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Faculty: Engineering	Department: Mechanical and Mechatronic Engineering			
Division: Design & Mechatronics / Mechanics / Thermo Fluids / <u>Renewable Energy</u>				
Research field: Concentrating solar power; system modelling and optimisation; thermal energy storage; high temperature process heat.				
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. Design and experimental performance of an enclosed heliostat concentrator to enable wind-free and dust-free operation		X	X	
2. Assessment of hybrid air/water cooling for the s-CO ₂ cycle in concentrating solar applications		X	X	
3. Modelling of CSP plants for peaking power application on the South African grid		X		
4. Design and performance of an engineered material for thermal energy storage (TES) in hot oil or molten salt CSP plants		X	X	
5. Design of the thermal transport and heat transfer equipment for particle-based receivers in a CST plant.		X		
6. Design and manufacture of an automated flux map sensor for the Helio100 receiver.		X	X	
7. Techno-economic assessment and optimisation of a hybrid CSP/PV power plant		X		
8. Techno-economic assessment and optimisation of a Carnot battery (thermal energy storage) in both a CSP plant and as a retrofit to existing coal-fired power station		X	X	
Specific requirements:				