics to actuate the system.
3. Supervised a master's student in the development of a flying capacitor-based power amplifier.

Power Electronics Engineer at DC Opportunities R&D B.V., Delft, The Netherlands 2019 - 2020

- Research and development focus: *New generation Welder development.*
 1. Propose alternatives for electrical components to save bills of material costs by upto 90 %.
 2. Development of PLC platform to replace the legacy.
 3. Development of power electronics for a welder with a peak power of 80 kW.

Electrical Maintenance Manager at JCAPCPL, Ranchi, India 2013 - 2017

- Key responsibilities:
 1. Predictive and Preventive maintenance of electric equipment and instruments.
 2. Continual improvement by implementing Kaizens.
 3. Personnel training and supervision.
 4. Set up work methods and procedures according to ISO/TS 16949.

PUBLICATIONS / RESEARCH OUTCOMES

Journal articles (4)

1. **S. Yadav**, Z. Qin, P. Bauer, "Bipolar DC grids on ships: possibilities and challenges", *Elektrotechnik und Informationstechnik*, vol. 139, no. 4-5, pp. 458-467, 2022.
2. **S. Yadav**, Z. Qin, P. Bauer, "Synthesis and Comparison of Soft-Switched Operating Modes of a Series Resonant Balancing Converter for Bipolar DC Grids", *IEEE Open Journal of the Industrial Electronics Society*, 5, 547-561, 2024.
3. **S. Yadav**, Z. Qin, P. Bauer, "Simplified Operation and Control of a Series-Resonant Balancing Converter for Bipolar DC Grids", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, 12(4), 4015-4024, 2024.
4. G. Yu, **S. Yadav**, J. Dong, P. Bauer, "Revisiting the Reverse Switched Current of Buck, Boost, and Buck-Boost Converters in Voltage-Mode TCM-ZVS Control Considering Parasitic Resistances", *IEEE Transactions on Power Electronics*, 39(7), 8254-8268, 2024.

a Kaizen Patents (2)

1. **S. Yadav**, Z. Qin, P. Bauer "A series resonant converter for balancing a bipolar Direct Current, DC, power grid, as well as a corresponding arrangement, method and computer program product," WO2023096491A1.
2. Z. Qin, **S. Yadav**, P. Bauer "A series resonant converter having an increased overall efficiency, as well as a related arrangement and method of operating the series resonant converter.," WO2025183553A1.

SUPERVISION AND TEACHING

- Lecturer, Master's course, "Advanced Power Electronics" at Delft University of Technology.
- Supervisor, Bachelor Thesis Project, "GEMS" at Delft University of Technology.
- Supervisor, Master Extra Project, "Power Amplifier based upon 13-level Flying Capacitor Converter" at Delft University of Technology.

LANGUAGE AND INTERESTS

- English (fluent), Dutch (B1), Hindi (mother tongue)
- Homelab