Lecturer: Prof Johan (SJ) van der Spuy	***Email*:**	sjvdspuy@sun.ac.za
Faculty: Engineering	***Department:*** Mechanical and Mechatronic Engineering	

Division:
Design & Mechatronics / Mechanics / Thermofluids / Renewable Energy

Research field:

1) Turbomachinery:
   a. Axial flow fans for cooling systems
   b. Micro gas turbines
   c. Supercritical CO2 compressor specification

General description of research field:

1) The use of direct dry-cooling in power generation systems is a means of ensuring sustainable water usage. The efficient, low noise, operation of the axial flow fans that form part of such an air-cooled system is essential for a well-performing system. These research topics (topics 1, 2 and 3) focus on the design, testing and analysis of axial flow fans for these systems.
2) The use of micro gas turbines (MGTs) for the propulsion of aerial vehicles or solar thermal power applications hold specific advantages. The two related topics below are as follows:
   a. Experimental evaluation of the existing micro gas turbine compressor test facility. Upgrade the test facility to run the large compressor test bench.
   b. Experimental evaluation of the solarised micro gas turbine test facility. Evaluate proposal for improving the efficiency of the gas turbine.
3) The use of supercritical CO_2 as working fluid for power generation cycles. Current investigations indicate very specific compressor pressure ratio requirements for recuperated sCO_2 loops. This thesis will specifically investigate this requirement further.

Individual topics listed:	***MEng (Structured)***	***MEng (Research)***	**PhD**	**Funding**
1. Design of an axial flow fan for a unique cooling application.		X	X	Project funding available
2. Measuring the performance of the 24 ft. installed MinwaterCSP axial flow fan.		X	X	Project funding available
3. Modelling the noise of a large diameter axial flow cooling fan.		X		Project funding available
4. The development of a test facility for a micro gas turbine compressor stage.		X		limited funding available
5. The development of a micro gas turbine for solar-hybrid application.		X	X	Project funding available
6. The specification of a compressor for a recuperated supercritical CO2 loop.		X	X	Limited funding available

***Specific requirements*:**
Thermofluids 344, Computational Fluid Dynamics.