Dosent / *Lecturer:*	**Email:**	albertg@sun.ac.za
Prof Albert Groenwold	**Tel:**	+27 21 808 4028
	Office:	M605

Fakulteit / *Faculty:*	**Departement / *Department:***
Engineering	Mechanical and Mechatronic Engineering

Afdeling / *Division:*
Design & Mechatronics / Mechanics / Thermo fluids / Renewable Energy

Navorsingsveld / *Research field:*
Numerical optimization, Artificial Intelligence (AI), Numerical modelling, Computing on the CPU and GPU, topology optimization.

Algemene beskrywing van navorsingsveld:
General description of research field:
We are interested in the development and application of algorithms for general problems that are problematic in classical optimization, due to, for example, multimodality, discontinuities, etc. In particular, we are interested in very large scale (VLS) optimal design. Typically, hundreds of thousands design variables and constraints may be present. In addition, we are interested in artificial intelligence (AI), using for example particle swarm optimization (PSO) algorithms, differential evolution (DE) and genetic algorithms (GAs), etc.

Typical areas of interest (applications) include structural and multidisciplinary optimization, aspects of renewable or sustainable energy, composite materials, optimal heliostat and wind farm lay-out, and many more. However, we are not only interested in applying the algorithms we use, but also in the fundamental math that is used to formulate these algorithms, with the aim of improving performance.

An overview of my research is available here.

Lys van onderwerpe/*List of topics:*	*MEng (Structured)*	*MEng (Research)*	PhD	**Funding**
1. Mathematical modelling and optimization – various topics, ranging from mathematical algorithmic intricacies to practical, real-world applications.		**x**	**x**	Unknown
2. Artificial Intelligence - again, various topics, ranging from mathematical algorithmic intricacies to practical, real-world applications.		**x**	**x**	Unknown

*Specific requirements***:**
Knowledge of some computing language, and a sound mathematical background. However, not all topics require mathematicians, nor fear!