

Yixuan Wu

PHD STUDENT · ELECTRICAL MACHINES AND DRIVES

KTH Royal Institute of Technology, Division of Electric Power and Energy Systems, 10044 Stockholm, Sweden

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Academic Experience

University of Bologna

Bologna, Italy

VISITING SCHOLAR

Jan. 2024 - Mar. 2024

- Sensorless Control of a Seven-Phase Induction Machine
- Supervisor: Professor Dr. Luca Zarri

University of California, Berkeley

Berkeley, CA, USA

VISITING SCHOLAR

Oct. 2023 - Dec. 2023

- Variable Switching Frequency in a Single-Phase Flying Capacitor Multilevel Inverter
- Supervisor: Professor Dr. Robert Pilawa-Podgurski

KTH Royal Institute of Technology

Stockholm, Sweden

PHD IN ELECTRICAL ENGINEERING

Nov. 2019 - present

- Fault Tolerance in Multiphase Electrical Machines
- Supervisor: Associate Professor Dr. Luca Peretti

Education

KTH Royal Institute of Technology

Stockholm, Sweden

M.SC. IN ELECTRICAL POWER ENGINEERING

Aug. 2017 - Sep. 2019

RWTH Aachen University

Aachen, Germany

M.SC. IN ELECTRICAL ENGINEERING, INFORMATION TECHNOLOGY, AND COMPUTER ENGINEERING

Oct. 2016 - Sep. 2019

- Master thesis: Modelling of the voltage distribution in the windings of inverter-fed electrical machines
- Final Grade: excellent (1.0)

RWTH Aachen University

Aachen, Germany

B.SC. IN ELECTRICAL ENGINEERING, INFORMATION TECHNOLOGY, AND COMPUTER ENGINEERING

Oct 2013 - Sep 2016

- Bachelor thesis: Auslegung einer Asynchronmaschine als Traktionsantrieb für ein 48V Hybridfahrzeug mit Allradantrieb
- Final Grade: very good (1.4)

Professional Experience

Oct. 2022 - Dec. 2022 **Research Internship**

ABB Corporate Research, Västerås, Sweden

Aug. 2018 - Jan. 2019 **Student Research Assistant (Amanuens)**

Division of Electric Power and Energy Systems, KTH Royal Institute of Technology

Mar. 2017 - Aug. 2017 **Student Internship**

Siemens eAircraft, Ottobrunn, Germany

Oct. 2016 - Mar. 2017 **Student Research Assistant (HiWi)**

Institute of Electric Machines, RWTH Aachen University

Oct. 2015 - Aug. 2016 **Student Research Assistant (HiWi)**

Institute for Power Electronics and Electrical Drives, RWTH Aachen University

May 2014 - Sep. 2015 **Student Research Assistant (HiWi)**

Institute of Electric Machines, RWTH Aachen University

Publications

PEER-REVIEWED INTERNATIONAL JOURNALS

- Y. Wu**, L. Vancini, L. Zarri, A. Tani and L. Peretti, "Open-Phase Fault Tolerant Pole Transition Control of an Asynchronous Variable-Pole Machine Using Harmonic Plane Decomposition," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, doi: 10.1109/JESTPE.2024.3396722.
- G. Falk Olson, **Y. Wu** and L. Peretti, "Parameter Estimation of Multiphase Machines Applicable to Variable Phase-Pole Machines," in *IEEE Transactions on Energy Conversion*, doi:10.1109/TEC.2023.3288368.
- Y. Wu**, G. Falk Olson, C. Henriksson and L. Peretti, "Open Fault Detection in Variable Phase-Pole Machines based on Harmonic Plane Decomposition," in *IEEE Transactions on Power Electronics*, doi: 10.1109/TPEL.2023.3348973.
- O. Ikram ul Haq, **Y. Wu**, L. Peretti, S. Bosga and R. Kanchan, "Generalized Harmonic Injection Strategy for Multiphase Induction Machine Control," in *IEEE Transactions on Energy Conversion*, doi: 10.1109/TEC.2023.3331233.
- G. Falk Olson, **Y. Wu** and L. Peretti, "Parameter Estimation of Multiphase Machines Applicable to Variable Phase-Pole Machines," in *IEEE Transactions on Energy Conversion*, doi: 10.1109/TEC.2023.3288368.
- Y. Wu**, G. Falk Olson and L. Peretti, "Pole-Transition Control of Variable-Pole Machines Using Harmonic-Plane Decomposition," in *IEEE Transactions on Industrial Electronics*, doi: 10.1109/TIE.2022.3231328.
- F. Pauli, **Y. Wu**, N. Driendl, M. Schröder and K. Hameyer, "Transiente Spannungsmodellierung in umrichtergespeisten Niederspannungsmaschinen mit Steckwicklungen," in *Elektrotechnik und Informationstechnik* 137, 179–187 (2020), doi: 10.1007/s00502-020-00800-1

PROCEEDINGS OF PEER-REVIEWED INTERNATIONAL CONFERENCES

- Y. Wu** and L. Peretti, "Pole Transition Under Open Phase Fault Conditions in a Variable Pole Machine," *IECON 2023- 49th Annual Conference of the IEEE Industrial Electronics Society*, Singapore, Singapore, 2023, pp. 1-6, doi: 10.1109/IECON51785.2023.10312343.
- Y. Wu** and L. Peretti, "Detection of Multiple Open Faults in Variable Phase-Pole Machines based on Harmonic Plane Decomposition," *2023 IEEE 14th International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives (SDMPED)*, Chania, Greece, 2023, pp. 141-146, doi: 10.1109/SDMPED54949.2023.10271488.
- Y. Wu**, G. Falk Olson and L. Peretti, "Fault Detection in Variable Phase-Pole Machines based on Harmonic Plane Decomposition," *IECON 2022 – 48th Annual Conference of the IEEE Industrial Electronics Society*, Brussels, Belgium, 2022, pp. 1-6, doi: 10.1109/IECON49645.2022.9968826.
- Y. Wu**, A. Pisani, G. Falk Olson, K. Bitsi, O. Wallmark and L. Peretti, "FEM-based Parameter Estimation for a Variable Phase-Pole Induction Machine," *2021 23rd European Conference on Power Electronics and Applications (EPE'21 ECCE Europe)*, Ghent, Belgium, 2021, pp. P.1-P.10, doi: 10.23919/EPE21ECCEurope50061.2021.9570586.
- Y. Wu**, G. Falk Olson, L. Peretti and O. Wallmark, "Harmonic Plane Decomposition: An Extension of the Vector-Space Decomposition - Part I," *IECON 2020 The 46th Annual Conference of the IEEE Industrial Electronics Society*, Singapore, 2020, pp. 985-990, doi: 10.1109/IECON43393.2020.9255228.
- G. Falk Olson, **Y. Wu**, L. Peretti and O. Wallmark, "Harmonic Plane Decomposition: An Extension of the Vector-Space Decomposition - Part II," *IECON 2020 The 46th Annual Conference of the IEEE Industrial Electronics Society*, Singapore, 2020, pp. 991-996, doi: 10.1109/IECON43393.2020.9254279.

IN REVIEW

- G. Falk Olson, **Y. Wu**, L. Peretti and M. Hinkkanen, "Multiphase Machines: Stator and Rotor Inter-Plane Cross Saturation," submitted for publication in *IEEE Access*
- A. A. Khan, N. A. Zaffar, M. J. Ikram, **Y. Wu** and L. Peretti, "Combined Reduction of DC-link Harmonics and Common Mode Voltage in Interleaved Multi-inverter Systems by Modified SVPWM Schemes," submitted for publication in *IEEE Transactions on Industrial Electronics*.
- X. Lin, **Y. Wu**, G. Falk Olson, J. Liu, L. Wu and L. Peretti, "Optimal Current Distribution for Pole-Transition Control of Variable-Pole Machines Considering Energy Cost," submitted for publication in *IEEE Transactions on Power Electronics*.
- Y. Wu**, L. Vancini, M. Mengoni, L. Zarri and L. Peretti, "Sensorless Control with Indirect Field Oriented Speed Estimation for Seven-Phase Induction Machines," submitted at *26th International Conference for Electrical Machines (ICEM 2024)*, Torino, Italy, 2024

Y. Wu, G. Falk Olson and L. Peretti, "Modification of the Clarke Transformation Matrices for Controlling Electric Machines with Non-Equally Spaced Windings," submitted at *21st International Power Electronics and Motion Control Conference (IEEE-PEMC 2024)*, Pilsen, Czech Republic, 2024

F. Giardine, **Y. Wu** and R. Pilawa-Podgurski, "A variable switching frequency control technique for dc-ac flying capacitor multilevel converters to improve efficiency and inductor utilization," submitted at *16th Annual IEEE Energy Conversion Congress and Exposition (ECCE 2024)*, Phoenix, USA, 2024

Awards and Scholarships

- Nov. 2020 **Springorum Denkmünze**
RWTH Aachen University
10% best of graduates at RWTH Aachen University
- Dec. 2021 - present **Promotionsstipendium (Doctoral scholarship)**
Studienstiftung des deutschen Volkes e.V. (German Academic Scholarship Foundation)
- Sep. 2017 - Mar. 2019 **Graduate Scholarship**
Deutscher Akademischer Austauschdienst (DAAD)
- Apr. 2016 - Sep. 2019 **Scholarship**
Studienstiftung des deutschen Volkes e.V. (German Academic Scholarship Foundation)
- Dec. 2014 - Sep. 2019 **Dean's List**
RWTH Aachen University
Top 5% students in Electrical Engineering
- Oct. 2014 - Mar. 2016 **Deutschlandstipendium**
Education Fund of RWTH Aachen University

Teaching Experience

- 2022 - 2023 **EJ2230 Control in Electrical Energy Conversion**
Teaching Assistant
KTH Royal Institute of Technology
- 2019 - 2022 **EJ2201 Electrical Machines and Drives**
Teaching Assistant
KTH Royal Institute of Technology
- 2018 - 2022 **EJ2410 Hybrid Vehicle Drives**
Teaching Assistant
KTH Royal Institute of Technology
- 2016 **Systemtheorie I**
Teaching Assistant
RWTH Aachen University
- 2014 - 2015 **Elektrotechnik und Elektronik**
Teaching Assistant
RWTH Aachen University

Student Supervision

DEGREE PROJECTS

- Spring 2022 **Claes Henriksson**
Master Thesis, KTH Royal Institute of Technology
Fault Diagnosis of a Variable Pole-Phase Motor
urn:nbn:se:kth:diva-326120
- Spring 2021 **Jonas Hansson**
Master Thesis, KTH Royal Institute of Technology
Commissioning of a FPGA/DSP unit for Centralized Control of a Variable Phase Pole Multiphase Machine
urn:nbn:se:kth:diva-313834
- Spring 2021 **Xinyue Shan**
Master Thesis, KTH Royal Institute of Technology
Field Oriented Current Control with Harmonic Injection in a Six-Phase Induction Machine
urn:nbn:se:kth:diva-307580
- Spring 2020 **Bhanu Pratap Singh**
Master Thesis, KTH Royal Institute of Technology
Real-time detection of stator resistance unbalances in three phase drives
urn:nbn:se:kth:diva-286813

STUDENT PROJECTS

- Spring 2023 **Lukas Grigelionis**
Individual Project, KTH Royal Institute of Technology
Hardware-in-the-loop modelling of electric machines on FPGA
- Spring 2022 **Nils Felix Fuchs**
Student Internship, Technical University of Berlin in visit at KTH Royal Institute of Technology
Distributed control of a six-phase motor
- Summer 2023 **Felix Söderman, Erik Skog**
Summer Internship, KTH Royal Institute of Technology
SD-Card Interface for Xilinx Zynq ZC702/ZC706

Services & Memberships

PEER REVIEW

IEEE Transaction on Industrial Electronics
IET Electric Power Applications
IEEE Transactions on Transportation Electrification

PROFESSIONAL MEMBERSHIPS

IEEE

Skills

COMPUTER SKILLS

Programming Languages C, C++, VHDL, \LaTeX

Software Suites Microsoft Office, Mathworks MATLAB/Simulink, Xilinx Vitis Unified Software Platform, Texas Instruments Code Composer

LANGUAGES

German	Mother tongue
English	Proficient user (C1)
Swedish	Independent user (B2)
Chinese	Independent user
Spanish	Basic user (B1)