



## Call for Papers for the Special Session on

### Integrated Motor Drive Systems for Robotics: From Component Design to Motion Control

#### Organized and co-chaired by

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#### Technical Outline of the Session and Topics

With the rapid proliferation of collaborative robots (cobots), exoskeletons, and humanoid robots, the demand for high-performance joint actuators has never been greater. Unlike traditional industrial automation, next-generation robotics requires actuation systems that offer high torque density, compact integration, and exceptional dynamic transparency.

This special session aims to bridge the gap between electrical machine design, power electronics integration, and advanced motion control algorithms. It focuses on the holistic optimization of the robotic joint—viewing the motor, driver, sensor, and controller not as separate components, but as a unified system. We invite researchers to submit original papers addressing the challenges in miniaturized drive topologies, thermal management in compact spaces, nonlinear friction compensation, and AI-driven control strategies for redundant and dynamic robotic systems.

#### Topics of the session include, but are not limited to:

- High-torque density motor design for robotics (e.g., axial flux, frameless motors).
- Advanced control strategies (MPC, adaptive control, sliding mode control) for joint servos.
- AI-driven and data-driven methods in motor drive and fault diagnosis.
- Wide-bandgap (GaN/SiC) device applications in compact robotic drives.
- Sensorless control and low-speed performance optimization.
- Force/impedance control and haptic feedback implementation.

#### Timeline for Authors

All the instructions for paper submission are available on the conference website. Please visit [www.iecon2026.org](http://www.iecon2026.org) or scan the QR code for the timeline.

