Yixuan Wu

PhD Student · Electrical Machines and Drives

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

yixuanw@kth.se | yixuan-wu-092222217 | ORCID: 0000-0003-4393-8990

Academic Experience

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

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

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.

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.

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.

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.

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.

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 (SDEMPED)*, Chania, Greece, 2023, pp. 141-146, doi: 10.1109/SDEMPED54949.2023.10271488.

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/EPE21ECCEEurope50061.2021.9570586.

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.

Accepted for Publication

Y. Wu, L. Vancini, M. Mengoni, L. Zarri and L. Peretti, "Sensorless Control with Indirect Field Oriented Speed Estimation for Seven-Phase Induction Machines," accepted 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," accepted 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," accepted at *16th Annual IEEE Energy Conversion Congress and Exposition* (ECCE 2024), Phoenix, USA, 2024

In Review

Y. Wu, O. Ikram ul Haq and L. Peretti, "Minimum Torque Dip Pole Transition in Variable Phase-Pole Machines with Voltage Limitation," submitted for publication in *IEEE Transactions on Energy Conversion*

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*.

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)