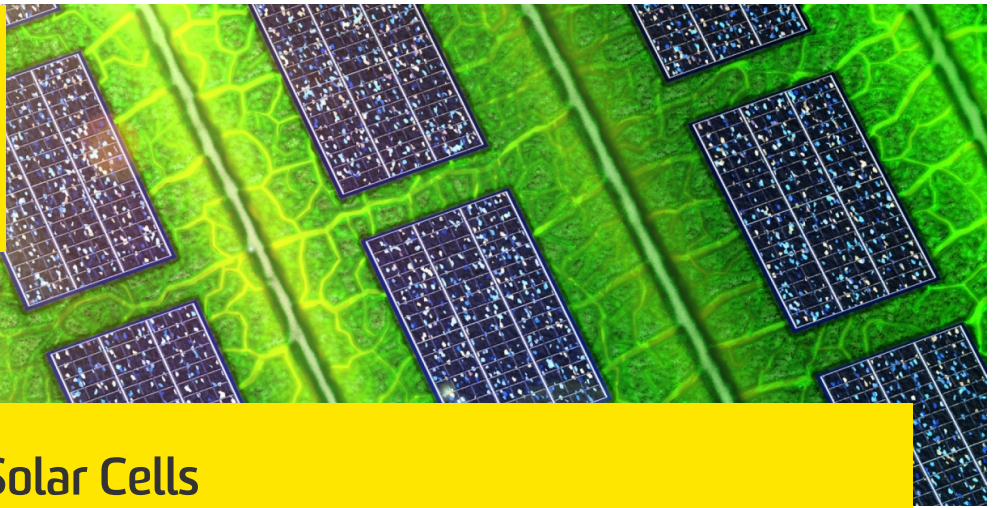




**UNSW**  
SYDNEY



## Advanced Concept Solar Cells

**Seeking to demonstrate new, long-term approaches to photovoltaic power conversion that can fundamentally increase photovoltaic device efficiency.**

### Competitive advantage

- Deep conceptual understanding of the thermodynamic basis for solar power conversion
- World class semiconductor and molecular device fabrication and characterisation facilities

### Impact

- Demonstrated the first hot carrier quantum well photovoltaic device
- Demonstrated a metallic hot carrier photovoltaic device where sunlight is extinguished in an 8nm layer of chromium

### Successful applications

- Four patents on hot electron photovoltaic devices in collaboration with Toyota Motor Corporation
- One patent on hot electron photodetectors in collaboration with Sharp Corporation

### Capabilities and facilities

- The SPECTRE Lab (SPECTroscopy for Renewable Energy) houses a suite of techniques that allow the measurement and development of advanced solar cell technologies using a tuneable femtosecond laser system
- Molecular approaches to spectral engineering to better utilize the solar spectrum. This includes the development of both optical and electrical devices
- Inorganic semiconductor based approaches to third generation photovoltaics including intermediate band solar cells and hot carrier solar cells
- Semiconductor Molecular Beam Epitaxy, capable of fabricating quantum heterostructure electronic devices with atomic layer control
- Atomic Layer Deposition of metal oxides

### Our partners

- Toyota Motor Corporation
- Sharp Laboratories Europe

### More Information

School of Photovoltaic and Renewable Energy Engineering

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