



Research Topics in Renewable Energy for 2021

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Faculty: Engineering		Department: Mechanical and Mechatronic Engineering		
Division: Design & Mechatronics / Mechanics / Thermofluids / <u>Renewable Energy</u>				
Research field: Concentrating solar power; system modelling and optimisation; thermal energy storage; high temperature process heat; green hydrogen.				
General description of research field: Concentrating solar is a technology that combines optics and heat transfer and thermal storage to either generate electricity or to supply high temperature process heat. Unlike wind turbines and solar photovoltaics, it is the only renewable energy technology that can supply dispatchable electricity when the wind does not blow and the sun doesn't shine. Hence, it can play a critical role in the future energy systems. In addition, solar thermal technologies offer a way to decarbonise high temperature manufacturing processes that have no alternative. Research and innovation is critical to enable concentrating solar to be deployed at large scale.				
List of topics:	MEng (Structured)	MEng (Research)	PhD	Funding
1. Configuration and testing of a steam expander / generator demonstrator for medium-scale CSP applications (w C Meyer).		X	X	1× MEng or PhD
2. Design and experimental testing of a gabion packing in thermal energy storage (w T von Backström).		X		1× MEng
3. Design and performance of an engineered material for thermal energy storage (TES) in hot oil or molten salt CSP plants.		X	X	
4. Construction and testing of a circular beam-down Fresnel reflector concentrator.		X	X	
5. Design and testing of a solar receiver based on heat pipes (w C Meyer).		X	X	
6. Techno-economic assessment of electricity generation from a 10 MW medium-scale CSP plant using a steam expander/generator.	X	X		
7. Techno-economic assessment and optimisation of a hybrid CSP/PV power plant.	X	X		
8. Optical performance and economic assessment of a glasshouse enclosed heliostat field for a CSP plant.	X	X		
9. Design of the thermal transport and heat transfer equipment for particle-based receivers in a CST plant.		X		
Specific requirements:				