

Curriculum Vitae

Name: Dr. Barnabas Ndlovu Gatsheni, PhD

Tertiary Education:

University of Edinburgh (1997 – 2001) PhD in Electronic Engineering

Thesis Title: Automatic textures Classification in manufactured Paper.

Techniques used Bayesian learning, decision trees, concept learning, expert systems, artificial neural networks, probabilistic reasoning and learning, learning from data and other statistical pattern recognition techniques; principal components analysis, co-occurrence matrices and image analysis among others.

University of Nottingham (1994 – 1995) MSc. Electronic Engineering

- Dissertation: Gate Array Design Project and optical interconnects.

Subjects:

- *Signal Processing, Microprocessors, Digital Systems (CAD for VLSI, VLSI Design),*
- *Analogue Electronics, High-Speed Circuits & Devices, Solid State Electronics.*

University of Zimbabwe: Undergraduate degree Hons (1989 – 1992)

Final year courses:

- *Control Engineering, Computer Engineering, Electrical machines and drives,*
- *Advanced Electronics, Telecommunications, Power Systems Engineering.*

Degree classification: 2.1

Scholarship and Awards:

1997 – 2001 Edinburgh University Department of Electronic & Electrical Engineering-funded *Scholarship* worth in excess of **£30 000** for PhD study.

1997 – 2001 scholarship worth in excess of **£18 000** for PhD study

1994 – 1995 *Staff development fellowship* worth in excess of **£18 000** to pursue MSc in Electronic Engineering at the University of Nottingham.

Employment:

University of Johannesburg (June 2010 --)

Senior Lecturer

Deputy Head of Department

Vaal University of Technology (2007—2010)

Associate Professor

Delphi Energy and Chassis Systems (Suffolk, England, United Kingdom):

Quality Assessor (2004 – 2006)

University of Essex: (2001 – 2004)

Research Officer sponsored by the United Kingdom Engineering and Physical Science Research Council (EPSRC) Grant GR/M 45764. I worked with Dr. Stephen Sangwine. We designed colour image filters based on hypercomplex mathematics. The result was 3 conference papers, 2 in the EUSIPCO 2002), Toulouse, France and Eusipco 2004 Vienna, Austria and 1 in the IEEE (ICIP 2003) in Barcelona, Spain.

University of Edinburgh: Research Associate Department of Electronic and Electrical Engineering, (Jan 2000 – Sep 2000). The project was sponsored by **EPSRC (Grant R33569)**.

Microlab Assistant (grade MG1) 2000-2001: Holland House, Edinburgh: Duties included helping first year and visiting mostly American students use computers effectively.

2004 – Feb 2006 Delphi Energy & Chassis Systems in Sudbury, East Anglia. Duties included working on data acquisition systems and quality control.

Teaching and Lecturing:

I have participated in laboratory teaching (Electronics) both at the University of Edinburgh and the University of Essex for a combined period of 4 years. I also taught at the Edinburgh University Computing services (EUCS) for over 14 months.

At the University of Johannesburg, I am currently teaching Artificial Intelligence courses and Expert Systems. I have also worked as a temporary-full Time teaching Assistant at the National University of Science and Technology in the department of Electronic Engineering in 1993 and 1994. I became a full time lecturer in Digital Systems (1995 –1997) after graduating with an MSc from the University of Nottingham (UK). I also taught embedded systems to MSc computer Science in 1997. In 2007 I was appointed as an associate professor computational intelligence at the Vaal University of Technology until 2010.

Artificial Intelligence Skills

Probabilistic Reasoning and modeling,
Machine learning
Genetic algorithms
Expert Systems
Learning from Data
Neural Computation

Focus Area and Achievements

- a) A masters student, Mr. Molupe Chere got an award from the NRF worth R 70 000 and the title of his project is: *The design of an intelligent vehicle traffic flow prediction model for the Gauteng freeways.*
- b) Another masters student Mr Jethro Mangane got funding from worth 10 000 and the title of his project is Gauteng Economic Development Agency (GEDA): The title of the project: *The Design of an Integrated Real-Time Information sharing model for a train Incidence response and handling between related departments at commuter rail company in Gauteng.*
- c) Grace Malenkelo Lethatsa (graduated 2012 with a Masters degree): *The exploitation of ICT technologies in mitigating road traffic jam in Gauteng*
- d) Mr Rengith Baby Kuriakose: Masters: Graduated Masters 2009
- e) Mr Thabo Chiloane: Masters: Graduated in May 2014
- f) Mr Theko Marie: Masters: graduating October 2014: *An intelligent automatic vehicle traffic flow monitoring and control system.*
- g) Mr. Nkosinathi Qwabe: Masters: graduating October 2014
- h) Mr Molupe Chere: Masters: Will be graduating October 2014
- i) 3 articles have been published from this area in the last 4 years
- j) 14 Honours students have worked on projects in this focus area
- k) There are 4 new Masters students currently working on this focus area

Continuous Professional Development (CPD)

University of Edinburgh short Courses for PhD students:

- PIC microcontrollers
- Data Security (encryption – symmetric and asymmetric)
- Scientific and Technical writing, Team work (sponsored by British Petroleum),
- Intellectual Property,
- 5day course on Medical statistics.

University of Edinburgh Staff Development Courses:

- Effective Presentation skills, Leadership skills, Applying for Grant Funding,
- Staff development course for postgraduate demonstrators

University of Essex Short courses (5–day courses):

- Hardware-Software Co-Design, Internet Protocol Version 6 and Quality of Service,
- IP Over Transport Networks,
- Mobile computing, XML.

Selected Publications:

1. *Barnabas Ndlovu Gatsheni*, A vehicle traffic prediction model for a Gauteng freeway; 2014 under review by the South African Journal of Computer Science (SACJ)
2. *Barnabas Ndlovu Gatsheni, Ike Sikakana, Jethro Mangane*: The design for a Johannesburg commuter rail of an incidence response system based on web services and UML; 2013 Proceedings of the 14th Annual Conference on World Wide Web Applications, Johannesburg
3. Design of a commuter train punctuality prediction model for Gauteng based on the Naïve Bayes Algorithm (submitted to 2014)
4. *Barnabas Gatsheni, Ike Sikakana, Jethro Mangane*: Design of an integrated real-time information sharing model for a train incidence response between related departments at WitsMetrorail in South Africa ; 2011 Proceedings of the 13th Annual Conference on World Wide Web Applications, Johannesburg
5. [B.N. Gatsheni](#), R.B. Kuriakose and F. Aghdasi, (IEEE International Conference on Mechatronics ICM2007, Kumamoto, Japan), Automating a student class attendance register using radio frequency identification in South Africa, May 2007
6. Barnabas Ndlovu Gatsheni, [Zwelakhe Mabizela](#): A High Speed Mobile Courier Data Access System That Processes Database Queries in Real-Time. [ICIC \(3\) 2008](#): 329-336, 2008,
7. The design of a “Global View” web interface for Sasol’s global operations management, 2009; Proceedings of the 11th Annual Conference on World Wide Web Applications, Port Elizabeth
8. Vector amplification for color-dependent image filtering, T. Ell, B.N. Gatsheni, S.J. Sangwine (*International Conference on Image processing (ICIP) 2003*, Barcelona, Spain))
9. Linear Colour-Dependent Image filtering based on Vector Decomposition: S.J. Sangwine, B.N. Gatsheni, T. Ell, *European Signal Processing Conference (EUSIPCO) 2002*, and paper No. 543.
10. Color-dependent linear vector image filtering, Todd A. Ell, Stephen J. Sangwine, Barnabas N. Gatsheni, *EUSIPCO 2004*, Austria, Vienna.
11. Analysis of Analogue – Digital Systems in Frequency Domain:, *IEEE International Symposium on Communication Systems, Networks and Digital Signal Processing (CSNDSP) 1998*, pp 279–282 B. Nleya, B. Ndlovu Gatsheni
12. Design Considerations for Nust’s campus network, B. Nleya, B. Ndlovu *IEEE CSNDSP 1998*, pp 399 – 402

13. ATM call set-up algorithm based on parallel distributed computing resources, *IEEE CSNDSP*, B. Nleya, Barnabus Ndlovu, 1998
14. Technical Report to United Kingdom's EPSRC **Grant Number R33569**, 2000.
15. Technical Report to United Kingdom's **EPSRC Grant Number GR/M 45764**, 2003.

Membership of Professional Bodies

1996--Member Institution of Electrical Engineers (MIEE UK)

1998--2001 Member of Edinburgh Junior Chamber of Commerce (EJCC)

1999--Associate of the Scottish International Resources Programme (SIRP)