

# Solid-State Power Processing - Modern Power Conversion



Alberto  
CASTELLAZZI

アルベルトカステッラッジ

Faculty of Engineering

Department of Mechanical and  
Electrical Systems Engineering

Professor

## Major Research Achievements

SiC Power Module Design Performance, robustness and reliability - ISBN-13: 978-1-78561-907-6

Kwak, J. and Castellazzi, A., 2023. State-of-the-Art 800 V Electric Drive Systems: Inverter-Machine Codesign for Energy Efficiency Optimization. *Electronics*, 12(14), p.3063.

Trang, H., Castellazzi, A., Domae, S., Dong, T. and Nakamura, T., 2023. Light electric vehicle motor-drive design based on hybrid Si/SiC Y-inverter and dual-rotor Halbach machine. *Journal of Electrical Engineering & Technology*, 18(1),

Jaber, H.J., Horie, K., Domae, S. and Castellazzi, A., 2023, May. Dual switching-frequency hybrid Si-SiC Y-Inverter. In 2023 11th International Conference on Power Electronics and ECCE Asia (ICPE 2023-ECCE Asia) (pp. 757-763). IEEE.

Castellazzi, A., 2023. Trends and Challenges in Wide-Band-Gap Power Semiconductors Packaging. *Journal of The Japan Institute of Electronics Packaging*, 26(5), pp.454-459.

## Research Keywords

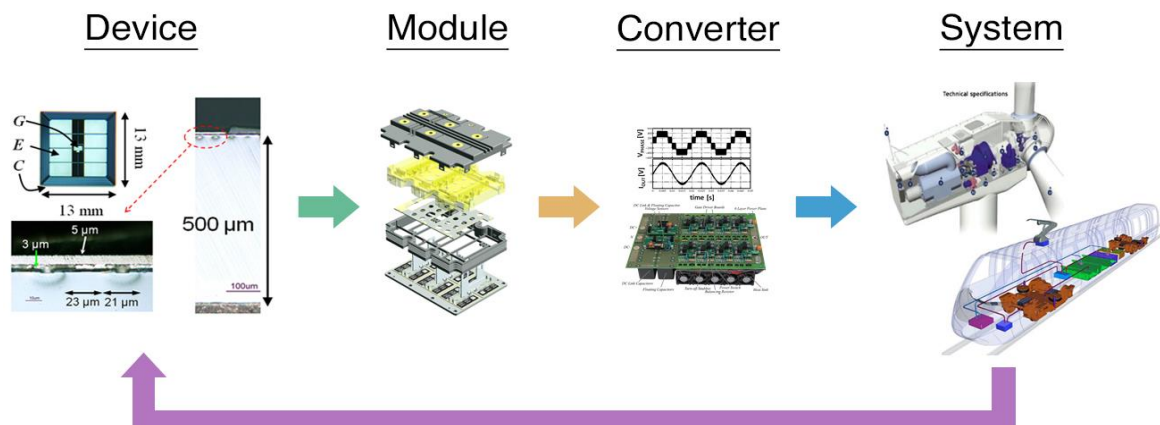
Power electronics, Wide-band-gap semiconductors, Thermal management, Topologies and Technologies, Reliability

## Overview of the Study

The SP2-Lab was established in Apr. 2020, with the launch of the KUAS Faculty of Engineering.

Activities in the Lab focus on the characterization, circuit deployment and integration of wide-band-gap (WBG) semiconductor devices (silicon carbide, SiC; gallium nitride, GaN).

A holistic approach is pursued encompassing device, module, converter and system level analysis and synthesis to ensure well-matched and seamless integration of the functional and structural characteristics of all components.



## Need for Industry-Government-Academia Collaboration

The Lab has held a number of Government-sponsored grants, as well as Industry sponsored collaborations. It regularly collaborates with other renowned Academic Labs, both in Japan and overseas.