

# Computer, Communications and Process Systems Research Group (CCPSRG)

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## 1.0 Computer and Communications, Process Systems Research Group (CCPSRG)

Computer, Communications and Process Systems Research Group (CCSRG) was established in the department of Process Control & Computer Systems, Vaal University of Technology in 2015 to spearhead research activities in the department. Computing, communication and electronic systems are installed in a wide range of simple and complex systems. Computing and communication has become inseparable in everyday life. Cell phones or mobile phones, iPads, PDAs are examples of this inseparability or integration.

Process control is extensively used in industry and enables mass production of consistent products from continuously operated process such as oil refinery, paper manufacturing, chemicals, power plants and many others. Process control enables automation, by which small staff of operating personnel can operate a complex process from a central control room (Wikipedia.com).

CCPSRG has identified the following research fields:

1. Computer Systems Architecture.
2. Intelligent Agents.
3. Communication Systems Architecture.
4. Electronic Systems and Devices.
5. Process Control.

### 1.1 Computer Systems Architecture

Computing devices have become common in peoples' daily lives. Research in computing devices is necessary to improve functionalities and performance of these devices.

### 1.2 Intelligent Agents

Research in Intelligent Agents has been ongoing for sometimes, yielding interesting results, some of which have been translated into commercial ventures. Intelligent Agents are executable software components that represent the user, perform tasks on behalf of the user and when the task completes, the agents send the results back to the user. The Agents execution is best suited to the Internet: an interconnected a world-wide communication network. A number of Agent systems have been implemented, tested and evaluated and, the simulation test results do show the potential of Intelligent Agents being applied to solve a number of everyday tasks.

### 1.3 Communication Systems Architecture

Recent technological developments in the telecommunications field are rapidly converging towards integrated voice, data and video traffic, the coexistence of ATM and IP, the integration of wired and wireless services with the final target of delivering new and sophisticated broadband services to the users. This process is strongly due to the evolution of multimedia applications that pose new and challenging problems related to the prediction, guarantee and adaptation of quality of service (QoS). The new services such as video on demand require a certain level of network performance to enable an acceptable quality reception. Implementing network QoS guarantees availability of network resources to meet the user needs. Technology is now mature enough to really pursue the objective to negotiate QoS in the delivery of services through the network, eventually adapting to different levels if unpredictable events occur.

### 1.4 Electronic Systems and Devices

Electronic systems and devices have become common in people's daily lives. There is need for research to improve the functionalities and performance of electronic systems and devices.

### 1.5 Process Control

Process control is an engineering discipline that deals with architecture, mechanisms and algorithms for maintaining the output of a specific process within a desired range. For instance, the temperature of a chemical reactor may be controlled to maintain a constant product output.

## 2.0 CCPSRG Members

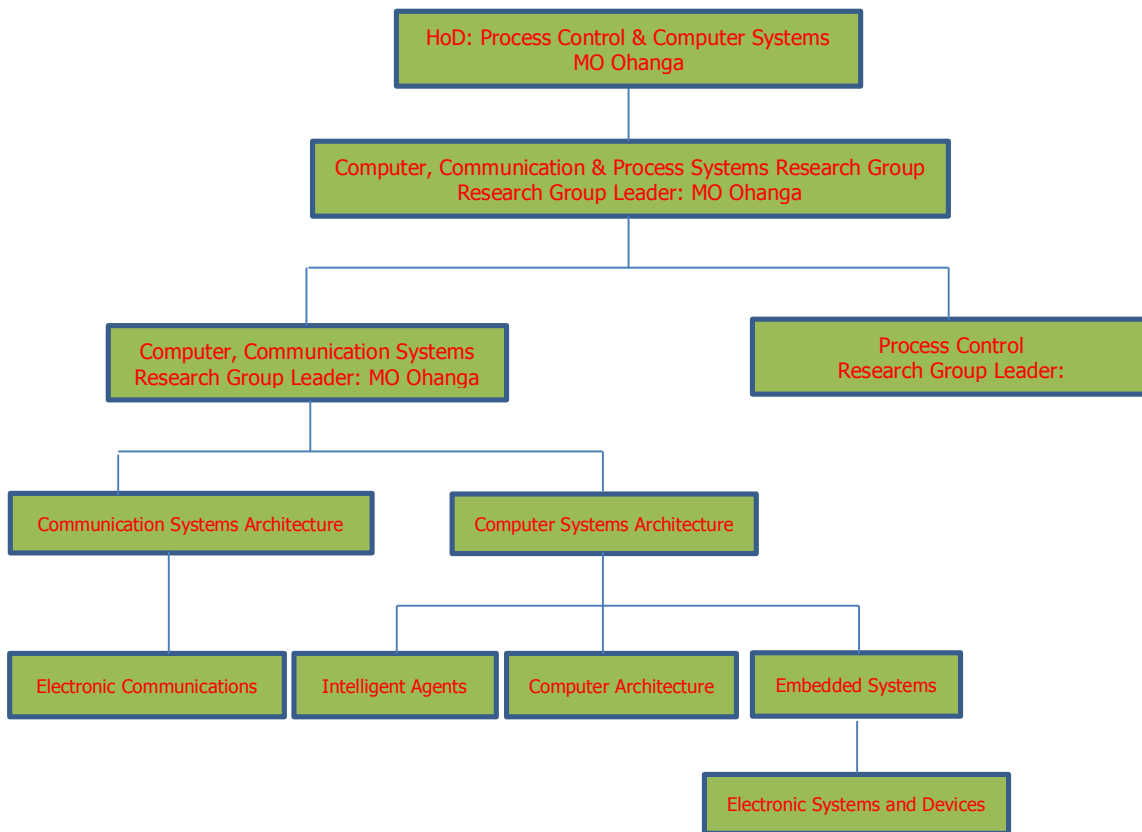
The following comprise the list of CCPSRG members:

- |                              |   |
|------------------------------|---|
| Prof. Marcel Odhiambo Ohanga | - Group Leader.   |
| Departmental staff           | - Phd/DTech or Msc/MTech holders: supervisor/co-supervisor. |
| Postgraduate students        | - BTech/BSc or MTech/MSc.                                   |

## 3.0 Qualification

DTech: Engineering: Electrical  
MTech: Engineering: Electrical

## 4.0 CCPSRG Structure



## 5.0 Research Projects

CCPSRG is looking into possible collaboration with both internal and external entities to conduct research into but not limited to the following areas:

1. Integrated Image Capture and Motion Detection Home Security Systems.
2. Telecommunication and Utility Cable Tampering Monitoring System.
3. Personal Health Data Storage and Retrieval System for the Health Providers.
4. Technology for the Provision of Cost Effective and Affordable Telecommunications Services in Rural Areas.
5. Schemes and Methodologies for the Provision of Quality of Service (QoS) in Telecommunication Networks.
6. Priority-Based Dynamic Bandwidth Allocation Protocol with Reservation for Wireless Mesh Networks.
7. Subscriber Migration (Tunneling) to Neighboring Base Stations to Support Network Quality of Service.

## 6.0 Publications

1. Mwashita W, Odhiambo MO. A Survey of Base Station Sleeping Technology for Green Cellular Networks. International Conference on Wireless Networks 2015, (ICWN 2015), The 2015 World Congress in Computer Science, Computer Engineering, and Applied Computing WORLDCOMP 2015, July 27<sup>th</sup> – 30<sup>th</sup>, 2015, Las Vegas, USA. <http://www.world-academy-of-science.org/>
2. Theko Emmanuel Marie, Barnabas Gatsheni. Intelligent Highway Vehicle Traffic Flow Monitoring and Control System. The 2015 International Conference on Artificial Intelligence. The 2015 World Congress in Computer Science, Computer Engineering, and Applied Computing WORLDCOMP 2015, July 27<sup>th</sup> – 30<sup>th</sup>, 2015, Las Vegas, USA. <http://www.world-academy-of-science.org/>
3. Odhiambo MO, Aderemi Lawal. Network Security Management Using Intelligent Mobile Agents. International Conference on Wireless Networks 2015, (ICWN 2015), The 2015 World Congress in Computer Science, Computer Engineering, and Applied Computing WORLDCOMP 2015, July 27<sup>th</sup> – 30<sup>th</sup>, 2015, Las Vegas, USA. <http://www.world-academy-of-science.org/> submitted.

## 7.0 Contacts

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