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Honours

The Honours Degree will benefit your career because:

- The Honours level is the international standard for a first degree. For international mobility, and entrance into postgraduate courses at foreign universities, the honours degree is a minimum requirement.
- The Rhodes degree is an advanced, marketable qualification, recognised internationally. The course provides improved employment prospects (not only now, but later on in your career), and opens up increased opportunities for entrepreneurial prospects.
- It is the degree that provides entry into research and development.
- It allows specialisation not possible in general undergraduate degrees, and satisfies love of the subject.

COURSE CO-ORDINATOR

Your course co-ordinator is **Mr Yusuf Motara**, room 025, Hamilton Building (Y.Motara@ru.ac.za).
Queries and comments about the Honours course should be addressed to the course co-ordinator.

ADMISSION CRITERIA

While admission to the Honours course requires a minimum mark of 60% for CS3 (aggregate for CSc301 and CSc302), students intending to study Honours should aim considerably higher than this minimum, and obtaining the required minimum does not automatically imply acceptance into Honours.

Acceptance into any postgraduate course is at the discretion of the Department. A number of factors may be considered when we make this decision. Space or supervision constraints may limit the number of students we can accept. We will also consider performance and participation across the whole of your academic career. We may also seek evidence of passion and participation in the discipline outside the confines of our courses - a "portfolio". This could include software or games that you've written, courses you may have offered to others (e.g. a student society), web sites you might have built, learning a different computer language or operating system, using your Computer Science in your other subjects, software consulting, maintaining networks at a local school or business, and any software-related work during vacations.

COURSE OPTIONS

In the BSc (Honours) programme, you are required to take course options which count towards the final mark and which are examined formally in June or November. No more than 3 courses may be taken in the 2nd semester. The remaining marks come from project and assignment work undertaken during the year. Students may elect to do no more than one extra course.

For students registered for 100%

60%	Six formal course examinations and practical work
40%	Project assessment mark made up as follows:
10%	Project related assignments through the year (including the final oral presentation)
30%	Final project report

For students registered for 60%

20%	Two formal course examinations and practical work
40%	Project assessment mark made up as follows:
10%	Project related assignments through the year (including the final oral presentation)
30%	Final project report

For students registered for 40%

40%	Four formal course examinations and practical work

Criteria for the marking of the project will be given in a formal Project Management course, a **compulsory** module at the start of the year, that counts towards the project related assignments. This module covers various aspects involved in tackling a large project, including writing and research skills. An important component of modern science is the ability to write up one's work in a clear form, perhaps with the intention of publishing it.

Each option will have related portfolio work that will consist of at least one formal submission per course. Shaded areas in the provisional course time-table denote periods that are intended for use to mop up assignment work, and to focus your energies on your project work. Some of these weeks go into the vacations. It is assumed that Honours

students will be working on project coursework through the vacations.

Full time Computer Science students are required to complete six coursework modules. One of these may be an external module, with the permission of the heads of both departments concerned, with the remainder coming from the Department or Ancillary pools. Joint Honours students must complete all their modules from the Department or Ancillary pools.

This year, the following course options will be offered. They are classified into three categories.

DEPARTMENT MODULES	ANCILLARY MODULES	EXTERNAL MODULES
Computer Security Image Processing GPU programming Real-Time Multimedia Engineering in ICTD Quality Assurance	Hardware Interfacing	Information Systems Electronics Mathematics Physics

Students must discuss their course configuration with their project supervisor. The project supervisor will determine whether their course configuration supports their project both in terms of time management and course content. Students must email their course configuration to the Honours Co-ordinator, and to the project supervisor, indicating that confirmation has been obtained.

EVALUATION

Please note that individual modules may have specific DP requirements that must be met before a student may write the examination for that module. Students should check with the lecturer of each module what the requirements are for that module.

- Normally, students must pass ALL qualifying coursework modules, as well as the project.
- Students should note that the marks for modules may be subject to scaling at the Department's and/or the external examiner's discretion.
- In the case of students who are not performing adequately during the year, they will be advised to withdraw from the Honours Course or to take the Honours Course over two years.

LECTURES AND TIME ALLOCATION

Lectures are either single or double period slots, which dovetail with the times of the undergraduate time-table. Other Departments use different lecturing schemes, and time tabling joint honours is sometimes rather awkward. Students planning to take modules from other Departments should be careful that their load does not become excessive at any one stage of the year.

Honours lectures will be held in the CORAL SEMINAR ROOM, HAMILTON BUILDING. You will be informed of lecture time slots by each individual lecturer.

Additional short courses of either an optional or a compulsory nature may be mounted during the year, depending on the availability of expert lecturers.

NOTE:

(a) You will also need to timetable in
   - demonstrator's pre-prac sessions, if you are a graduate tutor (graduate tutor awards will be announced at the start of the academic year)
   - Departmental seminars, at which **all** postgraduate students should be present.
   - formal project supervision sessions each week.

(b) Note that there are extended periods with one or no module(s) on offer at some times of the year, to make sure the projects are properly under way, and are not meant as a vacation!

(c) Attendance at lectures, practicals, seminars and project supervision sessions is compulsory.

(d) To give you an idea of how we pitch the course work, we expect honours students to put in 50 hours of work per week. When you are attending two course options, the approximate breakdown should be:
   - 10 hours on lectures
   - 2 x 10 hours on practicals
   - 20 hours on your project

When you only attend one course option, and during break periods, you are expected to put more time into your project work.

HONOURS PROJECTS

A very important part of the Honours year is the project, which is undertaken on a rather grander scale than anything you might have done in your undergraduate years. At one stage we adopted a policy whereby students could identify their own project, if that seemed possible, but this led to some problems in supervision and motivation, and we now favour a scheme where we provide a fairly small list of projects that are of immediate relevance to staff and research interests here.

Ideally, we would like each student to be part of a team working in an area related to one of the main research thrusts in the Department, primarily the Distributed Multimedia group, the Parallel and Distributed group, the Security group or the Distributed Audio group (see Research section). You are advised to chat to staff members involved with a particular project you might be interested in before making a final choice. Project choices should be finalised by the fourth week of lectures.

An important part – perhaps the most important part – of the effort in the project goes into producing the report. Each report should be produced in the style of a paper for publication. We also require you to produce a short paper of your project work. One of the supervision requirements of all postgraduate projects is that the student set up and maintain a web page for their project, under the main research site of the Department and this must be updated regularly. Requirements for the project web page appear later in this handbook.

The final project reports have to include machine readable versions of the report as well as of any software written.

HANDOUT FEE

A non-refundable charge of R250-00 will be made to cover the cost of course handouts, laboratory consumables, and payments of royalties on copyright material. We keep this charge as low as possible. This amount will be debited to your student account.

AND FINALLY ...

Honours can be very worthwhile – but, like much else in life, it depends largely on what you put into it. We often have Honours students remarking that they have learned more about Computer Science in their Honours year than in their whole undergraduate degree. We hope, and expect, that you will put a lot into it, starting from day one. At this level everyone in the course – staff and students alike – become contributors to a pool of knowledge. Your project work, and the seminar programme, for example, become important areas in which information can be spread about the group as a whole.

A prize, generously sponsored by
Open Box software,
is offered for the top student in the course

and a prize, generously sponsored by
Jannine Franke,
is offered for the top Honours project.

SUMMARY OF HONOURS COURSES

All students who have not completed their undergraduate degree through Rhodes University are advised to discuss their module choices, in terms of what knowedge is assumed, with the relevant module lecturers at the beginning of the year.

Research (Project) Management Course (Prof Karen Bradshaw)

Objectives:
This course aims to equip you with enough information to complete a fairly substantial research project.

Contents:
The entire life cycle of the project is covered in detail -- from inception (finding a project topic and writing the proposal) to completion (thesis structure and assessment). Other topics covered are aspects of the literature survey, how to present a research seminar and general issues like time management, scientific writing skills, and an introduction to LaTeX.

This module is compulsory, is assessed throughout the year and examined in the final project report.

Computer Security (Prof Barry Irwin)

Objectives:
To enable students to gain a better understanding of the importance of Security within the larger realm of Information Technology and to provide insight into the effects of security on Information Systems. Emphasis will be placed on the importance of holistic integration of security practices into Information Technology. The course curriculum is structured around the internationally recognised Certified Information Systems Security Professional (CISSP) certification.

Contents:
The following components relating to Information Security are explored:

- Cryptography
- Security Architectures and Models
- Application Development and Secure programming
- Systems Security
- Operations Security
- Security Management
- Distributed Systems
- Physical Security
- Disaster Recover and Business Continuity Planning
- Network and Telecommunications Security
- Forensics and Investigation

Prerequisites:
Students should be familiar with programming constructs such as those covered in CSc201/CSc202 and a good understanding of Computer Networks and Operating Systems as covered in CSc302.

Engineering in ICTD (Prof Alfredo Terzoli)

Objectives:
This module focuses on honing general ICT engineering skills through the exposure to problems that need to be solved within difficult (and often badly specified) constraints, foregrounding good technique and innovation. While low resource settings are various in nature, the scenarios will be mostly drawn from the realities of underdevelopment and poverty.
The practical work will require the solution of a (small) real-life problem in a limited resource setting.

Contents:

- Low resource setting: characterization and identification of a problem set
- General computer and software engineering: a brief review
- Living Lab meets Agile Programming: displacing the user requirement elicitation problem and cutting useless application features
- Engineering the e-infrastructure: network and device design and deployment – fit for purpose and efficient
- Method and innovation: a concluding reflection

Prerequisites:
- A working knowledge of TCP/IP networks, Operating Systems and Java programming

GPU Programming (Prof Karen Bradshaw)

Although graphics processing units (GPUs) are well known for their use in rendering images, their power for general parallel computing has only been explored in the past few years. With the increased availability of parallel frameworks, programming models, and development tools, however, GPUs have developed into flexible processors that typically outperform CPUs in the parallel computation of many problems.

This course covers the fundamentals of parallel computing using the CUDA parallel computing platform and programming model. Basic CUDA commands and syntax, and the use of CUDA libraries are covered in depth, as well as some relevant optimizations specific to the architecture of the GPUs being used. Practical labs focussing on applications in graphics, simulations, physics, and other topics complement the programming concepts and techniques introduced in the lectures.

Contents:
- GPU Programming Model
- GPU Hardware and Parallel Communication
- Fundamental Parallel Algorithms
- Optimizing GPU Programs
- Future of GPU Computing

Prerequisites: Reasonable competence in C/C++ programming and a desire to make programs execute faster.

Image Processing (Mr James Connan)

Objectives:
To introduce students to image processing. This module covers aspects of image generation and manipulation, but focusses on the extraction of information from images. The concepts covered are relevant to computer vision and image manipulation.

Contents:
Topics covered include:
- Basic concepts such as image file formats, scaling and rotation.
- Colour manipulation such as grey scaling and colour models.
- Image segmentation using background subtraction, edge detection, filters, etc.
- Image processing techniques such as Hierarchical Chamfer Distance Transforms, AdaBoost, Histograms and CAMShift.
- Taking a look at current developments in the field and directions for possible research.

Prerequisites: Enthusiasm and the ability to think outside of the box. Any language that has a wrapper for OpenCV should be usable.

Quality Assurance (Mrs Lydia Palmer and Prof Karen Bradshaw)

Objectives:
Quality assurance is an essential, yet contentious, part of the Information Systems development process. The main issues are that software testing is not conducted in a consistent manner, and normally only takes place once the system has been completed. This module aims to equip software developers with a better understanding of when and how software testing can be done to enhance the quality of the software produced.

Contents:
The module is divided into five topics, the first four of which are taught by Mrs Palmer, and the last one by Prof Bradshaw:

- Fundamentals and concepts of testing
- Testing throughout the software development life cycle (SDLC)
- Static and dynamic test techniques
- Verification and validation activities
- Automated test frameworks

Prerequisites: Knowledge of the SDLC and some experience in developing software systems.

Real-Time Multimedia (Dr Mosiuoa Tsietsi)

This course seeks to leverage student's background in computer networking as covered in undergraduate courses in order to introduce them to the practicalities involved in the delivery of Internet content in general, and real-time voice and video multimedia in particular. It weaves theory and practice together to equip students with the practical skills necessary to prototype networking applications, with an emphasis on voice and video over IP (VVoIP). Importantly, the course touches on a new networking paradigm known as software defined networking (SDN) which is currently behind the advance of sophisticated cloud platforms.

Objectives:
To bridge the gap between networking theory and practice using standard open source tools and platforms.

Contents:
- Multimedia Streaming
- IP Telephony Protocols
- Constraints in Real-time Multimedia
- VoIP Network Design, Prototyping and Benchmarking
- Software Defined Networking for Real-time Applications

Prerequisites: Basic understanding of computer networks; familiarity with the Linux environment.

Computer Hardware Interfacing (Mr Anthony Sullivan)

This is an electronics orientated course, and is presented in the Department of Physics and Electronics.

Objectives:
To provide the student with a hands on knowledge of hardware interfacing using a microcontroller enviroment.

Contents:
Assembly level programming of the Atmel 8-bit RISC architecture and associated common peripheral interfaces. A strong emphasis is placed on the differences to 'normal' computer programming such as no scheduling or other OS provided crutches. Practical exposure to system design of fundamental hardware interfaces.

Prerequisites: Physics 1E2 or equivalent electronics experience.
PLEASE NOTE THERE IS A 10 PERSON LIMIT ON THIS MODULE.

The course is taught via the investigation of peripherals available on the development board, how they can be made to interact and produce a desired outcome. Short tasks will be set for investigation after each lecture (not all of these are for assessment purposes). The main assessment (besides the theory examination) is a practical assignment that effectively combines elements from each of the tasks to work together to produce a stated goal.

MSc by Coursework and Thesis Specialising in Information Security

The Department of Computer Science at Rhodes University, in response to market research done in early 2010, commenced offering a Master's degree programme focused on Information Security in 2011. Now in its fifth offering, this part time offering has been designed specifically for Information Security practitioners in industry. The two year course is a combination of coursework in the first year, followed by a research project and written thesis in the second year.

INFORMATION SECURITY CO-ORDINATORS

The Information Security co-ordinator is Prof Barry Irwin, Room 006, Hamilton Building (B.Irwin@ru.ac.za).
The Research methods course is run by Prof Karen Bradshaw (K.Bradshaw@ru.ac.za).

COURSE STRUCTURE

The taught part of the course will be delivered by a combination of academic staff within the University and leading information security practitioners from within the South African Information Security industry. The course is also available to full time students as a one year in-attendance Master's degree, in which the coursework and research are undertaken concurrently.

Year 1

The coursework modules will be delivered in Grahamstown on the Rhodes University campus over the course of the first year. Students are required to attend the modules. These modules will be assessed by a written assignment based on the module material, to be submitted roughly four weeks later.

Other than the startup block, modules will start at 08h30 on the Friday of the course weekend, and will finish at 13h00 on the Sunday. These will be assessed by a written assignment based on the module material, to be submitted roughly four weeks later (dates will be specified at each module). Some modules may also require students to give presentations or coursework to be completed while in attendance which may contribute to the assessment mark.

The Research Methods module will focus on the research aspects of the course, and will culminate in the submission of an approved research proposal by year end.

In addition to the compulsory Introduction to Security and Research Methods modules run as part of the startup block, five elective modules will run during the year covering a range of Information Security topics such as:

- Penetration Testing
- Data Analytics for Security
- Application Security (including web applications)
- Security Metrics
- Malware Analysis
- Security within the Enterprise
- Threat Modelling
- Digital Forensics

Specific topics attached to each module are dependent on the availability of industry partners. Students are required to complete three of the five offered elective modules in 2017.

Year 2

The second (research) year is dedicated to the research project that students must write up in a formal document (spanning approximately 80-100 pages). This research is based on the research proposal submitted in year one.
This research needs to be focused on some aspect within the larger Information Security space. Topic will be determined in the first year. Students are strongly encouraged to publish their research. This should be done in consultation with their supervisors.

There is normally a compulsory workshop scheduled during the year (currently targeted in June 2017), where you will present your research. You are strongly encouraged to plan at least one other visit to campus during the year. This should be done in consultation with your research supervisor.

EVALUATION

The assessment of the coursework component of the degree is made up of the four Information Security modules, and the Research Methods module. Each Information Security module holds an 11% weighting and the Research Methods module 6%, for a total of 50%. Assessment of the course is based on a 50/50 weighting between the coursework and the research thesis.

The research thesis is externally examined and makes up the remainder of the marks. Students are required to pass all the modules in order to proceed to the research year. Students may apply to take an additional module in their first year. In this case the Research, Introduction and the best three elective modules are used to calculate the coursework mark.

In order for a distinction to be obtained for the degree, both the coursework and thesis will need to have attained a mark greater than (or equal to) 75%.

2017 Course details are contained in the Course Handbook.

INTERESTED IN JOINING THE COURSE?

Interested parties should email csinfosec@ru.ac.za and request to be added to the course notification list. Addresses on this list will be notified when the next intake opens. Normally intakes open in early August and close mid-September in the year prior to entry.

ELIGIBILITY

This qualification is targeted at individuals who are Information Security practitioners and are looking to broaden their knowledge of the field of Information Security. Normal eligibility requirements are a Bachelors or Honours degree and five years of working experience, preferably within the Information Security field. Applicants who have suitable work experience in related fields (such as Network Operations, Auditing and Software Development) who are interested in expanding into the Information Security field are also encouraged to apply. Applicants who do not meet the criteria for formal education must contact the co-ordinator, Prof Barry Irwin (b.irwin@ru.ac.za) to discuss eligibility prior to submission of an application and should indicate this on their Departmental application forms.

APPLICATION PROCESS

Candidates interested in applying need to register via the Rhodes University Online Postgraduate Admissions page once the application process has opened, and submit the necessary documentation. Selection of candidate will be largely based on the Departmental Application form. Candidates will be informed if they have been selected, and will then be required to complete the Rhodes Application process.

Once the University is satisfied that a candidate has met the admission criteria, a formal offer letter will be sent to the candidate.

SELECTION

Selection of candidates into the course will be decided by a group within the department, based on a number of criteria including skills, experience and the motivation provided by applicants in the Departmental Application Form. The department is looking to accept a cross-section of Information Security practitioners in order to create a diverse group. Limited positions are available for the programme.

A prize, generously sponsored by
THINKST
is offered for the best half-thesis in the course.

Masters & Doctorates

The Department of Computer Science has an established and highly respected research school. Research is funded by the Telkom Centre of Excellence in Distributed Multimedia, the National Research Foundation and Rhodes University. Each year, staff members and senior students present their work in national and international forums. Several staff members serve on international advisory boards, standardisation forums, and organising committees.

POSTGRADUATE SCHOOL LEADER

The postgraduate school leader is **Prof Philip Machanick,** Room 101, Hamiton Building (P.Machanick@ru.ac.za).

Queries and comments about the degrees should be addressed, initially, to him.

MASTER OF SCIENCE DEGREES - MSC

The Department of Computer Science offers a pure research MSc degree, for which the entire assessment is by thesis, and an MSc (Applied Computer Science) degree, by course work and short thesis. Since 2011, an MSc (Applied Computer Science) specializing in Information Security has been activated, offering an excellent possibility of further training to practitioners in the industry. Details about this offering can be found elsewhere in this handbook.

Students work on an approved research topic, under the supervision of an experienced researcher, usually contributing towards an established project. Some of the projects offered for this purpose are undertaken in conjunction with external corporations or institutions. These projects are intended to increase the relevance to industry of the degree and usually require additional visits to the institution concerned. The research is written up as a thesis, which is examined by selected area specialists external to the University.

Duration

The residence period for the Master's degree is a minimum of one full year, from February to January of the following year. An MSc thesis typically takes between 18 to 24 months to complete.

Entrance requirements

The normal entrance requirement for an MSc candidate is an appropriate Honours degree, or an equivalent qualification. In exceptional cases a BSc degree and a minimum of three years of relevant experience may be considered for acceptance.

MASTERS DEGREE PROGRESS MILESTONES

These progress milestones are intended to indicate the maximum time that a full-time student should take on each phase of the masters degree (by thesis) in order to successfully complete in a time period not exceeding two years. This allows ample time for examining, corrections, and the submission of a final paper on the work.

Students must produce reports at the end of each quarter of study detailing their progress and the meeting of the milestone requirements. More regular interim progress notes are also encouraged. Requirements for the project web page appear later in this handbook.

Year one - quarter one

At the end of this quarter, students should have:

- written a project proposal (approximately ten pages long)
- presented a seminar on the material to his or her supervisors and peers
- created a web page for the project, containing at least an abstract and description of the project, links to related sites, and a research plan for the remainder of the project.

Year one - quarter two

At the end of this quarter, students should have:

- made some progress in implementing the project
- written an extended abstract for the SATNAC conference's "work in progress" track, outlining the project proposal.

Year one - quarter three

At the end of this quarter, students should have:
- completed a good portion of the implementation of the project and the research should be well underway
- made contact with researchers at other institutions active in the field and received wider feedback on the content and approach of the research project
- presented a written and oral paper on the project to a wider audience than his/her immediate institution.

Year one - quarter four

At the end of this quarter, students should have:
- completed the broad implementation goals of the project
- prepared a demonstration of the work
- submitted a revised plan of action with an implementation schedule for the 2nd year of the project and an updated literature survey
- added considerably to the number of web links to related sites
- prepared a content outline for the written thesis.

Year two - quarter one

At the end of this quarter, students should have:
- made significant progress in writing the thesis
- submitted a rough draft of the thesis to the supervisor for comment
- identified all remaining problem areas that fall within the scope of the study.

Year two - quarter two

At the end of this quarter, students should have:
- submitted a complete draft of the thesis to the supervisor for comment
- made a critical self assessment on the approach of the project and the conclusions drawn
- submitted a paper to the SATNAC conference outlining the project's aims, results and conclusions.

Year two - quarter three

At the end of this quarter, students should have:
- submitted the final thesis in polished form for examination
- published the detailed SATNAC paper on their project web page
- identified a journal, with a view to publishing an enhanced version of the paper
- polished the demonstration system if necessary
- if appropriate, prepared an online demonstration of the their work into their project web page.

Year two - quarter four

At the end of this quarter, students should have:
- completed any updates or corrections required by the examiners, and submitted a final corrected thesis
- presented a final demonstration and verbal report to industrial partners/funders
- submitted a paper to a journal for refereeing, taking into account the feedback of the external examiners.

DOCTOR OF PHILOSOPHY DEGREES - PHD

As for the pure research MSc degree, the PhD degree involves the preparation of a thesis based on original and independent research. The residence period for full time pursuit of a PhD degree is normally 3 years.

A PhD candidate is expected to publish substantially more than an MSc candidate.

Research

CENTRE OF EXCELLENCE

Since 1997, the Department of Computer Science has hosted a Telkom Centre of Excellence, which focuses on distributed multimedia. The Centre brings together the research expertise within the department, contributions from other departments at Rhodes University and at other tertiary institutions (both nationally and internationally), and input from industry partners. The Centre is a good example of triple helix at work, where academia, industry and government come together to pool resources and improve the competiveness of the industry, via the preparation of highly skilled practitioners and the co-development of appropriate technology. The Centre is supported by Telkom - the anchor partner, Coriant, Easttel and Bright Ideas Project 39, and the National Research Foundation (NRF).

The Centre operates under the management of a joint academic/industry steering committee, and has high level representation from the partner industries and from the DTI through the National Research Foundation. The Centre is headed by Prof Alfredo Terzoli. Ms Ingrid Siebörger is the co-ordinator of the Centre and provides invaluable help.

In 2014 a new funding cycle will start, exploring Unified Communications within the context of the convergence of 'legacy' telecommunications and the Internet. The end-points for experimentation are often located in a real-life test-bed network, which was started over ten years ago and was kept up-to-date by continuous technology upgrades. The test-bed includes most current network transport technologies - ISDN, ATM, FIREWIRE, ADSL, WIFI, WiMAX and VSAT - interconnected by an Ethernet fabric supporting IP.

RESEARCH GROUPS

The Department has a number of research and development groups, several of which feed into the realisation of the distributed multimedia platform under the auspices of the Centre of Excellence. They are:

- Convergence (Prof Alfredo Terzoli & Dr Mos Tsietsi)
- Security and Networks (Prof Barry Irwin)
- Distributed Audio (Prof Richard Foss)
- Distributed and Parallel Computing (Prof Karen Bradshaw & Prof George Wells)
- ICT4D (Prof Alfredo Terzoli)
- Bioinformatics (Prof Philip Machanick)

They are described in some detail in the next few sections.

Convergence

This group carries the core activity of the Centre of Excellence, working at the provision of specific support for mobile devices in the previously developed distributed media-service platform. This is done through the investigation of available architectures to specialize appropriately, and the creation of suitable toolkits for the fast creation and deployment of services on the platform. Naturally, particular attention is given to services that integrate audio, video and location information.

Security and Networks (SNRG)

The Security and Networks Research Group (SNRG) efforts are concentrated in the areas of Information Security and Computer Networks. Members of the group are currently involved in a variety of projects, including a selection of visualisation techniques for security metrics, network traffic classification and monitoring, intrusion detection and hardware acceleration of these and other network and security centric tasks using commodity graphics cards.

Distributed Audio

Over the past 5 years, the Distributed Audio group has been involved in the conceptualization and implementation of a connection management and control protocol known as XFN (Cross Fire Network). This protocol is aimed at allowing for comprehensive control over the routing of audio within large sound installations such as stadiums, studios, convention centres, law courts, and live concerts. The project has involved embedded firmware programming of nodes for amplifiers and other professional audio devices, the construction and programming of special purpose routers, and the creation of graphical control software.

Distributed and Parallel Computing

This group has a long history in the department, going back to the origins of the paradigm in the 1980's when transputers were the main focus. More recently, the group's research efforts have focused on various aspects of Linda, a coordination language for parallel/distributed programming, grid computing and general purpose GPU

programming. Emphases is also places on making concurrent programming more readily accessible to non-computer scientists.

ICT4D

Recently, the Centre has started a large, long-term multidisciplinary effort focused on the introduction of ICT in a deep rural area in the Mbashe area, on the Wild Coast in Transkei, in collaboration with the University of Fort Hare. There, technological solutions developed by both Universities are tested in the field, in rather harsh conditions. This research effort, connected closely to the other research pursuits in the department, situates itself in the growing area of ICT for Development. The field work is being structured as a living lab (Siyakhula Living Lab), a vehicle which permits the use of a new research methodology, whereby the services needed by a community are co-created with the community.

Bioinformatics

Prof Philip Machanick researches in bioinformatics and works with academics at Rhodes and other universities on identifying biologically interesting research problems. In this field it is possible at PhD level to obtain a degree in either the field of Computer Science or Bioinformatics.

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