Curriculum Vitae

AP Engelbrecht

Contents

1 Biographical Sketch

1.1 General Information

Surname	Engelbrecht			Maiden Name		
First names	Andries Petrus			**ID Number**		6911075040081
Citizenship	South African			**Title**	Prof	**Gender**	Male
Place of Birth	Lüderitz, Namibia			**Date of Birth**	1969/11/07	
Population group	**African**		**Coloured**		**Indian**		**White**	X	**Other**	
Marital status	Married					
Department	Computer Science			**Position**	Professor, Director: Institute for Big Data and Data Science, SARChI Chair in AI	
Direct Telephone	+27 12 420 5232			**Direct Telefax**	+27 12 362 5188	
E-mail	engel@cs.up.ac.za			**URL**	http://cirg.cs.up.ac.za	
Date of Appointment	1998-02-01			**Permanent Full-time**	X	**Temporary Full-Time**	
Residential Address	11 Johann Place Willow Acres, 0081			**Postal Address**	P.O. Box 102774 Moreletta Plaza 0167	

1.2 Language Proficiency

Afrikaans (read, write, speak)

English (read, write, speak)

German (understands a little)

1.3 Highest School Qualification

Institution	Subjects	Symbols
Bosmansdam High School	Afrikaans	A
	English	C
	Mathematics	B
	Science	C
	Biology	A
	History	A

1.4 Academic Qualifications Obtained

Degree/ Diploma	Field of study	Higher education institution	Period	Year of graduation	Distinction
B.Sc	Computer Science Mathematics	University of Stellenbosch	3 years	1990	no
Hons-B.Sc	Computer Science	University of Stellenbosch	1 year	1992	yes
M.Sc	Computer Science	University of Stellenbosch	2 years	1994	yes
PhD	Computer Science	University of Stellenbosch	5 years	1999	N/A

1.5 Work Experience to Date

Name of Employer	Capacity and/or type of work	Period
Tygerberg High School	Substitute teacher (Computer Studies, Mathematics)	08/1992 - 11/1992
University of Stellenbosch (US)	Part time lecturer for the Institute for Mathematics and Science Teaching (IMSTUS)	1/1991-12/1995
University of South Africa (UNISA)	Lecturer (Computer Science) Senior Lecturer (Computer Science)	1/1996-12/1997 1/1998
Hendrik Verwoerd High School	Computer Studies teacher	1996
Garsfontein High School	Computer Studies teacher	1996
Center of Gifted Children (Teachers College, Pretoria)	Teacher (C++)	1996
University of Pretoria (UP)	Lecturer (Computer Science) Senior Lecturer (Computer Science) Associate Professor (Computer Science) Full Professor (Computer Science) South African Research Chair in AI Acting Head of Department (Computer Science) Head of Department (Computer Science) Director: Institute for Big Data and Data Science	2/1998-12/1998 1/1999-12/2000 1/2001-12/2003 1/2004-present 2/2007-2021 9/6/2008-31/5/2009 1/6/2009-31/08/2017 01/09/2017-present

2 Teaching Activities

2.1 Courses/modules presented: Undergraduate

Course	Level	Academic Institution	Degree/ Diploma	Compiled Study Guides	Curri- culum Design
COS110 Introduction to Programming	1	2009-2011,2013 2014-2016 UP	B.IS (MM), B.IT B.Sc (IT/CS) B.Sc B.Eng (Comp)	yes	yes
COS212 Data Structures	2	2005-2011, 2015 UP	B.IS (MM), B.IT B.Sc (IT/CS) B.Sc B.Eng (Comp)	yes	yes
COS333 Programming Languages	3	1998 UP	B.Sc (IT)	yes	no
ERP210 Software Engineering	2	1998-1999 UP	B.Ing (EE)	yes	no
COS213 Advanced Programming	2	1998-2003 UP	B.Sc (IT/CS), B.IT B.IS (MM)	yes	yes
COS314 Artificial Intelligence	3	1999-2008,2013 2015-2018, UP	B.Sc (IT/CS), B.IT B.IS (MM)	yes	yes
COS111-U Introduction to Programming 1	1	1996-1997 UNISA	B.Sc	yes	yes
COS112-U Introduction to Programming 2	1	1996-1997 UNISA	B.Sc	yes	yes
COS221-3 Computer Organization	2	1996-1997 UNISA	B.Sc	yes	no
INF306-G Computer Networks	2	1997 UNISA	B.Sc	yes	yes

2.2 Courses/modules presented: Postgraduate

Course	Level	Academic Institution	Degree/ Diploma	Compiled Study Guides	Curri- culum Design
COS710 Artificial Intelligence I	4	2012-present UP	Hons-B.Sc (CS)	yes	yes
COS711 Artificial Intelligence II	4	2012-2014 UP	Hons-B.Sc (CS)	yes	yes
AIP780 AI in Planning	4	2010-2011 UP	Hons-B.Sc (CS)	yes	yes
KMI780 Artificial Intelligence	4	1999-2011 UP	Hons-B.Sc (CS)	yes	yes
KVM780 Data Mining	4	1998-2011 UP	Hons-B.Sc (CS)	yes	yes
GRF780 Graphics	4	2007 UP	Hons-B.Sc (CS)	yes	no
RNW781 Cellular Networks	4	2001 UP	Hons-B.Sc (CS)	yes	yes

Course	Level	Academic Institution	Degree/ Diploma	Compiled Study Guides	Curri- culum Design
SPE781 Several Topics	4	1999-2000 UP	Hons-B.Sc (CS)	yes	yes
SPE780 Projects	4	1998-present UP	Hons-B.Sc (CS)	N/A	N/A
MIT808 Data Science Project	5	2018 UP	M.IT	yes	yes
MIT836 Network Management	5	2000 UP	M.IT	yes	yes
MIT842 Computing in Perspctive	5	2008 UP	M.IT	no	no
MIT831 Knowledge Discovery	4	2000 UP	M.IT	no	no
INF406-H Data Communications	4	1996-1997 UNISA	Hons-B.Sc	yes	no
COS419-G Operating Systems	4	1996-1998 UNISA	Hons-B.Sc	yes	yes
GPG780 Generic Programming	4	2003-2007 UP	Hons-B.Sc	yes	yes
MIT835 Corporate IT Systems	5	2004 UP	M.IT	yes	yes
MA course Guest lecture on AI	5	2006-2008 UP	MA	n/a	n/a

2.3 Other Education and Pedagogic Courses Presented

Unix shell script and awk programming	1995	Vodacom
Introduction to Particle Swarm Optimization	2008	Rorotika
Artificial Neural Networks	2008	Rorotika
Swarm Intelligence	2016,2017	TEKBAC, Kuala Lumpur
Swarm Intelligence	2016,2017	TEKBAC, Singapore
Machine Learning	2017	Digitata
Applied Machine Learning	2018	Training Solutions, Enterprises at UP

2.4 Hons-B.Sc Project Supervision

Student	Project Title	Year
D Breedt	*Multi-priority Foraging with Division of Labor*	2018
D De Jager	*Using Niching Algorithms to Evolve Neural Network Ensembles*	2018
J Daubinet	*Dynamic Multi-Guided PSO for Dynamic Multi-Objective Optimization*	2018
K Erwin	*Adaptive Multi-Guided Particle Swarm Optimization*	2018
M Gerber	*Better than Random Search?*	2018
S Nell	*Particle Swarm Optimization to Optimally Distribute Manure from Live Stock Farms as Fertilizer to Crop Farms in Catalonia*	2018
K Pennels	*Increasing population size: Just a Random Search?*	2018

Student	Project Title	Year
M Peroski	*Modeling Gene-to-gene Interaction*	2018
Q Sarfo-Abronen	*Random Grouping and Factorization to Train Large Neural Networks using Cooperative PSO*	2018
M Songazizi	*Particle Swarm Optimization with Adaptive Coordinate Search*	2018
C Steenkamp	*Multi-Guided PSO for Many-Objective Optimization*	2018
F Van der Merwe	*Training Neutral Networks with Variable Length Input Vectors*	2018
B Van Tonder	*Fitness Landscape Analysis of $\prod \sum$ Neural Networks*	2018
H Oldewage	*Review and Empirical Analysis of PSO Algorithms*	2016
M Swanepoel	*Critical Review of Swarm Intelligence Algorithms*	2016
E Boshoff	*Boltzmann Selection in Differential Evolution*	2015
D Doman	*Heterogeneous Vector-Evaluated Particle Swarm Optimization*	2015
M Ellis	*Incremental Training of Neural Networks using Particle Swarm Optimization*	2015
A Pretorius	*Niching Ability of Bacterial Foraging Optimization*	2015
N Taljaard	*Cluster-Based Prioritized Foraging using Robot Swarms*	2015
A Volschenk	*Random Pruning in Game Trees using Competitive Coevolution*	2015
P Mphahlele	*Optimal Differential Evolution Population Sizes*	2014
J Singeer	*Cluster-based Swarm Robotics Foraging*	2014
E van Zyl	*Self-Adaptive Particle Swarm Optimization*	2014
P Bosman	*Diversity Rate of Change Measure*	2013
R Garden	*Analysis of Boundary Constrained Optimization Benchmarks*	2013
G Jordaan	*Analysis of Coevolution Fitness Sharing Approaches*	2013
P Mphahlele	*Influence of Population Size on Differential Evolution*	2013
J Nikitaritis	*Headless Chicken Cultural Algorithm*	2013
S van Dyk	*Adaptive Neural Network Architecture Selection*	2013
L van Niekerk	*Self-Adaptive Differential Evolution*	2013
W Minnaar	*Comparing Optimization Function Gradients in PSO*	2012
B Leonard	*Heterogeneous PSO for Dyamic Environments*	2011
C Enslin	*Approximating Neural Network Derivatives*	2011
C Cleghorn	*Piecewise Linear Approximation using PSO*	2011
J Abbott	*Bacterial Foraging for Dynamic Environments*	2011
M Randall	*End-milling Anomaly Detection*	2011
N Welters	*Order Independent Transparency Algorithms for Real-Time Rendering*	2011
W Robert	*Scalability of Niche PSO Algorithms*	2011
Z Nhleko	*Age Prediction from Images*	2011
F Nepomuceno	*Opposition-based Learning for PSO*	2010
L Ackerman	*Speech Extraction for High Frequency Signals*	2010
R van der Vyver	*Traffic-Optimized Navigation*	2009
A van Wyk	*Bee Colony Optimization*	2008
B Angelov	*Discrete Pulse Transform of Images*	2008
J Buys	*Evolving Robot Swarms to Play a Simple Ball Game*	2007
H de Nysschen	*Procedural Texture Evolution using Genetic Programming*	2007
C Gouws	*Coevolutionary Training of Neural Networks*	2007
M Lynch	*Coevolving Strategies for Multiple Predator-Prey Interactions*	2007
W. Matthysen	*A PSO using Polar Coordinates*	2007
M. Riekert	*Evolving Dynamic Decision Trees Using Genetic Programming*	2007
H Roux	*Using Differential Evolution to Train Self-Organizing Feature Maps*	2007
J Swanepoel	*Swarm Robots for Object Clustering*	2007
D Uys	*Using Robots to Map Unknown Environments*	2007

Student	Project Title	Year
J van der Walt	*Development of an Acting Module for Role Playing Games*	2007
L Langenhoven	*Evolving Agents for War Games*	2006
S Olorunda	*Comparison of Scalability of PSO Niching Methods*	2006
J du Toit	*CIlib Evolutionary Computation Framework*	2005
F Geldenhuys	*Foraging Model for Robot Swarms*	2005
C Schutte	*Swarm Robot Navigation*	2005
P vd Merwe	*Evolving Strategies for Robot Swarms*	2005
S Allen	*Object Recognition by Robots*	2004
J Conradie	*Training Bao Game Agents from Zero Knowledge*	2004
H Grobler	*Robots Construction from PC Components*	2004
G Pampara	*CIlib Framework for ACO Algorithms*	2004
G Tanna	*CIlib Implementation of Binary PSO*	2004
L van Loggeren-berg	*Protein Tertiary Structure Visualization*	2004
C Coetser	*Spam Detection using Artificial Immune Systems*	2003
C Dubber	*Plan Sequencer for Multi-Agent Systems*	2003
D Fine	*Emotion Detection from Facial Expressions*	2003
E Papacostantis	*Data Analysis using SOMs*	2003
F Scheffer	*SVM for Detection of Pornographic Images*	2003
L Liddell	*Positioning of Robots in a MAS Environment*	2003
M Drodz	*Planner for Multi-Agent Systems*	2003
P Lefenya	*Generic Simulator for Multi-Agent Systems*	2003
R vd Hoven	*Training NN ensembles using PSO*	2003
D Barla-Szabo	*Discrete Particle Swarm Optimization*	2002
M Combrink	*Swarm Intelligence in Game Development*	2002
E de Villiers	*Particle Swarm Visualization*	2002
C Esterhuizen	*A Neural Network for E-mail Spam Detection*	2002
N Franken	*Artificial Intelligence for Intrusion Detection*	2002
H Kunzman	*Evolutionary Approaches to Particle Swarm Optimization*	2002
C Naicker	*Training Neural Networks using Cultural Algorithms*	2002
D Naude	*A Neural Network Model for Linux User Authentication*	2002
G Potgieter	*Genetic Algorithm Music Composer*	2001
G Bijker	*Neural Networks and Evolutionary Computing for Econometric Modeling*	2000
HW Botha	*Cultural Evolution Algorithms to Train Neural Networks*	2000
R Brits	*Cluster Incremental Learning for Feedforward Neural Networks*	2000
F du Toit	*Data Compression using Particle Swarm Optimization*	2000
B Badenhorst	*Data Generation for Neural Network Training*	2000
JC Welgemoed	*Cooperating Genetic Algorithms*	1999
RNM Minnaar	*Generic Genetic Algorithm Simulator*	1998
E Basson	*Approximation of n-th Order Derivatives using Neural Networks*	1998
D Rodich (UNISA)	*A Framework for Hybrid Intelligent Models*	1997
W Butler (UNISA)	*State Classification in a GSM Cell using a Backpropagation Artificial Neural Network*	1997
M Kies (UNISA)	*An ANN Model for Renumeration Analysis and Fraud Detection*	1997
G Benson (UNISA)	*A Neural Network Model for the Prediction of Future Values of the Gold Share Index*	1997
J de Waal (US)	*Musical Editor*	1995

Student	Project Title	Year
D van der West-huysen (US)	*SUNNE: Stellenbosch University Neural Network Engine*	1995
AS Sevenster (US)	*GARTNet: A Genetic Algorithm for Routing in Telecommunications Networks*	1995
M Hattingh (US)	*A Routing Rule Simulator for Telephone Networks*	1994

2.5 Educational Publications and Products

1. J Barrow, AP Engelbrecht, *COS111: Introduction to Programming I*, Study guide, UNISA, 1996

2. H Rosenblatt, AP Engelbrecht, *COS112: Introduction to Programming II*, Study guide, UNISA, 1996

3. W Smuts, AP Engelbrecht, *INF306-G: Business Data Communications*, Study guide, UNISA, 1996

4. AP Engelbrecht, L Marshall, T Cloete, *Fitchfork: An Automated Marking System for C++ Programs*, Software package for the automated marking of C++ programs, University of Pretoria, 2004

2.6 Curriculum Design

I have been involved in the design of the following curricula:

- Played a leading role in the development of the BSc IT (Extended Program) degree, a four year degree offered at the University of Pretoria to students who do not meet the entrance requirements of the three year degree.

- Co-developer of the new BSc IT and BSc CS degrees offered by the University of Pretoria, to align the degrees with the ACM curriculum for Information Technology and Computer Science respectively.

- Played a leading role in the redesign of the BSc Honours (Computer Science) degree offered by the University of Pretoria, to align with the main research focus areas of the Department of Computer Science

- Played a leading role in the development of the Masters in Information Technology (M.IT) degree with specialization in Big Data Science, offered by the University of Pretoria.

2.7 Visits to Local and Overseas Universities as Guest Professor or Lecturer in Regard to Teaching

None

2.8 Participation in National and International Teaching Associations, Bodies, Committees

None

3   Postgraduate Supervision

	Summary of Postgraduate Supervision	
	Completed Degrees	Current Students
Masters (research)	44	20
M.IT (dissertation)	2	10
PhD	14	21
Total	60	51

3.1   Supervision or Co-supervision of Students Who have Completed Degrees

Student	Degree Thesis Title Graduation Year Examiner(s)	Supervisor/Co-supervisors	Duration	Comment
A Adejumo	M.Sc (Computer Science) *Active learning Algorithms for Multi-layer Feedforward Neural Networks* 1999 Mr A Vahed (UWC)	AP Engelbrecht	2	
D Rodic	M.Sc (Computer Science) *Hybrid Exhaustive Search for Knowledge Discovery* 2000 Prof M Embrechts (USA)	AP Engelbrecht	3	*Cum Laude*
A Ismail	M.Sc (Computer Science) *Training and Optimization of Product Unit Neural Networks* 2002 Prof CW Omlin (UWC)	AP Engelbrecht	3	*Cum Laude*
F vd Bergh	PhD (Computer Science) *An Analysis of Particle Swarm Optimizers* 2002 Prof R Eberhart (USA) Prof PJ Lisboa (UK)	AP Engelbrecht	2	
R Brits	M.Sc (Computer Science) *Niching Strategies for Particle Swarm Optimization* 2003 Prof T Krink (Denmark)	AP Engelbrecht F vd Bergh	1	*Cum Laude*
G Potgieter	M.Sc (Computer Science) *Mining Continuous Classes using Evolutionary Computing* 2003 Prof R Setiono (Singapore)	AP Engelbrecht	1	*Cum Laude*
G Zowa	M.BA *Technical Survival: Strategic Technology Migration for Next Generation Networks Telecommunication Business* 2003	AP Engelbrecht L Schoeman	1	

Student	Degree Thesis Title Graduation Year Examiner(s)	Supervisor/Co-supervisors	Duration	Comment
	Dr L van Zijl (SU)			
D v Wyk	M.IT *A Genetic Programming Approach to Normalizing Databases* 2003 Prof T Grant (Netherlands)	AP Engelbrecht	1	*Cum Laude*
U Paquet	M.Sc (Computer Science) *Training Support Vecor Machines With Particle Swarms* 2003 Dr Y Shi (USA)	AP Engelbrecht	1	*Cum Laude* Accepted for PhD at Cambridge
A Graaff	M.Sc (Computer Science) *The Artificial Immune System with Evolved Lymphocytes* 2004 Prof J Timmis (UK)	AP Engelbrecht	2	*Cum Laude*
N Franken	M.Sc (Computer Science) *PSO-Based Coevolutionary Game Learning* 2004 Prof G Kendall (UK)	AP Engelbrecht	2	*Cum Laude*
G Nel	M.Sc (Computer Science) *A Memetic Genetic Program for Knowledge Discovery* 2005 Prof H Viktor (Canada)	AP Engelbrecht	4	*Cum Laude*
ES Peer	M.Sc (Computer Science) *Serendipitous Software Framework for Facilitating Collaboration in Computational Intelligence* 2005 Prof P Suganthan (Singapore)	AP Engelbrect F vd Bergh	3	*Cum Laude*
M Omran	PhD (Computer Science) *Particle Swarm Optimization Methods for Pattern Recognition and Image Processing* 2005 Prof X Li (Australia) Dr Xie	AP Engelbrecht A Salman (Kuwait)	3	
D Rodic	PhD (Computer Science) *Intelligent Distributed Agent Based Architecture* 2005 Prof T Balch (USA) Prof E Grislin (France)	AP Engelbrecht	3	
A Combrink	M.Sc (Computer Science)	L van Zijl (US)	3	

Student	Degree Thesis Title Graduation Year Examiner(s)	Supervisor/Co-supervisors	Duration	Comment
(US)	*Context Extraction from Text* 2005	AP Engelbrecht		
J du Plessis	M.Sc (Computer Science) *ACODV: Ant Colony Optimisation Distance Vector Routing in Ad* 2006 Prof L Gambardella (Switzerland)	AP Engelbrecht	3	*Cum Laude*
L Messerschmidt	M.Sc (Computer Science) *Using Particle Swarm Optimization to Evolve Two-Player Game Agents* 2006 Dr D Fogel (USA)	AP Engelbrecht	5	
H Grobler	M.Sc (Computer Science) *Surface Defect Detection by means of a Structural Light System* 2006 Dr Malin Premaratne (Australia)	AP Engelbrecht	2	*Cum Laude*
W Duminy	M.Sc (Computer Science) *A Learning Framework for Zero-Knowledge Game Playing Agents* 2007 Dr SM Lucas (United Kingdom)	AP Engelbrecht	3	*Cum Laude*
C Naicker	M.Sc (Computer Science) *Derating NichePSO* 2007 Prof M Vrahatis (Greece)	AP Engelbrecht	4	*Cum Laude*
J Pun	M.Sc (Computer Science) *Gesture Recognition with Application in Music Arrangement* 2007 Prof W Duch (Singapore)	AP Engelbrecht F van den Bergh	5	*Cum Laude*
S vd Stockt	M.Sc (Computer Science) *A Generic Neural Network Framework using Design Patterns* 2008 Prof L Stirling (Australia)	AP Engelbrecht	4	*Cum Laude*
F Zablocki	M.Sc (Computer Science) *Multiple Sequence Alignment using Particle Swarm Optimization* 2008 Prof A Abraham (South Korea)	AP Engelbrecht	3	*Cum Laude*
M Poggiolini	M.Sc (Computer Science) *The Feature Detection Rule and its application within the Negative Selection Algorithm* 2009	AP Engelbrecht	5	*Cum Laude*

Student	Degree Thesis Title Graduation Year Examiner(s)	Supervisor/Co-supervisors	Duration	Comment
	Prof J Timmis (UK)			
J Grobler	M.Eng (Industrial) *Particle Swarm Optimization and Differential Evolution for Multi-Objective Multiple Machine Scheduling* 2009 Prof G Kendall (UK)	S Yadavalli AP Engelbrecht	1	*Cum Laude*
M Neethling	M.Sc (Computer Science) *Using SetPSO to Determine RNA Secondary Structure* 2009 Dr GB Fogel (USA)	AP Engelbrecht	5	*Cum Laude*
S Khan	PhD *Design and Analysis of Iterative Heuristics for Topology Design of Distributive Local Area Networks* 2009 Prof J Kaczpryk (Poland) Prof M Middendorf (Germany)	AP Engelbrecht	6	
A Hauptfleisch	M.Sc (Computer Science) *Automatic Road Extraction from High Resolution Satellite Imagery using Spectral Classification Methods* 2010 Prof J Inglada (France)	AP Engelbrecht F vd Bergh	5	*Cum Laude*
A Louis	M.Sc (Computer Science) *Unsupervised Discovery of Relations for Analysis of Textual Data in Digital Forensics* 2010 Prof S Aggarwal (USA)	AP Engelbrecht	5	*Cum Laude*
D Barla-Szabo	M.Sc (Computer Science) *A Study of Grandient Based Particle Swarm Optimisers* 2010 Prof K Deep (India)	AP Engelbrecht	8	*Cum Laude*
E Dean	M.Sc (Computer Science) *Computer Aided Identification of Biological Specimens using Self-Organizing Maps* 2010 Prof B Ombuki-Berman (Canada)	AP Engelbrecht A Nicholas (KZN)	9	*Cum Laude*
E Papacostantis	M.Sc (Computer Science) *Competitive Co-Evolution of Trend Reversal Indicators using Particle Swarm Optimisation* 2010	AP Engelbrecht	6	*Cum Laude*

Student	Degree Thesis Title Graduation Year Examiner(s)	Supervisor/Co-supervisors	Duration	Comment
	Prf KC Tan (Singapore)			
M Smit	M.Sc (Computer Science) *Interactive Narrative Generation using Computational Verb Theory* 2010 Prof T Yang (USA)	AP Engelbrecht	4	*Cum Laude*
A Graaff	PhD (Computer Science) *A Local Network Neighbourhood Artificial Immune System* 2011 Prof N de Castro (Brazil) Prof D Dasgupta (USA)	AP Engelbrecht	7	
IL Schoeman	PhD (Computer Science) *Niching in Particle Swarm Optimization* 2011 Prof X Li (Australia) Prof T Blackwell (UK)	AP Engelbrecht	8	
PEN Lutu	PhD (Computer Science) *Dataset Selection for Aggregate Model Implementation in Predictive Data Mining* 2011 Prof K-M Osei-Bryson (USA) Prof H Liu (USA)	AP Engelbrecht	8	
D Constantinou	PhD (Computer Science) *Ant Colony Optimisation Algorithms for Solving Multi-Objective Power-Aware Metrics for Mobile Ad Hoc Networks* 2011 Prof A Pitsillides (Cyprus) Prof F Buarque (Brazil)	AP Engelbrecht	6	
B Anguelov	M.Sc (Computer Science) *Video Game Pathfinding and Improvements to Discrete Search on Grid-based Maps* 2012 Prof N Sturtevant (USA)	AP Engelbrecht	4	*Cum Laude*
J Duhain	M.Sc (Computer Science) *Particle Swarm Optimization in Dynamically Changing Environments* 2012 Prof D Pelta (Spain)	AP Engelbrecht	5	*Cum Laude*
G Pampara	M.Sc (Computer Science) *Angle Modulated Population based Algorithms to Solve Binary Problems* 2012	AP Engelbrecht	7	*Cum Laude*

Student	Degree Thesis Title Graduation Year Examiner(s)	Supervisor/Co-supervisors	Duration	Comment
	Prof S Das (India)			
A Rakitianskaia	M.Sc (Computer Science) *Using Particle Swarm Optimisation to Train Feedforward Neural Networks in Dynamic Environments* 2012 Prof J Zurada (USA)	AP Engelbrecht	5	*Cum Laude*
T Morkel	M.Sc (Computer Science) *Image Steganography Applications for Secure Communication* 2012 Prof K Curran (UK)	AP Engelbrecht	7	*Cum Laude*
MC du Plessis	PhD (Computer Science) *Adaptive Multi-Population Differential Evolution for Dynamic Environments* 2012 Prof J Branke (UK) Prof S Yang (UK) Prof D Zaharie (Romania)	AP Engelbrecht	6	
M Helbig	PhD (Computer Science) *Solving Dynamic Multi-Objective Optimisation Problems using Vector Evaluated Particle Swarm Optimisation* 2012 Prof CA Coello Coello (Mexico) Prof K Deb (India) Prof KC Tan (Singapore)	AP Engelbrecht	5	
N Engelbrecht	M.Eng (Computer Engineering) *Analysis of RED Packet Loss Performance in a Simulated IP WAN* 2013 Prof R Salles (Brazil)	AP Engelbrecht	4	*Cum Laude*
T Scheepers	M.Sc (Computer Science) *Co-evolution of Neuro-Controllers to Train Multi-Agent Teams from Zero Knowledge* 2013 Prof X Li (Australia)	AP Engelbrecht	5	*Cum Laude*
C Cleghorn	M.Sc (Computer Science) *A Generalized Theoretical Deterministic Particle Swarm Model* 2014 Prof E Ozcan (UK)	AP Engelbrecht	2	*Cum Laude*
K Malan	PhD (Computer Science) *Characterising Continuous Optimisation Problems for Particle Swarm Optimisation Performance Prediction*	AP Engelbrecht	7	

Student	Degree Thesis Title Graduation Year Examiner(s)	Supervisor/Co-supervisors	Duration	Comment
	2014 Prof X Yao (UK) Prof G Ochoa (UK) Prof S Verel (France) Dr S Khan (Bahrain)			
KS Georgieva	M.Sc (Computer Science) *A Computational Intelligence Approach to Clustering of Temporal Data* 2015 Prof S Das (India)	AP Engelbrecht	3	*Cum Laude*
CF Stallmann	M.Sc (Computer Science) *Digital Audio Restoration of Gramophone Records* 2015 Prof S Squartini (Italy)	AP Engelbrecht	3	*Cum Laude*
A van Wyk	M.Sc (Computer Science) *An Analysis of Overfitting in Particle Swarm Optimized Neural Networks* 2015 Prof S Mostaghim (Germany)	AP Engelbrecht	6	*Cum Laude*
J Grobler	PhD (Industrial Engneering Science) *The Heterogeneous Meta-hyper-heuristic: From Low Level Heuristics to Low Level Meta-heuristics* 2015 Prof T Rinarsson (Iceland) Prof X Yao (UK) Prof R Qu (UK) Prof E Hart (UK)	VSS Yadavalli AP Engelbrecht G Kendall (UK)	6	
J Langeveld	M.Sc (Computer Science) *Set-Based Particle Swarm Optimization* 2015 Prof E Ozcan (UK)	AP Engelbrecht	6	*Cum Laude*
R Klazar	M.Sc (Computer Science) *Ant-Inspired Strategies for Opportunistic Load Balancing in the Distributed Computation of Solutions to Embarrassingly Parallel Problems* 2016 Prof Marco Dorigo (Belgium)	AP Engelbrecht	10	*Cum Laude*
T Naidoo	M.Sc (Computer Science) *Reconstruction and Analysis of Holograhic Images for Lens-less Microscopy* 2017 Prof Michael Liebling (USA)	AP Engelbrecht	8	*Cum Laude*

Student	Degree Thesis Title Graduation Year Examiner(s)	Supervisor/Co-supervisors	Duration	Comment
	Dr Frans van den Bergh (SA)			
WS van Heerden	M.Sc (Computer Science) *Self-Organizing Feature Maps for Exploratory Data Analysis and Data Mining: A Practical Perspective* 2017 Prof Barbara Hammer (Germany)	AP Engelbrecht	15	*Cum Laude*
CW Cleghorn	PhD (Computer Science) *Particle Swarm Optimization: Empirical and Theoretical Stability Analysis* 2017 Prof Ender Ozcan (UK) Prof Tim Hendtlass(Australia) Prof Thomas Stützle (Belgium)	AP Engelbrecht	4	
BJ Leonard	MSc (Computer Science) *Critical Analysis of Angle Moduleated Particle Swarm Optimisers* 2017 Dr Marde Helbig (RSA) Prof Ajith Abraham (USA)	AP Engelbrecht	6	*Cum Laude*
JZ Abbott	MSc (Computer Science) *Nature Inspired Algorithms for Prioritized Foraging* 2018 Dr Christopher Cleghorn (RSA) Prof Erol Sahin (Turkey)	AP Engelbrecht	6	*Cum Laude*
ET Oldewage	MSc (Computer Science) *The Perils of Particle Swarm Optimisation in High Dimensional Problem Spaces* 2018 Prof Rolf Wanka (Germany) Prof Roman Senkerik (Czech Republic)	AP Engelbrecht CW Cleghorn	3	*Cum Laude*
C Scheepers	PhD (Computer Science) *Multi-guided Particle Swarm Optimization: A Multi-objective Particle Swarm Optimizer* 2018 Dr Marde Helbig (South Africa) Prof Carlos Coello Coello (Mexico) Prof Josua Knowles (UK)	AP Engelbrecht	4	

3.2 Current Postgraduate Students

Student	Degree	Research Topic	Supervisor(s)	First Year of Registration
O Babajide	M.Sc	*Optimizing Technical Indicators for Financial Trade*	AP Engelbrecht	2015
P Bosman	M.Sc	*Diversity-rate-of-change Analysis of Particle Swarm Optimization*	AP Engelbrecht	2014
M Ellis	M.Sc	*Dynamic Neural Network Architecture Selection*	AP Engelbrecht	2016
E du Plessis	M.Sc	*Coevolutionary Approaches to Market Forecasting*	AP Engelbrecht	2017
R Garden	M.Sc	*Guide Selection Strategies for Particle Swarm Optimization*	AP Engelbrecht	2014
W Greenberg	M.Sc	*Stability of Standard Particle Swarm Optimization*	AP Engelbrecht CW Cleghorn	2017
C Enslin	M.Sc	*Training Cascade Correlation Networks using Particle Swarm Optimization*	AP Engelbrecht	2013
S Manganye	M.Sc	*Active Learning by Neural Networks as a Dynamic Optimization Problem*	AP Engelbrecht	2018
F Mnkandla	M.Sc	*Self-Organizing Maps in Dynamic Environments*	AP Engelbrecht	2017
W Mostert	M.Sc	*Fitness Landscape Analysis of Feature Selection Landscapes*	AP Engelbrecht KM Malan	2018
F Nepomuceno	M.Sc	*Self-Adaptive Heterogeneous Particle Swarm Optimizers*	AP Engelbrecht	2011
J Nicholls	M.Sc	*Evolving Macro-Level Financial Traders*	AP Engelbrecht	2008
M Riekert	M.Sc	*Evolving Decision Trees for Dynamically Changing Data*	AP Engelbrecht M Helbig	2008
A Schreuder	M.Sc	*Hyper-Heuristic to Train Neural Networks*	AP Engelbrecht	2016
M Siddiqui	M.Sc	*Secure Image Steganography using Multi-Objective Ant Colony Optimization*	AP Engelbrecht	2012
N Thangelane	M.Sc	*Competitive Coevolutionary Approaches to Train Deep Neural Networks*	AP Engelbrecht A Bosman	2017
A Thele	M.Sc	*Honey Bee Optimisation in Dynamic Multiobjective Problems: An Empirical Study*	AP Engelbrecht	2017
S van Eeden	M.Sc	*Evolving Grammars for Programming Languages*	AP Engelbrecht	2009
R Benefeld	M.IT	*Personalized Lifestyle Recommendations*	J Grobler AP Engelbrecht	2018
B Bosman	M.IT	*Review and Empirical Analysis of Clustering Approaches for Verly Large Data Sets*	AP Engelbrecht M Helbig	2018
P Doolabh	M.IT	*Time Series Data Clustering*	AP Engelbrecht	2018

Student	Degree	Research Topic	Supervisor(s)	First Year of Registration
L-M Dreyer	M.IT	*Feature Engineering and Predictive Modelling on Time Series Data to Predict Patient Diagnopsis based on Medication Purchasing Habits*	J Grobler AP Engelbrecht	2018
N Guga	M.IT	*Data Science as a Toll for Identification of Suspicious Behavior and Prevention of Terrorism in the Hospitality Industry*	J Grobler AP Engelbrecht	2018
P Moletsane	M.IT	*Model Tree Forests*	AP Engelbrecht J Grobler	2018
A Sadeghi	M.IT	*Analysis of Celullar Usage Data*	M Helbig AP Engelbrecht	2018
A Thudhope	M.IT	*Banking Anomaly Detection using Spatial Statistices*	CW Cleghorn AP Engelbrecht	2018
T Twala	M.IT	*TBD*	AP Engelbrecht M Jounert	2018
D Wertheimer	M.IT	*Membership Fraud Detection at Multiply*	J Grobler AP Engelbrecht	2018
SA Abdulkarim	PhD	*Computational Swarm Intelligence for Optimization*	AP Engelbrecht	2012
M Ballot	PhD (Eng)	*Automatic Cell Planning*	AP Engelbrecht	2009
A Bailey	PhD	*Automatic Inference of Graph Models for Large-Scale Complex Networks*	AP Engelbrecht BM Ombuki-Bernman	2015
D Bockus	PhD	*Many-objective Optimization using Particle Swarm Optimization*	AP Engelbrecht BM Ombuki-Bernman	2018
AS Bosman	PhD	*Fitness Landscape Analysis of Feedforward Neural Networks*	AP Engelbrecht M Helbig	2012
E Buabin	PhD	*Noncummutative Time Series Feature Extraction with Banach Lie Algebra*	AP Engelbrecht	2014
M Caselina	PhD	*Programmable Ondemand Lightpath Services*	AP Engelbrecht A Lysko	2017
J Cronje	PhD	*Image Mining*	AP Engelbrecht	2013
K Harrison	PhD	*Self-Adaptive Particle Swarm Optimization*	AP Engelbrecht BM Ombuki-Bernmann	2015

Student	Degree	Research Topic	Supervisor(s)	First Year of Registration
M Kebalepile	PhD (Public Health)	*Supervised Neural Network Algorithm for Predicting Imminent Asthma Attacks using Clinical Records of Respiratory Diseases and Environmental Data*	K Voyi AP Engelbrecht	2016
R Klazar	PhD	*A Framework for Tuning Meta-Heuristics*	AP Engelbrecht	2017
R Koen	PhD	*Fungus Optimization Algorithm for Image Analysis and Digital Forensics*	AP Engelbrecht	2014
C Kuranga	PhD	*Evolving Model Trees in Dynamic Environments*	AP Engelbrecht	2012
C Mathiesen	PhD	*Machine Learning for Epigenomics*	AP Engelbrecht M Pepper	2018
M Mohiuddin	PhD	*Iterative Heuristics for Open Shortest Path First Weight Setting Problem to Optimize Network Resources*	AP Engelbrecht	2010
T Morkel	PhD	*Automated Diagosis of Altzheimers Desease from MRI Scans and Genomic Data*	AP Engelbrecht	2018
R Nshimirimana	PhD	*Particle Swarm Optimization for Tomography Imaging*	AP Engelbrecht	2010
G Pampara	PhD	*Solving Optimization Problems with Dynamically Changing Constraints*	AP Engelbrecht	2013
A Saad	PhD	*Analysis of Population Sizes for Differential Evolution*	AP Engelbrecht SA Khan	2017
C Stallmann	PhD	*Distributive Neural Network Computation*	AP Engelbrecht	2018
K Tope	PhD	*Incremental Learning Neural Networks for Big Data*	AP Engelbrecht	2016
S van der Stockt	PhD	*Hyper-Heuristics for Dynamic Environments*	AP Engelbrecht	2013

3.3 External Student Supervision

C Chushig	PhD	Rey Juan Carlos University	*Data Analysis for Diabetes Prediction*	2018
S Rigot Q Rouyre	Bachelors	French Military Academy of Saint-Cyr	*Design and implement a visualization tool for population-based optimization algorithms*	2017
M Clark	Honours	Brock University	*Linking PSO Performance with Fitness Landscapes*	2017-2018
R McLean	MSc	Brock University	*Dynamic Niching PSO*	2017-2018
J Douglas	MSc	Brock University	*Merging and Decomposition Cooperative PSO*	2017-2018

V Pauthe B Csakany	Bachelors	French Military Academy of Saint-Cyr	*Prioritized Foraging Using Robots Swarm*	2016
M Paulet T Ziemmermann	Bachelors	French Military Academy of Saint-Cyr	*Using Competitive Coevolution to train FeedForward Neural Networks in Dynamic Environments*	2015
N Banda J Maltese	PhD MSc	Cambridge University Brock University	*Multimodal Emotion Recognition using Deep Continuous Conditional Recurrent Neural Fields* *Many-Objective Optimization*	2015-2018 2015
Boulet Veyron	Bachelors	French Military Academy of Saint-Cyr	*Hyper Heuristics for training neural networks*	2014
N Banda	PhD	University of Cambridge	*Affective Computing*	2014-2017
D Dibblee	Honours	Brock University	*Local Search in Vector-Evaluated Particle Swarm Optimization*	2014
K Harrison	Masters	Brock University	*Knowledge Transfer Strategies in Vector-Evaluated Particle Swarms*	2013-2014
R Bond	Masters	Brock University	*Tracking Multiple Optima in Dynamic Environments using Particle Swarm Optimization*	2014
K Harrison	Honours	Brock University	*Analysis of Vector-Evaluated Particle Swarms*	2011-2012
N Unger	Masters	Brock University	*Cooperative Particle Swarm Optimization in Dynamic Environments*	2012-2013
A Stirtan	Masters	Brock University	*Self-Adaptation of Dynamic Particle Swarm Optimization*	2012
P Antoniou	PhD	Cyprus University	*Designing Robust Congestion Control Mechanisms in Self-Organized Autonomous Decentralized Networks*	2008-2010
C Castillo	Masters	Vrije Universiteit	*Ensemble Neural Network using Particle Swarms*	2006-2007
S Rouwhorst	Masters	Vrije Universiteit	*A Building Block Approach to Genetic Programming*	1999-2000
A de Waal	M.Sc (Statistics)	University of Orange Free State	*Bayesian Networks for Decision Support*	2000

4 Research Funding

4.1 Obtaining Research Funds

Origin of Funds	Title of research project/programme	Duration	Money Allocated
NRF Science Liaison Fund	To attend World Congress on Computational Intelligence	1998	R10000
NRF Science Liaison Fund	To attend IEEE International Joint Conference on Neural Networks	2001	R10000
NOP (UP)	Development of Computational Intelligence Tools for Knowledge Discovery	1999-2001	R53000
BMW via BE@UP	Image Analysis for Surface Defect Detection	2002-2003 2004-2005	R109000 R500000
NRF ICT focus area GUN 2053405	Explorative Computelligence	2003-2004	R380000
NRF ICT focus area GUN FA2004051100003	CiClops	2005-2009	R1000000
NRF France/SA	Multi-Agent Systems for Complex System Modelling and Simulation	2006-2007	R209000
DST/NRF GUN 2075438	Chair in Artificial Intelligence	2007-2011 2012-2016 2017-2021	R7500000 R12500000 R23250000
Cyprus Research Promotion Foundation	Self-Organized Autonomous Decentralized Networks	2009-2010	99960 Euro
NRF Incentive Funding NRF Incentive Funding NRF Incentive Funding	CIlib Development CIlib Development CIlib Development	2008 2009-2014 2015-current	R400000 R800000 R100000
NRF/CRC Mobility Grant, GUN 2025057	Bayesian Joint Analysis of Imaging and Genetic Data	2017-2019	R200000
ABSA/Barclays	ABSA Chair in Data Science	2018-2020	R8400000

4.2 Involvement in Research Fund Applications

In addition to the above, I was involved in the application process of research funding for the following projects, as well as taking actively part as member.

Fund	Title of Project	Duration
FRD Competitive Industries University of Stellenbosch	*Telecommunications: New Opportunities*	1996-1998
Telkom Teletraffic Application Development Program University of Stellnebosch	*Routing Optimization and Dimensioning of Telephone networks using Neural Networks*	1994-1995
Telkom Center of Excellence University of Stellenbosch	*Intelligent Routing and Congestion Prediction using Neural Networks*	1997-1998

5 Research Outputs

The table below contains a summary of all research outputs. Number of citations are based on Google Scholar Citations, 3 April 2018.

Type of Output	Number
Peer-reviewed journal articles	79
Books	4
Chapters in books	8
Peer-reviewed conference articles	252
Total reviewed outputs	343
Total citations	20126
H-index	51
i10-index	169
Non-reviewed articles	14
Technical reports	7
Patents	0
Products	4

5.1 Research Fields

Research Field:	Speciality
Artificial Intelligence	Artificial Neural Networks
	Swarm Intelligence
	Artificial Immune Systems
	Evolutionary Computation
	Data and Text Mining
	Swarm Robotics
	Game Learning
	Image Processing
	Bioinformatics
	Multi-Agent Systems
	Optimization
	Machine Learning

5.2 Publications in Peer-reviewed or Refereed Journals

1. AP Engelbrecht, *Sensitivity Analysis for Decision Boundaries*, Neural Processing Letters, Vol 10, No 3, pp 253-266, 1999, Kluwer Academic Publishers.

2. AP Engelbrecht, A Ismail, *Training Product Unit Neural Networks*, Stability and Control: Theory and Applications, Vol 2, No 1/2, pp 59-74, 1999.

3. AP Engelbrecht, *Using the Taylor Expansion of Multilayer Feedforward Neural Networks*, South African Computer Journal, Number 26, pp 181-189, 2000.

4. F van den Bergh, AP Engelbrecht, *Cooperative Learning in Neural Networks using Particle Swarm Optimizers*, South African Computer Journal, Number 26, pp 84-90, 2000.

5. AP Engelbrecht, *Sensitivity Analysis for Selective Learning by Feedforward Neural Networks*, Fundamenta Informaticae, IOS Press, Vol 45, Number 1, pp 295-328, 2001.

6. AP Engelbrecht, *A New Pruning Heuristic Based on Variance Analysis of Sensitivity Information*, IEEE Transactions on Neural Networks, 12(6), pp 1386- 1399, 2001.

7. AP Engelbrecht, R Brits, *Supervised Training Using an Unsupervised Approach to Active Learning*, Neural Processing Letters, Vol 15, pp 247-260, 2002.

8. L Messerschmidt, AP Engelbrecht, *Learning to Play Games using a PSO-Based Competitive Learning Approach*, IEEE Transactions on Evolutionary Computation, 8(3):280-288, 2004.

9. F van den Bergh, AP Engelbrecht, *A Cooperative Approach to Particle Swarm Optimisation*, IEEE Transactions on Evolutionary Computation, 8(3):225-239, 2004.

10. N Franken, AP Engelbrecht, *Evolving intelligent game-playing agents*, South African Computer Journal, 32:44-52, 2004.

11. D Rodic, AP Engelbrecht, *Social Networks as a Task Allocation Tool for Multi-Robot Teams*, South African Computer Journal, number 33, 2004.

12. A Salman, MG Omran, AP Engelbrecht, *SIGT: Synthetic Image Generation Tool for Clustering Algorithms*, ICGST International Journal on Graphics, Vision and Image Processing, 2:33-44, 2005.

13. M Omran, AP Engelbrecht, A Salman, *Particle Swarm Optimization Method for Image Clustering*, International Journal on Pattern Recognition and Artificial Intelligence, vol 19, number 3, pp 297–322, 2005.

14. MG Omran, AP Engelbrecht, A Salman, *A PSO-Based Color Image Quantizer*, Informatica Journal, 29(3):263–271, 2005.

15. MG Omran, AP Engelbrecht, A Salman, *A PSO-Based End-Member Selection Method for Spectral Unmixing of Multispectral Satellite Images*, International Journal of Computational Intelligence, 2(2):124–132, 2005 (http://www.enformatika.org/journals/1304-2386/v2.htm).

16. N Franken, AP Engelbrecht, *Analysis of PSO Approaches to Co-evolve IPD Strategies*, IEEE Transactions on Evolutionary Computation, (9)6:562-579, 2005.

17. W Duminy, AP Engelbrecht, *Composing linear evaluation functions from observable features*, South African Computer Journal, volume 35, pp 48–58, 2005.

18. MG Omran, A Salman, AP Engelbrecht, *Dynamic Clustering using Particle Swarm Optimization with Application in Image Segementation*, Pattern Analysis and Applications Journal, 8(4):332–344, 2006.

19. F van den Bergh, AP Engelbrecht, *A Study of Particle Swarm Optimization Particle Trajectories*, Information Sciences, 176(8):937–971, 2006.

20. A Graaff, AP Engelbrecht, *Optimised Coverage of Non-self with Evolved Lymphocytes in Artificial Immune Systems*, International Journal of Computational Intelligence Research, 2(2):127–150, 2006.

21. PEN Lutu, AP Engelbrecht, *A Comparative Study of Sample Selection Methods for Data Mining*, Joint Special Issue on Advances in End-User Data-Mining Techniques, ARIMA/SACJ, Number 36, pp 69-85, 2006.

22. U Paquet, AP Engelbrecht, *Particle Swarms for Equality-Constrained Optimization*, Fundamenta Informaticae, IOS Press, volume 76, pp 1–24, 2006.

23. G Potgieter, AP Engelbrecht, *Genetic Algorithms for the Structural Optimisation of Learned Polynomial Expressions*, Applied Mathematics and Computation, volume 186, pages 1441–1466, 2007.

24. SA Khan, AP Engelbrecht, *Application of Fuzzy Logic in Topology Design of Distributed Local Area Networks*, Information Sciences, 177(13):2692–2711, 2007.

25. M Omran, AP Engelbrecht, S Ayed, *Empirical Analysis of Self-Adaptive Differential Evolution*, European Journal of Operational Research, vol 183, 785–804, 2007.

26. M Omran, AP Engelbrecht, S Ayed, *An Overview of Clustering Methods*, Intelligent Data Analysis, 11(7):584-605, 2007.

27. R Brits, AP Engelbrecht, F van den Bergh, *Locating Multiple Optima using Particle Swarm Optimization*, Applied Mathematics and Computation, 189(2):1859-1883, 2007.

28. MGH Omran, AP Engelbrecht, M Zraibi, E Omran, *Empirical Analysis of Using Neighborhood Topologies with Differential Evolution*, Advances in Computer Science and Engineering Journal, 1(3):189–222, 2008.

29. D Rodic, AP Engelbrecht, *Social Networks in Simulated Multi-Robot Environment*, International Journal of Intelligent Computing and Cybernetics, 1(1):110-127, 2008.

30. G Potgieter, AP Engelbrecht, *Evolving Model Trees for Mining Data Sets with Continuous-Valued Classes*, Expert Systems with Applications, volume 35, pp1513–1532, 2008.

31. SA Khan, AP Engelbrecht, *Fuzzy Hybrid Simulated Annealing Algorithms for Topology Design of Switched Local Area Networks*, Soft Computing, 13(1):45–61, 2008.

32. Marco Dorigo, Marco A Montes de Oca, Andries Engelbrecht, *Particle Swarm Optimization*, Scholarpedia, 3(11):1486, 2008

33. NK Khalid, Z Ibrahim, TB Kurniawan, M Khalid, AP Engelbrecht, *DNA Sequence Optimization Based on Continuous Particle Swarm Optimization for Reliable DNA Computing and DNA Nanotechnology*, Journal of Computer Science, 4(11):942–950, 2008

34. MGH Omran, AP Engelbrecht, A Salman, *Bare Bones Differential Evolution*, European Journal of Operational Research, 196(1):128-139, 2009.

35. NK Khalid, Z Ibrahim, TB Kurniawan, M Khalid, NH Sarmin, AP Engelbrecht, *Function Minimization in DNA Sequence Design based on Continuous Particle Swarm Optimization*, Innovative Computing, Information and Control Express Letters, 3(1):27-32, 2009.

36. J Grobler, AP Engelbrecht, S Kok, S Yadavalli, *Metaheuristics for the multi-objective FJSP with sequence-dependent set-up times, auxiliary resources and machine down time*, Annals of Operations Research, 2009, 180(1), pp 165–196.

37. IL Schoeman, AP Engelbrecht, *A Novel Particle Swarm Niching Technique based on Extensive Vector Operations*, Natural Computing, 9(3):683–701, 2009.

38. PEN Lutu, AP Engelbrecht, *A Decision Rule-based Method for Feature Selection in Predictive Mining*, Expert Systems with Applications, 37(1):602–609, 2010.

39. M Mtshali, AP Engelbrecht, *Robotic Architectures: A Review*, Defence Science Journal, 60(1):15–22, 2010.

40. F van den Bergh, AP Engelbrecht, *A Convergence Proof for the Particle Swarm Optimizer*, Fundamenta Informaticae, 105(4):341-374, 2010.

41. W Matthysen, AP Engelbrecht, *A Polar Coordinate Particle Swarm Optimiser*, Applied Soft Computing, 11(1):1322–1339, January 2011

42. AJ Graaff, AP Engelbrecht, *Clustering Data in an Uncertain Environment using an Artificial Immune System*, Pattern Recognition Letters, 32(2):342–351, 2011

43. AJ Graaff, AP Engelbrecht, *Using Sequential Deviation to Dynamically Determine the Number of Clusters Found by a Local Network Neighbourhood Artificial Immune System*, Applied Soft Computing, 11:2698–2713, 2011.

44. AL Louis, AP Engelbrecht, *Unsupervised Discovery of Relations for Analysis of Textual Data in Digital Forensics*, Digitial Investigation, 7:154–171, 2011

45. PEN Lutu, AP Engelbrecht, *Using OVA Modeling to Improve Classification Performance for Large Datasets*, Expert Systems With Applications, 39(4):4358–4376, 2012

46. AJ Graaff, AP Engelbrecht, *Clustering Data in Stationary Environments with a Local Network Neighborhood Artificial Immune System*, International Journal of Machine Learning and Cybernetics, 3(1):1-26, 2012

47. SA Khan, AP Engelbrecht, *A Fuzzy Particle Swarm Optimization Algorithm for Computer Communication Network Topology Design*, Applied Intelligence Journal, 36(1):161–177, 2012

48. MC du Plessis, AP Engelbrecht, *Using Competitive Population Evaluation in a Differential Evolution algorithm for Dynamic Environments*, European Journal of Operational Research, 218(1):7–20, 2012

49. AS Rakitianskaia, AP Engelbrecht, *Training Feedforward Neural Networks with Dynamic Particle Swarm Optimisation*, Swarm Intelligence Journal, 6(3):233–270, 2012

50. J Langeveld, AP Engelbrecht, *Set-Based Particle Swarm Optimization applied to the Multidimensional Knapsack Problem*, Swarm Intelligence, 6(4):297–342, 2012

51. MC du Plessis, AP Engelbrecht, *Differential Evolution for Dynamic Environments with Unknown Numbers of Optima*, Global Optimization, 55(1):73–99, 2013

52. P Antoniou, A Pitsillides, T Blackwell, AP Engelbrecht, L Michael, *Congestion Control in Wireless Sensor Networks based on Bird Flocking Behavior*, Computer Networks, 57(5):1167–1191, 2013

53. PEN Lutu, AP ENgelbrecht, *Base Model Combination Algorithm for Resolving Tied Predictions for K-Nearest Neighbour OVA Ensemble Models*, INFORMS Journal on Computing, 25(3), 2013

54. PEN Lutu, AP Engelbrecht, *Positive-Versus-Negative Classification for Model Aggregation in Predictive Data Mining*, INFORMS Journal on Computing, 25(4), 2013

55. M Poggiolini, AP Engelbrecht, *The Application of the Feature-Detection Rule to the Negative Selection Algorithm*, Expert Systems with Applications, 40(8):3001-3014, 2013

56. M Helbig, AP Engelbrecht, *Performance Measures for Dynamic Multi-objective Optimisation Algorithms*, Information Sciences, 250:61–81, 2013.

57. M Helbig, AP Engelbrecht, *Population-based Metaheuristics for Continuous Boundary-Constrained Dynamic Multi-Objective Optimisation Problems*, Swarm Intelligence and Evolutionary Computation Journal, 2013

58. KM Malan, AP Engelbrecht, *A Survey of Techniques for Characterising Fitness Landscapes and Some Possible Ways Forward*, Information Sciences, 241:148–163, 2013

59. M Helbig, AP Engelbrecht, *Benchmarks for Dynamic Multi-Objective Optimisation Algorithms*, ACM Computing Surveys, 46(3), Article number 37, 2014

60. CW Cleghorn, AP Engelbrecht, *A Generalized Theoretical Deterministic Particle Swarm Model*, Swarm Intelligence, 8(1):35-59, 2014

61. KM Malan, AP Engelbrecht, *Characterising the searchability of continuous optimisation problems for PSO*, Swarm Intelligence, 8(4):275–302, 2014

62. A Mohiuddin, SA Khan, AP Engelbrecht, *Simulated Evolution and Simulated Annealing Algorithms for Solving Multi-objective Open Shortest Path First Weight Setting Problem*, Applied Intelligence, 41(2):348–365, 2014

63. J Grobler, AP Engelbrecht, G Kendall, VSS Yadavalli, *Heuristic Space Diversity for Improved Meta-Hyperheuristics Performance*, Information Sciences, 300:49–62, 2015

64. AS Dymond, AP Engelbrecht, S Kok, PS Heyns, *Tuning Optimization Algorithms under Multiple Objective Function Evaluation Budgets*, IEEE Transactions on Evolutionary Computation, 19(3):341–358, 2015

65. CW Cleghorn, AP Engelbrecht, *Particle Swarm Variants: Standardized Convergence Analysis*, Swarm Intelligence, 9(2-3):177–203, 2015

66. BJ Leonard, AP Engelbrecht, CW Cleghorn, *Critical Considerations on Angle Modulated Particle Swarm Optimisers*, Swarm Intelligence, 9(4):291–314, 2015.

67. C Scheepers, AP Engelbrecht, *Training Multi-Agent Teams from Zero Knowledge with the Competitive Coevolutionary team-based Particle Swarm Optimiser*, Soft Computing, 20(2):607–620, 2016

68. AP Engelbrecht, *Particle Swarm Optimization with Crossover: A Review and Empirical Analysis*, Artificial Intelligence Review, 45(2):131–165, 2016

69. MA Mohiuddin, SA Khan, AP Engelbrecht, *Fuzzy Particle Swarm Optimization Algorithms for the Open Shortest Path First Weight Setting Algorithm*, Applied Intelligence, 45(3):598–621, 2016

70. KR Harrison, AP Engelbrecht, BM Ombuki-Berman, *Inertia Control Strategies for Particle Swarm Optimization: Too Much Momentum, Not Enough Analysis*, Swarm Intelligence, 10(4):267–305, 2016

71. C Stallmann, AP Engelbrecht, *Gramophone Noise Detection and Reconstruction using Time Delay Artificial Neural Networks*, IEEE Transactions on Systems, Man, and Cybernetics, 47(6):893–905,2017

72. X Li, MG Epitropakis, K Deb, AP Engelbrecht, *Seeking Multiple Solutions: An Updated Survey on Niching Methods and Their Applications*, IEEE Transactions on Evolutionary Computation, 21(4):518–538, 2017

73. CW Cleghorn, AP Engelbrecht, *Particle Swarm Stability A Theoretical Extension using the Non-Stagnate Distribution Assumption*, Swarm Intelligence, 12(1):1-22, 2018

74. J Maltese, BM Ombuki-Berman, AP Engelbrecht, *A Scalability Study of Many-Objective Optimization Algorithms*, IEEE Transactions on Evolutionary Computation, 22(1):79–96, 2018

5.3 Papers Accepted for Publication in Peer-reviewed or Refereed Journals

1. AS Bosman, AP Engelbrecht, M Helbig, *Fitness Landscapes of Weight-Elimination Neural Networks*, Neural Processing Letters, October 2017

2. J Grobler, AP Engelbrecht, *Arithmetic and Parent-Centric Headless Chicken Crossover Operators for Dynamic Particle Swarm Optimization Algorithms*, Softcomputing Journal, Ocotbert 2017

3. KR Harrison, AP Engelbrecht, BM Ombuki-Bernman, *Self-Adaptive Particle Swarm Optimization: A Review and Analysis of Convergence*, Swarm Intelligence, November 2017

4. KR Harrison, AP Engelbrecht, BM Ombuki-Berman, *Optimal Parameter Regions and the Time-Dependence of Control Parameter Values for the Particle Swarm Optimization Algorithm*, Swarm and Evolutionary Computation, January 2017.

5. SAG van der Stockt, AP Engelbrecht, *Analysis of Selection Hyper-heuristics for Population-based Meta-heuristics in Real-valued Dynamic Optimization*, Swarm Intelligence and Evolutionary Computation, April 2018.

5.4 Papers Submitted for Publication in Peer-reviewed or Refereed Journals

1. A Kamilaris, AP Engelbrehct, A Anton, A Pitsillides, FX Prenafeta-Boldú, *Transfer of Animal Manure used as Fertilizer from Livestock to Crop Farms using an Ant-Inspired Technique*, Swarm Intelligence, March 2018

2. JZ Abbott, AP Engelbrecht, *Nature Inspired Algorithms for Prioritized Foraging*, submitted to Applied Soft Computing, January 2018

3. ET Oldewage, AP Engelbrecht, CW Cleghorn, *Movement Patterns of a Particle Swarm in High Dimensions*, submitted to Swarm Intelligence, January 2018

4. C Scheepers, AP Engelbrecht, *Multi-Guide Particle Swarm Optimization: A Multi-Swarm Multi-Objective Particle Swarm Optimizer*, submitted to Swarm Intelligence, January 2018

5. S.A. Abdulkarim, A.P. Engelbrecht, *Time Series Forecasting with Feedforward Neural Networks Trained using Particle Swarm Optimizers for Dynamic Environments*, submitted to International Journal of Bio-Inspired Computation, June 2017

6. C Scheepers, AP Engelbrecht, *Comparing Performance of Multi-Objective Algorithms using the Porcupine Measure*, Evolutionary Computation, November 2017

7. WS van Heerden, AP Engelbrecht, *Unsupervised neuron labelling for self-organizing maps: a taxonomy that generalizes existing techniques*, submitted to ACM Computing Surveys, Dec 2016

5.5 Papers to be Submitted for Publication in Peer-Reviewed or Refereed Journals

The following papers will be submitted:

1. R Koen, AP Engelbrecht, *A Fungal Search Algorithm for Image Segmentation*

2. M Helbig, AP Engelbrecht, *Solving Many-objective Problems with a Relaxed Pareto-dominance Relation*

3. KS Georgieva, AP Engelbrecht, *Differential Evolution for Clustering Temporal Data*

5.6 Books/Textbooks

1. AP Engelbrecht, *Computational Intelligence: An Introduction*, Wiley & Sons, October 2002, ISBN 0-470-84870-7.

2. AP Engelbrecht, *Fundamentals of Computational Swarm Intelligence*, Wiley & Sons, December 2005, ISBN 0-470-09191-6. Also translated into Chinese, 2009.

3. AP Engelbrecht, *Computational Intelligence: An Introduction*, Wiley & Sons, Second Edition, December 2007.

4. A Abraham, A-E Hassanien, P Siarry, AP Engelbrecht (editors), *Foundations on Computational Intelligence Volume 3: Global Optimization*, Springer, Series: Studies in Computational Intelligence, Vol 203, 2009

5.7 Chapters in Books

1. AP Engelbrecht, SE Rouwhorst, L Schoeman, *A Building Block Approach to Genetic Programming for Rule Discovery*, In Data Mining: A Heuristic Approach, HA Abbass, R Sarkar, C Newton (eds), Idea Group Publishing, chapter IX, pp 174-189, 2001.

2. M Omran, AP Engelbrecht, S Ayed, *Image Classification using Particle Swarm Optimization*, Recent Advances in Simulated Evolution and Learning, Advances in Natural Computation, Vol 2, KC Tan MH Lim, X Yao, L Wang (eds), World Scientific, 2004, Chapter 19, pp 347–365.

3. M Omran, AP Engelbrecht and A Salman, *Particle Swarm Optimization for Pattern Recognition and Image Processing*, Swarm Intillegence and Data Mining, A. Abraham, C. Grosan and V. Ramos (Editors), Springer-Verlag, SCI series 'Studies in Computational Intilligence', 2006.

4. M Greeff, AP Engelbrecht, *Dynamic Multi-Objective Optimisation using PSO*, Multi-Objective Swarm Intelligent Systems, Studies in Computational Intelligence, Springer-Verlag, August 2009.

5. MC du Plessis, AP Engelbrecht, *Self-Adapting Differential Evolution for Dynamic Environments with Fluctuating Numbers of Optima*, Metaheuristics for Dynamic Optimization, Studies in Computational Intelligence, Volume 433, pp 117–145, 2013

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5.8 Published Full-Length Conference Papers

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2. AP Engelbrecht, I Cloete, J Zurada, *Determining the Significance of Input Parameters using Sensitivity Analysis*, International Workshop on Artificial Neural Networks, Torremolinos, Spain, June 1995, in J Mira, F Sandoval (eds), 'From Natural Science to Artificial Neural Computing' in the Springer-Verlag series 'Lecture Notes in Computer Science', Vol 930, pp 382-388.

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11. H Viktor, AP Engelbrecht, I Cloete, *Incorporating Rule Extraction from ANNs into a Cooperative Learning Environment*, NEURAP98, Neural Networks & Their Applications, Marseilles, France, March 1998, pp 385-391. (best poster award, full-length paper published in proceedings)

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158. AP Engelbrecht, *Roaming Behavior of Unconstrained Particles*, BRICS-CCI 2013

159. AP Engelbrecht, *Particle Swarm Optimization: Global Best or Local Best?*, BRICS-CCI 2013

160. AP Engelbrecht, *Particle Swarm Optimization: Iteration Strategies Revisited*, BRICS-CCI, 2013

161. FV Nepomuceno, AP Engelbrecht, *Behavior Changing Schedules for Heterogeneous Particle Swarms*, BRICS-CCI, 2013

162. J Mwaura, E. Keedwell, AP Engelbrecht, *Evolved Linker Gene Expression Programming: A New Technique for Symbolic Regression*, BRICS-CCI, 2013

163. M Helbig, AP Engelbrecht, *Challenges of Dynamic Multi-objective Optimisation*, BRICS-CCI, 2013

164. J Grobler, AP Engelbrecht, *Solution Space Diversity Management in A Meta-Hyperheuristic Framework*, BRICS-CCI, 2013

165. C Stallmann, AP Engelbrecht, *A Comparison of Interpolation Algorithms for Gramaphone Record Sound Restoration*, SPIN 2014

166. AS Rakitianskaia, AP Engelbrecht, *Training High-Dimensional Neural Networks with Cooperative Particle Swarm Optimiser*, IJCNN 2014

167. KM Malan, AP Engelbrecht, *A Progressive Random Walk Algorithm for Sampling Continuous Fitness Landscapes*, IEEE Congress on Evolutionary Computation 2014

168. SG Reid, KM Malan, AP Engelbrecht, *Carry Trade Portfolio Optimization using Particle Swarm Optimization*, IEEE Congress on Evolutionary Computation 2014.

169. C Scheepers, AP Engelbrecht, *Competitive Coevolutionary Training of Simple Soccer Agents from Zero Knowledge*, Congress on Evolutionary Computation 2014

170. R Garden, AP Engelbrecht, *Analysis and Classification of Function Optimisation Benchmark Function and Benchmark Suites*, IEEE Congress on Evolutionary Computation 2014

171. J Grobler, AP Engelbrecht, G Kendall, VSS Yadavalli, *Heuristic Space Diversity Management in a Meta-Hyperheuristic Framework*, IEEE Congress on Evolutionary Computation 2104

172. M Helbig, AP Engelbrecht, *Heterogeneous Dynamic Vector Evaluated Particle Swarm Optimisation for Dynamic Multi-Objective Optimisation*, IEEE Congress on Evolutionary Computation 2014

173. KS Georgieva, AP Engelbrecht, *Cooperative DynDE for Temporal Data Clustering*, IEEE Congress on Evolutionary Computation 2014

174. KR Harrison, BM Ombuki-Bernman, AP Engelbrecht, *Dynamic Multi-Objective Optimization using Charged Vector Evaluated Particle Swarm Optimization*, Congress on Evolutionary Computation 2014

175. CW Cleghorn, AP Engelbrecht, *Particle Swarm Convergence: An Empirical Investigation*, IEEE Congress on Evolutionary Computation 2014

176. R Klazar, AP Engelbrecht, *Parameter Optimization by Means of Statistical Quality Guides in F-Race*, IEEE Congress on Evolutionary Computation 2014.

177. CW Cleghorn, AP Engelbrecht, *A Generalized Theoretical Deterministic Particle Swarm Model*, Hot Off the Press Worshop of Genetic and Evolutionary Computation Conference 2014.

178. CW Cleghorn, AP Engelbrecht, *Particle Swarm Convergence: Standardized Analysis and Topological Influence*, International Swarm Intelligence Conference (ANTS), 2014

179. J Abbott, AP Engelbrecht, *Nature-inspired Swarm Robotics Algorithms for Prioritized Foraging*, International Swarm Intelligence Conference (ANTS), 2014

180. P Bosman, AP Engelbrecht, *Diversity Rate of Change Measurement for Particle Swarm Optimisers*, International Swarm Intelligence Conference (ANTS), 2014

181. BJ Leonard, AP Engelbrecht, *Angle Modulated Particle Swarm Variants*, International Swarm Intelligence Conference (ANTS), 2014

182. E van Zyl, AP Engelbrecht, *Comparison of Self-Adaptive Particle Swarm Optimizers*, IEEE Swarm Intelligence Symposium 2014

183. S van der Stockt, AP Engelbrecht, *Analysis of Hyper-heuristic Performance in Different Dynamic Environments*, IEEE Symposium on Computational Intelligence in Dynamic and Uncertain Environments, 2014

184. C Scheepers, AP Engelbrecht, *Analysis of Stagnation Behaviour of Competitive Coevolutionary Trained Neuro-Controllers*, IEEE Swarm Intelligence Symposium 2014

185. A Rakitianskaia, AP Engelbrecht, *Weight Regularisation in Particle Swarm Optimisation Neural Network Training*, IEEE Swarm Intelligence Symposium 2014

186. M Helbig, AP Engelbrect, *Using Heterogeneous Knowledge Sharing Strategies with Dynamic Vector-evaluated Particle Swarm Optimisation*, IEEE Symposium on Computational Intelligence in Dynamic and Uncertain Environments, 2014

187. J Grobler, AP Engelbrecht, *The Entity-to-Algorithm Allocation Problem: Extending the Analysis*, IEEE Symposium on Computational Intelligence in Ensemble Learning, 2014

188. KM Malan, AP Engelbrecht, *Particle Swarm Optimisation Failure Prediction Based on Fitness Landscape Characteristics*, IEEE Swarm Intelligence Symposium, 2014

189. AP Engelbrecht, *Fitness Function Evaluations: A Fair Stopping Condition?*, IEEE Swarm Intelligence Symposium 2014.

190. AP Engelbrecht, *Asynchronous Particle Swarm Optimization with Discrete Crossover*, IEEE Swarm Intelligence Symposium, 2014

191. MC du Plessis, AP Engelbrecht, A Calitz, *Self-Adapting the Brownian Radius in a Differential Evolution Algorithm for Dynamic Environments*, Foundations of Genetic Algorithms XIII, 2015

192. AS Rakitianskaia, AP Engelbrecht, *Saturation in PSO Neural Network Training: Good or Evil?*, IEEE Congress on Evolutionary Computation, 2015

193. CW Cleghorn, AP Engelbrecht, *Fully Informed Particle Swarm Optimizer: Convergence Analysis*, IEEE Congress on Evolutionary Computation 2015

194. S van der Stockt, AP Engelbrecht, *Analysis of Global Information Sharing in Hyper-heuristics for Different Dynamic Environments*, IEEE Congress on Evolutionary Computation, 2015

195. M Helbig, AP Engelbrecht, *Influence of the Archive Size on the Performance of the Dynamic Vector Evaluated Particle Swarm Optimisation Algorithm Solving Dynamic Multi-objective Optimisation Problems*, IEEE Congress on Evolutionary Computation, 2015

196. D Dibblee, J Maltese, BM Ombuki-Berman, AP Engelbrecht, *Vector-Evaluated Particle Swarm Optimization with Local Search*, IEEE Congress on Evolutionary Computation, 2015

197. R Bond, AP Engelbrecht, B Ombuki-Bernman, *Evaluating Landscape Characteristics of Dynamic Benchmark Functions*, IEEE Congress on Evolutionary Computation 2015.

198. KM Malan, JF Oberholzer, AP Engelbrecht, *Characterising Constrained Continuous Optimisation Problems*, IEEE Congress on Evolutionary Computation 2015

199. M Helbig, AP Engelbrecht, *The Effect of Quantum and Charged Particles on the Performance of the Dynamic Vector-evaluated Particle Swarm Optimisation Algorithm Solving Dynamic Multi-objective Optimisation Problems*, Genetic and Evolutionary Computation Conference 2015

200. CF Stallmann, AP Engelbrecht, *Gramophone Noise Reconstruction: A Comparative Study of Interpolation Algorithms for Noise Reduction*, 13th International Conference on Signal Processing and Multimedia Applications, 2015

201. N Banda, AP Engelbrecht, P Robinson, *Continuous Emotion Recognition using a Particle Swarm Optimized NARX Neural Network*, 6th International Conference on Affective Computing and Intelligent Interaction, 2015

202. CF Stallmann, AP Engelbrecht, *Digital Noise Detection in Gramophone Recordings*, 7th International Conference on Signal Processing Systems, 2015

203. BJ Leonard, AP Engelbrecht, *Frequency Distribution of Candidate Solutions in Angle Modulated Particle Swarms*, IEEE Swarm Intelligence Symposium 2015.

204. A Rakitianskaia, AP Engelbrecht, *Measuring Saturation in Neural Networks*, IEEE Symposium on Foundations of Computational Intelligence, 2015

205. KR Harrison, BM Ombuki-Berman, AP Engelbrecht, *The Effect of Probability Distributions on the Performance of Quantum Particle Swarm Optimization*, IEEE Swarm Intelligence Symposium 2015

206. J Maltese, AP Engelbrecht, BM Ombuki-Bernman, *High-Dimensional Multi-Objective Optimization using Co-operative Vector-Evaluated Particle Swarm Optimization with Random Variable Grouping*, IEEE Swarm Intelligence Symposium, 2015

207. J Maltese, BM Ombuki-Berman, AP Engelbrecht, *Co-operative Vector-evaluated Particle Swarm Optimization*, IEEE Swarm Intelligence Symposium, 2015

208. N Banda, AP Engelbrecht, P Robinson, *Feature Reduction for Dimensional Emotion Recognition in Human-Robot Interaction*, IEEE Symposium on Computational Intelligence in Healthcare and e-health, 2015

209. J Grobler, AP Engelbrecht, *Metric-based Heuristic Space Diversity Management in a Meta-heuristic Framework*, IEEE Symposium on Computational Intelligence and Ensemble Learning, 2015

210. M Helbig, AP Engelbrecht, *Dynamic Vector-evaluated PSO with Guaranteed Convergence in the Subswarms*, IEEE Swarm Intelligence Symposium 2015

211. ET van Zyl, *A Subspace-based Method for PSO Initialization*, IEEE Swarm Intelligence Symposium 2015.

212. G Pampara, AP Engelbrecht, *Towards A Generic Computational Intelligence Library: Preventing Insanity*, IEEE Symposium on Foundations of Computational Intelligence, 2015

213. M Helbig, AP Engelbrecht, *Using Headless-chicken Crossover for Local Guide Selection when Solving Dynamic Multi-Objective Optimization*, NaBIC, 2015

214. J Grobler, AP Engelbrecht, *Headless Chicken Particle Swarm Optimization Algorithm*, Seventh International Conference on Swarm Intelligence, Advances in Swarm Intelligence, Lecture Notes in Computer Science, Volume 9712, pp 350–357,2016

215. D Doman, M Helbig, AP Engelbrecht, *Heterogeneous Vector-Evaluated Particle Swarm Optimisation in Static Environments*, Seventh International Conference on Swarm Intelligence, Advances int Swarm Intelligence, Lecture Notes in Computer Science, Volume 9712, pp 293–304, 2016

216. A Volschenk, AP Engelbrecht, *An Analysis of Competitive Coevolutionary Particle Swarm Optimizers to Train Neural Network Game Tree Evaluation Functions*, Seventh International Conference on Swarm Intelligence, Advances in Swarm Intelligence, Lecture Notes in Computer Science, Volume 9712, pp 369–380, 2016

217. ET van Zyl, AP Engelbrecht, *Group-Based Stochastic Scaling for PSO Velocities*, IEEE Congress on Evolutionary Computation, 2016

218. AS Rakitianskaia, E Bekker, KM Malan, AP Engelbrecht, *Analysis of Error Landscapes in Multi-layerd Neural Nertworks for Classification*, IEEE Congress on Evolutionary Computation, 2016

219. M Helbig, K Deb, AP Engelbrecht, *Key Challenges and Future Directions of Dynamic Multi-objective Optimisation*, IEEE Congress on Evolutionary Computation, 2016

220. C Scheepers, AP Engelbrecht, *Vector Evaluated Particle Swarm Optimization Exploration behavior Part II: Quantitative Analysis*, IEEE Congress on Evolutionary Computation, 2016

221. AB van Wyk, AP Engelbrecht, *Analysis of Activation Functions for Particle Swarm Optimised Feedforward Neural Networks*, IEEE Congress on Evolutionary Computation, 2016

222. J Mwaura, AP Engelbrecht, FV Nepomuceno, *Performance Measures for Niching Algorithms*, IEEE Congress on Evolutionary Computation, 2016

223. CW Cleghorn, AP Engelbrecht, *Unified Particle Swarm Optimizer: Convergence Analysis*, IEEE Congress on Evolutionary Computation, 2016

224. KR Harrison, BM Ombuki-Berman, AP Engelbrecht, *A Radius-Free Quantum Particle Swarm Optimization Technique for Dynamic Optimization Problems*, IEEE Congress on Evolutionary Computation, 2016

225. KR Harrison, AP Engelbrecht, BM Ombuki-Bernman, *The Sad State of Self-Adaptive Particle Swarm Optimizers*, IEEE Congress on Evolutionary Computation, 2016

226. C Scheepers, AP Engelbrecht, *Vector Evaluated Particle Swarm Optimization Part I: Explorative Analysis*, IEEE Congress on Evolutionary Computation, 2016

227. J Maltese, BM Ombuki-Berman, AP Engelbrecht, *Pareto-Based Many-Objective Optimization using Knee Points*, IEEE Congress on Evolutionary Computation, 2016

228. J Grobler, AP Engelbrecht, *Hyper-heuristics for the Multi-Objective Flexible Job Shop Scheduling Problem with Additional Constraints*, International Conference on Swarm Intelligence, Advances in Swarm Intelligence, Lecture Notes in Computer Science, volume 9713, pp 3–10, 2016

229. J Grobler, AP Engelbrecht, *Headless Chicken Particle Swarm Optimization Algorithms for Improved Diversity in a Dynamically Changing Environment*, 3rd Intl. Conference on Soft Computing & Machine Intelligence (ISCMI), 2016

230. R Koen, AP Engelbrecht, E Pretorius, *A Best-Effort Fibrin Strand Detection Algorithm*, 3rd Intl. Conference on Soft Computing & Machine Intelligence (ISCMI), 2016

231. C Scheepers, AP Engelbrecht, *Vector Evaluated Particle Swarm Optimization Archive Management: Pareto Optimal Front Diversity Sensitivity Analysis*, IEEE Swarm Intelligence Symposium, 2016

232. C Scheepers, AP Engelbrecht, *Misleading Metrics for Pareto Optimal Front Diversity: Spacing and Distribution*, IEEE MCDM, 2016

233. AS Bosman, AP Engelbrecht, M Helbig, *Search Space Boundaries in Neural Network Error Landscape Analysis*, IEEE Symposium on Foundations of Computational Intelligence, 2016

234. CW Cleghorn, AP Engelbrecht, *Particle Swarm Optimizer: The Impact of Unstable Particles on Performance*, IEEE Swarm Intelligence Symposium, 2016

235. WS van Heerden, AP Engelbrecht, *An Investigation into the Effect of Unlabeled Neurons on Self-Organizing Maps*, IEEE Symposium on Computational Intelligence in Data Mining, 2016

236. J Cronje, AP Engelbrecht, *Training Convolutional Neural Networks with Class Based Data Augmentation for Detecting Distracted Drivers*, 9th International Conference on Computer and Automation Engineering, 2017

237. R Koen, AP Engelbrecht, *Maze Exploration using a Fungal Search Algorithm: Part 1 - Empirical Analysis*, ISMSI 2017

238. R Koen, AP Engelbrecht, *Maze Exploration using a Fungal Search Algorithm: Part 2 - Algorithm Model*, ISMSI 2017

239. C Scheepers, AP Engelbrecht, *Vector Evaluated Particle Swarm Optimization: The Archive's Influence on Performance*, IEEE CEC 2017

240. KR Harrison, BM Ombuki-Berman, *Optimal Parameter Regions for Particle Swarm Optimization Algorithms*, IEEE CEC, 2017

241. CW Cleghorn, AP Engelbrecht, *Fitness-Distance-Ratio Particle Swarm Optimization: Stability Analysis*, GECCO 2017

242. J Grobler, AP Engelbrecht, *A Scalability Analysis of Partile Swarm Optimization Behaviour*, Eight International Conference on Swarm Intelligence, 2017

243. ET Oldewage, AP Engelbrecht, CW Cleghorn, *The Merits of Velocity Clamping Particle Swarm Optimisation in High Dimensional Spaces*, IEEE Swarm Intelligence Symposium, 2017

244. C Scheepers, AP Engelbrecht, *Quantified Pareto-Optimal Front Comparisons using Attainment Surfaces*, IEEE Sympusium on Multicriteria Decision Making, 2017

245. KR Harrison, AP Engelbrecht, BM Ombuki-Bernman, *An Adaptive Particle Swarm Optimization Algorithm Based on Optimal Parameter Regions*, IEEE SIS, 2017

246. N Banda, L He, AP Engelbrecht, *Bio-Acoustic Emotion Recognition using Continuous Conditional Recurrent Neural Fields*, IEEE CIHLI, 2017

247. CW Cleghorn, AP Engelbrecht, *Firefly Optimization: A Study of Frame Invariance*, IEEE SIS, 2017

248. AP Engelbrecht, *Inertia Weight Control Strategies: Particle Roaming Behavior*, International Conference on Soft Computing and Machine Intelligence, 2017

249. N Banda, AP Engelbrecht, *Quality Assessment of Large Scale Dimensionality Reduction Methods*, International Conference on Soft Computing and Machine Intelligence, 2017

250. AP Engelbrecht, V Pauthe, B Csakany, *Swarm-Inspired Algorithms for Prioritized Foraging*, International Conference on Intelligent Systems, Metaheuristics & Swarm Intelligence, 2018

251. J Douglas, AP Engelbrecht, BM Ombuki-Berman, *Merging and Decomposition Variants of Cooperative Particle Swarm Optimization: New Algorithms for Large Scale Optimization Problems*, International Conference on Intelligent Systems, Metaheuristics & Swarm Intelligence, 2018

252. N Banda, AP Engelbrecht, *Multimodal Emotion Recognition using Deep Continuous Conditional Recurrent Neural Fields*, IJCNN, 2018

253. W Mostert, KM Malan, AP Engelbrecht, *Filter versus Wrapper Feature Selection based on Problem Landscape Features*, GECCO, Worksop on Fitness Landscape Analysis, 2018

5.9 Conference Papers Submitted

The following papers have been submitted to conferences and are currently under review:

1. CW Cleghorn, C Scheepers, AP Engelbrecht, *Multi-Guide Vector Evaluated Particle Swarm Optimizer: Stability Analysis*, ANTS, 2018

2. ET Oldewage, AP Engelbrecht, CW Cleghorn, *Boundary Constraint Handling echniques for PSO in High Dimensional Problem Spaces*, ANTS 2018

3. G Pampara, AP Engelbrecht, *Quantum Particle Swarm Optimization within Dynamic Environments without a Radius Parameter*, ANTS 2018

4. KR Harrison, BM Ombuki-Berman, AP Engelbrecht, *Gaussian Velocity Particle Swarm Optimization*, ANTS 2018

5. ET Oldewage, AP Engelbrecht, CW Cleghorn, *The Importance of Component-wise Stochasticity in Particle Swarm Optimization*, ANTS 2018.

5.10 Conference Papers To Be Submitted

The following papers will be submitted to conferences and are currently under development:

1. CF Stallmann, AP Engelbrecht, *An Efficiency Analysis of CPU and GPU Online Training of Neural Networks*

5.11 Non-refereed Publications or Popular Articles

1. AP Engelbrecht, *Modeling Algorithms suitable for the South African Telephone Network*, Proceedings of the 8th National Conference of Masters and PhD Students in Computer Science, UNISA, Pretoria, 1993, pp 69-70.

2. AP Engelbrecht, I Cloete, *Optimal Routing in Telephone Networks using Hopfield Neural Networks*, Telkom Seminar, UCT, 1994, pp 1-10.

3. AP Engelbrecht, I Cloete, *A Neural Network Tool for Decision Support*, RMiSC Report Back, Stellenbosch, 1994.

4. AP Engelbrecht, I Cloete, *A Neural Network Tool for Decision Support*, Proceedings of the 9th National Conference for Masters and PhD Students in Computer Science, Stellenbosch, 1994.

5. I Cloete, AP Engelbrecht, *New Tools for Decision Support*, AMSE International Conference on Intelligent Systems, Pretoria, South Africa, 1994.

6. AP Engelbrecht, I Cloete, *A Neural Network Dimensioning Tool*, TELKOM'95, Bienniel Conference and Exhibition on Telecommunications in South Africa, Galagher Estate, Midrand, 1995, Vol 4, pp 1-10.

7. AP Engelbrecht, I Cloete, *Routing Optimization using a Hopfield Neural Network*, Regional International Teletraffic Conference, Pretoria, 1995, pp 154-164.

8. AP Engelbrecht, I Cloete, *Building Intelligence into Network Management*, Regional International Teletraffic Conference, Pretoria, 1995, pp 271-281.

9. A Graaff, AP Engelbrecht, *An Overview of Models to Detect and Analyze Fraud in the Telecommunications Environment*, South African Telecommunications Networks and Applications Conference, South Africa, September 2002.

10. EJ Dean, AP Engelbrecht, A Nicholas, *Artificial Intelligence Approach to Multi-Attribute Pattern Recognition for Tree Identification*, Proceedings of the 33rd annual conference of the South African Computer Lecturers' Association, Manyane, Pilanesberg June/July 2003.

11. N Franken, AP Engelbrecht, *Evolving Intelligent Game-Playing Agents*, SAICSIT, pp 102-110, 2003.

12. AJ Graaff, AP Engelbrecht, *Using a Threshold Function to Determine the Status of Lymphocytes in the Artificial Immune System*, SAICSIT, pp 268-274, 2003.

13. IL Schoeman, AP Engelbrecht, *Containing Particles inside Niches when Optimizing Multimodal Functions*, SAICSIT, 2005.

14. AI Edwards, AP Engelbrecht, *Nonlinear Mapping using Particle Swarm Optimisation in Security based Applications*, SATNAC, 2005.

15. R Nshimirimana, AP Engelbrecht, *Optimization of a Neutron/X-Ray Radiography Scan using Swarm Intelligence*, poster, The 59th Annual Conference of the SA Institute of Physics, 2014

5.12 Patents

None

5.13 Technical Reports

1. AP Engelbrecht, *Classification and Survey of Routing Rules in Telephone Networks*, Technical Report RW/TEL/92/02/00, Department of Computer Science, University of Stellenbosch, 1992.

2. AP Engelbrecht, *A Model for Dimensioning Hierarchical Telephone Networks*, Technical Report RW/TEL/92/03/00, Department of Computer Science, University of Stellenbosch, 1992.

3. AP Engelbrecht, I Cloete, *A Genetic Algorithm for Routing Optimization in Telecommunications Networks*, Report for Center of Excellence (University of Stellenbosch), 1998.

4. AP Engelbrecht, I Cloete, *Approximation of Traffic Distributions in Telecommunications Networks using Neural Networks*, Report for Center of Excellence (University of Stellenbosch), 1998.

5. AP Engelbrecht, I Cloete, *Classification of The State of GSM Cells*, Report for Center of Excellence (University of Stellenbosch), 1998.

6. AP Engelbrecht, *RapAnalyst: A Self-Organizing Map for Intelligent Data Analysis*, Evaluation Report for Raptor Technologies, 2002.

7. AP Engelbrecht, F van den Bergh, E Papacostantis, *Surface Anaomaly Detection using a Structured Light System*, Report for BMW, 2004.

8. X. Li, A. Engelbrecht, and M.G. Epitropakis, *Benchmark Functions for Congress on Evolutionary Computation'2013 Special Session and Competition on Niching Methods for Multimodal Function Optimization*, Technical Report, Evolutionary Computation and Machine Learning Group. RMIT University, Australia, 2013

5.14 Products Developed

The following software products have been developed:

1. *RapAnalyst*, a tool for intelligent data analysis using self-organized maps, developed for Raptor Technologies, 2001-2002.

2. *Fitchfork: An Automated Code Evaluator*, developed to automate the marking of C++ code, 2004.

3. *A System for Surface Anomaly Detection*, developed as a prototype for BMW South Africa, 2002-2005.

4. *CIlib*, an opensource library hosted on sourceforge (http://cilib.sourceforge.net) containing a large collection of CI algorithms, 2002-present.

6 Other Scholarly Research-Based Contributions

6.1 Participation in conferences, workshops and short courses

6.1.1 National

1. The 8th National Conference for Masters and PhD Students in Computer Science, 1993, Pretoria, South Africa – presented 1 paper

2. Research Manpower in Computer Science, Report Back, 1994, Stellenbosch, South Africa – presented 1 paper

3. The 9th National Conference for Masters and PhD Students in Computer Science, 1994, Stellenbosch, South Africa – presented 1 paper

4. 27th Annual South African Computer Lecturer Assocoation (SACLA) Conference, 1997, Wilderness, South Africa – attended

5. Annual Conference of the South African Institute of Computer Scientists and Information Technologists, Cape Town, 2001 – presented 1 paper

6. Annual Conference of the South African Institute of Computer Scientists and Information Technologists, Four Ways, 2001 – panelist, session chair, organizing committee

6.1.2 International

1. AMSE International Conference on Intelligent Systems: Methodologies and Applications, 1994, Pretoria, South Africa – presented 1 paper

2. TELKOM'95, Biennial Conference and Exhibition on Telecommunications, 1995, Midrand, South Africa – presented 1 paper

3. International Workshop on the Applications of Neural Networks to Telecommunications, 1995, Stockholm, Sweden – presented 1 paper

4. International Workshop on Artificial Neural Networks, 1995, Torremolinos, Spain – presented 3 papers

5. St. Petersburg International Teletraffic Seminar, 1995, St. Petersburg, Russia – presented 2 papers

6. Regional International Teletraffic Conference, 1995, Pretoria, South Africa – presented 2 papers

7. Multiconference on Computational Engineering and Systems Applications, 1996, Lille, France – presented 1 paper

8. IEEE Internationl Joint Conference on Neural Networks, 1998, Anchorage, Alaska – presented 1 paper

9. International Conference on Systems, Signals, Control, Computers, Durban, September 1998 – presented 1 paper, organizer and chair of special invited session

10. IEEE International Joint Conference on Neural Networks, 1999, Washington DC, USA – presented 3 papers

11. International Conference on Artificial Intelligence, Durban, South Africa, 1999 – presented 4 papers, organizer and chair of special invited session

12. IEEE Congress on Evolutionary Computing, San Diego, 2000 – presented 1 paper

13. IEEE International Joint Conference on Neural Networks, Como, Italy, 2000 – presented 1 paper

14. International Symposium on Computational Intelligence, Kosice, Slovakia, 2000 – presented 1 paper, best paper award

15. International Workshop on Artificial Neural Networks, Granada, Spain, 2001 – presented 1 paper, session co-chair

16. IEEE International Joint Conference on Neural Networks, Washington DC, USA, 2001 – presented 2 papers

17. IEEE World Congress on Computational Intelligence, Honolulu, Hawaii, 2002 – preseted 1 paper

18. 4th Asia-Pacific Conference on Simulated Evolution and Learning, Singapore, 2002 – presented 4 papers, organizer of special session, chair of session

19. International Conference on Information Processing, Singapore, 2002 – presented 1 paper, chair of session, invited panelist (Topic: Future Challenges in Soft Computing: Theory? Computational Paradigms? Applications?)

20. IEEE Swarm Intelligence Symposium, Indianpolis, 2003 – presented 1 paper, and session chair

21. IEEE Congress on Evolutionary Computation, Australia, 2003 – presented 3 papers, and session chair

22. IEEE Symposium on Computational Intelligence in Games, Colchester, UK, 2005 – presented 1 paper and 1 tutorial, session chair

23. IEEE Congress on Evolutionary Computation, Edinburgh, UK, 2005 – presented 1 paper and a tutorial, organiser of special session, session chair, attendance of editorial board of IEEE Transactions on Evolutionary Computation meeting

24. IEEE International Conferences on Cybernetics and Intelligent Systems, and Robotics, Automation and Mechatronics, Bangkok, Thailand, 2006 – presented 1 paper, session chair

25. IEEE Congress on Evolutionary Computation, Vancouver, Canada, 2006 – 3 papers, session chair, attendance of editorial board of IEEE Transactions on Evolutionary Computation editorial board meeting, attended IEEE CIS task force meetings.

26. IEEE Symposium Series on Computational Intelligence, Honolulu, Hawaii, 2007 – presented 3 papers, session chair of the IEEE Swarm Intelligence Symposium

27. IEEE World Congress on Computational Intelligence, Hong Kong, 2008 – special session organizer, session chair, attended IEEE Transactions on Evolutionary Computation editorial board meeting

28. International Conference on Hybrid Intelligent Systems, Barcelona, Spain, 2008 – plenary talk, attended hybrid intelligent systems board meeting

29. IEEE Congress on Evolutionary Computation, Trondheim, Norway, May 2009, Chair Sessions, Presented tutorial: Particle Swarm Optimization: A Universal Optimizer?, presented two papers.

30. IEEE Swarm Intelligence Symposium, Paris, France, 2011, presented one papers

31. IEEE Symposium on Computational Intelligence for Financial Engineering & Economics, Paris, France, 2011, presented one paper

32. IEEE Congress on Evolutionary Computation, Trondheim, Norway, 2011, presented two papers, one tutorial, session chair

33. IEEE Congress on Evolutionary Computation, Melbourne, Australia, 2012, presented three papers, one tutorial, session chair

34. IEEE Congress on Evolutionary Computation, Cancun Mexico, 2013, presented three papers, one tutorial, session chair

35. IEEE Symposium Series on Computational Intelligence, Singapore, 2013, presented two papers, session chair

36. Evolutionary and Multi-Criteria Optimization Conference, Sheffield, UK, 2013, presented one paper

6.2 Speaker at Colloquia / Invited Presentations / Panelist

1. *Modeling Algorithms Suitable for the South African Telephone Network*, Department of Computer Science, University of Stellenbosch, 1994

2. *Neural Network Architecture Optimization*, Department of Computer Science and Information Systems, University of South Africa, 1996

3. *Model Selection using Neural Networks*, Department of Statistics, University of South Africa, 1996

4. *Sensitivity Analysis of Neural Networks*, Department of Informatics, University of Pretoria, 1998

5. *What can we Learn from Sensitivity Analysis of Neural Networks?*, Department of Computer Science, University of Pretoria, 1998

6. International Conference on Information Processing, Singapore, 2003, Panel Topic: Future Challenges in Soft Computing: Theory? Computational Paradigms? Applications?

7. Annual Conference of the South African Institute of Computer Scientists and Information Technologists, South Africa, 2003, Panel Topic: Computer science / Information Systems research in a developing country

8. *Particle Swarm Optimization for Learning Game Strategies*, tutorial presented at the IEEE Symposium on Computational Intelligence in Games, April 2005.

9. *Particle Swarm Optimization: Pitfalls and Convergence Aspects*, tutorial presented at the IEEE Congress on Evolutionary Computation, September 2005.

10. *Particle Swarm Optimization*, Genetic Algorithm and Evolutionary Computation Conference, 2007, co-presenter with X. Li.

11. *Particle Swarm Optimization: An Introduction and Some Applications*, Department of Industrial Computing, Faculty of Information Science & Technology, National University of Malaysia, October 2007.

12. *Particle Swarm Optimization: A Universal Optimiser?*, Faculty of Information Technology, Multimedia University, Kuala Lumpur, Malaysia, October 2007

13. *Using Coevolutionary Particle Swarm Optimization for Strategy Generation*, Center for Artificial Intelligence and Robotics (CAIRO), Department of Mechatronics and Robotics, Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Johor, Malaysia, October 2007

14. *Can Particle Swarm Optimization Be Considered An Universal Optimizer?*, University of Kuwait, April 2008.

15. *Strategy Learning from Zero Knowledge*, University of Kuwait, April 2008.

16. *Strategy Learning from Zero Knowledge*, Gulf University of Science and Technology, April 2008.

17. *Game Strategy Learning from Zero Knowledge*, Department of Computer Science, Cyprus University, April 2008.

18. *CIlib: A Component-based Framework for Plug-and-Simulate Hybrid Computational Intelligence Systems*, Keynote speaker, HIS 2008, Barcelona, Spain.

19. Eight International Conference on Hybrid Intelligent Systems, Barcelona, September 2008, Panel Topic: *Hybrid Intelligent Systems: Current developments, Theoretical foundations, and Required Innovations*

20. Invited to the Royal Society Scientific Discussion Meeting on Swarm Intelligence, September 2009

21. *Natural Computing*, Department of Genetics, University of Pretoria, 2008.

22. *Particle Swarm Optimization: A Universal Optimizer?*, tutorial to be presented at IEEE Congress on Evolutionary Computation, Trondheim Norway, May 2009.

23. *Computational Swarm Intelligence*, tutorial presented at Department of Computer Science, University of Cyprus, March 2009.

24. *Particle Swarm Optimization in Dynamic Environments*, invited colloquium presented at the University of Cyprus, March 2009.

25. *Particle Swarm Optimization*, invited lecture presented at the Department of Computer Science, University of Cyprus, March 2009.

26. Keynote speaker at the Fourth Australian Conference on Artificial Life, Dec 2009, *CIlib: A Component-based Framework for Plug-and-Simulate Computational Intelligence Systems*

27. *Particle Swarm Optimization in Dynamic Environments*, First Australian Computational Intelligence Summer School, Melbourne, Dec 2009.

28. Keynote speaker at the International Conference on Mathematical and Computational Models, Coimbatore, India, December 2009, *Finding Multiple Solutions to Unconstrained Optimization Problems using Particle Swarm Optimization*,

29. Inauguration speech of the International Conference on Mathematical and Computational Models, Coimbatore, India, December 2009, *Trends in New Computational Models from Nature*

30. Locating and Tracking Multiple Optima using Particle Swarm Optimization, Seventh International Conference on Swarm Intelligence, ANTS2010, Brussels, September 2010

31. An Introduction to Particle Swarm Optimization, International Workshop on Nature Inspired Computation and Applications, Hefei, China, October 2010

32. Particle Swarm Optimization as a Universal Optimizer, International Workshop on Nature Inspired Computation and Applications, Hefei, China, October 2010

33. Particle Swarm Optimization in Dynamic Environments, Department of Computer Science, Brock University, Canada, Sep 2011

34. Particle Swarm Optimization with Heterogeneous Behaviors, University of Lugano, 2011

35. Particle Swarm Optimization in Dynamic Environments, Department of Computer Science, Brock University, September 2011

36. Particle Swarm Optimization, Tutorial at IEEE Congress on Evolutionary Computation, 2012

37. Learning from Zero-Knowledge using Competitive Coevolution, seminar, FAIR 2012, Pretoria

38. Particle Swarm Optimization, tutorial at IEEE Congress on Evolutionary Computation 2012

39. CIlib, tutorial at BRICS-CCI 2013

40. Particle Swarm Optimization, tutorial at IEEE Congress on Evolutionary Computation 2013

41. Particle Swarm Optimization, tutorial at Genetic and Evolutionary Computation Conference 2014

42. Particle Swarm Optimization Lore, keynote, IWNICA 2014

43. Heterogeneous Particle Swarm Optimization Algorithms, keynote, IWNICA 2014

44. Particle Swarm Optimization Lore, invited talk, Brock University, 2014

45. Heterogeneous Particle Swarm Optimization Algorithms, keynote, SocProS 2015

46. Dynamic Multi-Objective Optimization using Particle Swarm Optimization, keynote Second International Afro-European Conference for Industrial Advancement/Nostradamus 2015

47. AP Engelbrecht, Advances in Particle Swarm Optimization, tutorial, IEEE Congress on Evolutionary Computation, 2016

48. Niching Methods for Multimodal Optimization, competition, IEEE Congress on Evolutionary Computation, 2016

49. AS Rakitianskaia, AP Engelbrecht, Nature-Inspired Neural Network Optimization, special session, International Joint Conference on Neural Networks, 2016

50. KM Malan, AP Engelbrecht, Fitness Landscape Analysis in Practice, special session, IEEE Congress on Evolutionary Computation, 2016

51. MG Epitropakis, X Li, AP Engelbrecht, Niching Methods for Multimodal Optimization, tutorial, IEEE Congress on Evolutionary Computation, 2016 tem MG Epitropakis, X Li, AP Engelbrecht, Niching Methods for Multimodal Optimization, competition, IEEE Congress on Evolutionary Computation, 2016

52. M Helbig, K Deb, AP Engelbrecht, Dynamic Multi-Objective Optimization, special session, IEEE COngress on Evolutionary Computation, 2016

53. AP Engelbrecht, *Particle Swarm Optimization: A Universal Optimizer?*, tutorial, the Seventh International Conference on Swarm Intelligence, 2016

54. AP Engelbrecht, *Introduction to Computational Swarm Intelligence and Its Application in Optimization*, Short course, TEKBAC, Kuala Lumpur, 2016

55. AP Engelbrecht, *Introduction to Computational Swarm Intelligence and Its Application in Optimization*, Short course, TEKBAC, Singapore, 2017

56. AP Engelbrecht, *Recent Advances in Swarm Intelligence*, Keynote, 5th International Conference on Software Engineering & Computer Systems, Langkawi, Malaysia, Nov 2017.

57. AP Engelbrecht, *Heterogeneous Particle Swarm Optimizers: Scalability, Self-Adaptive Behaviors, and Dynamic Environments*, invited talk, Department of Computer Science, Brock University, Canada, September 2017

58. AP Engelbrecht, *An Overview of the Computational Intelligence Research Group*, talk at VSB-Technical University of Ostrava, October 2017

59. AP Engelbrecht, *Particle Swarm Optimization: A Multi-Purpose Optimization Approach*, Invited Tutorial, Department of Computer Science, University of Cyprus, 2018

60. AP Engelbrecht, *Multi-Guided Particle Swarm Optimization for Multi-Objective Optimization Problems*, Keynote, International Conference on Intelligent Systems, Metaheuristics & Swarm Intelligence, 2018

61. AP Engelbrecht, CW Cleghorn, *Particle Swarm Optimization: A Guide to Effective, Misconception Free, Real World Use*, Tutorial, GECCO, 2018

62. AP Engelbrecht, *A Hyper-Heuristic Framework for Real-Valued Dynamic Optimization*, Keynote, GECCO Workshop on Evolutionary Algorithms for Problems with Uncertainty, 2018

6.3 Teamwork and Collaboration with Others

6.3.1 Other Researchers (National and International)

1. Dr Andreas Kamilaris, Institute of Agriculture and Food Research and Technology (IRTA), Barcelona, Spain, *Meta-heuristics for Optimal Transport of Manure from Livestock to Crop Farms*, 2018

2. Prof Farouk Nathoo, University of Victoria, *Altzheimer Disease Prediction from MRI and Genetic Data*, 2017-present

3. Dr Michael Epitropakis, Management School, Lancaster University, *Niching Algorithms*, 2013-present *Niching Algorithms*, 2012–present

4. Prof Beatrice Ombuki-Bernmann, Department of Computer Science, Brock University, Canada,

5. Dr Xiaodong Li, School of Computer Science and Information Technology, RMIT University, Melbourne, *Niching Algorithms*, 2012–present

6. Prof Beatrice Ombuki-Bernmann, Department of Computer Science, Brock University, Canada, *Particle Swarm Optimization in Dynamic Environments*, 2011-present

7. Prof Graham Kendall, Department of Computer Science, Nottigham University, *Hyperheuristics*, 2011-2015

8. Proff Andreas Pitsillides and Vasos Vassilliou, University of Cyprus, and Prof Tim Blackwell, Goldsmiths University of London, *Nature Inspired Methods for Optimizing Sensor Webs*, 2008-2011.

9. Dr Salman Khan, King Fahd University of Minerals and Petroleum, Saudi-Arabia, 2010-present, *Fuzzy Optimization Approaches to Multi-Objective Optimization*

10. Prof Gennadi Ososkov, Joint Institute for Nuclear Research, Dubna, Russia, *Neural Network Applications in Experimental Physics*, 2008-2009.

11. Dr Ibrahim Zuwairie, Universiti Teknologi Malaysia, 2007-2010, *DNA Sequences Design.*

12. Prof Jean-Pierre Müller, CIRAD, France, 2006, *Multi-Agent Systems for Complex Systems Modelling and Simulation*

13. Dr Mahamed Omran, Open Arab University, 2005-2007, University of Science and Technology, 2008-present, *Development of new Differential Evolution Algorithms*

14. Dr Vincent Dietemann, Department of Zoology, University of Pretoria, 2004-present, *Bee Image Analysis*

15. Prof A Salman, Kuwait, 2003-2007, *Image Analysis using Particle Swarm Optimization*

16. Dr A Groenwold, Mechanical Engineering, University of Pretoria
Truss Optimization using Ant Colony Optimization, 2000

17. Dean Fairbanks, PhD Student, School of Environmental Studies, University of Pretoria
Analysis of Sustainability of Magisterial Districts in KwaZulu Natal using Rule Induction and Evolutionary Computing, 2000

18. Prof I Cloete, Department of Computer Science, University of Stellenbosch
    Hopfield Neural Networks for Routing Optimization in Telephone Networks
    Dimensioning of Telephone Networks using Feedforward Neural Networks
    Funded from the Telkom Teletraffic Application Development Program, 1994-1995

19. Prof I Cloete, Department of Computer Science, University of Stellenbosch
    Telecommunications: New Opportunities
    Funded from FRD research grant in the Competitive Industries theme, 1996-1998

20. Prof I Cloete, Department of Computer Science, University of Stellenbosch
    Intelligent Routing and Congestion Prediction using Neural Networks
    Funded from the Center of Excellence at the University of Stellenbosch, 1997-1998

21. Prof I Cloete, Department of Computer Science, University of Stellenbosch
    Development of a Generic Artificial Intelligence Package, 1997-1999

22. L Fletcher, Department of Statistics, UNISA
    Statistical Perspectives of Neural Networks, 1997-1999.

23. Dr F van den Bergh, Meraka Institute, 2005-2010
    Road Extraction from Satellite Images; *Particle Swarm Optimization*

24. Ms M van der Merwe, CSIR, 2005-present
    Analysis of Cholera Occurrence Data

25. A de Waal, Defensetek, CSIR
    Bayesian Networks for Decision Support, 2000

26. M de Wit, G Flemming, J Muller, M van der Merwe, Division of Water, Environment and Forestry Technology, CSIR
    Integrated Assessment and Modeling (IAM): Suggestions for Research Program, 2000

6.3.2   Other Research Institutions (National and International)

- Institute of Agriculture and Food Research and Technology (IRTA), Barcelona, Spain

- Cambgridge University, UK

- Rey Juan Carlos University, Spain

- University of Victoria, Canada

- Meraka/CSIR, Pretoria, South Africa

- Lancaster University, UK

- RMIT University, Melbourne, Australia

- Brock University, Canada

- University of Cyprus, Cyprus

- Goldsmiths University of London, UK

- Syracuse University, USA

- University of Science and Technology, Kuwait

- Indian Institute of Technology, Roorkee, India

- Universiti Teknologi Malaysia, Johor, Malaysia

- Joint Institute for Nuclear Research, Dubna, Russia

6.3.3 Industry

1. NMRQL, Machine Learning Technology for Financial Markets, 2017-present

2. Merlynn Technologies, Development of Virtual Human Expert Models, 2015-present

3. Columbus Steel, Exploratory research on optimization of end-milling, 2010

4. Formal agreements with IBM secured an IBM Cloud Computing solution for the Computational Intelligence Research Group in the Department of Computer Science, as one of 6 universities world wide rolling out IBM Cloud Computing technologies.

5. H Goodhead, Rorotika, 2007-2008, *The development of CI methods for dynamic pricing*

6. T Botha, IBM South Africa, *Intelligent Text Mining*, 1999-2000

7. BMW South Africa, *The development of an Image Analysis System for the Detection of Defects on Surface of Body Panels*, 2002-2006.

8. Raptor Technologies, *Development of a Self-Organizing Map Tool package for Exploratory Data Analysis*, 2001.

9. Sanlam, *Analysis of Data on Long-term Insurance Data*, 2001.

10. Rand Merchant Bank, *Computational Intelligence for Financial Predictions*, 2007.

6.4 Membership in National and International Bodies

International Neural Network Society

Member		1998-2003
SIG AFRICA	Chair: Publicity	1999-2000
SIG AFRICA	General Chair	2001-2003
SIG Hybrid Systems	member	1999-2003
SIG Text & Document Analysis	member	1999-2003

International Society of Applied Intelligence

Member	1999

IEEE

Member (Computational Intelligence Society)	2000-2008
Senior Member (Computational Intelligence Society)	2008-present
EC & games task force	2003-2005
Swarm Intelligence task force	2003-present
Coevolution task force	2004-2005
Chair: Data, Text and Web mining	2004
Chair: Task force swarm intelligence for games (Games TC)	2007-2011
EC in Dynamic and Uncertain Environments TC	2008-2016
Member ECTC	2011-present
Vice Chair ECTC	2014-present
Member NNTC	2015-present
Education TC	2012
Chair: Task Force on SI	2012
Meritorious Award Subcommittee	2016
IEEE TEC Outstanding Paper Award Subcommittee	2016

Regular Member AFRON

African Robotics Network	2012

IAAMSAD: International Association for Advancement of Methods for System Analysis and Design

Board of Country Representatives	2000-2003
Chair: South African Section	2000-2003

Member of Computational Intelligence and Machine Learning Virtual Infrastructure Network

	2008-2010

6.5 Visits to Local and Overseas Universities or Research Institutes as Guest Professor or Researcher

1. Dr I Zuwairie, Department of Mechatronics and Robotics, University Teknologi, Malaysia, October 2007.

2. Faculty of Information Technology, Multimedia University, Malaysia, October 2007.

3. Department of Industrial Computing, National University of Malaysia, October 2007.

4. Prof A Salman, Department of Computer Engineering, University of Kuwait, April 2008.

5. Dr Mohammed Omran, Department of Computer Science, Gulf University of Science and Technology, April 2008.

6. Prof Vasos Vassiliou, Department of Computer Science, University of Cyprus, April 2008

7. Prof Andreas Pittsillides, Department of Computer Science, University of Cyprus, March 2009, 2010, 2018

8. Prof Luca Gambardella, University of Lugano, 2011

9. Prof Beatrice Ombuki-Bernmann, Department of Computer Science, Brock University, 2011, 2014, 2017

7 Management and Administrative Duties

7.1 Duties

1. Mamelodi Steering Committee, 2011-present

2. Management committee of Unit for Intelligent Digital Forensics, 2012

3. Liaison with Department of Electrical and Electronic Engineering, 1998-1999

4. Liaison with Department of Biochemistry on curriculum planning for new Bioinformatics degree, 2002-2007

5. Organize departmental colloquia, 1998-1999

6. Functional head: technical staff (Department of Computer Science), 1999-2004. Duties include

   - Appointment of technical staff
   - Project management
   - Duty scheduling
   - Managing technical staff budget

7. Manage hardware and software budget, 2000-2003. Duties include

   - Ordering and distribution of hardware and software
   - Planning of new budget

8. Member of Informatorium committee, 1998, 2006-present

9. Chairman of Informatorium committee, 1999-2000. Duties included

   - Chair committee meetings
   - Scheduling of practicals, tests, exams and external courses for several departments and faculties using the Informatorium
   - Writing reports on the usage of the Informatorium
   - Designing and implementing Informatorium usage policy
   - Liaison with students, Department of IT, and academic staff
   - Ensuring efficient operation of computer systems
   - Planning of future requirements, upgrades and extensions

10. Appointments Committee

    - Appointment of ABSA Data Science Chair, 2018

- Appointment of Junior Lecturer, Computer Science, 2008
- Appointment of Senior Lecturer, Computer Science, 2007
- Appointment of Lecturer, Computer Science, 2004, 2006
- Appointment of Senior Lab Administrator, Informatorium, 2003
- Appointment of Senior Lab Administrator, 4th floor, Informatorium, 2002
- Appointment of new head of Department of Computer Science, 2002
- Appointment of academic staff member for Department of Computer Science, 2001
- Promotion of Department of Informatics academic staff, 1999
- Appointment of senior messenger, School for IT, 1999

11. First years orientation, 2001-2017

12. Acting head of department on various occasions 1999-2007

13. Acting head of Computer Science department, 9 June 2008 to 31 March 2009.

14. Head of Computer Science department, 2009-31 August 2017

15. Acting Chair of SIT, April-July 2010.

16. UP Postdoc Advisory Committee, 2008-2012

17. UP Research Strategy Discussion Meeting, 2010

18. UP Committee on Research Computing, 2009-2012

19. UP Panel for the Evaluation for Books and Published Conference Proceedings, 2014, 2015

20. Extended Program Steering Committee, 2011-2014

21. School of Information Technology Programme Committee, 2002-2017

22. Faculty of Engineering, Built Environment and Information Technology Research Committee, 2002-2010.

23. Undergraduate manager, Computer Science, 2005-2008. Tasks include
    - Undergraduate planning
    - Revision of degrees
    - First years orientation
    - Degree accreditation

24. Member of UP delagation to EPFL and ETH Zurich, 2016

25. Management Committee of Institute of Sustainable Malaria Control, 2017-present

26. Advisory Board of Sport, Exercise Medicine and Lifestyle Institute, 2017-present

27. Advisory Board: Centre for Geoinformatics, 2015-present.

28. Member of the UP High Performance Computing Steering Committee, 2018

7.2 Administrative Reports

1. Informatorium Statistieke: Tweede Semester 1999, AP Engelbrecht, Chairman Informatorium Committee, 10 August 1999

2. Informatorium Gebruikstatistiek: Eerste Kwartaal 2000, AP Engelbrecht, Chairman Informatorium Committee, 5 April 2000.

3. Informatorium Code of Conduct, written by AP Engelbrecht, 2000.

8 Community Service or Professional Skills

8.1 Outreach Projects

1. SoftstartBTI director as from February 2009, and Member of EXCO as from October 2009

2. Steering Committee of Innovation Hub as from 2009.

8.2 Professional Services Performed

8.2.1 Editorial Activities

- Advisory Board:

  - Springer Natural Computing Book Series, 2018-present

- Editor:

  1. Co-Editor-in-Chief: International Journal of Computers, Systems and Signals, 2001-2003
  2. Co-editor for Genetic and Evolutionary Computation Conference 2010, Genetic and Evolutionary Computation Conference 2011
  3. Co-Editor for ANTS 2010, International Swarm Intelligence Conference (ANTS), 2012

- Associate Editor:

  1. Metaheuristics, 2018
  2. Engineering Applications ot Artificial Intelligence, 2016-present
  3. Complex & Intelligent Systems, 2016-present
  4. IEEE Transactions on Neural Networks and Learning Systems, 2015-present
  5. IEEE Transactions on Evolutionary Computation, 2005-present
     - Committe Chair to examine plagiarism cases, April 2008, February 2012
     - Best associate editor award for 2007.
  6. IEEE Transactions on Computational Intelligence and AI in Games, 2008-2014
  7. Journal of Swarm Intelligence, 2008-present
  8. International Journal of Applied Metaheuristic Computing, 2009
  9. Soft Computing, Springer, 2013-2014

- Editorial Board:

  1. Journal of Automation, Mobile Robotics and Intelligent Systems, 2015
  2. Nature Inspired Computing : Theory and Industrial Application, BK Panigrahi and Z Cui (eds), Computational Intelligence series of Springer, 2013

3. International Journal of Computers, Systems and Signals, 2000

4. Applied Soft Computing, 2009

5. International Journal of Intelligent Computing and Cybernetics, 2007-present

6. Far East Journal of Experimental and Theoretical Artificial Intelligence, 2008

- Guest Editor:

  1. Special issue on Data and Text Mining, International Journal of Computers, Systems and Signals, 2000

  2. Special issue on Swarm Intelligence for IEEE Transactions on Evolutionary Computation, 2009.

  3. Special issue on Particle Swarm Optimization for Swarm Intelligence Journal, 2009.

  4. Special issue on Swarm Intelligence for The Computer Journal, 2010

  5. ANTS2010 special issue, Swarm Intelligence Journal, 2010

  6. Special issue on Applied Swarm Intelligence, Swarm Intelligence Journal, 2011

  7. ANTS2012 special issue, Swarm Intelligence Journal, 2012

- Production Editor:

  1. Co-Production Editor: South African Computer Journal, 1999

  2. Production Editor: South African Computer Journal, 2000-2003

- Steering Committee:

  - Member of steering committee of South African Machine Learning and Deep Learning Schools, 2017

- International Program Committee:

  1. 8th International Conference on Modeling, Simulation and Applied Optimization, 2019

  2. 10th International Conference on Evolutionary Multi-Criterion Optimization, 2019

  3. International Conference on Soft Computing for Problem Solving, Advisory Board, 2018

  4. 10th International Conference on Soft Computing and Pattern Recognition, 2018

  5. 15th International Conference on Parallel Problem Solving From Nature, 2018

  6. International Conference on Learning and Optimization Algorithms: Theory and Application, 2018

  7. 4th International Conference on Machine Learning, Optimization and Data Science, 2018

  8. International Joint Conference on Neural Networks, 2018

  9. International Conference on Learning and Optimization Algorithms: Theory and Application, 2018

  10. 10th International Conference on Advanced Computational Intelligence, 2018

  11. IEEE 5th Intl. Conference on Soft Computing & Machine Intelligence, Member of International Advisory Board, 2018

  12. 9th International Conference on Innovations in Bio-Inspired Computing and Applications, 2018

  13. 18th International Conference on Hybrid Intelligent Systems, 2018

  14. Genetic and Evolutionary Computation Conference, ACO-SI Track Chair, 2018

  15. European Conference on the Applications of Evolutionary Computation, 2018

16. IEEE Congress on Evolutionary Computation, 2018

17. ANTS - 11th International Conference on Swarm Intelligence, 2018

18. Ninth International Conference on Swarm Intelligence, Plenary Session co-chair, 2018

19. 6th International Conference on the Theory and Practice of Natural Computing, 2017

20. IEEE Symposium Series on Computational Intelligence, 2017

21. 7th International Conference on Soft Computing for Problem Solving, 2017

22. 11th International Conference on Simulated Evolution and Learning, special session on Swarm and Evolutionary Computation in Dynamic and Uncertain Environments, 2017 3rd International Workshop on Machine learning, Optimization and Big Data, 2017

23. International Conference on Learning and Optimization Algortihms: Theory and Applications, 2018

24. International Conferences on Internet of Things and Machine Learning, 2017

25. International Conference on Advanced Computational Intelligence, 2017

26. Symposium on Swarm Intelligence & Evolutionary Computation, 2017

27. International Joint Conference on Neural Networks, 2017

28. Eighth International Conference on Swarm Intelligence, 2017

29. Genetic and Evolutionary Computation Conference, 2017

30. European Conference on the Applications of Evolutionary Computation, 2017

31. 9th International Conference on Evolutionary Multi-Criterion Optimization, 2017

32. IEEE Congress on Evolutionary Computation, 2017

33. 12th International Conference on Bio-inspired Computing: Theories and Applications, 2017

34. Swarm Intelligence & Evolutionary Computation, 2017

35. International Conference on Advances in Computing and Computer Engineering, 2016

36. ISNN 2016

37. 7th Inernational Conference on Evolutionary Computation Theory, 2016

38. ANTS 2016, African Liaison Chair, 2016

39. MOD 2016 PC, 2nd International Workshop on Machine Learning, Optimization and Big Data

40. ICSI 2016 PC

41. ICIS 2016 PC

42. ACO-SI track PC for GECCO 2016, 2017

43. International Conference on Bio-inspired Computing: Theories and Applications (BIC-TA), 2015

44. BRICS-CCI 2015

45. 6th International Conference on Swarm Intelligence, 2015

46. 6th International Conference on Pattern Recognition and Machine Intelligence (PReMI 2015)

47. Seventh International Conference on Advanced Computational Intelligence (ICACI 2015).

48. Fifth International Conference on Information Science and Technology (ICIST 2015)

49. EvoSTOC 2015, 2016, 2017

50. Evo* 2014

51. IEEE Intelligent Systems Conference, 2014

52. Swarm Intelligence Symposium special sessions co-chair, 2014

53. 2nd International Conference on the Theory and Practice of Natural Computing, 2013, 2014

54. NaBIC 2013

55. International Symposium on Innovations in Intelligent Systems and Applications, 2013

56. 2nd Special Track on Robotics and AI in Africa, IEEE AFRICON 2013

57. International Conference on Swarm Intelligence (ICSI), 2013

58. 4th International Conference on Intelligent Control and Information Processing (ICICIP 2013)

59. Third IEEE International Conference on Information Science and Technology, 2013

60. Fift International Conference on Pattern Recognition and Machine Intelligence, 2013

61. EMO 2013, 2014, 2015

62. ECTA 2012, 2013, 2014, 2015

63. 1st International Conference on the Theory and Practice of Natural Computing (TPNC 2012) 2012

64. TPNC 2013-2017

65. International Conference on Swarm Intelligence (ICSI), 2012

66. European Conference on the Applications of Evolutionary Computation, 2012

67. Genetic and Evolutionary Computing Conference, 1999, 2007, 2008, 2009

68. International Conference on Artificial Intelligence, 1999

69. IEEE Swarm Intelligence Symposium, 2003, 2005, 2006, 2007, 2008, 2009, 2010

70. Computational Intelligence, Robotics and Autonomous Systems, 2003

71. IEEE Congress on Evolutionary Computation, 2003-present

72. IEEE Symposium on Computational Intelligence and Games, 2005, 2006, 2007, 2013

73. IEEE Conference on Cybernetics and Intelligence Systems, 2004.

74. International Conference on Neural Information Processing, 2004

75. International Conference on Parallel Problem Solving From Nature, 2004, 2006, 2010.

76. International Conference on Natural Computation, 2005-present

77. IEEE International Conferences on Cybernetics and Intelligent Systems, and Robotics, Automation and Mechatronics, 2005-present

78. International Conference on Ant Colony Optimization and Swarm Intelligence, 2006, 2008, 2009

79. International Conference on Simulated Evolution and Learning, 2005-present

80. International Conference on Fuzzy Systems and Knowledge Discovery, 2007, 2008

81. Pacific-Asia Conference on Knowledge Discovery and Data Mining, 2007, 2008

82. International Conference on Hybrid Intelligent Systems, 2008, 2009, 2010

83. International Conference on Intelligent Systems Design and Applications, 2008

84. Workshop cum Summer School on Evolutionary Computing, 2008

85. International Symposium on Neural Networks, 2008

86. International Conference on Soft Computing as Transdisciplinary Science and Technology, 2008

87. International Multiconference on Computer Science and Information Technology, 2008

88. Arab Science and Technology Foundation 5th Conference on Scientific Research Outlook, 2008.

89. IEEE International Conference on Soft Computing as Transdisciplinary Science and Technology, 2008

90. World Congress on Nature and Biologically Inspired Computing, 2009

91. International Conference on Control, Instrumentation and Mechatronic Engineering, 2009

92. Workshop on Computational Optimization, 2008, 2009, 2010

93. International Joint Conference on Neural Networks, 2009

94. International Conference on Informatics in Control, Automation and Robotics, 2009

95. International Conference on Evolutionary Computation, 2009

96. International Conderence on Artificial Immune Systems, 2009, 2010

97. International Conference on Soft Computing and Pattern Recognition, 2009

98. Track Chair: Ant Colony Optimization and Swarm Intelligence, Genetic and Evolutionary Computation Conference, 2010, 2011, 2018

99. 7th European Workshop on Evolutionary Algorithms in Stochastic and Dynamic Environments, 2010

100. International Conference of Numerical Analysis and Applied Mathematics, 2009

101. Seventh European Workshop on Evolutionary Computation in Stochastic and Dynamic Envirotnments, 2010

102. Learning and Intelligent Optimization Conference, 2009

103. ISNN 2008, 2010

104. European Conference on the Applications of Evolutionary Computation, 2010

105. IEEE IS (Intelligent Systems) 2010

106. International Conference on Swarm Intelliegnce, 2010

107. ICARIS 2010

108. IEEE Symposium on Differential Evolution, 2011

109. Fifth Learning and Intelligent OptimizatioN conference, 2011

110. International Conference on Evolutionary Multicriterion Optimization, 2011

111. SEAL2010

112. Fourth International Workshop on Advanced Computational Intelligence (IWACI) 2011.

113. LION 6, Learning and Intelligent OptimizationN Conference, 2012

114. LION 9, Learning and Intelligent OptimizationN Conference, 2014

8.2.2 Conference Involvement

- International Advisory Committee:

  1. International Cinference on Intelligent Systems, Metaheurisitcs and Swarm Intelligence, 2018

  2. International conference on Soft computing and problem solving (SoCPros2017), 2017

  3. 1st International Conference on Innovative Algorithms, 2017

  4. 8-th International Conference on Nature and Biologically Inspired Computing (NaBIC16)

  5. 16th International Conference on Hybrid Intelligent Systems (HIS16)

  6. 16th International Conference on Intelligent Systems Design and Applications (ISDA16)

  7. 6th World Congress on Information and Information Technology (WICT16)

  8. Intl. Conf. on Intelligent Systems. Metaheuristics & Swarm Intelligence (ISMSI), 2017

  9. India Intl. Congress on Computational Intelligence, 2017

10. 3rd Intl. Conference on Soft Computing & Machine Intelligence (ISCMI16)

11. SocProS 2014, 2015

12. Swarm, Evolutionay and Memetic Computing (SEMCCO 2013)

13. International Conference on Technology, Communication and Education, 2008

14. SwarmForce, November 2007-present, Texas, USA.

15. International Conference on Control, Instrumentation and Mechatronics, 2009

16. Fourth Australian Conference on Artificial Life, 2009

17. Program committee advisory board of IEEE IS (Intelligent Systems) 2010

18. International Workshop on Future Directions of ANN, 2010

19. Workshop of Computational Optimization, 2011

20. International Symposium on Swarm Intelligence and Differential Evolution, 2012

21. SOCPROS 2011, Roorkee, India

22. SOCPROS 2012, Jaipur, India

23. Swarm, Evolutionary and Memetic Computing Conference, and Fuzzy and Neural Computing Conference, 2012

24. Intl. Conference on Soft Computing & Machine Intelligence(SCMI14)

- Organizing Committee:

  1. Plenary session co-chair ICSI'2017 & DMBD'2017

  2. Best paper award chair, IEEE SSCI 2016

  3. General C-Chair NaBIC 2015

  4. General Chair, IEEE SSCI 2015

  5. Steering Committee, BRICS-CCI 2015, Co-Chair.

  6. Joint General Co-Chair, BRICS-CCI 2015

  7. Fift International Conference on Swarm Intelligence (ISCI), Technical Co-Chair, 2014

  8. 2nd ISCBI, General Co-Chair, 2014

  9. IEEE Congress on Evolutionary Computation, Program Co-Chair, 2014

  10. BRICS-CCI 2013, Program Chair.

  11. IEEE Swarm Intelligence Symposium 2006, Special sessions chair

  12. IEEE Congress on Evolutionary Computation 2007, Technical co-chair

  13. IEEE Swarm Intelligence Symposium 2007, Steering Committee

  14. IEEE Computational Intelligence in Games, 2008, Publicity Chair

  15. IEEE Swarm Intelligence Symposium 2008, Special Sessions Chair, 2008, 2011, 2013

  16. IEEE Computational Intelligence in Games Symposium, 2008, Regional Publicity Coordinator

  17. International CoChair of World Congress on Nature and Biologically

  18. Program Chair of International Conference on Swarm Intelligence, 2010 Inspired Computing, 2009

  19. IEEE Swarm Intelligence Symposium 2011, Special sessions chair

  20. ANTS 2010 PSO Program Committee Chair

  21. Genetic and Evolutionary Computation Conference 2010, ACO-SI Track Chair.

22. Genetic and Evolutionary Computation Conference 2011, ACO-SI Track Co-Chair.

23. ICSI 2011, Technical Committee Co-chair (International Conference on Swarm Intelligence)

24. IEEE Congress on Evolutionary Computation, 2011, Publicity Co-Chair

25. SSCI 2013, publicity committee

26. International Conference on Swarm Intelligence, Technical Committee Co-Chair, 2012

27. Co-Chair, Program Committee, IEEE Congress on Evolutionary Computation 2014

- National Program Committee:

  1. SAICSIT, 2000-2003, 2005

- Organizing Special Sessions:

  1. *Computational Intelligence*, International Conference on Systems, Signals, Control and Computers, Durban, South Africa, 1998

  2. *Learning Algorithms of Neural Networks*, International Conference on Artificial Intelligence, Durban, South Africa, 1999

  3. *Trends in Global Optimization*, International Conference on Information Processing, Singapore, 2002

  4. *Particle Swarm Optimisation*, IEEE Congress on Evolutionary Computation, 2005

  5. *New Particle Swarm Optimisation Methods*, IEEE Congress on Evolutionary Computation, 2007

  6. *Evolutionary Computation in Dynamic and Uncertain Environments*, IEEE Congress on Evolutionary Computation, 2007-2008

  7. Niching, Congress on Evolutionary Computation 2013, Congress on Evolutionary Computation 2014

  8. M Helbig, AP Engelbrecht, *Dynamic Multi-Objective Optimization*, Congress on Evolutionary Computation 2014

  9. X Li, AP Engelbrecht, MG Epitropakis, *Niching Methods for Multimodal Optimization*, special session Congress on Evolutionary Computation 2015

  10. M Helbig, AP Engelbrecht, R Wang, *Dynamic Multi-objective Optimization*, Congress on Evolutionary Computation 2015

- Session Chair for various conferences

- Panelist:

  1. International Conference on Information Processing, Singapore, 2003
     Topic: Future Challenges in Soft Computing: Theory? Computational Paradigms? Applications?

  2. Annual Conference of the South African Institute of Computer Scientists and Information Technologists, South Africa, 2003
     Topic: Computer science / Information Systems research in a country (South Africa)

  3. International Conference on Hybrid Intelligent Systems, Barcelona, Spain, 2008
     Topic: Future Challenges in Hybrid Intelligent Systems

- Chair of the Doctoral Award Committe for the World Congress on Nature and Biologically Inspired Computing, 2009

- Emergent Technologies Committee Chair of the World Congress on Nature and Biologically Inspired Computing, 2010

- Tutorials presented:

  1. *Particle Swarm Optimization for Learning Game Strategies*, tutorial presented at the IEEE Symposium on Computational Intelligence in Games, April 2005.

  2. *Particle Swarm Optimization: Pitfalls and Convergence Aspects*, tutorial presented at the IEEE Congress on Evolutionary Computation, September 2005.

  3. *Particle Swarm Optimization*, Genetic Algorithm and Evolutionary Computation Conference, 2007.

  4. *Particle Swarm Optimization*, IEEE Congress on Evolutionary Computation, 2007.

  5. *Particle Swarm Optimization*, Center for Artificial Intelligence and Robotics (CAIRO), Department of Mechatronics and Robotics, Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Johor, Malaysia, October 2007.

  6. *Ant Colony Optimization*, Center for Artificial Intelligence and Robotics (CAIRO), Department of Mechatronics and Robotics, Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Johor, Malaysia, October 2007.

  7. *Particle Swarm Optimization: A Universal Optimizer?*, IEEE Congress on Evolutionary Computation, Trondheim, Norwat, May 2009.

  8. *Particle Swarm Optimization in Dynamic Environments*, First Australian Computational Intelligence Summer School, Melbourne, Australia, December 2009.

  9. *Particle Swarm Optimization*, IEEE Congress on Evolutionary Computation, 2012

  10. *Particle Swarm Optimization*, IEEE Congress on Evolutionary Computation, 2013

  11. *CIlib*, BRICS-CCI, 2013

  12. Particle Swarm Optimization, tutorial at Genetic and Evolutionary Computation Conference 2014

  13. AP Engelbrecht, Advances in Particle Swarm Optimization, tutorial, IEEE Congress on Evolutionary Computation, 2016

  14. MG Epitropakis, X Li, AP Engelbrecht, Niching Methods for Multimodal Optimization, tutorial, IEEE Congress on Evolutionary Computation, 2016

  15. AP Engelbrecht, *Particle Swarm Optimization: A Universal Optimizer?*, tutorial, the Seventh International Conference on Swarm Intelligence, 2016

  16. AP Engelbrecht, CW Cleghorn, *Particle Swarm Optimization: A Guide to Effective, Misconception Free, Real World Use*, Tutorial, GECCO, 2018

  17. M Epitropakis, AP Engelbrecht, X Li, *Recent Advances on Multi-modal Optimization*, Tutorial, GECCO, 2018

8.2.3 Other

- Facilitator: First South African International Workshop on Sensor Web Enablement, March 2005, CSIR

- IBSA Academic Seminar, Florianopolis, Brazil, 13-15 August 2008, South African Representative for the theme on Engineering, Mathematics and Computer Science.

8.2.4 Consultation

1. Member of Technical Advisory Board, NMRQL, 2017-present

2. Member of the SoftStart BTI board as from 2009.

3. Advice on CI methods for dynamic environments to Rorotika, 2007-2008.

4. Advice on the creation of a National Institute for Artificial Intelligence.

5. Took part in a discussion of the concept framework for Intellectual Property Reights, drafted by DST.

6. Took part in discussions on the Maxum Awards program of the Innovation Hub, 2005

7. Advice on Case-Based Reasoning System for fault analysis, M&MTek, CSIR, 2001

8. Advice on using Genetic Algorithms for placing axial lines on rectangular grids, I Sanders, Department of Computer Science, University of Witwatersrand, 2001.

9. Advice on the development of self-organizing maps for exploratory data analysis, Raptor Technologies (Pty) Ltd, 2001.

10. Advice on design of environmental project using artificial intelligence, Division of Water, Environment and Forestry Technology, CSIR, 2000

11. Advice and cooperation with Dean Fairbanks on environment sustainability analysis using tools from artificial intelligence, School of Environmental Studies, University of Pretoria, 2000

12. Advice on Data and Text Mining to Mr T Botha and P Cronje, IBM South Africa, 1999-2000

13. Development of data mining and visualization tools: Raptor Technologies, 2001-2002

14. Evaluation of specialized data mining tool: Raptor Technologies, 2001

15. Bussiness Enterprises:

    - Development of SANLAM value-model, 2001
    - ABSA workshop on evaluation of insurance practices, 2001
    - BMW (South Africa) on the development of a computerized system for the detection of defects on external car body parts

8.3 Clinical Services

None

8.4 Involvement with Other Universities/Scientific Institutions

8.4.1 Thesis Examination Completed

1. I Govender, *Default Reasoning and Neural Networks*, M.Sc Thesis, Department of Computer Science and Information Science, UNISA, 1998

2. Mieso Denko Kabeto, *The Design and Simulation of Routing Protocols for Mobile Ad hoc Networks*, PhD, Department of Computer Science, University of Natal, 2001

3. Stefanus Maré, *The In-Service Determination of the Presence of Distortion in a High Quality Analogue Sound Signal*, PhD, Technikon Natal, 2002

4. M Fick, *Neurale Netwerke as moontlike Woordafkappingstegniek vir Afrikaans*, M.Sc (Operational Research), Department of Operational Research, UNISA, 2002

5. L Fletcher, *Statistical Modeling by Neural Networks*, PhD, Department of Statistics, UNISA, 2002

6. M Fuchs, *Comparing Incremental to Batch Tree Induction in the Incremental Learning Task*, M.Sc, Department of Computer Science, University of Witwatersrand, 2002

7. PW Barnard, *The Prediction of the Emission Spectra of Flares and Solid Propellant Rockets*, M.Sc. Eng, Department of Chemical Engineering, University of Stellenbosch, 2003

8. J Kruger, *Constructing Bayesian Belief Network Structure from the Correlation Matrix*, PhD, Department of Computer Science, University of Witwatersrand, 2003

9. A Vahed, *Knowledge-Driven Training of Recurrent Neural Networks with Application to Time Series Prediction*, PhD, Department of Computer Science, University of Western Cape, 2003-2004

10. N Pillay, *An Evaluation of Genetic Programming as a Means of Inducing Solutions to Novice Procedural Programming Problems in Intelligent Programming Tutors*, PhD, Department of Computer Science, University of Natal, 2004

11. A Combrink, *A Preprocessor for an English-to-Sign Language Machine Translation System*, M.Sc, University of Stellenbosch

12. AGW Murray, *The Parallel Path Artificial Neuron*, PhD thesis, Swinburne University, 2006

13. CA Anthonissen, *A population-based approach to sequential ordering problems*, M.Ing, Industrial Engineering, Stellenbosch, 2006

14. ET Teweldemedhin, *Agent-Based Simulation in Predicting the Spread of the HIV Epidemic*, M.Sc, University of the Witwatersrand, 2007

15. Ho Chin Kuan, *Metaheuristics for Ad Hoc Network Clustering: A Graph-Theoretic Perspective*, PhD, Faculty of Information Technology, Multimedia University, Malaysia, 2007

16. AM Engelbrecht, *Modelling of Mass Transfer in Packing Materials With Cellular Automata*, M.Ing, Department of Process Engineering, University of Stellenbosch, 2008

17. CJ Woodward, *Ecosystems, Complexity, Topology and Evolutionary Computation*, PhD Thesis, Swinburne University, 2010

18. CJ van Heerden, *Accurate and efficient classifiers for large datasets*, PhD Computer Engineering, North-West University, 2011

19. R Raghavjee, *A Study of Genetic Algorithms for Solving the School Timetabling Problem*, Department of Computer Science, University of KwaZulu Natal, 20122013, and accepted.

20. IJG del Amo, *Uncertain and Dynamic Optimization Problems: Solving Strategies and Applications*, Department of Computer Science and Artificial Intelligence, University of Granada, 2012

21. W Bezuidenhout, *Optimising the Frequency Assignment Problem Utilising Particle Swarm Optimisation*, MSc Information Technology, University of Johannesburg, 2012

22. M Ahmad, *Tool-Supported Spelling Normalization for Medieval German Mansuscripts*, PhD, Department of Computer Science, University of Pretoria, 2013

23. MA Munoz Acosta, *Decision Support Systems for the Automatic Selection of Algorithms for Continuous Optimization Problems*, Department of Mechanical Engineering, PhD, The University of Melbourne, 2014

24. M Bonyadi, *Particle Swarm Optimization: Theoretical Analysis, Modifications and Applications to Constrained Optimization Problems*, PhD Computer Science, University of Adelaide, 2014

25. M Beer, *Dynamic Search Space Characterisation*, PhD, Department of Computer Science, Swinburne University, Australia, 2015

26. Sunrise Wang, Department of Computer Science, PhD, University of Cape Town, 2015

27. Nor Azlina Ab. Aziz, *An Adaptively Switching Iteration Strategy for Population Based Metaheuristics*, PhD, Faculty of Engineering, University of Malaya, 2016

28. JA Yacim, *Artificial neural networks modelling for mass appraisal of properties*, PhD, Department of Construction Economics, University of Pretoria, 2016

29. SM Akandwanaho, *A Dynamic Gaussian Process Regression, An Efficient Choice Function for Hyper-Heuristics and A Spy Search Algorithm for Memetic Algorithms*, PhD, Computer Science, UKZN, 2017

30. SM Akandwanaho, *Search and Selection Methods for Hyper-Heuristics*, PhD, Computer Science, UKZN, 2017

31. Neha Bharill, *Investigations in Fuzzy Based Learning Algorithms with Application to Big Data Classification*, PhD, Computer Science & Engineering, Indian Institute of Technology, Indore, 2017

32. Lunga Mxhalisa, *Machine Learning in Galaxy Evolution: Source Classification & Redshift Estimation*, MSc, Astronomy, University of Cape Town, 2017

33. Devendra Gengan, *An Ant-based Mobile Agent Approach for Resource Discovery in Computational Grids*, MSc, Computer Science, UNISA, 2017

34. Yuan Sun, *On the Analysis aof Interaction between Decision Variables*, PhD, Mechanical Engineering, The University of Melbourne, 2017

8.4.2 External Examiner and Moderator

1. Several under and post graduate courses, UNISA, 1998-2002

2. INF785, Department of Informatics, UP, 1996-2000

3. Informatics third year projects, Department of Informatics, UP, 1997-1998

4. RW178, Department of Computer Science, US, 1999-2000

5. Third year data communications course, Department of Computer Science, UWC, 1996

6. Hons AI course, Department of Computer Science, UWC, 2003

7. University of Natal, Computer Science, 2004-2005

8. Neural, Fuzzy and Adaptive Systems course at UCT, 2008

9. Hons AI course, Department of Computer Science, NMMU, 2007-present

8.4.3 Evaluation Panels

1. Member of NRF Specialist Committee for Information Technology Rating Panel, 1 March 2009 – 28 February 2011.

2. Convener of NRF Specialist Committee for Information Technology Rating Panel, 1 March 2011 – 28 February 2012.

8.5 Referee Duties

8.5.1 Journals

1. Information Fusion, 2018

2. Cognitive Computation, 2017, 2018

3. IEEE Access, 2017

4. IEEE Transactions on Industrial Informatics, 2017

5. Mathematical Modelling and Analysis, 2017

6. Optimization and Engineering, 2016-present

7. Computational Intelligence and Neuroscience, 2016

8. Computers & Operations Research, 2015, 2016

9. IEEE Computational Intelligence Magazine, 2016

10. IEEE Transactions on Cybernetics, 2014-2016

11. Engineering Computations, 2016

12. IEEE Transactions on Neural Networks and Learning Systems, 2015-present

13. Journal of Experimental & Theoretical Artificial Intelligence, 2015

14. ACM Computing Surveys, 2015

15. Engineering Applications of Artificial Intelligence, 2015

16. Nonlinear Analysis: Modelling and Control, 2015

17. Engineering with Computers, 2015

18. Neural Computing & Applications, 2015

19. Machine Learning, 2015

20. IEEE Transactions on Image Processing, 2015

21. Nonlinear Analysis: Modelling and Control, 2014

22. Applied Computational Intelligence and Soft Computing, 2014

23. Nonlinear Theory and Its Applications, 2014

24. IEEE Transactions on Industrial Informatics, 2014, 2015

25. Engineering with Computers, 2014

26. Natural Computing, 2014

27. IEEE Transactions on Cybernetics, 2014

28. International Transactions in Operational Research, 2014

29. Transportation Research Part C: Emerging Technologies, 2014

30. Neural Computing and Applications, 2013

31. Neurocomputing Journal, 1997-present

32. IEEE Transactions on Neural Networks, 1999-present

33. IEEE Transactions on Evolutionary Computation, 2002-present

34. IEEE Transactions on Fuzzy Systems, 2007-present

35. IEEE Transactions on Systems, Man, and Cybernetics, Part C: Applications and Reviews, 2003-present.

36. South African Computer Journal, 1997-present

37. Journal of Knowledge-Based Systems, Special issue on Artificial Intelligence in Knowledge, 2000

38. International Journal of Computers, Systems and Signals, 2000-2003

39. IEE Software, 2000-2003

40. Neural Computation, 2001-present

41. IEEE Transactions on Broadcasting, 2002

42. International Journal of Applied Mathematics and Computer Science, 2004.

43. Journal of Systemics, Cybernetics and Informatics, 2004

44. International Journal of Intelligent Systems in Accounting, Finance and Management, 2004

45. Neural Processing Letters, 2005

46. Iranian Journal of Electrical and Computer Engineering, 2004-present

47. Tsinghua Science and Technology, 2005

48. Scientia Iranica, 2005, 2015

49. Journal of the Franklin Institute, 2005

50. Information Sciences, 2005-present

51. International Journal of System Science, 2005-present

52. Applied Soft Computing, 2006

53. South African Journal for Industrial Engineering, 2006

54. Journal of Global Optimization, 2006-present

55. Swarm Intelligence Journal, 2007-present

56. Journal of Structural Optimization, 2007

57. BioSystems, 2007-present

58. Journal of Scheduling, 2007

59. Annals of Operations Research, 2007

60. Computers & Operations Research, 2008

61. Automation in Construction, 2008

62. International Journal of Pattern Recognition and Artificial Intelligence, 2006-present

63. European Journal on Operational Research, 2007-present

64. International Game Theory Review, 2008

65. Evolutionary Computation Journal, 2007-present

66. Recent Patents in Computer Science, 2008

67. Applied Mathematics and Computation, 2008

68. Journal of Zhejiang University- Science A, 2008

69. Theoretical Computer Science, 2008,2009

70. Computers & Security, 2008

71. Advances in Complex Systems, 2008

72. Frontiers of Computer Science in China, 2009

73. Discrete Optimization, 2009

74. Journal of Scheduling, 2009

75. Neural Computing and Applications, 2009

76. European Journal of Medicinal Chemistry, 2009

77. International Journal of Intelligent Computing and Cybernetics, 2009

78. Computational Optimization and Applications, 2009

79. The Computer Journal, 2009

80. Neural Networks, 2010

81. IEEE Transactions on Parallel and Distributed Systems, 2010

82. IEEE Transactions on Image Processing, 2010

83. International Journal of Applied Metaheuristic Computing, 2010

84. Engineering Applications of Artificial Intelligence, 2010

85. Optimization and Engineering, 2010

86. Computational Optimization and Applications, 2010

87. Chaos, Solitons & Fractals, 2010

88. Neural Network World, 2010

89. Artificial Intelligence, 2010

90. International Journal of Metaheuristics, 2010

91. Discrete Dynamics in Nature and Society, 2010

92. Swarm and Evolutionary Computation, 2011

93. Computer Physics Communications, 2011

94. Journal of Electrical and Computer Engineering, 2011

95. Journal of Computers & Mathematics, 2011

96. Applied Soft Computing, 2011

97. Computers and Mathematics with Applications, 2011, 2013

98. Information Processing Letters, 2012, 2016

99. Nonlinear Theory and Applications, 2012

100. International Journal of Swarm Intelligence, 2013

101. Journal of Heuristics, 2013

102. International Journal of Electronics and Communications, 2013

8.5.2 Conferences

In addition to the conferences below, also see section 8.2.1 for list of conferences where I served as member of the program committee.

1. Compiler Construction Conference, CC'99

2. World Multi-Conference on Systematics, Cybernetics and Informatics, 2003

3. IEEE Congress on Evolutionary Computation, 2003-present

4. World Multi-conference on Systemics, Cybernetics and Informatics, 2004

5. IEEE Swarm Intelligence Symposium, 2003-present

6. International Conference on Neural Information Processing, 2003

7. Asia-Pacific Conference on Simulated Evolution and Learning, 2003-present

8. Annual Conference of the South African Institute of Computer Scientists and Information Technologists, 1999-2005

9. IEEE Conference on Cybernetics and Intelligent Systems, IEEE Conference on Robotics, Automation and Mechatronics, 2004-present

10. IEEE Symposium on Computational Intelligence in Games, 2005-present

11. International Conference on Hybrid Intelligent Systems, 2005, 2008

12. International Conference on Nature in Computation, 2006

13. International Conference on Parallel Problem Solving from Nature, 2006, 2008

14. International Conference on Computational Intelligence and Security, 2005-present

15. International Conference on Ant Colony Optimization and Swarm Intelligence, 2006-present

16. 5th Congress of Scientific Research Outlook & Technology Development in the Arab World, 2008

17. Fifth IEEE International Conference on Soft Computing as Transdisciplinary Science and Technology, 2008

18. Genetic Algorithms and Evolutionary Computation Conference, 2008

19. International Symposium on Neural Networks, 2008

20. 10th Brazilian Congress on Computational Intelligence, 2011

21. International Conference on the Theory and Practice of Natural Computing, 2012

22. International Symposium on Swarm Intelligence and Differential Evolution, 2012

23. Learning and Intelligence Optimization Conference, 2012

8.5.3 Books

1. TI Zohdi, *An Introduction to Direct Simulation of Dry Particulate Flows*, Wiley, 2004

2. X Feng, FCM Lau, *Nature-inspired Particle Mechanics Algorithm*, World Scientific, 2008

3. F Li, R Klette, *Rubberband Algorithms*, Springer, 2008.

4. J Sun, C-H Lai, WB Xu, *Quantum-Behaved Particle Swarm Optimisation for Complex Problem Solving*, Chapman & Hall / CRC, 2008.

5. SL Smith, *Medical Applications of Genetic and Evolutionary Computation*, Wiley, 2008

8.5.4 Research Proposals

1. NRF, Telecommunications and Expert Systems, Eastern Cape Technicon, postal evaluation of research outputs, 2001

2. NRF, Several Grant Applications in 2002-present

3. Innovation Fund Application T60004: Artificial Intelligence for South African Fibres

4. Research Grants Council, Hong Kong, 2003.

5. Belgian Science Policy Office, 2006, review of research grant of Prof Marco Dorigo (father of ant colony optimization)

6. Research proposals for the Australian Research Council, 2007-present

7. Research grant proposals for FONDECYT-CHILE, 2014

8. Research proposal for Royal Society, International Joint Project, 2007

9. SARChI grant applications, 2006

10. Newton International Fellowships Application for the Royal Society of Xin Yao, 2009.

11. Research proposal, PROP 123 (Computational Intelligence for verification and validation of XML-based systems), for the Office of the Vice-Rector for Academic Affairs, University of Cyprus, 2009

12. Discovery grant applications for the Natural Sciences and Engineering Research Council of Canada, 2009, 2010

13. Grant applications for the Icelandic research fund, 2013

8.5.5 International/National Promotions

1. Promotion of candidate to position of associate professor, University of Jordan, 2005

2. Promotion of candidate to tenure and associate professor, University of Syracuse, 2005

3. Promotion of candidate from associate professor to tenure, Nanyang Tech nological University, 2007.

4. Promotion of candidate to associate professor and tenure, Brigham Young University, 2007.

5. Promotion of candidate to Senior Lecturer, University of Kwazulu-Natal, 2009

6. Pomotion of candidate from Senior Lecturer to Associate Professor as iternational reviewer on research leadership and scholarship, University of Melbourne, 2010, 2012

7. Promotion of candidate from Lecturer to Senior Lecturer, Swinburne University, Melbourne, 2012

8. Promotion of candidate from Senior Lecturer to Professor, Bond University, Australia, 2015

9. Promotion of Dr Konstantinos Parsopoulos to Professor, University of Ioannina, Greece, 2016

8.5.6 Institutions

1. B.Sc Computer Science Degree, Midrand Graduate Institute, 2004.

2. School of Computer Science, University of KwaZulu-Natal, October 2007.

8.5.7 Other

1. NRF scarce skills bursary applications, 2005

2. NRF rating applications, 2007-present

3. NRF IT specialist rating panel 2009-2012, Convenor of panel 2011-2012

9 Awards and Scientific/Scholarly Recognition

9.1 Evaluation Status as Scientist/Scholar

Authority	Rating	Period
NRF	Y1	2004-2008
NRF	B2	2009-2014
NRF	A2	2015-2020

9.2 Research Awards and Prizes

1. Best poster award: H Viktor, AP Engelbrecht, I Cloete, *Incorporating Rule Extraction from ANNs into Cooperative Learning Environment*, NEURAP, 1998.

2. Best paper award: AP Engelbrecht, *Data Generation using Sensitivity Analysis*, International Symposium on Computational Intelligence, Slovakia, 2000.

3. Fellowship award for young researchers to attend the International Symposium on Computational Intelligence, Slovakia, 2000. The award paid for conference fees and accommodation.

4. Young researcher award, University of Pretoria, 2003.

5. Exceptional Academic Achievers Award, University of Pretoria, 2007-2009, 2010-2012

6. Best Associate Editor Award 2007 for IEEE Transactions on Evolutionary Computation

7. Nominated for IBM Faculty Award, 2009

8. Best paper award: M. Helbig and A.P. Engelbrecht, *Issues with performance measures for dynamic multi-objective optimisation*, IEEE Symposium on Computational Intelligence in Dynamic and Uncertain Environments, 2013.

9.3 Teaching Awards and Prizes

None

9.4 Artistic Awards and Prizes

None