# Curriculum Vitae – Thegaran Naidoo

## Personal Details

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| Name: | Thegaran Naidoo |
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## Education

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|---|---|
| Institution: | University of South Africa (UNISA) |
| Qualification: | BSc (Hons) Computer Science |
| Year: | 2008 |

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| Institution: | University of South Africa (UNISA) |
| Qualification: | BTech: Electrical Engineering |
| Year: | 2005 |

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| Institution: | University of South Africa (UNISA) |
| Qualification: | University Certificate in Datametrics |
| Year: | 2005 |

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| Institution: | M L Sultan Technikon (now DUT) |
| Qualification: | National Diploma: Electrical Engineering |
| Year: | 1999 |

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| Institution: | Earlington Secondary School |
| Qualification: | Matric |
| Year: | 1993 |

## Publications and Conferences

Thegaran Naidoo, Deon Joubert, Tapiwa Chiwewe, Ayanda Tyatyantsi, Bruno Rancati, Asanda Mbizeni, **Visual surveying platform for the automated detection of road surface distresses**, Sensors, Micro-electro-mechanical systems (MEMS) and Electro-Optical Systems, 2014 (to be published by SPIE)

S.Hugo, T. Naidoo, H. Swart, S. Potgieter, K Land; **A Lensless, automated microscope for disease diagnostics;** Sensors, Micro-electro-mechanical systems (MEMS) and Electro-Optical Systems, 2011

Thegaran Naidoo, Roel Stolper, **Robust rotary-winged unmanned aerial system for inspecting electrical pylons**, International Aerospace Symposium of South Africa 2010, Stellenbosch, South Africa, November 2010.

Etienne Barnard, Christiaan van der Walt, Marelie Davel, Charl van Heerden, Fred Senekal, and Thegaran Naidoo, **Learning Structured Representations of Data**, Twentienth Annual Symposium of the Pattern Recognition Association of South Africa, Stellenbosch, South Africa, December 2009.

Davrajh,S, Naidoo,T, Bright, G et al. **Automated visual inspection of moving custom parts**. 15th International Conference on Mechatronics and Machine Vision in Practice, Auckland, New Zealand, 2 - 4 December 2008.

Gazendam, A, Bosscha, P, Donovan, J, Naidoo T, et al. **Inclusive vision of high performance computing at the CSIR**. (Poster Presentation) CSIR Research and Innovation Conference: 1st CSIR Biennial Conference, CSIR International Convention Centre Pretoria, 26-27 February 2006

## Work Experience

**1999-2006**: CSIR, MSM, Sensor Science and Technology, Research Technologist
**2006-Present**: CSIR, MSM, Mechatronics and Micro-Manufacturing, Senior Research Technologist, Project Leader (Industrial Analytics)

## Technical Skills

- Automation – sensing, control, embedded systems development, signal processing.
- Software development – embedded controllers, desktop applications, distributed, high-performance computing, mobile.
- Electronic design and implementation
- Computer vision  and image processing
- Knowledge base (Formal logic) programming – ECLiPse, Prolog
- Statistical methods for machine learning
- Computational and artificial intelligence
- Fourier Optics
- Signal processing
- Integration of technologies across the disciplines specified above.

## References

Riaan Coetzee
Competency Area Manager: Mechatronics and Micro-Manufacturing
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# Description of projects and technologies (subset)

- **Visual Surveying Platform**
  - This is a system for monitoring and managing road infrastructure. The system collects data from the environment and performs analysis on the data to detect anomalies in the road infrastructure. It currently focuses on detecting and geo-tagging potholes. The system consists of a mobile sensor system and software for data management, visualisation and decision support.
- **Cellnostics Prototype v1.0**
  - This prototype implements the Gabor in-line digital holography to reconstructed and analyse a blood sample in a portable format. It uses the digital holography to produce an image of blood cells without using lenses and then analyses these images to detect and count white blood cells and provide an estimated count of red blood cells. This prototype was exhibited at a health conference in the US during 2011.
- **Navigation for Service Robotics**
  - This was a system fitted to a two wheeled service robot that enabled it to develop a map of an unknown environment and to determine its position within this environment. The system also incorporated a camera based object recognition system that allowed the robot to identify objects that are part of its task within the unstructured environment.
- **Single Camera Ranging**
  - This was a bio mimicry system that exploited the variations in illuminations patterns to determine the range of obstacles from a single camera to allow a robot to determine the proximity of objects in its environment.
- **Minicontroller**
  - This was a cost effective process controller to supplement the existing range of process controllers developed at the SST CA. It could provide data logging and PID based control. It was developed as a fully functional product.
- **CellLearn**
  - This is an image management and annotation teaching tool developed for health institutes such as the NHLS. This tool makes the teaching of pathology more accessible.
- **Mobile unit for Safety and Security**
  - This is a standalone, robust mobile unit that captures video, GPS, audio and thermal data from an environment. It can be deployed in fixed location or it can be mounted onto security vehicles. It implements an on-board processing framework that implements algorithms for detecting anomalies and objects of interest. The first implementation is number plate recognition. This system is currently under development.
- **Digital Holography Platform**
  - This system represents unique infrastructure within the CSIR and in South Africa. The system consists of hardware for capturing digital holograms and software for reconstructing and analysing these holograms to detect specific micro-sized objects of interest without lenses. These objects have typically been red blood cells, white blood cells and platelets. The system also has many derivative technologies such as the implementation of the holographic propagation space for improving the analysis results. A patent has been applied for the latter as well as the overall system.