Electronic and Electrical Engineering

Professor David Stone

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Research Interests

Prof Stone has interests in all facets of power electronics and energy storage, including:

- Development of 'smart' battery packs for all-electric and hybrid-electric vehicles, based on both Li-based chemistries, Ni-MH and VRLA cells containing cell state-of-charge monitoring and conditioning electronics to extend the lifetime of the cells. Incorporation of observer techniques into state of function monitoring for cells to increase operation lifetime and consumer confidence in battery technology.
- Investigation into second life operation of EV batteries for Grid support and localised energy storage.
- High efficiency EV-contact less battery charging
- Modelling and control of novel fluorescent lamps to improve the efficiency of light generation. Incorporation of physical lamp models (based on electron energy level interactions) into both Simulink and spice based packages has led to novel lamp models based on the physical interactions within the plasma
- Design, modelling and digital control of high-order resonant converter topologies for high frequency switched mode power supplies for use in 'white goods', and concentrates on the analysis and design of high order resonant converter topologies, with the inclusion of piezzo electric transformers where possible.
- Investigation into high frequency, high power, resonant converters for induction heating applications. Continuing work is now looking at the use of high frequency matrix converters (operating above 150kHz) for direct ac-ac conversion for heating applications.
- Design and digital control of matrix converters for aerospace and sub-sea applications in specialist environments.
- Power Electronics Packaging for high temperature and harsh environments, including high temperature gate drive design and thermal management of converters

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Power Electronics
Energy Storage
Energy Conversion

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TITLE	CITED BY	YEAR
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