Barend J. Leonard   Curriculum Vitae

CONTACT
INFORMATION

Department of Computer Science
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CITIZENSHIP

South Africa

BACKGROUND

I am a computer scientist with a deep understanding and working knowledge of a wide range of computational intelligence techniques. I am especially familiar with the application of swarm intelligence to machine learning. I have been working at the University of Pretoria for the past four years. During this time I was required to implement and test many existing and newly developed computational intelligence algorithms. In addition, I was the lead author of a number of publications that were presented at leading international conferences on computational intelligence. My supervisor is a world leader in the field of computational swarm intelligence and is currently the only A-rated computer scientist in South Africa. I am currently registered for an M.Sc. in computational intelligence under his supervision.

I enjoy analysing and critiquing existing algorithms and solving problems in the context of computational intelligence. I have excellent report writing skills and a broad range of scientific interests. Finding an industry position where I can apply my knowledge to real-world problems would be ideal for me.

BASIC
EDUCATION

Hoërskool Garsfontein, Pretoria, South Africa

Matric   **2004 - Passed with endorsement**

- Mathematics
- Science
- Computer Studies
- Afrikaans 1st language
- English 2nd language
- Accounting

HIGHER
EDUCATION

The University of Pretoria, Pretoria, South Africa

M.Sc. (Computer Science)   **Expected graduation date: November 2015**

- *Specialisation:* Computational intelligence
- *Thesis title:* Angle Modulated Particle Swarm Optimisation.
    - My research is focussed on the application of particle swarm optimisation to discrete optimisation problems. The work included a thorough theoretical and empirical analysis of an existing technique, known as *angle modulation*. A number of flaws in the technique were identified and solutions were developed to circumvent those problems. The final stage of the research is to conduct an empirical study to show that the newly developed methods outperform existing techniques.
- *Derived publications:* 1 published, 1 under review (see Publications section for details.)
- *Supervisor:* Prof. A.P. Engelbrecht

The University of Pretoria, Pretoria, South Africa

B.Sc. (Hons) (Computer Science) 2011

- *Areas of focus:* Computational intelligence, data mining, computer security, formal methods for algorithm construction and analysis, computer networks theory, research methods.
- *Research project title:* Empirical Analysis of Heterogeneous Particle Swarms in Dynamic Environments.
- *Supervisor:* Prof. A.P. Engelbrecht

The University of Pretoria, Pretoria, South Africa

B.Sc. (Computer Science) 2010

- *Areas of focus:* Computational intelligence, programming language theory, computer networks, databases, discrete data structures, software engineering principles & practices.
- *Programming languages:* Java, C, C++, JavaScript, PHP and others.

CERTIFICATES

Duke University, North Carolina, United States of America

Verified certificate: Introduction to genetics and evolution 2015

- *Subject material:* A whirlwind introduction to evolution and genetics, from basic principles to current applications, including how disease genes are mapped, areas of research in evolutionary genetics, and how evolutionary concepts are leveraged to aid humanity.
- Completion of this certificate gave me a deeper understanding of the evolutionary concepts that are used in the design of evolutionary algorithms. (Evolutionary algorithms is a field of specialisation in computational intelligence and machine learning.)

WORK
EXPERIENCE

The University of Pretoria, Pretoria, South Africa

Programmer and Researcher January 2012 to present

- Contribution of code to the CILib open-source computational intelligence library.
- Design, implementation and maintenance of a platform-independent cluster for the execution of large-scale computational intelligence experiments
(including both server-side and client side programming and web design).
- Configuration and maintenance of Unix servers and other computing infrastructure.
- Presenting international workshops and tutorials on the use of CILib when conducting computational intelligence research.

Reference at the Department of Computer Science: *Available on request*

The University of Pretoria, Pretoria, South Africa

Research Assistant   March 2010 to December 2011

- Implementation of modern computational intelligence algorithms for research purposes.
- Contribution of code to the CILib open-source computational intelligence library.

Reference at the Department of Computer Science: *Available on request*

Meraka Institute, CSIR, Pretoria, South Africa

Software Engineer   March 2009 to November 2009

- Designed and implemented a multi-user text based game engine (MUD) for Dr Math on MXit.
- The project was done in partial fulfilment of a *B.Sc. (Computer Science)* degree at the University of Pretoria.

Reference at CSIR Meraka Institute: *Available on request*

The University of Pretoria, Pretoria, South Africa

Laboratory Assistant   March 2008 to February 2010

- Maintenance of computers and printers in the laboratory.
- Providing assistance to students in any of the following areas:
  - Logging onto campus network using Novell.
  - Use of word processors, spreadsheet applications and presentation design software (in both Windows and Linux environments).
  - Sending of e-mails using the university mail server, or third party mail servers such as GMail.
  - Provide support to the best of my ability on any other issues students may experience in the laboratory.

Reference at the UP Open Labs: *Available on request*

TEACHING
EXPERIENCE

The University of Pretoria, Pretoria, South Africa

Third Year and Honours Teaching   2012 to present

- Lectures on the use and development of the CiLib computational intelligence library.

University of Pernambuco, Recife, Brazil

Third Year and Honours Teaching   2012

- Presented a series of tutorials on the use and development of the CiLib open source computational intelligence library.

Brock University, Toronto, Canada

Honours Teaching   2011

- Presented a series of tutorials on the use and development of the CiLib open source computational intelligence library.

TECHNICAL SKILLS	**Programming Languages and Tools:** Java, C, C++, JavaScript, PHP, Python, UNIX shell scripting, git, maven, sbt, Netbeans, Eclipse and others.

Databases: SQL, mySQL, MongoDB.

Applications: LaTeX, BibTeX, Microsoft Office, Libre Office, and other common productivity packages for Windows and Linux platforms.

Operating Systems: Linux and other UNIX variants, Microsoft Windows XP, Windows Vista / Windows 7 / Windows 8 / Windows 10.

Networking: Extensive experience in setting up and maintaining wired and wireless networks; Experience programming CISCO routers via telnet in WAN environments; Experience installing and configuring Mikrotik routers via WinBox in both LAN and WAN environments.

Hardware: Solid knowledge of computer components and experience in building a variety of computer systems.

<small>PUBLICATIONS</small>

Leonard, B. and Engelbrecht, Critical Considerations on Angle Modulated Particle Swarm Optimisers. *Swarm Intelligence, [under review]*.

Leonard, B. and Engelbrecht, Angle Modulated Particle Swarm Variants. *ANTS 2014*, 2014.

Leonard, B. and Engelbrecht, A. On the optimality of Particle Swarm Optimizers in Dynamic Environments. *2013 Congres on Evolutionary Computation*, 2013.

Leonard, B. and Engelbrecht, A. Scalability study of Particle Swarms in Dynamic Environments. *ANTS 2012*, 2012.

Leonard, B. and Engelbrecht, A. and Van Wyk, A. Heterogeneous particle swarms in dynamic environments. *2011 IEEE Symposium on Swarm Intelligence*, 2011.

Butgereit, L. and Leonard, B. *et al.* Dr Math gets MUDDY: the "dirt" on how to attract teenagers to mathematics and science by using multi-user dungeon games over Mxit on cell phones. *IST Africa 2010*, 2010.