

CURRICULUM VITAE

Deshendran Moodley

Associate Professor, Department of Computer Science, University of Cape Town, Cape Town, South Africa

Deputy Director and co-founder, South African National Centre for Artificial Intelligence Research (CAIR)

QUALIFICATIONS

PhD Computer Science, University of KwaZulu-Natal, 2001-2009
Thesis title: Ontology Driven Multi-Agent Systems: An Architecture for Sensor Web Applications

MSc Computer Science, University of Natal Pietermaritzburg, 1995
Dissertation title: Artificial Neural Networks for Image Recognition: A study of feature extraction methods and an implementation for handwritten character recognition

BSc Honours Computer Science, University of Natal Pietermaritzburg, 1994
BSc Computer Science, University of Durban Westville, 1991 – 1993

National Research Foundation (NRF) **C2 rating** – 1 Jan. 2019 – 31 Dec 2024

DETAILED ACADEMIC AND EMPLOYMENT HISTORY

ACADEMIC EXPERIENCE

POSITION	Associate Professor of Computer Science
INSTITUTION	Department of Computer Science, University of Cape Town <i>Cape Town, South Africa</i>
DURATION	Jul 2016 – present

ROLES/DUTIES

- undergraduate and postgraduate course development and teaching in Computer Science, in 2017:3rd year C++ and the intelligent agents in gaming modules, and an honours course on Intelligent Systems
- course convenor for 3rd year Computer games major (2017), CSC3020, CS3022
- Academic Advisor for undergraduate Computer Science students
- supervision of honours, masters and doctoral students
- lead and manage the Adaptive and Cognitive Systems Lab, which is a group within the UCT node of CAIR

POSITION	Deputy Director and co-founder
INSTITUTION	National Centre for Artificial Intelligence Research , <i>inter-institutional research network coordinated and managed by the CSIR Meraka, Pretoria, South Africa</i>
DURATION	Oct. 2011 – Nov. 2012, Jul. 2016 - present

ROLES/DUTIES

- formulate and operationalise the applied AI research strategy within CAIR
- in conjunction with the CAIR Director formulate overall research and capacity development strategy
- ensure cohesion and integration of CAIR research across CAIR nodes at UCT, US, UP, UKZN, NWU
- establish CAIR as a leading research and innovation network in South Africa
- establish links with industry and promote innovation and technology transfer
- co-founded and established the Centre while at UKZN together with Prof Tommie Meyer at the CSIR

POSITION Senior Lecturer of Computer Science
INSTITUTION **School of Mathematics, Statistics & Computer Science, Westville Campus,
University of KwaZulu-Natal**
Durban, South Africa
DURATION Jan. 2005 – Jun. 2016

ROLES/DUTIES

- undergraduate and postgraduate course development and teaching in Computer Science
- administrative portfolios for Computer Science: higher degrees and research representative for Computer Science (2014, 2015), academic counselling and undergraduate programme coordination (2014, 2015), teaching and learning quality representative (2007), public relations coordinator (2006), member of the School board (2006-2015),
- supervision of honours, masters and doctoral students
- research leadership, capacity development and establishment and management of strategic partnerships
- resource mobilisation and grant administration
 - co-founder of the joint UKZN/CSIR Centre for Artificial Intelligence Research
 - established and manage the Health Architecture Lab, an applied Computer Science research group in the School
- research into health informatics, agent based systems, ontologies, Bayesian networks, Semantic Sensor Web
- developed and initiated the masters programme in medical informatics, a joint programme between the Department of TeleHealth and the School of Computer Science
- developed and ran a structured additional tutorial programme for first year Computer Science students (2004-2006)

POSITION Head of School
INSTITUTION **School of Computer Science, University of KwaZulu-Natal**
Durban, South Africa
DURATION Feb. 2008 – Jan. 2011

SKILLS SUMMARY Academic leadership, strategic planning, staff mentoring and development, management and interpersonal skills, human resources, finance and budgeting, student academic management, teaching and research

Provided overall leadership and management of the School of Computer Science. The School had two centres of operation 80km apart, one on the Pietermaritzburg and the other on the Westville campus. During my tenure the School comprised of 14-15 permanent academic and 6-8 temporary academic staff, 4 administrative and 6 technical staff. The School taught over 500 Computer Science students and 450 students taking basic Computing modules at the undergraduate level, 10-20 honours and 25 masters and doctoral students.

ROLES/DUTIES

- served on Faculty and University leadership structures and committees
- initiated and led a major review and update of the undergraduate Computer Science programme
- established the following research partnerships with national and international organisations and consortiums:
 - ICT4EO and KRR research groups, Meraka Institute, CSIR
 - DPSS group at CSIR
 - Centre for High Performance Computing
 - Medical Research Council and Jembi Health Systems
 - Masters exchange programme with Institute for Geoinformatics, University of Muenster, Germany,
 - South African Partnership with International research universities network (SAPIENT) Erasmus Mundus staff and postgraduate student mobility grant
 - Derivco, a large international software development company located in Durban

POSITION Lecturer
INSTITUTION **Department of Computer Science, University of Natal Durban**
Durban, South Africa
DURATION Mar. 2003 – Dec 2004

ROLES/DUTIES

- undergraduate course development and teaching in Computer Science
- supervision of projects for Computer Science honours students
- administrative portfolios: postgraduate & research coordinator (2003-2004), co-ordinating and managing the student demonstrators and the student demonstrator budget (2003-2004)
- developed and ran a structured additional tutorial programme for first year Computer Science students
- research into multi-agent systems

POSITION Senior Researcher (part time appointment)
COMPANY **Meraka Institute, Council for Scientific and Industrial Research (CSIR)**
Pretoria, 0001, South Africa
DURATION May 2007 – Dec. 2008
SKILLS SUMMARY Sensor Web, software agents, ontologies, web technologies, research methodologies, research supervision

DUTIES

Provided research guidance and supported human capital development activities on a monthly basis (average 2 days a month) within the ICT4EO research group. The group's research programme centred around technologies for the Sensor Web, i.e. a global computing infrastructure for publishing, accessing and processing earth observation data.

LECTURING EXPERIENCE

2003-current School of Computer Science, Westville Campus, University of KwaZulu-Natal Durban / University of Natal Durban

- Undergraduate Computer Science
 - First foundational courses: Introduction to Computer Science, Computing Fundamentals, Computer Programming, additional tutorial programme for first year students
 - Software Design (2008-2010), a final year project course, where students worked in groups to design and develop an online learning system and learned to use design patterns for designing and implementing large scale systems
 - Advanced programming (2015), final year project course, C++, OpenGL, game programming
 - Computer Graphics (2014-2015), final year course on Open GL in Java and C++ with a project on interactive 3D worlds
- Honours courses: Ontologies and Knowledge Based Systems, Medical Informatics, Computer Graphics
- Developed and coordinated a full-time masters programme in Biomedical Informatics in collaboration with the Department of TeleHealth. Taught the Medical Information Systems masters course

2004-2005 Department of TeleHealth, Medical School, University of KwaZulu-Natal Durban

Developed and lectured postgraduate courses for the Masters/postgraduate diploma in Medical Informatics in conjunction with UKZN Medical School, Harvard and MIT. Students attended on a part-time basis and ranged from a nurse, pharmacist, medical practitioners, managers in the health department and to a professor of medicine. The IT skills (programming background) ranged from beginner with no IT experience to expert:

- *Java programming*: 4 week compressed course, that covered most of the first year programming course in Computer Science with some additional topics
- *Advanced Java programming*: 2 week compressed course - building dynamic web sites using Java Server Pages (JSP) with a database backend
- *Open Source Software*: introduction to Linux and open source office software. Configuring and using an FTP and web server

2002 Department of Computer Science, University of Natal Durban

Lectured the computer literacy course to first year students, filled in for new lecturer for 1 month February 2002

2001 ML Sultan Technikon, Durban

Developed and lectured the Networking 4 course to Final Year BTech students. Included setting and marking the final examination, projects, tests and assignments

INDUSTRY EXPERIENCE

POSITION C++ Programmer, Technical Manager, Director of Application Integration
COMPANY **DyDx Technologies**, Honeydew, Johannesburg, SA /
Systemfusion Inc. World Trade Centre, Denver, Colorado, US
A South African Internet start-up company that designed an "Application Service Provider" platform in 2000, which is a richer platform than cloud computing. The company relocated to the USA in 2000, but was scaled down after the dot com crash at the end of 2000.
DURATION Feb. 2000 - Jan. 2001
SKILLS SUMMARY C++, gnu STL, roquewave STL, Corba, Python, Perl, Sun hardware, TCP/IP, Windows Terminal Server. Metaframe, Oracle 8i, Interbase, Mysql, RedHat Linux, Sun Solaris, Apache, Exim, Project Management, Team management

DUTIES

- managed the core programming team and application integration team and reported directly to the Chief Technical Officer. These teams comprised of between 4-5 high performance programmers
- lead C++ programmer using GNU gcc and the KAI compiler on Redhat Linux and Sun Solaris. Projects centred around development and maintenance of an ISP (internet service provider) provisioning and ASP (application service provider) product called Evolutionware™
- managed and co-ordinated updates to the main software library with the aid of the cvs program
- managed central testing and final release of new versions of the software
- high level design of new features and improvements to the product
- assumed position of Director of Application Integration - liaised with software application vendors to investigate new internet applications for possible integration into Evolutionware™

POSITION Senior NT Systems specialist in the FIDS NT server team
COMPANY **Credit Suisse First Boston**, Canary Wharf, London
DURATION Feb. 1999 - Sept. 1999
SKILLS SUMMARY Windows NT 4.0 server, DHCP, WINS, TCP/IP, Perl, Compaq hardware, Compaq Insight Manager, Visual C++,

DUTIES

- Windows NT systems specialist in fixed income and derivatives team (trading floor users)
- planning and integration of new applications and infrastructure for the trading floor users
- escalation for 2nd line IT staff on the trading floor
- co-ordination of teams for IT crisis management on the trade floor
- certification, integration and daily maintenance of windows NT servers in large NT environment +/- 150 NT servers
- NT infrastructure management including DHCP, WINS in a multiple master domain
- perl and batch scripting for automatic system jobs
- developed basic visual C++ network management tools

POSITION NT Systems specialist in the NT server team
COMPANY **Dresdner Kleinwort Benson on behalf of SHL**, Riverbank House, London
DURATION Aug. 1998 - Dec. 1998
SKILLS SUMMARY Windows NT 4.0 server, DHCP, WINS, TCP/IP, Perl, Novell network 3.12, Compaq hardware, Compaq Insight Manager

DUTIES

- Windows NT systems specialist in server management team
- certification, integration and daily maintenance (3rd line support) of windows NT servers in large NT environment +/- 450 NT servers
- NT infrastructure management including DHCP, WINS in a multiple master domain
- Perl and batch scripting for automatic system jobs
- participated in DKB NT infrastructure and server migration project to new premises at Riverbank House.

POSITION Systems specialist, Project Consultant
COMPANY **Seagram Spirits & Wines Group**, *The Ark, Hammersmith, London, Chivas Regal, Paisley, Scotland*
DURATION Sep.1997 - May 1998
SKILLS SUMMARY Windows NT 4.0 & NT 3.51 server, winframe citrix 1.6/1.7, Oracle 7.3.2 & 7.3.3 for NT, Perl, Novell, Unix, Compaq insight manager

DUTIES

- deployed as a project consultant to Chivas Regal headquarters in Paisley, Scotland to update server infrastructure and Citrix Winframe infrastructure for remote connectivity to depots in rural Scotland.
- Windows NT systems specialist in global operations for Europe and Africa, main point of contact for daily NT server problems
- consulted on global NT domain project involving master domain located in the US and three resource domains namely Americas, Europe/Africa, Asia - pacific, to enable single logon for all global resources. This included implementation of WINS, DNS and DHCP in a TCPIP environment
- design, implementation, integration and maintenance of windows NT servers in WAN/LAN environments
- design and implementation of backup strategy for oracle databases on NT platform
- design, implementation and integration of Winframe Citrix 1.6/1.7 servers with oracle databases

POSITION Unix systems administrator
COMPANY **Londis Holdings Ltd, Hampton Hill**
DURATION 21 Aug. 1997 - 1 Sep. 1997
SKILLS SUMMARY HP UX 9/10

DUTIES

- Unix systems administration on 3 HPUX boxes running HPUX 9 using LVM and running an informix database. Filled in for IT support manager/ resident administrator for a week.

POSITION Technical Consultant
COMPANY **Computer Management (Pty) Ltd**
HP resellers/consultants, Durban, South Africa
DURATION Feb. 1996 - Jul. 1997
SKILLS SUMMARY Team management, NT server/workstation 3.51, 4.0, Citrix 1.6 on HP Netserver, Wininstall, HPUX 10.01, 10.20 on HP K250/2 PC Solaris, Unix shell scripting, ksh, awk, grep, Perl, SQL programming, Oracle 7.2 database, Netscape gold, internet assistant for word, html writing, MS office.

DUTIES

- infrastructure design and planning, rollout and administration of NT3.51/4.0 workstation and server.
- managed a team of three support staff for daily PC support
- evaluation and feasibility studies of new products and tools
- consulted at external clients such as Petronet and Durban Electricity
- assisted with HP UX and Solaris administration in an oracle client/server environment: 200 NT 4.0 and Sun Solaris PC clients running health care applications accessing a 20 gig oracle database on an HP K250/2 with HPUX 10.20.

RESEARCH VISITS

University of Muenster, Germany, Sep. 11 – Oct. 11, visiting academic in the Sensor Web & Simulation Lab, Institute for Geoinformatics, research in the Sensor Web and initiated a joint research project to develop a low cost unmanned aerial vehicle (UAV) surveillance platform, hosted by Dr Christoph Brox and Dr Theodor Foerster, visiting staff scholarship via an Erasmus Mundus SAPIENT

University of Edinburgh, UK, Apr. 11 – Jun. 11, visiting academic in the Machine Vision Unit, Institute of Perception, Action and Behaviour (IPAB), School of Informatics, research in knowledge representation in cognitive vision systems and worked on the Fish4K EU-FP7 project, hosted by Prof. Bob Fisher

Massachusetts Institute of Technology (MIT), USA, Dec. 04 – Jan. 05, visiting academic in the Clinical Decision making group in the Computer Science and Artificial Intelligence Lab, (CSAIL), via the NIH ITGH programme, hosted by Prof. Peter Szolovitz and Dr Hamish Fraser, staff scholarship provided by the NIH ITGH grant on Medical informatics

Meraka Institute, CSIR, Pretoria, South Africa, Dec. 05 – Jan. 06, visiting scientist in the ICT4EO group, research in ontology and agent based architectures for wildfire detection from satellite imagery, hosted by Mr Andrew Terhorst, Research Group Leader, ICT4EO group

RESEARCH GRANTS & FUND RAISING

I have played a pivotal role in raising in excess of R 50 million for Computer Science research and postgraduate training. Amounts shown below indicate funds that I have received or expect for my participation/role in each grant

1. June 2015 – 2019 In 2015 CAIR was expanded. CAIR nodes have been established at UCT, UP, SU, NWU. The national Centre has committed core funding of R 35-40 million (R 5-6 million x 5 years), of which the UKZN node portion is R 4.7 million.
2. May 2011 – Apr 2016 UKZN/CSIR Meraka Centre for Artificial Intelligence Research (CAIR), Raised research funding of ± R 6 million (R 1.2 m x 5 years) from CSIR Meraka and R 5.2 million (R 1.04 m x 5 years) from UKZN. Deputy Director and principal driver at UKZN behind the establishment of the Centre.
3. Dec. 2010 – May 2015 To establish a Health Enterprise Architecture Lab (HEAL) in the School of Computer Science, UKZN. \$ 850 000, Rockefeller Foundation and the Canadian International Development Research Centre (IDRC). Principal Investigator.
4. 2011-2014 SAPIENT: South African Partnership with International research universities network, European Union, Erasmus Mundus mobility grant for staff, PhD and masters student visits to selected European universities, Total funding of € 1.588.100 for 70 mobility scholarships, UKZN received funding for local organisation and full travel and stipend for staff and students. Principal driver and coordinator for UKZN's participation in the programme.
5. 2010-2012 Earth Observation and ENVironmental modelling for the mitigation of HEALth risks (EO2HEAVEN) (FP7-244100). European Union Framework 7 Programme. I estimate my participation to be funded at a minimum of R 50 000 per year
6. 2009-2011 Initiated a masters exchange programme with the Institute for Geoinformatics (IFGI), University of Muenster, Germany, Funding for UKZN Computer Science students provided by Northrhine-Westphalian Ministry for Innovation, Science, Research and Technology, 2 students per year for 1 semester (5 months), approx. € 20 000,
7. 2007-2009 OASIS grant for Medical Informatics, International Development Research Centre (IDRC) Canada and the Medical Research Council, Developing Open Architecture, Standards and Information Systems (OASIS) for Healthcare in Africa, R 100 000 + Travel costs, student stipends/bursaries
8. 2005 SUKAR grant via UND, Curriculum development for establishing an additional instruction programme for first year Computer Science students, R 30 000
9. 2005-2006 NRF Thuthuka Grant, National Research Foundation, R 49 000
10. 2005- 2007 Participated in Fogarty NIH grant to develop and teach a masters programme in Medical Informatics at UKZN.
11. 2003 - 2004 University Research Fund (URF) Grant, University of Natal, R 20 000

SELECTED HONOURS & AWARDS

Sep. 2011 - Oct. 2011	Erasmus Mundus SAPIENT visiting researcher scholarship, Sensor Web Simulation Lab, Institute for Geoinformatics, University of Muenster, Germany
Dec.2004–Jan.2005	Visiting fellowship, CS and AI lab at MIT & Harvard Medical School as part of ITGH Fogarty-NIH medical informatics grant
2002	German Government Academic Exchange Service (DAAD) doctoral scholarship
2002	National Research Foundation Scarce Skills doctoral scholarship
1991-1995	Various merit scholarships for B.Sc, B.Sc (Hons) and M.Sc. studies

PROFESSIONAL DUTIES

Directorships

2014 – present: Vice Chair of Board, Chair of the Strategic and Innovation sub-committee

2009 – present: Non-Executive Director – Jembi Health Systems, <http://www.jembi.org>

Jembi is a Not for Profit Organization focused on the furthering of Computer/IT based healthcare solutions for the developing world. It currently has over 100 staff with operations in South Africa, Mozambique, Rwanda and Zimbabwe

Reviewer: peer reviewed Journals

1. 2010, 2014, 2017, 2019 South African Computing Journal
2. 2015, 2017, IEEE Systems, Man, and Cybernetics Magazine
3. 2017, Neural Computing and Applications
4. 2012, International Journal of Remote Sensing
5. 2010, 2011, 2012 IEEE Journal of Selected Topics in Earth Observations and Remote Sensing
6. 2010 International Journal of Healthcare Technology and Management (IJHTM)

Reviewer: peer reviewed conferences and workshops

1. AAAI Conference on Artificial Intelligence - AAAI-18, sub-reviewer for AAAI-19, AAAI-20
2. International Joint Conference on Artificial Intelligence - IJCAI 2017, 2019, 2020
3. European Conference on Artificial Intelligence - ECAI-2020
4. Conference of the South African Institute of Computer Scientists and Information Technologists - SAICSIT 2016, SAICSIT 2017
5. Foundations of Health Information Engineering and Systems - FHIES 2012, FHIES 2013, FHIES 2014
6. International Workshop on Semantic Sensor Networks, SSN 2012, SSN 2013, SSN 2014
7. 7th IEEE International Workshop on Engineering Semantic Agent Systems, 2012
8. The 7th IEEE International Workshop on Engineering Semantic Agent Systems - ESAS 2012
9. Sub reviewer: 25th Australasian Joint Conference on Artificial Intelligence, 4-7 December 2012
10. Integrating Sensor-Web and Web-based Geoprocessing (ISW) Workshop at the AGILE Conference on GI Science - April 2011
11. IEEE AFRICON 2011 Special Session on Robotics and Artificial Intelligence in Africa
12. Australasian Ontology Workshop - AOW 2007, AOW 2009, AOW 2010, 2012
13. Knowledge Representation Ontology Workshop - KROW 2008

Other reviewer duties

1. Reviewer for NRF grants: Thuthuka grant (2015), Blue Skies grant (2014)
2. Reviewer for NRF rating: Senior Lecturer in Computer Science (2018), Senior Lecturer in Information Systems (2014), Professor in Computer Science (2012), Senior researcher (2010)
3. Grant reviewer for the Netherlands Foundation for Science for Global Development (WOTRO), 2011

Membership of research committees, working groups and organising committees

1. Member of the local organising committee for the inaugural Forum for Artificial Intelligence, Cape Town, South Africa, 2019
2. Steering committee, International Symposium series of Foundations for Health Information and Engineering Systems (FHIES), <http://www.iist.unu.edu/www/workshop/FHIES/>, since September 2011
3. Member of the scoping group, United Nations international masters in health informatics, Attended the first scoping workshop, 19-20 March 2012, Macau, China
4. Member of the Interoperability and Standards (I&S) Working Group of the National ICT4Health/eHealth Stakeholder Forum, convened by Deputy Minister of Health, Dr Ramokgopa, since April 2012
5. Reference group member, WRC project K5/1753: Land-Water Linkages: Agent-based modeling of land use change and its impact on water, 2007 – 2010

Examiner - Postgraduate

1. NV Upasani, PhD Computer Science & Engineering, Indian Institute of Technology, Dhanbad, Outlier Detection: A fuzzy neural network approach, 2020
2. SM Akandwanaho, PhD Computer Science, University of KwaZulu-Natal, Search and Selection Methods for Hyper-heuristics, 2018
3. IZ Muchaneta, MIT dissertation, University of Cape Town, Enhancing Colour-Coded Poll Sheets Using Computer Vision as a Viable Audience Response System (ARS) in Africa, 2017
4. JA Khethisa, MIT dissertation, University of Cape Town, A Highly Accessible Application for Detection and Classification of Maize Foliar Diseases from Leaf Images, 2017
5. T Bunn, MIT dissertation, University of Cape Town, An automatic marker for vector graphics drawing tasks, 2016
6. L van Niekerk – MA Socio-Informatics, Department of Information Science, Stellenbosch University The Development and Evaluation of an Electronic Serious Game Aimed at the Education of Core Programming Skills, 2016
7. N A Morar, MSc Computer Science, University of KwaZulu-Natal, Extending classical reasoning for classification queries over ontologies, 2016
8. OM Oluyide – MSc Computer Science, School of Mathematics, Statistics and Computer Science, University of KwaZulu-Natal, Automatic Lung Segmentation using Graph Cut optimization, 2015
9. JA Venter – MSc Information Technology, University of Johannesburg, ADLOA: An Architecture Description Language for Artificial Ontogenetic Architectures, 2014
10. Z Mayo – MSc Computer Science, School of Mathematics, Statistics and Computer Science, University of KwaZulu-Natal, Robust Vehicle Tracking for Automatic Traffic Surveillance, 2014
11. CC Kiptoo, Proposal for PhD Computer Science, School of Computing, UNISA, A Systems Architecture for Biodiversity Informatics using Collaborative Networks and Expert-Citizen Engagement, 2013
12. Z Khan – MSc Computer Science, School of Mathematics, Statistics and Computer Science, University of KwaZulu-Natal, Foundational Ontology Interchangeability with the Repository of Ontologies for MULTiple Uses (ROMULUS), 2013
13. N Vawda – MSc Computer Science, School of Computer Science, University of KwaZulu-Natal Face recognition with Eigenfaces - A detailed study, 2012
14. A Ragalo, MSc Computer Science, School of Computer Science, University of KwaZulu-Natal, An analysis of algorithms to estimate the characteristics of the underlying population in Massively Parallel Pyrosequencing data, 2011
15. WJ Kuyler – MTech, A multi-agent system for administering the prescription of anti-retroviral and anti-TB drugs, School of Information Technology, Central University of Technology, 2008
16. MC Sello, Masters (Information Technology), mini dissertation, Department of Computer Science, University of Cape Town, 2007
17. K O'Neill, MSc Computer Science, School of Computer Science, University of KwaZulu-Natal, Relieving the Cognitive Load of Constructing Molecular Biology Ontology Based Queries by means of Visual Aids, 2007
18. R Jimenez, MSc Computer Science, School of Computer Science, University of KwaZulu-Natal, Vector Graphics to improve BLAST graphic representations, 2007

External examiner – Undergraduate/Honours

1. 2017, Internet GIS 706, Honours in Geoinformatics, University of Pretoria
2. 2017 Research Essay (FIL 770), Honours in Philosophy, Keah Challenor, An Investigation into the Moral Permissibility of Using Lethal Autonomous Weapons Systems in Warfare, University of Pretoria
3. 2015, 2016 Data Mining (COS 781), a module in the BSc Honours in Computer Science, Department of Computer Science, University of Pretoria
4. 2005-2007 Technical Programming, a module in the B. Tech. Information Technology programme, School of Information Technology, Central University of Technology

RESEARCH OUTPUT & ACTIVITIES

See Google scholar profile (Deshendran Moodley) for citation counts

Peer reviewed journal papers and book chapters (* postgraduate student/postdoctoral fellow)

1. Coetzer W*, Moodley D, Gerber A (2017) A knowledge-based system for generating interaction networks from ecological data, *Data & Knowledge Engineering*, vol. 112, pp.55-78.
2. Seebregts CJ, Pillay A, Crichton R, Singh S, Moodley D. *Enterprise Architectures for Digital Health. Global Health Informatics: Principles of EHealth and MHealth to Improve Quality of Care.* 2017, MIT Press.
3. Ogundele OA*, Moodley D, Seebregts CJ, Pillay AW (2017), Building Semantic Causal Models to Predict Treatment Adherence for Tuberculosis Patients in Sub-Saharan Africa. In: Huhn M., Williams L. (eds) *Software Engineering in Health Care. FHIES 2014, SEHC 2014. Lecture Notes in Computer Science*, vol 9062. Springer
4. Adeleke JA*, Moodley D, Rens G, Adewumi AO (2017), Integrating Statistical Machine Learning in a Semantic Sensor Web for Proactive Monitoring and Control, *Sensors* 2017, 17(4), 807
5. Rens G*, Moodley D (2017) A hybrid POMDP-BDI agent architecture with online stochastic planning and plan caching, *Cognitive Systems*, vol. 43, pp.1-20.
6. Coetzer W*, Moodley D, Gerber A (2016) Eliciting and Representing High-Level Knowledge Requirements to Discover Ecological Knowledge in Flower-Visiting Data. *PLoS ONE* 11(11)
7. Ogundele OA*, Moodley D, Seebregts CJ, Pillay AW (2016) An ontology for factors affecting tuberculosis treatment adherence behavior in sub-Saharan Africa, *Patient Preference and Adherence* 2016;10, pp. 669-681.
8. Kala JR*, Viriri S, Moodley D (2016), Leaf Classification using Convexity Measure of Polygons in Image and Signal Processing, *Proceedings of the 7th International Conference, ICISP 2016, Trois-Rivières, QC, Canada, May 30 - June 1, 2016, Lecture Notes in Computer Science*, vol. 9680, pp. 51-60.
9. Coetzer W*, Moodley D and Gerber A (2014), A knowledge-based system for discovering ecological interactions in biodiversity data-stores of heterogeneous specimen-records: A case-study of flower-visiting ecology, *Ecological Informatics*, vol 24.
10. Brandt P*, Moodley D, Pillay A, Seebregts CJ and de Oliveira T (2014), An Investigation of Classification Algorithms for Predicting HIV Drug Resistance Without Genotype Resistance Testing, in Gibbons J and W MacCaul (Eds.) *Foundations of Health Information Engineering and Systems - FHIES 2013, Lecture Notes in Computer Science*, vol. 8315, pp. 236–253.
11. Moodley D, Seebregts CJ, Pillay A and Meyer T (2014), An ontology-driven modeling platform for regulating eHealth interoperability in low resource settings, in Gibbons J and W MacCaul (Eds.) *Foundations of Health Information Engineering and Systems - FHIES 2013, Lecture Notes in Computer Science*, vol. 8315, pp. 107–124.
12. Dube K, Moodley D, Thies B, Liu JWS, Cafazzo J, Sokolsky O, Position Statements – Panel discussion on Health informatics in the Developing World (2014), in Gibbons J and W MacCaul (Eds.) *Foundations of Health Information Engineering and Systems - FHIES 2013, Lecture Notes in Computer Science*, vol. 8315, pp. 22–31.
13. Coetzer W*, Moodley D & Gerber A (2013), A Case-Study of Ontology-Driven Semantic Mediation of Flower-Visiting Data from Heterogeneous Data-Stores in Three South African Natural History Collections, in Philipp Cimiano; Miriam Fernández; Vanessa Lopez; Stefan Schlobach & Johanna Völker, ed., *The Semantic Web: ESWC 2013 Satellite Events: Revised Selected Papers*, *Lecture Notes in Computer Science* Volume 7955, pp. 87-100.
14. Crichton R*, Moodley D, Pillay A, Gakuba R, Seebregts C (2013), An Architecture and Reference Implementation of an Open Health Information Mediator: Enabling Interoperability in the Rwandan Health Information Exchange. In: *Foundations of Health Information Engineering and Systems, Revised and Selected Papers, Lecture Notes in Computer Science* Volume 7789, pp. 87-104.
15. Moodley D, Simonis, I and Tapamo J (2012), An architecture for managing knowledge and system dynamism in the worldwide Sensor Web. *International Journal of Semantic Web and Information Systems: Special issue on Semantics-enhanced Sensor Networks, Internet of Things and Smart Devices*; 8(1), pp. 64-88
16. Moodley D, Pillay A & Seebregts CJ (2012), Position Paper: Researching and Developing Open Architectures for National Health Information Systems in Developing African Countries, *Revised and Selected Papers, Foundations of Health Informatics Engineering and Systems, Lecture Notes in Computer Science* Volume 7151, pp. 129-139
17. Terhorst A, Moodley D, Simonis I, Frost P, McFerren G, Roos S and van den Bergh F (2008), Using the Sensor Web to Detect and Monitor the Spread of Vegetation Fires in Southern Africa, in *Geosensor Networks, Lecture Notes in Computer Science, Volume 4540, Springer-Verlag*, pp. 239-251.

18. Fraser HSF, Biondich P, Moodley D, Choi S, Mamlin BW, Szolovits P (2005), "Implementing electronic medical record systems in developing countries", *Informatics in Primary Care* 2005;13, PHCSG, British Computer Society, pp. 83–95.

Peer reviewed conference and workshop papers (* postgraduate student)

1. Price CS*, Moodley D, Pillay AW (2019), Modelling uncertain adaptive decisions: Application to KwaZulu-Natal sugarcane growers. *Proceedings of South African Forum for Artificial Intelligence Research*, 4-6 December 2019, Cape town, South Africa, CEUR vol. 2540
2. Toussaint W*, Moodley D (2019), Comparison of clustering techniques for residential load profiles in South Africa. *Proceedings of South African Forum for Artificial Intelligence Research*, 4-6 December 2019, Cape town, South Africa, CEUR vol. 2540
3. Nudelman Z*, Moodley D, Berman S (2019), Using Bayesian Networks and Machine Learning to Predict Computer Science Success. In: Kabanda S., Suleman H., Gruner S. (eds) *ICT Education. SACLA 2018. Communications in Computer and Information Science*, vol 963. Springer, Cham
4. Price CS*, Moodley D and Pillay AW (2018), September. Dynamic Bayesian decision network to represent growers' adaptive pre-harvest burning decisions in a sugarcane supply chain. In *Proceedings of the Annual Conference of the South African Institute of Computer Scientists and Information Technologists* (pp. 89-98). ACM.
5. Moodley D, Pillay AW, and Seebregts CJ (2018), Establishing a health informatics research lab in South Africa. In *Proceedings of NEMISA 2018: Digital Re-imagination Colloquium 2018: Preparing South Africa for a Digital Future through e-Skills*, NEMISA, South Africa
6. Rens G*, Meyer T, Moodley D. A Stochastic Belief Management Architecture for Agent Control. In *Proceedings of the Workshop on Architectures for Generality & Autonomy at IJCAI-17*.
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1. Moodley D, Vahed A, Simonis I, McFerren G and Van Zyl T (2008). Enabling a new era of Earth observation research: scientific workflows for the Sensor Web. Ecological Circuits (1), pp. 20-23. Available online: <http://www.eepublishers.co.za/view.php?sid=15047>.
2. Moodley D, Chuntharpursat A (2007). Using ontologies to manage ecological data, SAEON newsletter, April 2007, Available online: <http://www.saeon.ac.za/enewsletter/archives/2007/april-2007/using-ontologies-to-manage-ecological-data>

Invited speaker, plenary sessions and discussion panels

1. D. Moodley, "Artificial Intelligence: Threat or hype?", Annual Weinbren Memorial Lecture, Opening Address, South African Society of Anaesthesiology (SASA) National Congress 2015, International Conference Centre, Durban, 20-24 March 2015
2. Panel Discussion on Health informatics in the Developing World. Moderator: Zhiming Liu, Panelists: Kudakwashe Dube, Deshendran Moodley, Bill Thies, Jane W. S. Liu, Joseph Cafazzo, Oleg Sokolsky, 3rd Intl Symposium on the Foundations of Health Information Engineering and Systems - FHIES 2013, Macau, China, August 21-23, 2013.
3. Panel Discussion on Global Health Care Challenges and the Impact of ICT. Panelists: Gerry Douglas, Syed Aljunid, Deshendran Moodley, Zhiming Liu, 2nd Intl Symposium on the Foundations of Health Information Engineering and Systems - FHIES 2012, Paris, August 27-28, 2012.
4. D. Moodley, AW Pillay, and CJ. Seebregts: "The Health Enterprise Architecture Laboratory" A presentation given at the "Workshop to Develop Specifications and an Implementation Roadmap for an Open Semantic Interoperability Platform for Wireless Devices Supporting Mobile, Electronic and Tele- Health Applications" Makaranga Lodge, Durban, South Africa on the 23-24 August 2011.
5. D. Moodley, CJ Seebregts; HEAL: Establishing a Health Enterprise Architecture Lab in Africa, invited speaker: International Plenary Session Enabling Healthy Outcomes: Views from across the Globe, eHealth 2011, May 29 – June 1, Toronto, Ontario
6. Moodley D. Using ontologies to facilitate data and knowledge sharing in large-scale, distributed and heterogeneous information environments, Invited speaker at National Biodiversity Information Management Workshop 6-7 Nov. 2007.

7. Moodley, D. Agents for the Sensor Web? The Sensor Web Agent Platform, Invited speaker at 2nd South African International Workshop on Sensor Web Enablement, 5-6 February 2007, Breakwater Lodge, Victoria and Alfred Waterfront, Cape Town.

Other conference presentations, abstracts & posters

8. Kala JR*, Viriri S, Moodley D (2016), Leaf Classification Using Convexity Moments of Polygons, *Advances in Visual Computing, Lecture Notes in Computer Science, Volume 10073*, pp. 330-339
9. Moodley D, Pillay A, and Seebregts CJ, Developing computer science capacity to design effective national health information systems in developing African countries, Cape Town, South Africa, 12-13 September 2012
10. Crichton R, Moodley D, Pillay A, Gakuba R and Seebregts CJ, A health information mediator for the Rwandan health information exchange, Cape Town, South Africa, 12-13 September 2012
11. Seebregts C, Gakuba R, Pastore R, Walker M, Fourie C, Campione A and Moodley D, Implementation-Driven Health Enterprise Architecture Framework for Low Resource Settings, Cape Town, South Africa, 12-13 September 2012
12. Moodley D, Researching and Developing Open Architectures for National Health Information Systems in Developing African Countries. Presentation at the ifgi GI Forum, Munster, Germany. 18 October 2011.
13. Aurore Gerber, Thomas Meyer, Chris Seebregts, Arina Britz, Laurette Pretorius, Ronell Alberts, Desehen Moodley. The Integration of SNOMED CT into the OpenMRS Electronic Medical Record System Framework. Poster in Proceedings of the 3rd Knowledge Representation in Medicine Conference (KR-MED'08), Phoenix, Arizona, USA, May 31 - June 2, 2008.
14. Seebregts CJ, Mars M, Moodley D, Fraser HSF, Human SP, Fourie C, Singh Y, Hajek M, Pillay W, Tapamo J-R, Murrell H, de Oliveira T, McGrath D and Bennish ML. Biomedical Informatics Training in South Africa. Presentation at the Health Informatics in Africa conference, Bamako, Mali, January 2007.
15. Parbhoo, C and Moodley, D. Knowledge-based system for the detection and classification of unplanned human settlements. Poster at 4th IFIP Summer School Workshop Gordon's Bay, South Africa, 26-30 March 2007, pp 1-4.
16. Terhorst A, Simonis I, Moodley D, A service-oriented multi-agent systems architecture for the sensor web, SAEON Summit 2006, Centurion, South Africa, 2006.

POSTGRADUATE SUPERVISION

Postdoctoral fellow

1. Gavin Rens, Agent decision making and belief revision based on Partially Observable Markov Decision Processes, University of KwaZulu-Natal, Jan. 2015 - Dec. 2016

Completed postgraduate students

PhD - Primary-supervisor

1. Willem Coetzer, A Knowledge-Based System for Automated Discovery of Ecological Interactions in Flower-Visiting Data, Jan 2017
2. Olukunle Ogundele, An Ontology-Driven Approach for Structuring Scientific Knowledge for Predicting Treatment Adherence Behaviour: A Case Study of Tuberculosis in Sub-Saharan African Communities, Dec. 2016
3. Jude Adeleke, A Semantic Sensor Web Framework for Proactive Environmental Monitoring and Control, Dec. 2017

PhD - Co-supervisor

1. Jules Raymond Kala, Leaf Recognition for Accurate Plant Classification, submitted Jan. 2017
Supervisor: S Viriri, , co-supervisor: D Moodley
2. Kodylan Moodley, Tractable ontology repair for inexpressive description logics, Primary Supervisor: T. Meyer, co-supervisors: U Sattler, D Moodley, Dec. 2015.
3. Gavin Rens, From an Agent Logic to a Robot Programming Language, 2014
Supervisor: T. Meyer, co-supervisors: G Lakemeyer, D Moodley

MSc - Primary supervisor

1. Stefan Drue, mini dissertation, MPhil Information Technology, A comparison of a factor-based investment strategy and machine learning for predicting excess returns on the JSE, 2019
2. Wiebke Toussaint, MSc Computer Science, Evaluation of Clustering Techniques for Generating Household Energy Consumption Patterns in a Developing Country, 2019
Supervisor: D Moodley, Co-supervisor: T Meyer
3. Andrew Clarke, MSc Computer Science, An Evaluation of Depth Camera-Based Hand Pose Recognition for Virtual Reality Systems, 2018
Supervisor: D Moodley, Co-supervisor: A Pillay
4. Michael Waltham, MSc Computer Science, Q-Cog: A Q-Learning Based Cognitive Agent Architecture for Complex 3D Virtual Worlds, 2017
Supervisor: D Moodley, Co-supervisor: A Pillay
5. Yerdashin Padayachi, MSc Environmental Science, Satellite Remote Sensing of Particulate Matter and Air Quality Assessment in the Western Cape, South Africa, Feb. 2016
6. Lizwe Mdakane, MSc Computer Science, Settlement Type Classification Using Aerial Images, MSc Computer Science, 2014
Supervisor: D Moodley, Co-supervisor: F van den Bergh
7. Pascal Brandt, MSc Computer Science, An Investigation Of Multi-label Classification Techniques For Predicting HIV Drug Resistance In Resource-limited Settings, MSc Computer Science, 2014
Supervisor: D Moodley, Co-supervisors: A Pillay, CJ Seebregts, T de Oliveira
8. Maldean Pillay, MSc Computer Science, Gabor Filter Parameter Optimization for Multi-textured Images: A Case Study in Water Body Extraction from Satellite Imagery, 2012
9. Chetna Parbhoo (with distinction), MSc Computer Science, An ontology-driven Sensor Web application for detecting and classifying informal settlements, MSc Computer Science, 2009
10. Yashik Singh (with distinction), mini dissertation, MMedSci Medical Informatics, Computer-based machine learning algorithms to assist with the analysis and interpretation of genetic sequence data in patient s failing anti-retroviral therapy, 2008
Supervisor: D Moodley, co-supervisor: M Hajek

MSc - Co-supervisor

1. Sagree Singh, An Analysis of Approaches for Developing National Health Information Systems: A Case Study of Two Sub-Saharan African Countries, April 2016.
Supervisor: A Pillay, co-supervisors: D Moodley, CJ Seebregts
2. Ryan Crichton, MSc Computer Science, The Open Health Information Mediator: An architecture for enabling interoperability in low to middle income countries, 2014
Supervisor: A Pillay, co-supervisors: D Moodley, CJ Seebregts
3. Hendrina Harmse (with distinction), Scenario Testing using OWL, 2014
Supervisor: K Britz, co-supervisors: A Gerber, D Moodley
4. Kodylan Moodley (with distinction), Debugging and Repair of Description Logic Ontologies, 2011
Supervisor: T Meyer, co-supervisors: I Varsincak, D Moodley

Current postgraduate students

PhD - Primary supervisor

1. Sue Price, Agent based optimization and simulation in the sugar industry, since 2011
2. Tezira Wanyana, An agent based architecture for automatic hypothesis generation, since 2019

MSc - Primary supervisor

1. Allan Berman, Computational Creativity for fine art using Generative Adversarial Networks, since 2017
2. Julius Stopforth – Deep reinforcement learning for drone control and failure recovery, since 2018
3. Hermann Kouassi – Automatic machine learning techniques for time series data, since 2019

MIT mini dissertation - Primary supervisor

4. Freddie Pyon, Neural Networks for share prediction on the JSE, since 2017
5. Jamie Boakes, Machine learning techniques for portfolio selection on the JSE, since 2017
6. Rachel Drake, Using ontologies for decision making in financial markets
7. Kimendree Naidoo, Machine learning for time series data
8. Edwina Williams, Machine learning for anomaly detection in weather data