

## POST DOC & SENIOR LECTURER POSITION

### About Innsbruck University & the i-PEL

Founded in 1669, the Leopold-Franzens University Innsbruck is the largest university in the western part of Austria. Located at a traditional north-south crossroads connecting Europe, we are oriented internationally while positioned locally. The University of Innsbruck looks back to a long and variable history. The University has always been a supporting pillar of the Tyrolean society and has influenced the region tremendously. The importance of its status as research and educating institution can be seen in the numerous award-winning alumni and current and former scientists teaching and researching at the University. Many scientific cutting-edge discoveries have been made at this institution. Today the University comprises of 16 faculties and 81 institutes, with more than 28,000 students and 4,500 staff and faculty members.

Innsbruck Power Electronics Laboratory (the i-PEL) has been founded in November 2018 by Infineon Technology Austria AG and Leopold-Franzens University Innsbruck (LFUI). The laboratory main focus is on cutting-edge of Si & WBG power semiconductors & their application in ultra-efficient & dense power converters. <https://www.uibk.ac.at/mechatronik/i-pel/>

### Our Partners

The i-PEL is intensively collaborating with worldwide recognized industrial and academic partners:

- 1) Infineon Technologies AG Austria, Villach (AT) (<https://www.infineon.com/cms/austria/de/>)
- 2) B&R Industrial Automation GmbH, Eggelsberg (AT) ([Industrial automation | B&R Industrial Automation \(br-automation.com\)](#))
- 3) Valeo eAutomotive SAS, Sergy (FR) (<https://www.valeo.com/>)
- 4) Leitner Ropeways AG/SPA, Vipetiano (IT) (<https://www.leitner.com/>)
- 5) Vishay BCcomponents Austria GmbH, Klagenfurt (AT) ([www.vishay.com](http://www.vishay.com))
- 6) Kuka Roboter GmbH, Augsburg (DE) ([industrial intelligence 4.0 beyond automation | KUKA AG](#))
- 7) Austrian Institute of Technology GmbH (AIT), Austria (<http://www.ait.ac.at>)
- 8) C-PED & Roma TRE University, Italy (<http://www.c-ped.org/>)
- 9) CEI & UPM, Spain ([www.cei.upm.es](http://www.cei.upm.es))
- 10) L'Institut National Polytechnique de Toulouse, France (<http://www.laplace.univ-tlse.fr/?lang=fr>)
- 11) Federal University Campina Grande (UFCG), Brazil (<https://www.ceei.ufcg.edu.br/>)
- 12) University of Pavia, Italy
- 13) Serbian Academy of Science and Arts (ITS-SASA), Serbia (<http://www.itn.sanu.ac.rs/>)
- 14) Innovation Center of School of Electrical Engineering (ICEF), Serbia (<https://www.ic.etf.bg.ac.rs/>)
- 15) Katolik University Luven (KU-LUVEN), Belgium (<https://homes.esat.kuleuven.be/~wmartine/projects/>)
- 16) Silicon Austria Labs (SAL), Austria ([Silicon Austria Labs \(SAL\) \(silicon-austria-labs.com\)](#))
- 17) European Center of Power Electronics ECPE Competence Centre, ([ECPE Home](#))

## The Position Mission

The position mission is split between three major activities:

1. Research (25%)
2. Teaching (65% // 8h per semester).
3. PhD students & Master students mentoring (5%)
4. Research-, Teaching- and Organizational tasks (2,5%)
5. Organizational (incl. project organization)- and administrative tasks (2,5%)

## Current & Future Research Activities @ the i-PEL

Current research projects founded by the University of Innsbruck, Infineon Technologies Austria AG and the i-PEL industrial partners:

- 1) Development and Design of an Intelligent Integrated Gate Driver for High Power IGBT Modules,
- 2) Planar Magnetics for High-Power DC-DC Converter for Future e-Mobility,
- 3) The Next Generation of OBC Based on Monolithic Bi-Directional GaN Power Semiconductors,
- 4) HESS4MRA - Hybrid Energy Storage for Mobile Robot Applications,
- 5) ML ULTRA – 5 Level E Type Power Converter,
- 6) Partial Power Processing Converters: Analysis, Modelling and Design,
- 7) The Extreme Fast Charging Station for e-Mobility Applications: Analysis, and Design,
- 8) Analysis, Modeling and Optimization of Ultra-Capacitor Module for Power Conversion Applications,
- 9) Mobile Wireless Chargers for Future Service Robots, and
- 10) Multi-Charging-Mode DC-DC Converter in fast EV-charging.

Future academic and industrial research projects:

- 1) Multi-Level Converters for Power Quality Applications,
- 2) Multi-Cell Current Source Converters: Analysis, Design and Application Perspectives,
- 3) High-Performance High-Power Source & Load Emulator,
- 4) Integrated Motor-Converter System for High Power Robot Applications,
- 5) High Power WBG Devices: Perspectives, Issues and Applications,
- 6) On-Line Monitoring and Diagnostic of High Power WBG Devices,
- 7) IGBT & MOSFET Gate Drivers: On-Chip Integration of Signal and Power,
- 8) Reverse Voltage Blocking Power Semiconductors: Perspectives, Issues and Applications, and
- 9) Quantum Mode Series Resonant dc/dc Converters for High Frequency & High-Power Applications.

Research project(s) are organized according to the following tasks:

- Literature & patents survey,
- Proposal of a novel solution(s),
- Theoretical analysis of the solution(s) proposed,
- High level hardware design and simulation using simulation tools such as Plexim, PSIM, Maxwell & FEM Tools,
- High level controls design and simulation using simulation tools such as Plexim, PSIM & Matlab,
- A proof of the concept prototype manufacturing and testing, and

- Patents, IEEE Journals and Conference publications.

## What we are looking for?

We are looking for perspective and ambitious candidates with Dr. Degree (PhD) in the field of power electronics & power converters. The candidate should be able to demonstrate:

- An evidence of research capability, with a specific focus on advanced power converter topologies, applications, power semiconductors, energy storage devices and power converters control,
- Very good analytical skills & methods,
- Experience with simulation and design tools such as Plexim, PSIM, FEM tools, Altium Designer and MATLAB,
- Experience in power converters design, debugging & testing is required,
- Experience in analysis and design of MF & HF magnetics (inductors and transformers) is desired, and
- Experience in scientific writing and evidence of peer-reviewed publications is required.

## What we are offering?

We are offering:

- A challenging job in a dynamic and ambitious university and a stimulating internationally renowned research environment,
- Exciting research projects with direct transfer from academia to industry R&D,
- Collaboration with worldwide recognized industrial and academic institutions and partners,
- Full time temporary appointment for 4 years with possibility to extend the appointment to 6 years, and
- Gross salary of approximately 65,8 k€ (14x4.700€) plus additional project-based bonus.

## The Location

The main working location is facility of Innsbruck Power Electronics Laboratory (the i-PEL), Institute of Mechatronics, University of Innsbruck, Innsbruck, Austria. For some projects founded by 3<sup>rd</sup> party partners, periodic traveling to the partner facility in France, Italy and Austria may be required.

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