

# CURRICULUM VITAE



**Bill Tucker**

## Personal Details

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Given Names:	William David
Surname:	Tucker
Address:	7th Avenue, Boston Estate, Bellville 7530
Gender:	Male
Marital Status:	Married since 1996 with one child born 2010.
Language Proficiency:	Native speaker: English Basic conversation: Spanish, Mandarin, Afrikaans and South African Sign Language
Health:	Excellent
Nationality:	United States of America with Permanent Residence in South Africa
Digital contact:	btucker@uwc.ac.za <a href="http://www.cs.uwc.ac.za/~btucker">http://www.cs.uwc.ac.za/~btucker</a> Skype: billandlizanne, Facebook: wildbilltucker Twitter: @BillTuckerUWC Google: btucker@uwc.ac.za
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Hobbies:	Rock climbing, surfing, mountain biking, song-writing and guitar.

## BIOGRAPHY

Bill Tucker is an Associate Professor of Computer Science at the University of Western Cape (UWC), starting out as a technical assistant there in 1998. He has several decades of experience in the discipline of Computer Science including both formal studies and work. He is founder and leader of the Bridging Application and Network Gaps (BANG) research group (see <http://www.coe.uwc.ac.za/index.php/BANG/BANG.html>) that conducts applied research into information and communication technology for development (ICT4D). Central research questions include: how to work with and for disadvantaged communities with respect to ICT; how to deploy alternative network and human language technologies for special needs users in resource-limited environments; and how social, technical, economic, legal and environmental factors inform the design, development and evaluation of ICT4D.

Under Bill's direction, BANG launched and maintains two long-running community engagement programmes in partnership with local NGOs and informal governance structures: SignSupport ([www.signsupport.org](http://www.signsupport.org)) is a telephony project for poor Deaf people in the Western Cape based on mobile sign language video, and Zenzeleni (<http://zenzeleni.net>) is a rural telephony project in the remote rural Eastern Cape that provides affordable and legal voice and Internet services with solar-powered wireless mesh networks. Both projects offer unique insights into an array of factors that impact the design and use of technology for communities with special needs and challenging socio-economic conditions.





Bill has lectured introduction to computer programming in Java for 1st year students, 3<sup>rd</sup> and 4<sup>th</sup> year Operating Systems and Computer Networks (with C), and has supervised postgraduate research in Computer Science at Honours, MSc and PhD levels with students from South Africa, Nigeria, Kenya, Malawi, Rwanda, Zambia, Cameroon, Ethiopia, China, India, Thailand, Netherlands, Spain, Zimbabwe, Botswana and Afghanistan.

BANG tends to have a population of 12-15 postgrads, and maintains strong links to the Institute of Social Development (ISD) and Pharmacy at UWC, Computer Science at UCT, Industrial Design Engineering at TU Delft (Netherlands), Electrical Engineering at Universidad Rey Juan Carlos (Spain) and Computer Science at University of Namibia. BANG also has strong ties to activist organisation Right2Know and active working relationships with several Deaf People's Organisations (NPOs): DCCT (Deaf Community of Cape Town), DeafSA (Western Cape provincial) and NID (National Institute for the Deaf, in Worcester).

Bill has a multi-disciplinary background, having earned a Bachelor's degree with a double major in Sociology and Business Administration, and a minor in Computer Science from Trinity University in Texas; a Master of Science in Computer Science from Arizona State University; and a PhD in Computer Science from the University of Cape Town, with a thesis entitled, "Softbridge: A socially aware framework for communication bridges over digital divides". With BANG, Tucker has furthered his PhD trajectory, and now supervises half a dozen PhD students continuing with new dimensions to the work with the same communities.

An American expatriate, and soon to be naturalised as a South African, Bill married a South African citizen in Arizona in 1996. Before moving to Cape Town in 1997, he spent six years as a software engineer for a start-up called UniKix Technologies that started in 1990 with 7 people and grew to 150 by 1996. UniKix was subsequently acquired by Fisher, then Sun Microsystems, and then Oracle. Apparently, some of the software Bill developed for UniKix during the original dot.com boom is still being used today.

## ACADEMIC QUALIFICATIONS

 <p><b>Taipei American School</b> 1983</p>	<p><b>High school matric</b> Taipei, Taiwan</p> <p>Student government: Grade 10: Class representative Grade 11: Class president Grade 12: Student body president (equivalent of SRC president)</p>
 <p><b>TRINITY UNIVERSITY</b> SAN ANTONIO • 1869</p> <p><b>Trinity University</b> 1988</p>	<p><b>Bachelor of Arts</b> San Antonio, Texas, USA</p> <p>Majors: Sociology and Business Administration Minor: Computer Science (2 courses short of a third major)</p>
 <p><b>Arizona State University</b> 1995</p>	<p><b>Master of Science, Computer Science</b> Tempe, Arizona, USA</p> <p>Concentrations: Operating systems, Computer graphics, Computer networks Thesis: HPL Shell - A visual hybrid programming interface to UNIX</p>
 <p><b>University of Cape Town</b> 2009</p>	<p><b>PhD, Computer Science</b> Cape Town, South Africa</p> <p>Dissertation: Softbridge - A socially aware framework for communication bridges over digital divides</p>

## EMPLOYMENT

 <p style="text-align: center;"><b>Taiwan</b> 1979-1987</p>	<p><b>English teacher</b> Kaohsiung and Taipei, Taiwan</p> <ul style="list-style-type: none"> <li>• Taught English as a second language, e.g. TOEFL preparation,</li> <li>• For various language schools and private students, individuals and groups.</li> </ul>
 <p style="text-align: center;"><b>Quelle, Taiwan</b> Summer 1988</p>	<p><b>Computer programmer</b> Taipei, Taiwan</p> <ul style="list-style-type: none"> <li>• Coded an inventory management system in FoxBase Pro.</li> <li>• Assembled and installed network of 80286-based PCs to run the software.</li> </ul>
 <p style="text-align: center;"><b>University of Alberta</b> Fall 1988</p>	<p><b>Teaching assistant</b> Edmonton, Alberta, Canada</p> <ul style="list-style-type: none"> <li>• Taught introductory Pascal programming to undergraduate students in the Business School.</li> <li>• Funded by Computer Science department while studying for Masters.</li> </ul>
 <p style="text-align: center;"><b>Arizona State University</b> 1989-1990</p>	<p><b>Teaching assistant/UNIX systems administrator</b> Phoenix, Arizona</p> <ul style="list-style-type: none"> <li>• Marked C programming assignments for Masters students in the Decision and Information Systems Department</li> <li>• Performed systems administration for research lab of Sun i386 workstations</li> </ul>
 <p style="text-align: center;"><b>UniKix Technologies</b> 1990-1996</p>	<p><b>Software Engineer/Systems Administrator</b> Phoenix, Arizona, USA</p> <ul style="list-style-type: none"> <li>• Firsthand experience of the dot.com boom: I was one of seven initial employees that grew to more than 150 by 1996 with two overseas offices.</li> <li>• My primary role was to design and build KixScan, a graphical user interface to our main product, UniKix, for on-site management and debugging.</li> <li>• My secondary role was to provide systems administration for 14 flavours of UNIX servers, and to manage the development, testing and administrative computing and networking infrastructure (HP and Sun Microsystems).</li> <li>• I was promoted in 1995 to project leader for the KixScan product line, and also to oversee two systems administrators.</li> </ul>



UNIVERSITY of the  
WESTERN CAPE

University of the Western  
Cape  
1998-present

**Associate Professor of Computer Science**  
Bellville, South Africa

1998: Technical assistant  
1998: Lecturer  
2002: Senior Lecturer  
2012: Associate Professor

***TEACHING AND LEARNING (Teaching Statement below)***

- Honours Network Topologies and Honours Network Administration 1998-2002
- Honours UNIX Programming 1999-2001
- 3rd year/Honours Network Programming and 3rd year Computer Networks: 2001-2002
- 2003 sabbatical, 2004 unpaid leave to work on PhD
- 2005 & 2006 research funds used for replacement lecturers to work on PhD
- 2012 1<sup>st</sup> semester sabbatical
- Honours Operating Systems: 2006-2013
- 3<sup>rd</sup> year Operating Systems: 2007-2015, 2017
- 3<sup>rd</sup> year Database: 2016
- 2016 2<sup>nd</sup> semester sabbatical
- 1<sup>st</sup> year Introduction to programming in Java: 2009-2015
- Honours ICT4D: 2017

***RESEARCH (more detail below)***

- NRF Rating: C3 (2013-2018)
- h-index = 16 (Google) (as of Jan 2017)

***LEADERSHIP AND ADMINISTRATION (more detail below)***

- BANG research group founder and director, 2000-present
- Department Postgraduate co-ordinator, 1999-2002
- Faculty Safety committee, 2000-2002
- Faculty Media & Recruitment committee, 2001-2002
- Department Postgraduate committee, 2005-present
- Faculty Higher Degrees committee, 2005-2014, Exco 2014
- SACBANGers coordinator, 2009-2010
- ICTDEVers coordinator, 2012-present (from 2015 with Dr Melissa Densmore @ UCT)
- Faculty Research committee and Ethics sub-committee, 2013
- Faculty Teaching and Learning committee, 2015-present
- Deputy HOD, 1<sup>st</sup> semester 2015

***COMMUNITY ENGAGEMENT (details below)***

- Deaf Community of Cape Town (DCCT) see <http://www.signsupport.org>
- Mankosi Community, Eastern Cape see <http://zenzeleni.net>

## TEACHING STATEMENT

### Students' needs

During my years at UWC, I have seen a *technical* shift in the capabilities, and thus the needs, of the incoming Computer Science students from a standard bell curve distribution to an inverse bell curve that I call the 'Gini curve' that clearly separates the 'haves' from the 'have-nots'. Whereas most incoming students had likely not seen a computer 10-15 years ago, currently half of the 1<sup>st</sup> year students pitch up with their own laptop and the attendant computer literacy skills that accompany owning such a device. The other half displays paucity in computing background similar to the majority of the students 10-15 years ago. I usually enquire about the use of laptops and cell phones with a simple show of hands. Due to my assessment techniques (see below), I also see this GINI-like spread of technical capabilities manifest in terms of written and programming performance.

However, no matter which side of the 'Gini curve', almost all of the students suffer from poor communication skills. As a native speaker of English, and as one who has almost 40 years of teaching experience, having begun teaching English as a foreign language as a teenager living in Taiwan, I am painfully aware of the dreadful English skills across the board: reading, writing and speaking. My assessment techniques (see below) are meant to simultaneously identify and address both technical and language skills because, based on my own experience in both postgraduate studies and in industry, the combination of the two comprise the key to any Computer Science student's future.

By the time students get to Honours level, the 'Gini curve' appears to return to a normal distribution. I continue to ascertain and emphasise both technical and language skills at postgraduate level where, for example, Honours students present a year-long project four times throughout the year to the department, in both a verbal presentation and a written report; each time also pre-presenting to the research group, and supervisor(s). Thus we are continuously able to assess and help improve written and spoken communication skills. We continue to do so at MSc and PhD levels, too, moving on to submitting work-in-progress papers, posters, and papers published in accredited national and international conference proceedings (see publications below as evidence that this is working well). We often emulate the peer review process in house, in courses and in research seminars, because all Computer Science conference proceedings submissions are peer-reviewed, and thereby serve as preparation for subsequent submission to accredited journals.

Moving students from a 3-year BSc degree to postgraduate studies, we lose 75-80% of our students to industry due to the financial pressures; as understandably, most come from poor and disadvantaged backgrounds. These students leave varsity to get a job as soon as they can. I strongly encourage a 4<sup>th</sup> year to 'cement' skills in a professional context, to enable students to gainfully enter the work force with a stronger skillset and/or to pursue advanced postgraduate studies. There are several ways to do this. Firstly, with funding (more on this later). In the classroom, though, I sometimes use programming exercises at 1<sup>st</sup> year to project income based on various degrees, entry-level salaries (based on communication with my graduates) and annual increases. I also show these results to third year students to remind them, at least in part, financially, why they should get an Honours and/or MSc degree. Secondly, I constantly integrate my research activities into undergraduate and postgraduate (Honours) courses to expose students to applications of the basic concepts they are learning in class. Thirdly, due to my industry experience in the American dot com boom of the early 90's, and long term corporate research funding and collaboration in South Africa with Telkom, Cisco, and Aria Technologies, I am also able to integrate a contemporary South African corporate professional experience into my lectures, exercises and postgraduate activities. Finally, through my research group's software development with free and open source software (FOSS), I am also able to integrate FOSS mechanisms of software development into my courses and research activities. We also publish all of our research as Open Access via the UWC Research Repository, making both the software and the outputs available to all.

I am grateful to have had long term THRIP funding which allows bursary payments to Honours students. We have been paying Honours students R20k/annum since 1999 whereas the NRF only upped its Honours support from R8k/annum much later on. Now we 'top up' NRF bursaries, allowing students a 50% increase of their

NRF bursaries tax free, with no strings attached, as our students often qualify for Scarce Skills bursaries. For the promising Honours students that we are able to retain after a BSc, we saw an almost 90% continuation to successful MSc studies for many years, also in part because we fund them amply with soft (restricted) funds, both South African and foreigners alike.

## Teaching and learning

My approach, at both under and post graduate levels, is based on learning by doing, aligned with the notion authentic learning. This is a transmission view to teaching and learning, and is not passive at all. I have been employing situated ‘learning by doing’ techniques since my early days of teaching English in Taiwan: to community college students preparing for the TOEFL, to business people needing English to conduct business with foreigners and to children in a dual language (Chinese/English) kindergarten. In each case, my approach was based on situated conversation, reading and writing in English with an emphasis on two-way conversation. Throughout my undergraduate studies I did not once study or cram for a final exam because I attended class regularly and did the assignments on time. At the University of Alberta and then at Arizona State University, I experienced a wide range of teaching and learning techniques as a student. Subsequently, I adopted the techniques from the only postgraduate course for which I received a B. I got all A’s in Computer Science from the very start. In my opinion, I learned the most in the single course that caused me the most grief. It was a ‘learning by doing’ course, writing an operating system from scratch in assembler language. When I came to UWC, I also brought with me the ‘learning by doing’ approaches gained from six years of industry experience in a professional software engineering environment that stressed design, documentation, source code control, rigorous debugging and testing, and performance profiling; exactly for what my ‘B’ operating systems course had prepared me. Now, after almost 20 years of teaching, learning and conducting research at UWC, I still follow that same approach, and still keep in touch with Professor Emeritus David Pheanis who taught me this way. Needless to say, I have adopted his techniques for my own purposes, and the UWC environment.

My approach to Computer Science education is programming, and more programming; alongside documentation and more documentation. My approach is distinguished in that I insist that a program must work perfectly, and be verified automatically by code I have designed, before it is marked for internal and external *documentation*, i.e. on written English in terms of content, structure, format, spelling and grammar. This sometimes perplexes students (and other lecturers) as students are often awarded partial marks for partially working code. I do not. If code does not work as specified, e.g. only passes a total of 9 out of 10 test cases, a student receives 0 marks, not 9. Working code, e.g. passing all 10 test cases, is a pre-requisite to marking the *documentation* of the code that describes what the code does and how it is done, in English. In the ‘real’ world, this is the norm, as is version control, testing and debugging, and performance profiling. These activities, in addition to authoring user guides and websites in English, are ‘tools of the trade’ that I insist that students learn by doing, and thereby award marks for these tasks above and beyond the task of programming. In the ‘real world’, if code does not work properly, no one will buy it; and in the academic world, if code does not produce results, it is difficult to get a degree and/or publish. I also only use continuous assessment (see below) and refrain from giving a final exam whenever possible. If I must give a final exam, e.g. for 1<sup>st</sup> years, it is a programming rather than a written exam. I am not a fan of supplementary nor special exams. I feel they waste so much time, in fact up to 62 academic days per year at UWC; time that in my opinion would be better spent having an additional or longer semesters to provide more authentic learning opportunities to students that come to university under-prepared, e.g. to retake ‘killer’ courses and also to take additional courses.

*The differences in approach within my department are often stark, and for that I believe the students should be grateful.* They should be exposed to different methods of instruction and assessment, for I have also benefited throughout my education and industry experience from a variety of approaches and methods. We should be teaching students how to *learn* to program, not how to program; and that requires a mixed bag of tools.

## Curriculum development

In Computer Science, there is a curriculum recommended by a combined ACM/IEEE effort. The ACM and IEEE Computer Society are considered the two most prestigious professional computing bodies, both based in

North America. Their computing curriculum recommendation puts us in a very difficult situation as it is intended for a 4 year degree, and we only offer a 3 year BSc in South Africa. As my colleagues can attest, I am very vocal at our annual curriculum development meetings where we consider adapting our curriculum to follow the ACM/IEEE recommendations while at the same time acknowledging the reality that most of our students leave with a 3 year degree that often takes longer than three years, even if not in the four year extended programme, which spreads the first year over two years. We do not give near the same number of courses as our peers in the North.

I feel we should be reorganising existing coursework to ensure that our 3<sup>rd</sup> year BSc students leave with at least an introduction to the recommended topics within the constraints of the module system given to us. For the latest version of the ACM/IEEE recommendation, recently revised, we must include more coursework on security; distributed and parallel processing; and ethics and social issues of computing. I have already reorganised 3<sup>rd</sup> year operating systems and networking courses that were originally designed to ‘hook’ students into staying on for Honours to complete the courses (because most textbooks are designed for a semester course and we only offer term courses, so term 1 would be given, for example, at the end of the 3<sup>rd</sup> year with the follow up in the first term for Honours) so that the 3<sup>rd</sup> year course is more comprehensive (although more shallow). I also suggested that we move the industry-based Cisco CCNA networks course to the evening for revenue generation, and return to a more academic orientation with computer networks (we have done the latter, not the former). I have also suggested that we synthesise distributed computing into the operating systems modules, and security into the computer networks. We introduced an ICT4D course at Honours level in 2012, and I have suggested that we make this a permanent addition to our curriculum, and have it include ethical and social issues of computing, as well as open source software engineering. However, due to the miniscule size of our department (6 permanent academics), such a course could eat too much into my research time. That’s ok. In addition, I have also suggested that a combined networks and operating systems course could easily follow on the combined database/software engineering/human computer interface grouping in terms of an extended year-long programming project at third year level. These ideas are still under discussion within the department, although it looks like the ICT4D course will resurface this year (2017).

I was responsible for redesigning the Honours curriculum and project structure in 1999, to reflect the Software Development Life Cycle (SDLC) best practices *by doing it*, and we continue to successfully use it to this day (see [www.cs.uwc.ac.za](http://www.cs.uwc.ac.za) -> Honours). Actually, I feel it must be updated. It has not changed since 1999!

I am also quite adamant that we further adapt our curriculum to train Computer Scientists *in Africa for Africa*, and not just for the West, as is typically done in Computer Science departments across the country, and the world. We are actually training our students to work in the USA, UK and Australia rather than in the so-called ‘developing world’ in which we inhabit. Our textbooks, even the International Editions, come laden with Western (mostly American) preconceptions, terminology and tacit cultural assumptions that are not necessarily appropriate for our context. For example, the African notion of Ubuntu is very different from the individualist competitive paradigm that comes embedded in our textbooks and our application of them within our courses. As an expatriate, I have bumped my head against these issues, in addition to the very different marking scale, e.g. in South Africa an ‘A’ is 75, whereas in America 75 is a ‘C’, or average. I think we shoot too low. Students just want to pass, i.e. get a 50, not excel. Regarding Ubuntu, I often take an extremely flexible approach to group work, allowing students to choose their own groups, and even change group membership at any time, and actively encourage students organised into groups to discuss assignments freely and openly with each other, even between groups. However, I also stress the ethical considerations of copying work, getting solutions from the Internet and obtaining pirate pdfs of textbooks; as far as I know, I am the only person in the department that asks students to sign a version of the UWC “plagiarism declaration” modified for Computer Science. However, in the ‘real’ software development world, whether corporate or open source, communication is ‘king’, especially with respect to communities in Africa. Thus I feel we need to adapt the Western ACM/IEEE curriculum for African students to link their studies to community needs, and to solve tasks with a thoughtful combination of African and Western approaches, for I feel my students have a foot in each world, and can benefit from that, particularly for our context.



To this end, I frequently edit a given text's examples, both in presentation and in programming examples and exercises, with localisation, e.g. rands instead of dollars and "bond" instead of "mortgage". These are simple ways to situate learning and enhance understanding (of examples). I also take pains to craft exercises that are directly relevant to students' lives, e.g. to project bond interest with and without over-payment and other exercises to handle the vast amounts of money our graduates earn upon graduation because their parents often lack that experience and thus cannot pass it on to their children. We also have exercises that compare cell phones packages, voice over IP vs. standard voice, SMS vs. WhatsApp and even implementing the South African tax code. I also attempt to weave the current political and ICT policy issues into lectures, e.g. before 2005 when voice over Internet Protocol (VoIP), e.g. Skype, was illegal; or handing out the recently gazetted ICT policy document and asking 1<sup>st</sup> year students to comment on it as a marked reading/writing exercise. These are yet other ways to situate learning, especially in a South African context.

To take this localisation even further, I have for several years now advocated that we start programming on cell phones. I mean programming **for** and **on** cell phones. Cell phones are essentially tiny computers, and are ubiquitous in Africa, much more so than in America, for example, where a smart phone was once far and few between while ubiquitous in my classroom. Many of our 1<sup>st</sup> year students have advanced smart phones, and even if they do not, they can group themselves together with someone that has one, or at the very least, can use a simulator on a PC or server in the department. I have started on this path by introducing graphical user interface programming exercises at first year level. Before I started doing that, we only introduced students to GUIs at 2<sup>nd</sup>, and now 3<sup>rd</sup>, year level, which is in my opinion far too late; and flies in the face of ubiquitous GUIs on phones, tablets, laptops, PCs and servers. We need to move with the times, and also with our continent, to provide relevant examples for students to hone their computing skills, on mobile devices in particular.

## **Assessment**

I use only continuous assessment, mainly in two forms: pop quizzes and assignments. Pop quizzes are short (5-10 minutes), individual assessment events that are handed out without notice. I usually give them randomly at the beginning of class to encourage timeliness. It still astounds me that even when pop quizzes become de rigor, students often still arrive 30 minutes late, or later, to sign an attendance roster and depart out the back of the hall, because the pop quiz also doubles as an attendance data collector, although by 3<sup>rd</sup> year the students 'get it'. I tend to drop the two lowest scoring pop quiz marks out of about 12 quizzes per term. There are no make-ups. I always discuss the pop quiz answers immediately after collecting them from students, and use it as a vehicle to manage the pace and learn exactly where students are excelling and struggling. Because each pop quiz is short, we can mark them quickly and make them available to students for nearly same-day feedback. I also use the pop quizzes to deter cheating and copying: we often circulate several versions of the same pop quiz. All versions of the pop quiz look the same, and address the same topics in slightly different ways. That way the answers to the 'master' pop quiz are relevant to all versions, and when marking, we can easily tell who has copied from whom. This deters plagiarism quickly and effectively with only a small extra effort on our part.

Assignments are handed out on a weekly basis. For first year students, we expect the students to complete the assignment in the laboratory at set times, and for 3<sup>rd</sup> year and Honours students, we expect students to complete the assignment on their own time. In both instances, this builds valuable time management skills. Until 2015, all assignments are done in teams: 1<sup>st</sup> years program in teams of 2, 3<sup>rd</sup> years in teams of 3 or 4 and Honours in teams of 2 again. In 2015, I opted to go for individual submissions, even at 1st year, to deter relying on someone to program. I found no changes in the marks (or in cheating prevalence); yet I suspect that more students learn to program on their own. Programming assignments and their rubrics (on the syllabus) are made available on the website of every course (I use Piazza). In brief, I code the assignment myself to exact specifications that I make available to students online, along with a server-based 'driver' that compares the output of my code to student code, given the same inputs. Course tutors validate my code to ensure that it is correct. The inputs are collected in the form of 'testfiles' that can contain up to 100's or 1000's of different forms of input, both good and bad, that the code must deal with. The principle is simple: there is no one way to code a given solution, as programming is as much an art as it is a science. However, the code must produce

specific output given specific input (the science!). I only start to mark coding style and efficiency from 3<sup>rd</sup> year up. For all levels, however, we award marks based on various types of documentation: high level (module/class), low level (function/method) and code level; once a student solution ‘passes the driver’, i.e. produces exactly the same outputs as my solution, given the same inputs (although it can be implemented any way they like). At various times, I also award marks based on the use of source code control, debugging techniques (e.g. debug vs. trace), profiling (number of CPU ticks during execution) and even size of the executable (important for mobile and embedded applications); however, over the years I removed these requirements because students simply didn't do them – at UWC, the majority want 50% not 100%. This is a cultural mindset that I find extremely challenging to combat and change; and I cannot do it alone.

At Honours level, I alternate programming exercises with written and verbal assignments in a ‘mini conference’ format. The process is as follows: write a 2-page paper and give a 5 minute presentation to the class, then expand the paper and presentation based on feedback (from fellow students and myself) to 4 pages and a 10 minute talk with 5 minutes Q&A, respectively, and then a final version back to 2 pages and 5 minutes, respectively. I designed it this way to stress the integration of feedback into the process, and to contrast with the ‘single shot’ paper typically assigned in other courses. Because everyone reads everyone else’s paper, it also introduces the students to peer review. Note that for the 3<sup>rd</sup> year OS course, we also perform peer review between and within groups on program design, e.g. UML, and implementation (code review).

There is no final exam for any of my courses anymore. I must point out that continuous assessment as described above is much more time consuming than a single marking of a long final exam that does not, in my opinion, encourage the student to do anything at all except cram for a single assessment. That said, I am not opposed to combining continuous assessment with a final exam, and I did this from 1998-2002. However, after returning from sabbatical in 2005, I have avoided final exams as I feel that pure continuous assessment does a much better job with respect to teaching and learning, particularly in setting expectations for a course and its goals (to learn something by doing instead of just aiming to pass an exam) and also relieves me from the double burden of both continuous and final assessment. Unfortunately for me, this approach is somewhat non-traditional and not catered for by UWC's marks administration system, and I therefore must be ‘creative’ to fit pure continuous assessment into a system that does not actually allow for it.

### **Institutional, administrative and committee work on teaching and learning**

Since 2010, I have volunteered every year to serve on the Faculty T&L committee. However, it was decided that it was more strategic for me to continue serving on the Faculty Higher Degrees committee to serve the department’s needs and so as not to overload my administrative load so I may concentrate on maintaining the critical mass of research activities in our department. I finally managed to join the T&L committee in 2015, and am still learning the ropes.

### **Scholarship of teaching and learning**

As started above, my approach to T&L is authentic and situated; and iteratively evolves incrementally, aligned with experimental empirical Computer Science where we iteratively make small incremental improvements to algorithms and prototypes to achieve a given objective based on observable results. I have co-authored an article based on ‘learning by doing’ in the African context, in terms of both courseware and research efforts, because our MSc system markedly differs from the course-based MSc prevalent in much of the world, several years ago with colleagues from UCT and the bridges.org NGO. The paper was accepted for a special issue in the Information Technology and International Development (ITID) journal, and then the special issue did not materialise. At some point, we should probably revise and submit the article locally to SACLA or SAICSIT.

Recently, my work with the Deaf community is featured as a case study in perhaps the world’s most popular textbook on human computer interaction (see Interaction Design 3<sup>rd</sup> edition), the same textbook we use for our own HCI course. The case study, at least the extended online version, is essentially an adaptation of one of the case study appendices from my PhD.

## **Professionalism of teaching and learning**

My engagement with T&L structures has mostly been through my peers in the department, and I hope from 2015, engagement with peers across the Science Faculty. I am constantly consulting my colleagues about this or that assignment, lecture or demonstration technique. I also engage with my students formally by having them write a simple course evaluation at the end of each module (complete class examples are included with the attached example course appendices), and we act upon these course evaluations, e.g. having lecturers take an entire 1<sup>st</sup> year term class instead of alternating weeks, and in 2015 I even relented and gave in to student pressure (after 17 years!) for partial marks for a programming assignment that didn't work; albeit on my own terms: a program that works gives 50% and the documentation the remaining 50%, i.e. only 50% is possible if the code doesn't work.

I have attended every Computer Science annual meeting since 1998 where we predominantly engage regarding the curriculum at both undergraduate and postgraduate levels. I am most involved with the postgraduate research, and even though I am only since 2012 in a senior position, I have been the most senior de facto researcher in my department with respect to volume of graduates, publications and funding. I also offered to take 1<sup>st</sup> year lectures from 2009 which senior academics tend not to do. I enjoy it immensely! I am an advocate of using technologies in learning, for hardware, e.g. multivendor equipment in the lab so that students learn principles rather than one vendor's approach; and for software, e.g. I use Facebook, LinkedIn, Google groups and Piazza on a regular basis to conduct both course and research activities with students. I am a supporter of FOSS and encourage all of my postgraduate students to get involved with an active online FOSS community, e.g. the mesh potato project with [www.villagetelco.org](http://www.villagetelco.org). To me, open source and open documentation, even open hardware, is the 'new' way for Computer Science, and prepares students for both advanced postgraduate studies and work in industrial, governmental and academic sectors. In my opinion, we should also probably be moving toward open courseware, as well, e.g. the Open University programmes and Kahn Academy.

## **Evaluation of teaching and learning**

All of my 3rd year and Honours level modules are externally evaluated, and I meet personally with examiners to discuss courses in detail, to measure up against myself annually, and also with respect to how courses are given and organised at examiners' respective universities, e.g. UCT and Stellenbosch. I also consistently conduct course evaluations with students by asking the same three questions: What did you like about the course? What did you dislike about the course? How would you change the course? I read these, and make corresponding small adjustments each year. I make an effort to read between the lines, e.g. when students complain about how hard assignments are, or how unfair a pop quiz is, I know I am doing the right thing because I receive email after several years thanking me for making my courses so difficult (sometimes I don't even have to wait that long), or for example when students complain about how I bring national politics into discussions about computing principles, e.g. socialist vs. despotic process scheduling in light of contemporary African politics, or even the use of social media in a politically responsible way, e.g. the Arab Spring or #FeesMustFall. I encourage my students to engage with their world, in and out the classroom, and often talk and joke about politics during a lecture, yet more seriously engage them as to how computing can be used in the political and socio-economic realms of our lives.

If I could, I would only give a course for 3-5 years and then move on, and apply techniques to other source material. I would actually like to lecture courses I did not take as a student, to widen my foundation knowledge. Even when I do take a course for a long period of time, e.g. the operating systems courses, I try to avoid doing the same things in the same way every year. Yet instead of making big changes, I make little ones. This is the way of experimental and empirical Computer Science, to continually making small iterative changes to assess and improve.

## PUBLICATIONS

Peer reviewed journal articles	Book sections	Peer reviewed international conference proceedings	Peer reviewed national conference proceedings	Peer reviewed conference posters	Other publications	Conference papers presented
7	3	27	49	20	6	4

### ***JOURNAL ARTICLES***

1. Chininthorn, P., Glaser, M., Tucker, W. D., & Diehl, J. C. (2016). Exploration of Deaf people's health information sources and techniques for information delivery in Cape Town: A qualitative study for the design and development of a mobile health application. *JMIR Human Factors*, 3(2), e28. ISSN: 2292-9495.
2. Dearden, A., & Tucker, W. D. (2016). Moving ICTD Research Beyond Bungee Jumping: Practical Case Studies and Recommendation. *IEEE Technology and Society Magazine*, September, 35(3): 36–43. ISSN: 1932-4529.
3. Rey-Moreno, C., Blignaut, R., May, J., & Tucker, W. D. (2016). An in-depth study of the ICT ecosystem in a South African rural community: unveiling expenditure and communication patterns. *Information Technology for Development (ITD)*, 22(sup1): 101–120. ISSN: 0268-1102.
4. Rey-Moreno, C., Sabiescu, A. G., Siya, M. J., & Tucker, W. D. (2015). Local Ownership, Exercise of Ownership and Moving from Passive to Active Entitlement: A practice-led inquiry on a rural community network. *The Journal of Community Informatics (JOCI)*, 11(2). ISSN: 1712-4441. <http://hdl.handle.net/10566/1609>
5. Blake, E., Tucker, W., & Glaser, M. (2014). Towards communication and information access for Deaf people. *South African Computer Journal (SACJ)*, (54), 10–19. ISSN: 1015-7999. <http://hdl.handle.net/10566/1424>
6. Bidwell, N. J., Siya, M., Marsden, G., Tucker, W. D., Tshemese, M., Gaven, N., ... Eglinton, K. A. (2013). Walking and the Social Life of Solar Charging in Rural Africa. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 20(4), Article 22, 33 pages. ISSN: 1073-0516.
7. Blake, E. H., & Tucker, W. D. (2006a). User Interfaces for Communication Bridges Across the Digital Divide. (A. Nijholt & T. Nishida, Eds.) *AI & Society*, 20(2), 232–242. ISSN: 0951-5666. <http://hdl.handle.net/10566/1054>

### ***BOOK SECTIONS***

1. Tucker, W. D. (2015). Beyond traditional ethics when developing assistive technology for and with Deaf people in developing regions. In M. Hersh (Ed.), *Ethical Engineering for International Development and Environmental Sustainability* (pp. 293-324), Springer: London. ISBN: 978-1-4471-6617-7. <http://hdl.handle.net/10566/1946>
2. Tucker, W. D., & Westerveld, R. (2015). ICT4D and Local Access. In R. Mansell & H. A. Peng (Eds.), *The International Encyclopedia of Digital Communication and Society* (1st Ed., pp. 365-368). John Wiley & Sons. ISBN: 9781118767771. <http://hdl.handle.net/10566/1680>
3. Blake, E. H., Tucker, W. D., Glaser, M., & Freudenthal, A. (2011). Deaf Telephony: Community-based Co-design. In Y. Rogers, H. Sharp, & J. Preece (Eds.), *Interaction Design: Beyond Human-Computer Interaction* (3rd Ed., pp. 412–413). Wiley. ISBN: 978-0470665763. <http://hdl.handle.net/10566/658>.

### ***ITEMS IN PEER REVIEWED INTERNATIONAL CONFERENCE PROCEEDINGS***

1. Tucker, W. D. (2017). Amplifying Positive Deviance with ICT. In J. Choudrie (Ed.), *Information and Communication Technologies for Development (ICT4D 2017, IFIP AICT 504)* (pp. 206–217). Yogyakarta, Indonesia: Springer. [http://doi.org/10.1007/978-3-319-59111-7\\_18](http://doi.org/10.1007/978-3-319-59111-7_18)

2. Hussen, T. S., Bidwell, N. J., Rey-Moreno, C., & Tucker, W. D. (2016). Gender and Participation: Critical Reflection on Zenzeleni Networks in Mankosi, South Africa. In Proc. *AfriCHI* (pp. 12–23). Nairobi, Kenya: ACM. Nov 21-25. ISBN: 978-1-4503-4830-0. <http://hdl.handle.net/10566/2856>
3. Chininthorn, P., Glaser, M., Diehl, J. C., & Tucker, W. D. (2015). Design Direction Analysis for a Health Knowledge Transfer System for Deaf People and Health Professionals in Cape Town. In Proc. *First International Conference on Smart Portable, Wearable, Implantable and Disability-oriented Devices and Systems* (SPWID 2015). Brussels, Belgium: IARIA. Jun 21-26. ISBN: 978-1-61208-446-6.
4. Dearden, A., & Tucker, W. D. (2015). From ICT Research to Development Outcomes: The Ethical Limits of Bungee Research. In Proc. *IEEE International Symposium on Technology and Society (ISTAS)* (1-6). Dublin, Ireland: IEEE. ISBN: 978-1-4799-8283-7.
5. Rey-Moreno, C., Tucker, W. D., Cull, D., & Blom, R. (2015). Making a Community Network Legal within the South African Regulatory Framework. In *Seventh International Conference on Information and Communication Technologies and Development (ICTD '15)* (Article 57). Singapore: ACM Press, NY, NY. ISBN: 978-1-4503-3163-0. <http://hdl.handle.net/10566/1948>
6. Meeran, M. T., & Tucker, W. D. (2014). An analysis of voice over Internet Protocol in wireless mesh networks. In Proc. *Wireless Communications, Vehicular Technology, Information Theory and Aerospace & Electronic Systems (VITAE)* (pp. 1–5). Aalborg, Denmark: IEEE. ISBN: 978-1-4799-4626-6. <http://hdl.handle.net/10566/1426>
7. Rey-Moreno, C., Ufitamahoro, M. J., Venter, I. M., & Tucker, W. D. (2014). Co-designing a Billing System for Voice Services in Rural South Africa: Lessons Learned. In Proc. *Fifth International Symposium on Computer for Development (ACM DEV-5)* (pp. 83-92). San Jose, CA, USA: ACM Press, NY, NY. ISBN: 978-1-4503-2936-1. <http://hdl.handle.net/10566/1425>
8. Motlhabi, M. B., Tucker, W. D., Parker, M., & Glaser, M. (2013). Improving Usability and Correctness of a Mobile Tool to help a Deaf person with Pharmaceutical Instruction. In Proc. *4th Annual Symposium on Computing for Development (DEV-4)* (Article 13, 10 pages). Cape Town, South Africa: ACM. ISBN: 978-1-4503-2558-5. <http://hdl.handle.net/10566/1102>
9. Rey-Moreno, C., Roro, Z., Siya, M. J., & Tucker, W. D. (2013). Community-based solar power revenue alternative to improve sustainability of a rural wireless mesh network. In Proc. *Sixth International Conference on Information and Communications Technologies and Development (ICTD)* (Vol. 2, pp. 132–135). Cape Town, South Africa: ACM. ISBN: 978-1-4503-1907-2. <http://hdl.handle.net/10566/1103>
10. Rey-Moreno, C., Tucker, W. D., Bidwell, N. J., Roro, Z., Siya, M. J., & Simo-Reigadas, J. (2013). Experiences, challenges and lessons from rolling out a rural WiFi mesh network. In Proc. *3rd Annual Symposium on Computing for Development (ACM DEV)* (Article 11, 10 pages). Bangalore, India: ACM. ISBN: 978-1-4503-1856-3. <http://hdl.handle.net/10566/676>
11. Chininthorn, P., Glaser, M., Freudenthal, A., & Tucker, W. D. (2012). Mobile Communication Tools for a South African Deaf Patient in a Pharmacy Context. In P. Cunningham & M. Cunningham (Eds.), Proc. *Information Society Technologies - Africa (IST-Africa)*. Dar es Salaam, Tanzania: IIMC International Information Management Corporation. ISBN: 978-1-905824-34-2. <http://hdl.handle.net/10566/654>
12. Kobo, H. I., & Tucker, W. D. (2012). Situation-aware routing for wireless mesh networks with mobile nodes. In P. Cunningham & M. Cunningham (Eds.), Proc. *Information Society Technologies - Africa (IST-Africa)*. Dar es Salaam, Tanzania: IIMC International Information Management Corporation. ISBN: 978-1-905824-34-2. <http://hdl.handle.net/10566/585>
13. Reitmaier, T., Bidwell, N. J., Siya, M. J., Tucker, W. D., & Marsden, G. (2012). Communicating in designing an oral repository for rural African villages. In P. Cunningham & M. Cunningham (Eds.), Proc. *Information Society Technologies - Africa (IST-Africa)*. Dar es Salaam, Tanzania: IIMC International Information Management Corporation. ISBN: 978-1-905824-34-2. <http://hdl.handle.net/10566/693>
14. Rey-Moreno, C., Roro, Z., Siya, M. J., Simó-Reigadas, J., Bidwell, N. J., & Tucker, W. D. (2012). Towards a Sustainable Business Model for Rural Telephony. In Proc. *3rd International Workshop on Research on ICT for Human Development* (pp. 208–220). Pisac, Peru. ISBN: 978-84-15413-17-2. <http://hdl.handle.net/10566/1101>
15. Bidwell, N. J., Lalmas, M., Marsden, G., Dlutu, B., Ntlangano, S., Manjingolo, A., Tucker, W. D., Jones

- M., Robinson S., Vartiainen E. and Klampanos I. (2011). Please call ME.N.U.4EVER: Designing for “Callback” in Rural Africa. In Proc. *International Workshop on Internationalisation of Products and Systems (IWIPS)* (pp. 117–137). Kuching, Malaysia. ISBN: 0-9722184-6-7.  
<http://hdl.handle.net/10566/1053>
16. Tucker, W. D., & Blake, E. H. (2010). Abstractions for designing and evaluating communication bridges for people in developing regions. In Proc. *First Annual Symposium on Computing for Development (ACM DEV) (Article 8, 10 pages)*. Cambridge, UK: ACM Press. ISBN: 978-1-4503-0473-3.  
<http://hdl.handle.net/10566/1422>
  17. Tucker, W. D., & Blake, E. H. (2008). The role of Outcome Mapping in developing a rural telemedicine system. In P. Cunningham & M. Cunningham (Eds.), Proc. *Information Society Technologies - Africa (IST-Africa)*. Windhoek, Namibia: IIMC International Information Management Corporation. ISBN: 978-1-905824-07-6. <http://hdl.handle.net/10566/525>
  18. Ma, Z. Y., & Tucker, W. D. (2007). Asynchronous video telephony for the Deaf. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 134–139). Mauritius: Telkom. ISBN: 978-0-620-39350-8. <http://hdl.handle.net/10566/486>
  19. Tucker, W. D., Blake, E. H., Marsden, G., Pearson, M., & Westerveld, R. (2007). Reflection on three years of rural wireless Internet Protocol communication. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 452–457). Mauritius: Telkom. ISBN: 978-0-620-39350-8. <http://hdl.handle.net/10566/487>
  20. Blake, E. H., & Tucker, W. D. (2006b). Socially Aware Software Engineering for the Developing World. In P. Cunningham & M. Cunningham (Eds.), Proc. *Information Society Technologies - Africa (IST-Africa)*. Pretoria, South Africa: IIMC International Information Management Corporation. ISBN: 1-905824-01-7. <http://hdl.handle.net/10566/662>.
  21. Adesemowo, A. K., & Tucker, W. D. (2005). Instant messaging on handhelds: an affective gesture approach. In Proc. *Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists (SAICSIT)* (pp. 244–251). White River, South Africa: SAICSIT in association with ACM. ISBN: 1-59593-258-5. <http://hdl.handle.net/10566/464>
  22. Hersh, M. A., & Tucker, W. D. (2005). Ethics and mono-disciplinarity: Positivism, informed consent and informed participation. In P. Zitek (Ed.), Proc. *16th International Federation of Automatic Control World Congress* (Vol. 16(1)). Prague, Czech Republic: Elsevier. doi:10.3182/20050703-6-CZ-1902.02317. ISBN: 978-3-902661-75-3. <http://hdl.handle.net/10566/466>
  23. Adesemowo, A. K., & Tucker, W. D. (2004a). Affective gesture feedback Instant Messaging on handhelds. In Proc. *Fifth International Conference on 3G Mobile Communication Technologies* (pp. 499–503). Savoy Place, London, United Kingdom: IEE. doi:10.1049/cp:20040725, ISBN: 0-86341-388-9.  
<http://hdl.handle.net/10566/1095>
  24. Blake, E. H., & Tucker, W. D. (2004). Bridging Communications Across the Digital Divide. In A. Nijholt & T. Nishida (Eds.), Proc. *3rd Workshop on Social Intelligence Design* (pp. 29–38). Enschede, Netherlands: CTIT. ISBN: 90-75296-12-6. <http://hdl.handle.net/10566/617>
  25. Chetty, M., Tucker, W. D., & Blake, E. H. (2004a). Developing locally relevant applications for rural areas: a South African example. In G. Marsden, P. Kotzé, & A. Adesina-Ojo (Eds.), Proc. *Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists (SAICSIT)* (pp. 234–239). Stellenbosch, South Africa: SAICSIT in association with ACM. ISBN: 1-58113-982. <http://hdl.handle.net/10566/532>
  26. Glaser, M., & Tucker, W. D. (2004). Telecommunications bridging between Deaf and hearing users in South Africa. In Proc. *Conference and Workshop on Assistive Technologies for Vision and Hearing Impairment (CVHI)*. Granada, Spain. <http://hdl.handle.net/10566/593>
  27. Tucker, W. D. (2004). Connecting bridges across the digital divide. *CHI '04 extended abstracts on Human factors in computing* (pp. 1039–1040). Vienna, Austria: ACM. doi:10.1145/985921.985968. ISBN: 1-58113-703-6. <http://hdl.handle.net/10566/591>

#### **ITEMS IN PEER REVIEWED LOCAL CONFERENCE PROCEEDINGS**

1. Petersen, F., Pather, S., & Tucker, W. D. (2017). Towards a model for user-centred design using a positive deviance approach: A case for diabetes self-management. In S. Kabanda and W. Chigona (Eds.), Proc. *African Conference on Information Systems and Technology (ACIST)*. Cape Town, South Africa. ISSN: 2467 8988.
2. Abdalla, T., Rey-Moreno, C., Tucker, W. D., & Bagula, A. (2015). Clustered Multi-layer Multi-protocol Wireless Mesh Networks. In F. Otten & R. Balmahoon (Eds.), Proc. *Southern Africa Telecommunication Networks & Applications Conference (Vol. I, pp. 99–104)*. Hermanus, South Africa: Telkom. ISBN: 978-0-620-67151-4. <http://hdl.handle.net/10566/1674>
3. Duma, L., Chininthorn, P., Glaser, M., & Tucker, W. D. (2015). Usability of an Authoring Tool for Generalised Scenario Creation for SignSupport. In F. Otten & R. Blamahoon (Eds.), Proc. *Southern Africa Telecommunication Networks & Applications Conference (Vol. 1, pp. 255–260)*. Hermanus, South Africa: Telkom. ISBN: 978-0-620-67151-4. <http://hdl.handle.net/10566/1648>
4. Rey-Moreno, C., Tucker, W. D., & Simo-Reigadas, J. (2014). Optimisation of SlotTime for a single-radio Mid-Range Multi-hop Wireless Mesh Network. In R. Volkwyn (Ed.), Proc. *SATNAC* (pp. 49–54). Port Elizabeth, South Africa: Telkom. ISBN: 978-0-620-61966-0. <http://hdl.handle.net/10566/1423>
5. Tiemeni, G. L. N., Venter, I. M., & Tucker, W. D. (2014a). Rural Wireless Mesh Network Analysis on Mobile Devices. In R. Volkwyn (Ed.), Proc. *SATNAC* (pp. 307–312). Port Elizabeth, South Africa: Telkom. ISBN: 978-0-620-61966-0. <http://hdl.handle.net/10566/1427>
6. Tiemeni, G. L. N., Venter, I. M., & Tucker, W. D. (2014b). Performance Evaluation of a Wireless Network using a VoIP Traffic Generator on a Mobile Device. In Proc. *SAICSIT* (pp. 297–303). Centurion, South African: ACM Press, NY, NY. ISBN: 978-1-4503-3246-0. <http://hdl.handle.net/10566/1421>
7. Ufitamahoro, M. J., Venter, I. M., Rey-Moreno, C., & Tucker, W. D. (2014). A participatory design for a billing system: A South African case study of a community based telephony system. In Proc. *SAICSIT* (pp. 270-275). Centurion, South Africa: ACM Press, NY, NY. ISBN: 978-1-4503-3246-0. <http://hdl.handle.net/10566/1428>
8. Mauwa, H. R., & Tucker, W. D. (2013). Security of a Mesh Potato Network in Ad Hoc Mode. In R. Volkwyn (Ed.), Proc. *Southern African Telecommunication Networks & Applications Conference* (pp. 431-432). Stellenbosch, South Africa: Telkom. ISBN: 978-0-620-57882-0. <http://hdl.handle.net/10566/1096>
9. Motlhabi, M. B., Glaser, M., Parker, M., & Tucker, W. D. (2013). SignSupport: A Limited Communication Domain Mobile Aid for a Deaf patient at the Pharmacy. In R. Volkwyn (Ed.), Proc. *Southern African Telecommunication Networks & Applications Conference* (pp. 173–178). Stellenbosch, South Africa: Telkom. ISBN: 978-0-620-57882-0. <http://hdl.handle.net/10566/1120>
10. Tiemeni, G.L.N., Venter, I.M., Rey-Moreno, C., and Tucker, W. D. (2013). A mobile platform traffic generator for network performance evaluation. In R. Volkwyn (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference* (pp. 447-448). Stellenbosch, South Africa. ISBN: 978-0-620-57882-0. <http://hdl.handle.net/10566/1119>
11. Chitedze, Z., & Tucker, W. D. (2012). FHMIPv6-based Handover for Wireless Mesh Networks. In S. Scriba (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 135–139). George, South Africa: Telkom. ISBN: 978-0-620-53713-1. <http://hdl.handle.net/10566/424>
12. Roro, Z., Rey-Moreno, C., Tucker, W. D., & Siya, M. J. (2012). Socio-economic aspects of voice-over-IP technology in rural SA. In S. Scriba (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 497–498). George, South Africa: Telkom. ISBN: 978-0-620-53713-1. <http://hdl.handle.net/10566/594>
13. Chitedze, Z., & Tucker, W. D. (2011). Mobile vertical handover between infrastructure and ad hoc Wi-Fi networks. In S. Scriba (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 355–360). East London, South Africa: Telkom. ISBN: 978-0620-50893-3. <http://hdl.handle.net/10566/700>
14. Kobo, H. I., Tucker, W. D., & Liu, X. M. (2011). Situation-aware routing based on link quality for static mesh networks with mobile nodes. In S. Scriba (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 299–304). East London, South Africa: Telkom. ISBN: 978-0620-50893-3. <http://hdl.handle.net/10566/699>
15. Kobo, H. I., Tucker, W. D., & Norman, M. (2010). Internet protocol-based push to talk. In D. Browne (Ed.),

- Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 243–248). Stellenbosch, South Africa: Telkom. ISBN: 978-0-620-47934-9. <http://hdl.handle.net/10566/623>
16. Mutemwa, M. & Tucker, W. D. (2010). A mobile Deaf-to-hearing communication aid for medical diagnosis. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 379–384). Stellenbosch, South Africa: Telkom. ISBN: 978-0-620-47934-9. <http://hdl.handle.net/10566/738>
  17. Wang, Y. Y., & Tucker, W. D. (2010). Browser-based sign language communication. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 71–76). Stellenbosch, South Africa: Telkom. ISBN: 978-0-620-47934-9. <http://hdl.handle.net/10566/739>
  18. Zulu, D., & Tucker, W. D. (2010). Call capacity for voice over Internet Protocol on wireless mesh networks. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 505–506). Stellenbosch, South Africa: Telkom. ISBN: 978-0-620-47934-9. <http://hdl.handle.net/10566/618>
  19. Mutemwa, M., Tucker, W. D., & Norman, M. (2009). Cell phone notification via Bluetooth for Web 2.0 applications. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 115–120). Swaziland: Telkom. ISBN: 978-0-620-44107-0. <http://hdl.handle.net/10566/530>
  20. Poroye, A., Tucker, W. D., & Norman, M. (2009a). Secure contactless smart card transactions on mobile devices. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 471–472). Swaziland: Telkom. ISBN: 978-0-620-44107-0. <http://hdl.handle.net/10566/540>
  21. Wang, Y. Y., & Tucker, W. D. (2009). Browser-based video communication for Deaf people. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 489–490). Swaziland: Telkom. ISBN: 978-0-620-44107-0. <http://hdl.handle.net/10566/622>
  22. Yi, L., & Tucker, W. D. (2009). Automatic voice relay with open source Kiara. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 143–148). Swaziland: Telkom. ISBN: 978-0-620-44107-0. <http://hdl.handle.net/10566/619>
  23. Daniels, F. N., & Tucker, W. D. (2008). Reliable communication across ad hoc networks. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 449–454). Wild Coast, Eastern Cape, South Africa: Telkom. ISBN: 978-0-620-41696-2. <http://hdl.handle.net/10566/508>
  24. Ma, Z. Y., & Tucker, W. D. (2008). Adapting x264 to asynchronous video telephony for the Deaf. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 127–132). Wild Coast Sun, Eastern Cape, South Africa: Telkom. ISBN: 978-0-620-41696-2. <http://hdl.handle.net/10566/511>
  25. Yi, L., & Tucker, W. D. (2008). Kiara: an open source SIP system to support Deaf telephony. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (pp. 537–538). Wild Coast Sun, Eastern Cape, South Africa: Telkom. ISBN: 978-0-620-41696-2. <http://hdl.handle.net/10566/523>
  26. Maunder, A., Marsden, G., & Tucker, W. D. (2006). Evaluating the relevance of the “Real Access” criteria as a framework for rural HCI research. In D. van Greunen (Ed.), Proc. *5th Conference on Human Computer Interaction in Southern Africa* (pp. 75–78). Cape Town, South Africa: ACM. ISBN: 1-59593-280-1. <http://hdl.handle.net/10566/663>.
  27. Julius, E. P., & Tucker, W. D. (2005). Guaranteed delivery of semi-synchronous IP-based communication. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 1, pp. 407–412). Drakensburg, South Africa: Telkom. ISBN: 0-620-34907-7. <http://hdl.handle.net/10566/509>
  28. Wu, W., Radovanovic, A., & Tucker, W. D. (2005). SIP presence location service. Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 1, pp. 371–376). Drakensburg, South Africa. ISBN: 0-620-34907-7. <http://hdl.handle.net/10566/494>
  29. Adesemowo, A. K., & Tucker, W. D. (2004b). Instant Messaging on handhelds: affective feedback. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference*



- (SATNAC) (Vol. 2, pp. 295–296). Stellenbosch, South Africa: Telkom. ISBN: 0-620-32632-8. <http://hdl.handle.net/10566/548>
30. Chetty, M., Tucker, W. D., & Blake, E. H. (2004b). Telemedicine using VoIP combined with a store and forward approach. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 53–56). Stellenbosch, South Africa: Telkom. ISBN: 0-620-32632-8. <http://hdl.handle.net/10566/621>
  31. Glaser, M., Tucker, W. D., & Mashao, D. (2004). Preparation of Deaf end-users and the Softbridge for semi-automated relay trials. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 255–256). Stellenbosch, South Africa: Telkom. ISBN: 0-620-32632-8. <http://hdl.handle.net/10566/447>
  32. Julius, E. P., & Tucker, W. D. (2004). Guaranteed delivery of semi-synchronous IP-based communication. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 329–330). Stellenbosch, South Africa: Telkom. ISBN: 0-620-32632-8. <http://hdl.handle.net/10566/463>
  33. Sun, T., & Tucker, W. D. (2004). A Softbridge with carrier grade reliability using JAIN SLEE. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 251–252). Stellenbosch, South Africa: Telkom. ISBN: 0-620-32632-8. <http://hdl.handle.net/10566/592>
  34. Tucker, W. D., Blake, E. H., & Marsden, G. (2004). Open User Interconnect and Quality of Communication. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 261–262). Stellenbosch, South Africa: Telkom. ISBN: 0-620-32632-8. <http://hdl.handle.net/10566/485>
  35. Vuza, X., & Tucker, W. D. (2004). An IP based multimodal semi-synchronous rural telehealth service: adding video messaging and conferencing to MuTI. In D. Browne (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 289–290). Stellenbosch, South Africa: Telkom. ISBN: 0-620-32632-8. <http://hdl.handle.net/10566/435>
  36. Adesemowo, A. K., & Tucker, W. D. (2003). Handheld fast-track feedback Instant Messaging. In Z. Miklos (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 289–290). George, South Africa: Telkom. ISBN: 0-620-30948-2. <http://hdl.handle.net/10566/539>
  37. Benjamin, A., & Tucker, W. D. (2003). Floor control arbitration for a hybrid voice/text web-board. In Z. Miklos (Ed.), Proc. *Southern African Telecommunications Networks and Application Conference (SATNAC)* (Vol. 2, pp. 301–302). George, South Africa: Telkom. ISBN: 0-620-30948-2. <http://hdl.handle.net/10566/538>
  38. Chetty, M., Tucker, W. D., & Blake, E. H. (2003). Using voice over IP to bridge the digital divide - a critical action research approach. In Z. Miklos (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 291–292). George, South Africa: Telkom. ISBN: 0-620-30948-2. <http://hdl.handle.net/10566/479>
  39. Lewis, J., Tucker, W. D., & Blake, E. H. (2003). SoftBridge: a multimodal Instant Messaging bridging system. In Z. Miklos (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 1, pp. 235–240). George, South Africa: Telkom. ISBN: 0-620-30948-2. <http://hdl.handle.net/10566/537>
  40. Tucker, W. D., Glaser, M., & Lewis, J. (2003). SoftBridge in action: the first Deaf telephony pilot. In Z. Miklos (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 293–294). George, South Africa: Telkom. ISBN: 0-620-30948-2. <http://hdl.handle.net/10566/535>
  41. Lewis, J., Tucker, W. D., & Blake, E. H. (2002). SoftBridge: an architecture for building IP-based bridges over the digital divide. In Z. Miklos (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 383–386). Drakensburg, South Africa: Telkom. ISBN: 0-620-29432-9. <http://hdl.handle.net/10566/606>
  42. Penton, J., Tucker, W. D., & Glaser, M. (2002). Telgo323: an H.323 bridge for Deaf telephony. In Z. Miklos (Ed.), Proc. *Southern African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 309–313). Drakensburg, South Africa: Telkom. ISBN: 0-620-29432-9.

- <http://hdl.handle.net/10566/612>
43. Glaser, M., & Tucker, W. D. (2001). Web-based telephony bridges for the Deaf. In Proc. *South African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 672–677). Wild Coast Sun, South Africa: Telkom. ISBN: 0-620-27769-6. <http://hdl.handle.net/10566/613>
  44. Jeffries, M., & Tucker, W. D. (2001). An interoperable signaling solution between SIP and H.323. In Proc. *South African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 689–693). Wild Coast Sun, Eastern Cape, South Africa: Telkom. ISBN: 0-620-27769-6. <http://hdl.handle.net/10566/465>
  45. Naidoo, V. D., & Tucker, W. D. (2001). Policy-based network management of legacy equipment in Next Generation Networks. In Proc. *South African Telecommunication Networks and Applications Conference (SATNAC)* (Vol. 2, pp. 602–606). Wild Coast Sun, Eastern Cape, South Africa: Telkom. ISBN: 0-620-27769-6. <http://hdl.handle.net/10566/519>
  46. Jeffries, M., & Tucker, W. D. (2000). An interoperable signaling solution for IP-based Next Generation Networks. In Proc. *2nd Annual South African Telecommunications Networks and Applications Conference (SATNAC)*. Stellenbosch, South Africa: Telkom. ISBN: 0-620-26497-7. <http://hdl.handle.net/10566/425>
  47. Naidoo, V. D., & Tucker, W. D. (2000). An Internet paradigm approach to policy-based network management of legacy kit for VoIP services in Next Generation Networks. In Proc. *2<sup>nd</sup> Annual South African Telecommunications Networks and Applications Conference (SATNAC)*. Stellenbosch, South Africa: Telkom. ISBN: 0-620-26497-7. <http://hdl.handle.net/10566/449>
  48. Paulse, T. M., & Tucker, W. D. (2000). A framework and toolkit for the collection and analysis of QoS statistics for voice traffic in Next Generation Networks. In Proc. *2<sup>nd</sup> Annual South African Telecommunications Networks and Applications Conference (SATNAC)*. Stellenbosch, South Africa: Telkom. ISBN: 0-620-26497-7. <http://hdl.handle.net/10566/1094>
  49. Tucker, W., & Keats, D. (1998). Grafting an ATM network onto an existing Ethernet network. In Proc. *1<sup>st</sup> Annual South African Telecommunications Networks and Applications Conference (SATNAC)* (pp. 485–494). Cape Town, South Africa: Telkom. ISBN: 07-992-19061. <http://hdl.handle.net/10566/448>

#### **REFEREED CONFERENCE POSTERS (based on paper submissions)**

1. Henney, A. J., & Tucker, W. D. (2016). Using accessible mobile technologies as communication bridges for Deaf people in healthcare. In DeafNet. Johannesburg: DeafNet.
2. Chininthorn, P., Glaser, M., Tucker, W. D., & Diehl, J. C. (2016). Mobile questionnaire for collecting data from Deaf people. In DeafNet. Johannesburg: DeafNet.
3. Chininthorn, P., Glaser, M., Tucker, W. D., & Diehl, J. C. (2016). Accessible Health Information for Deaf People Who Use Signed Language for Communication. In DeafNet. Johannesburg: DeafNet.
4. Om, S., Erasmus, Z., Rey-Moreno, C., & Tucker, W. D. (2015a). Evaluating Energy Consumption on Low-end Smartphones. In F. Otten & R. Blamahoon (Eds.), *Southern Africa Telecommunication Networks & Applications Conference* (Vol. 2, pp. 29–30). Hermanus, South Africa: Telkom. ISBN: 978-0-620-67151-4.
5. Om, S., Rey-Moreno, C., & Tucker, W. D. (2015b). Towards a Scalability Model for Wireless Mesh Networks. In F. Otten & R. Balmahoon (Eds.), *Southern Africa Telecommunication Networks & Applications Conference* (Vol. 2, pp. 49–50). Hermanus, South Africa: Telkom. ISBN: 978-0-620-67151-4. <http://hdl.handle.net/10566/1947>
6. Chininthorn, P., Diehl, J. C., & Tucker, W. D. (2015). The Use of Smartphones and a Health Knowledge Transfer System for Deaf Patients and Health Professionals. In F. Otten & R. Balmahoon (Eds.), *Southern Africa Telecommunication Networks & Applications Conference* (Vol. 2, pp. 74–75). Hermanus, South Africa: Telkom. ISBN: 978-0-620-67151-4.
7. Duma, L.S. & Tucker, W.D. (2014). An Authoring Tool to Create Multiple Scenarios of a Mobile Communication App for Deaf People. *Southern African Telecommunication Networks and Applications Conference (SATNAC)*. Port Elizabeth, South Africa.
8. Abdalla, T., Bagula, A. & Tucker, W.D. (2014). An Extension to B.A.T.M.A.N.-ADV for Extended Wireless Mesh Networks. *Southern African Telecommunication Networks and Applications Conference (SATNAC)*. Port Elizabeth, South Africa.

9. Henney, A. J., & Tucker, W. D. (2013). Information Protection in Video Relay Services. In Proc. *4th Annual Symposium on Computing for Development (DEV-4)* (Article 24, 2 pages). Cape Town, South Africa: ACM. ISBN: 978-1-4503-2558-5. <http://hdl.handle.net/10566/1117>
10. Rey-Moreno, C., Tucker, W. D., & Simo-Reigadas, J. (2013). Tuning a mid-range rural WiFi-based mesh network. In Proc. *4th Annual Symposium on Computing for Development (DEV-4)* (Article 30, 2 pages). Cape Town, South Africa: ACM. ISBN: 978-1-4503-2558-5. <http://hdl.handle.net/10566/1114>
11. Ufitamahoro, M. J., Venter, I. M., Tucker, W. D., & Rey-Moreno, C. (2013). Unmasking Community Trust Issues in Rural Field Work. In Proc. *4th Annual Symposium on Computing for Development (DEV-4)* (Article 23, 2 pages). Cape Town, South Africa: ACM. ISBN: 978-1-4503-2558-5. <http://hdl.handle.net/10566/1109>
12. Ufitamahoro, M. J., Venter, I. M., Rey-Moreno, C., & Tucker, W. D. (2013). Promoting Trust for Billing of Services on a Rural Wireless Mesh Network. In R. Volkwyn (Ed.), *Southern African Telecommunication Networks & Applications Conference*. Stellenbosch, South Africa.
13. Motlhabi, M., & Tucker, W. D. (2012). A Limited Communication Domain Mobile Aid for a Deaf patient at the Pharmacy. *Southern African Telecommunication Networks and Applications Conference (SATNAC)*. George, South Africa.
14. Chitedze, Z., & Tucker, W. D. (2010). Wireless mesh network and General Packet Radio Service interworking. *Southern African Telecommunication Networks and Applications Conference (SATNAC)*. Stellenbosch, South Africa.
15. Hoom, R. T. L., Venter, I. M., & Tucker, W. D. (2010). Comparison and evaluation of mass video notification methods used to assist Deaf people. *Southern African Telecommunication Networks and Applications Conference (SATNAC)*. Stellenbosch, South Africa.
16. Iraba, M. L., Venter, I. M., & Tucker, W. D. (2010). Using inexpensive mobile technologies to empower rural farmers. *Southern African Telecommunication Networks and Applications Conference (SATNAC)*. Stellenbosch, South Africa.
17. Kerchhoff, A., & Tucker, W. D. (2010). Rationalisation of heterogeneous rural Internet Protocol networks to achieve sustainability. *Southern African Telecommunication Networks and Applications Conference (SATNAC)*. Stellenbosch, South Africa: Telkom.
18. Kobo, H. I., Tucker, W. D., & Norman, M. (2010). Quality of Service-aware routing for static mesh networks with mobile nodes. *Southern African Telecommunication Networks and Applications Conference (SATNAC)*. Stellenbosch, South Africa.
19. Mutemwa, M., Tucker, W. D., & Norman, M. (2009b). A Deaf-to-hearing communication aid on a mobile phone. *Southern African Telecommunication Networks and Applications Conference (SATNAC)*. Swaziland.
20. Maunder, A., Tucker, W. D., & Marsden, G. (2005). Usability evaluation of the MuTI rural telehealth system. *Southern African Telecommunication Networks and Applications Conference (SATNAC)*. Central Drakensberg, Kwazulu-Natal, South Africa: Telkom.

## **OTHER PUBLICATIONS**

1. Blake, E. H., Tucker, W. D., Glaser, M., & Freudenthal, A. (2011). Deaf Telephony: Community-based Co-design. In Y. Rogers, H. Sharp, & J. Preece (Eds.), *Interaction Design: Beyond Human-Computer Interaction*. [http://www.id-book.com/casestudy\\_11-1.php](http://www.id-book.com/casestudy_11-1.php) or <http://hdl.handle.net/10566/844>.
2. Tucker, W. D., & Glaser, M. (2009). Tutorial: ICT for Deaf people in developing regions. In M. A. Hersh (Ed.), *Conference and Workshop on Assistive Technologies for Vision and Hearing Impairment (CVHI)*. Wroclaw, Poland.
3. Tucker, W. D., Vuza, X., Chetty, M., Blake, E. H., Marsden, G., Pearson, M., & Westerveld, R. (2007). MUTI Telehealth. <http://hdl.handle.net/10566/655>.
4. Tucker, W. D. (2005). Case study: Internet Protocol-based tele-consultation: a VoIP project. *VoIP World Africa* (pp. 34–39). Johannesburg, South Africa: Terrapin.
5. Tucker, W. D., Blake, E. H., & Glaser, M. (2003). Building bridges for Deaf Telephony in South Africa: A Community-centred Approach. *IFIP Working Group 9.4 Newsletter*. Retrieved from <http://www.iimahd.ernet.in/egov/ifip/nov2003/nov2003.htm>

6. Tucker, W. D., Glaser, M., & Penton, J. (2002). A Bridge for the Problem of Deaf Telephony. *Science in Africa*. Retrieved from <http://www.scienceinAfrica.co.za/2002/june/deaf.htm>

### **CONFERENCE PAPERS PRESENTED**

1. Tucker, W. D., Chetty, M., Marsden, G. and Olson G (2004). Fishing for Open Source Software in Africa. *Idlelo: First African Conference on the Digital Commons*. University of the Western Cape, Cape Town. 11-15 Jan, 2004.
2. Chetty, M. & Tucker, W. Bridging the digital divide with voice over Internet Protocol. *Acacia: Networking Africa's Future*, Kwa Maritane Game Lodge, Pilanesberg, South Africa, 11-13 April, 2003.
3. Tucker, W., & Hearn, G. Integrating tools into KEWL. *Knowledge Environment for Web-based Learning (KEWL) 1st Annual User-Developer Workshop*, University of the Western Cape, Cape Town, June 28, 2002.
4. Tucker, W. D. (2003). Social Amelioration of Bridged Communication Delay. *8th European Conference of Computer-supported Cooperative Work (Doctoral Colloquium)*. Helsinki, Finland.

### **CONFERENCE AND WORKSHOP ATTENDANCES (without presenting papers)**

- 6th International Conference and Information and Communication Technologies and Development (ICTD), Cape Town, Dec 7-10, 2013.
- 4th Annual Symposium on Computing for Development (ACM DEV-4), Cape Town, Dec 6-7, 2013.
- SANPAD Writing for Scientific Publication (WSP) 2, Durban, 29 Oct – 1 Nov, 2012.
- SANPAD Writing for Scientific Publication (WSP) 1, Durban, 27 – 29 Aug, 2012.
- 2<sup>nd</sup> Annual Symposium on Computing for Development (DEV), Georgia Tech, USA, 11-12 Mar, 2012.
- 6<sup>th</sup> International conference on Information and Communication Technologies and Development (ICTD), Georgia Tech, USA, 12-15 Mar, 2012.
- 5<sup>th</sup> International conference on Information and Communication Technologies and Development (ICTD), Royal Holloway, UK, 13-16 Dec, 2010.
- Tutorial; Using Ethnographic methods in Software Engineering Research By Sharp, De Souza and Dittrich. IEEE International Conference on Software Engineering (ICSE), ITICC, Cape Town, 4 May, 2010.
- David & Elaine Potter Charitable Trust seminar on ICTs and development in South Africa: an examination of the role of telecentres, Otto Beit Bldg, UCT, Mar 30, 2005.
- .NET Crash Course IV, 25-28 March 2003, Microsoft Research, Microsoft University Relations, St. John's College, Cambridge, UK.
- Southern African Internet Forum, Kwa Maritane Game Lodge, Pilanesberg, South Africa, 11-13 April, 2003.
- Microsoft Academic and Curriculum Workshop, .NET Crash Course V, 23-25 November 2003, Microsoft Research, Microsoft University Relations, University of Cape Town, Cape Town, South Africa.

## **INVITED TALKS and KEYNOTES**

Africa and the Digital Divide, pre-recorded video presentation to introduce the Africa track, which I chaired for Partnership for Progress on the Digital Divide (PPDD 2017), San Diego, CA, 22–24 May, 2017.

Public policy and modalities for providing public access to Internet. Panelist with Shaun Pather, Wallace Chigona and Raven Naidoo at African Conference on Information Systems Technology (ACIST), Cape Town, 10 Jul, 2017.

## **PUBLIC APPEARANCES AND MEDIA**

SAfm radio interview on SignSupport, Tue 26 Sep 2017 at 2:40pm (5 minutes).

Argus, Sep 19! Page 2!

Popular mechanics, "Speaking for the Deaf", Sep 2017, p57.

SABC coverage of SignSupport with Jabaar Cassiem Mohamed (DeafSA Western Cape Provincial Director) and Dr Mariam Parker (UWC Pharmacy). Sun 30 July, 2017. See <https://youtu.be/YNQ89Eosv0E>

Voice of the Cape radio interview on SignSupport Tue 1 Aug, 2017 at 11:12am (20 minutes).

**IFIP ICT4D Ethics co-convenor with Andy Dearden, Yogyakarta, Indonesia**

**ICTD Open Session Chair for Gary Marsden Memorial, Singapore, 15 May, 2015.**

**ICTD co-chair w/Dorothea Kleine for careers open session, Singapore, 18 May, 2015.**

CONFINE 3rd annual plenary review meeting, Presentation: ICARUS: Impact of Community networks as Alternative infrastructure in remote and Underserved areas. Rome, Italy 26-29 Nov, 2014.

**Conference co-chair, Local practitioner and research showcase, 6th International Conference and Information and Communication Technologies and Development (ICTD), Cape Town, Dec 7, 2013.**

**Conference Chair, 4th Annual Symposium on Computing for Development (ACM DEV-4), Cape Town, Dec 6-7, 2013.**

ICTDEVers convenor: every 3<sup>rd</sup> Tuesday, commencing 18 Sep 2012 – present at various venues: UWC, CPUT, UCT and the varsity-neutral Mountain Club of South Africa (most often).

Steering committee dinner, ACM DEV: Georgia Tech, USA, 13 Mar, 2012.

ViP dinner, ICTD, Georgia Tech, USA, 14 Mar, 2012.

Black tie event, SATNAC, Fancourt Hotel and Country Club, Southern Cape, 3 Sep, 2012.

Session chair, SATNAC, Fancourt Hotel and Country Club, Southern Cape, 5 Sep, 2012.

Participant, "Ethnography and Intervention in ICT4D" workshop, organized by Proff. E Blake and G Marsden, that included leading local ICT4D researchers and practitioners, UCT, 5 Aug 2011.

Lecture entitled "Some ICT4D tools for a Deaf telephony field study" for an Honours course on ICT for development at UCT Computer Science, 17 Aug, 2011.

Session chair, SATNAC, East London Convention Centre, Eastern Cape, 7 Sep, 2011.

Lecture entitled "An ICT4D Deaf telephony field study in South Africa", TU Delft Industrial Design Engineering, The Netherlands, 27 Sep, 2011.

Talk entitled "An ICT4D Deaf telephony case study", CHEC/CITI 2nd Research Showcase, STIAS Stellenbosch, 28 Oct 2011.

*more available on request*

## AWARDS

Semi-finalist (out of >100) Mozilla Foundation Equal Rating Challenge, Zenzeleni represented by Dr Carlos Rey-Moreno, 29 Mar 2017

<https://blog.mozilla.org/blog/2017/03/29/announcing-equal-rating-innovation-challenge-winners/>

Best Innovation for Social Impact at the TIA Innovation Bridge, 15 Sep 2017.

<http://www.innovationbridge.org.za/>

DCCT service award.

## EXTERNAL EXAMINATIONS

*only last 5 years*

### PhD Examinations

1. HA Haji (2016). Investigating mobile graphic-based reminders to support compliance of tuberculosis treatment. PhD Computer Science, University of Cape Town (U Rivett and H Suleman)
2. CL Sahl (2015). Bridging wireless access technologies to connect the unconnected. PhD Computer Science, Rhodes University (H Thinyane).
3. ZS Koradia (2015). Exploring the role of information and communication technologies in community radio stations in India. PhD Computer Science, India Institute of Technology Bombay (B Raman).

### MSc Examinations

1. M Reddy (2015). SignDIn: Designing and assessing a generalisable and extensible mobile interface for Sign Support. MSc (IT), Computer Science, University of Cape Town (E Blake).
2. S Yalezo (2015). Enhancement of the usability of Service Oriented Architectures for novice users. MSc, Computer Science, Fort Hare (M Thinyane).
3. S Honye (2014). Mobile application development for converged telecommunication/Internet environments. MSc, Computer Science, Rhodes University (H Thinyane and M Tsietsi).
4. details removed (2013) to preserve anonymity of self, student and supervisor(s). I uncovered plagiarism and student was expelled.
5. ST Ndakunda (2013). A mobile toolkit and customised location server for the creation of cross-referencing location-based services. MSc, Computer Science, Rhodes University (M Wright and A Terzoli).
6. G Yeratziotis (2013). Guidelines for the Design of Websites and phone applications for the Deaf. MIT (Information Technology), Engineering, the Built Environment and Information Technology, Nelson Mandela Metropolitan University (D van Gruenen).
7. N Ampofo-Anti (2012). A context orientated service brokering platform for the IP multimedia subsystem. MSc Electrical Engineering, University of Cape Town (N Ventura).
8. D Erasmus (2012). Video quality requirements for South African Sign Language communications over mobile phones. MSc Computer Science, University of Cape Town, South Africa. mini-thesis (E Blake).
9. T Gavaza (2012). Culturally-relevant augmented user interfaces for illiterate and semi-literate users. MSc Computer Science, Rhodes University (H Slay/Thinyane).
10. DT Kunjuzwa (2011). Investigating the development of user-driven telephony services in an information and communication technology for development context. MSc Computer Science, University of Fort Hare (M Thinyane).
11. BA Zimba (2011). Extensibility in end-user network applications: a feature or a flaw? MSc Computer Science, University of Cape Town. mini-thesis (H Le).

*more available on request*



## PROFESSIONAL REVIEWS AND DUTIES

*also only last 5 years*

2017

- ITID Associate Editor (AE)
- ICTD Senior programme committee/similar duties to journal AE
- Africa track programme chair, Partnership for Progress on the Digital Divide (PPDD 2017)
- SAJIM journal manuscript double blind review (Jan)
- Program committees: SATNAC
- NRF researcher rating of an ICT4D peer

2016

- ITID Associate Editor
- Program committees: ICTD, PDC, DEV and CHI
- ACM CHI Development Consortium: HCI4D co-chair w/Neha Kumar and Susan Dray
- NRF researcher rating \* 2 of ICT4D peers

2015

- ITID Guest Editor; Gary Marsden Special Issue editor, Vol 11, Issue 4 (itidjournal.org)
- Program committees: ICTD, DEV and SATNAC

2014

- ITID Associate Editor
- Program committee: SATNAC

2013

- Chaired ACM DEV in Cape Town (Dec) and co-chaired ICTD (co-located)
- NRF researcher rating review (Oct) of an ICT4D peer.
- NRF South Africa-Namibia research project review (May).
- Programme committees: SATNAC, ICTD
- ITIDa journal manuscript blind review for ICTD 2012 special issue.
- ITIDb journal manuscript double blind review, 3 cycles 2012-2013.

2012

- NRF researcher rating review (June).

*more available on request*

## POSTGRADUATE SUPERVISION

The following listings show the total number of postgraduate students I have supervised in terms of throughput, length of time to completion, gender and race composition, co-supervision and research theme. Students are shown with student name, year started-completed. Students are in Computer Science at UWC and solely supervised by Prof. Tucker, unless noted otherwise.

Abbreviations for research themes and other universities:

- ICT4D: Information and Communication Technologies for Development
- HCI: Human Computer Interface
- IM: Instant Messaging, e.g. store-and-forward and real-time communication
- QoS: Quality of Service
- VoIP: Voice over Internet Protocol
  
- TUD: Technology University of Delft, Netherlands
- UCT: University of Cape Town, South Africa
- URJC: Universidad Rey Juan Carlos University, Spain
- UWC: University of the Western Cape

### PHD STUDENTS

2 completed, 8 current=; 2 left unfinished\*

= denotes current, \* denotes left unfinished

1.	Mr AK Adesemowo	2010-2010*	ICT4D Rural telephony
2.	Mr G Hearn	2010-2013*	ICT4D m-Learning w/S Pather, Information Systems
3.	Mr C Rey-Moreno	2012-2015	ICT4D Rural telephony w/J Simó-Reigadas, URJC, Spain, Electrical Engineering
4.	Ms M Parker	2012-2016	ICT4D Deaf telephony w/N A Bheekie, UWC, Pharmacy
5.	Mr Andre Henney	2013-2017=	ICT4D Deaf telephony
6.	Ms P Chininthorn	2014-2017=	ICT4D Deaf telephony w/JC Diehl, TUD, The Netherlands, Industrial Design Engineering
7.	Mr S Om	2014-2017=	ICT4D Rural telephony
8.	Mr L Gwaka	2016-2018=	ICT4D Rural telephony w/J May, UWC ISD
9.	Mr F Kassongo	2016-2018=	ICT4D e-governance for Deaf people w/S Penderis, UWC ISD
10.	Ms F Petersen	2017=	ICT4D diabetes (tie-in to Deaf project): w/S Pather, UWC IS

Associated PhD students (working with the group but not officially co-supervised by myself)

11.	Mr L Mdleleni	2014=	ICT4D Rural telephony: J May, UWC ISD
12.	Ms T Hussen	2015=	ICT4D Rural telephony: D Lewis & N Bidwell, UWC Gender studies

## **SUPERVISED PhD THESES COMPLETED**

1. Ms M Parker (2016). Investigating medicine use in the Deaf community: toward informing a mobile pharmaceutical application for Deaf users and pharmacists. PhD Pharmacy, UWC, Supervised by Prof. Angeni Bheekie, co-supervised by W. D. Tucker.
2. Mr C Rey-Moreno (2015). Community Telco: An acceptable solution for providing affordable communications in rural areas of South Africa. PhD Electrical Engineering, UJRC, Spain. Supervised by Prof. Javier Simó-Reigadas, co-supervised by W. D. Tucker.

## MSC STUDENTS

25 completed, 0 current=, and 10 left unfinished\*.

1.	Mr M Jeffries	2000-2002*	VoIP
2.	Mr V Naidoo	2000-Sep 2002	VoIP QoS
3.	Ms T Paulse	2000-2002*	VoIP QoS
4.	Mr AK Adesemowo	2002-Mar 2006	Mobile IM HCI
5.	Ms A Benjamin	2002-2005*	Multi-modal IM
6.	Mr J Lewis	2002-2007*	ICT4D Deaf relay <i>w/E Blake, UCT</i>
7.	Ms M Chetty	2003-Dec 2006	ICT4D Rural telehealth <i>w/E Blake, UCT</i>
8.	Mr C February	2003-2004*	Multi-modal Virtual Reality
9.	Mr T Sun	2003-Mar 2005	ICT4D Deaf relay
10.	Mr YH Wu	2003-Mar 2006	Mobile location-based services <i>w/A Radovanovic</i>
11.	Mr E Julius	2004-Mar 2006	ICT4D Deaf relay
12.	Mr X Vuza	2004-Mar 2006	ICT4D Rural telehealth
13.	Mr B Tshabalala	2005-2005*	ICT4D Rural telehealth
14.	Mr T Meeran	2006-Mar 2012	ICT4D Rural mesh VoIP QoS
15.	Mr S Saay	2006-Sep 2011	ICT4D Rural mesh authentication
16.	Mr F Daniels	2007-2009*	ICT4D Rural mesh asynchronous VoIP
17.	Mr ZY Ma	2007-Mar 2009	ICT4D Deaf asynchronous video
18.	Mr DW Wanyonyi	2008-Mar 2011	ICT4D m-Learning multi-modal IM and HCI
19.	Mr A Kerchhoff	2009-2011*	ICT4D Rural telephony
20.	Mr JC Looijesteijn	2008-Aug 2009	ICT4D Deaf mobile communication aid <i>w/A Freudenthal, TUD</i>
21.	Mr M Mutemwa	2009-Sep 2011	ICT4D Deaf mobile communication aid <i>w/M Norman</i>
22.	Mr AO Poroye	2009-Sep 2011	ICT4D m-Banking <i>w/M Norman</i>
23.	Ms YY Wang	2009-Mar 2011	ICT4D Deaf mobile asynchronous video
24.	Mr Z Chitedze	2010-Mar 2013	ICT4D Rural mesh vertical handover
25.	Mr R Hoorn	2010-Sep 2012	ICT4D: Deaf mobile video messaging <i>w/I Venter</i>
26.	Ms ML Iraba	2010-Mar 2012	ICT4D Rural m-Agriculture <i>w/I Venter</i>
27.	Mr HI Kobo	2010-Mar 2012	ICT4D Rural mesh VoIP QoS
28.	Ms D Zulu	2010-Mar 2012	ICT4D Rural mesh VoIP QoS
29.	Mr G Carelse	2011-Sep 2016*	ICT4D Rural mesh vertical handover
30.	Ms P Chinthorn	2011-Aug 2011	ICT4D Deaf mobile communication aid <i>w/A Freudenthal, TUD</i>
31.	Mr Z Roro	2011-Sep 2016*	ICT4D Rural mesh telephony
32.	Mr M Motlhabi	2012-Mar 2014	ICT4D Deaf mobile telephony
33.	Ms MJ Ufitamahoro	2012-Mar 2015	ICT4D Rural mesh telephony <i>w/I Venter</i>
34.	Ms GL Ngangom	2013-Sep 2015	ICT4D Rural mesh telephony <i>w/I Venter</i>
35.	Mr LS Duma	2014-Aug 2017	ICT4D Deaf mobile telephony

## **SUPERVISED MSc THESES COMPLETED**

1. Mr LS Duma (2016). Mobile application generalisation: an authoring tool for SignSupport. MSc full thesis, UWC. (under examination)
2. Ms GL Ngangom Tiemeni (2015). Performance estimation of wireless networks using traffic generation and monitoring on a mobile device. MSc full thesis, UWC co-supervised with Prof. I Venter. Cum laude.
3. Ms JM Ufitamahoro (2015). Understanding the factors that Influence trust in e-services: a case study of a wireless mesh network implementation in Mankosi, South Africa. MSc full thesis, UWC co-supervised with Prof. I Venter.
4. Mr M Motlhabi (2014). Usability and Content Correctness of a Mobile Tool to help a Deaf person with Pharmaceutical Instruction. MSc full thesis, UWC.
5. Mr Z Chitedze (2013). Mobility management for Wi-Fi infrastructure and mesh networks. MSc full thesis, UWC.
6. Mr RTL Hoorn (2012). Comparison and evaluation of mass video notification methods used to assist Deaf people. MSc full thesis, UWC co-supervised with Prof. I Venter.
7. Ms ML Iraba (2012). Inexpensive mobile technologies to empower rural farmers with m-agriculture. MSc full thesis, UWC co-supervised with Prof. I Venter.
8. Mr HI Kobo (2012). Situation aware routing for static mesh networks with mobile nodes. MSc full thesis, UWC.
9. Mr MT Meeran (2012). An analysis of voice over Internet Protocol in wireless mesh networks. MSc full thesis, UWC.
10. Ms D Zulu (2012). Packet aggregation for voice over Internet Protocol on wireless mesh networks. MSc full thesis, UWC.
11. Mr M Mutemwa (2011). A mobile Deaf-to-hearing communication aid for medical diagnosis. MSc full thesis, UWC co-supervised by Mr M Norman.
12. Mr AO Poroye (2011). Secure contactless smart card transactions with Near Field Communication. MSc full thesis, UWC co-supervised by Mr M Norman. Cum laude.
13. Mr MS Saay (2011). Toward authentication mechanisms for Wi-Fi mesh networks. MSc full thesis, UWC.
14. Ms P Chininthorn (2011). Communication tool design for Deaf to hearing in South Africa. Mini-thesis + coursework at TU Delft co-supervised with Proff. A Freudenthal and J Verlinden. Cum laude.
15. Ms YY Wang (2011). Browser-based and mobile video communication alternatives for Deaf people. MSc full thesis, UWC.
16. Mr DW Wanyonyi (2011). Mobile presentations with interactive chat for m-Learning. MSc full thesis, UWC.
17. Mr JC Looijesteijn (2009). The design of a Deaf-to-hearing communication aid for South Africans. Mini-thesis & coursework, TU Delft, co-supervised with Proff. A Freudenthal and H Christiaans. Cum laude.
18. Mr ZY Ma (2009). Semi-synchronous video for Deaf telephony with an adapted synchronous codec. MSc full thesis, UWC.
19. Ms M Chetty (2006). Developing locally relevant applications for rural South Africa: A telemedicine example. MSc full thesis, UCT, co-supervised with Prof. E Blake. Cum laude.
20. Mr AK Adesemowo (2006). Affective gesture fast-track feedback Instant Messaging (AGFIM). MSc full thesis, UWC.
21. Mr EP Julius (2006). Guaranteed delivery of multimodal semi-synchronous IP-based communication. MSc full thesis, UWC.
22. Mr X Vuza (2006). Social and technical issues of IP-based multi-modal semi-synchronous communication: Rural telehealth communication in South Africa. MSc full thesis, UWC. Cum laude.
23. Mr YH Wu (2006). SIP-based location service provision. MSc full thesis, UWC co-supervised with Mr A Radovanovic. Cum laude.
24. Mr T Sun (2005). Carrier-grade adaptation for an IP-Based multimodal Application Server: Moving the SoftBridge into SLEE. MSc full thesis, UWC.
25. Mr V Naidoo (2002). Policy based network management of legacy network elements in Next Generation Networks for voice services. MSc full thesis, UWC.

## HONOURS STUDENTS

49 completed, 3 current= and 12 left unfinished\*

1.	Ms S Kwinda	1998-1998	
2.	Mr M Jeffries	1998-1999	
3.	Mr R Jacobs	1998-1999	
4.	Mr J Thema	1998-1999*	
5.	Ms T Paulse	1999-1999	
6.	Mr S Byrow	1999-1999	
7.	Mr G Arries	1999-2001	
8.	Mr R Burger	1999*	
9.	Mr I Sigasa	1999-1999	
10.	Mr MZ Fakier	2000-2000	
11.	Ms A Benjamin	2001-2001	
12.	Mr C Parker	2001-2001	
13.	Mr A Salie	2001-2001	
14.	Mr Y Isaacs	2002-2002	
15.	Mr S Libalele	2002-2002	
16.	Mr M Gordon	2002-2002	
17.	Mr A Ngxonono	2002-2002*	
18.	Mr S da Silva	2002-2002	
19.	Mr C February	2002-2002	
20.	Mr M Jooste	2006-2006	
21.	Mr F Daniels	2006-2006	
22.	Mr E Fredericks	2006-2006	w/A Radovanovic
23.	Mr P Legae	2006-2006	w/A Radovanovic
24.	Mr ZY Ma	2006-2006	
25.	Ms S. Makhoba	2007*	
26.	Mr AO Poroye	2008-2008	w/M Norman
27.	Mr M Mutemwa	2008-2008	w/M Norman
28.	Mr A Kerchhoff	2008-2008	w/I Venter
29.	Mr M Botsane	2009*	
30.	Ms D Zulu	2009-2009	
31.	Mr C Atuchukwu	2009-2009	w/I Venter
32.	Mr H Kobo	2009-2009	w/M Norman
33.	Mr R Hoorn	2009-2009	w/I Venter
34.	Mr K Adamson	2010-2010	
35.	Mr Z Roro	2010-2010	
36.	Mr S Mehlomakulu	2010*	w/I Venter
37.	Mr L Matanzima	2010*	
38.	Mr W Nel	2011-2011	
39.	Mr M Motlhabi	2011-2011	
40.	Ms M Chimbwanda	2011-2011	w/I Venter
41.	Mr N Bila	2011*	w/I Venter
42.	Mr J Martins	2012-2012	w/M Norman
43.	Mr C Malama	2012-2012	w/M Norman
44.	Mr OO Ajayi	2013-2014	w/M Norman
45.	Mr LS Duma	2013-2013	
46.	Mr D Francis-Ambrose	2013*	
47.	Mr LJ Mojabelo	2013*	w/M Norman
48.	Ms S Dayile	2013-2013	w/I Venter
49.	Ms B Buhle	2013-2013	w/I Venter
50.	Ms Z Tshaka	2013-2013	w/I Venter
51.	Mr SS Sibiya	2014-2014	w/M Norman
52.	Mr B Matshoba	2014*	
53.	Mr J Patil	2014-2014	
54.	Mr Z Ntuli	2014-2014	w/I Venter
55.	Ms C Miya	2014-2014	w/I Venter
56.	Mr Y Engidawork	2015-2015	
57.	Mr V Phindiso	2015-2015	
58.	Ms A Hoko	2016-2016	
59.	Ms S-B Adams	2016-2016	

- |     |                 |           |
|-----|-----------------|-----------|
| 60. | Mr A Fente      | 2016*     |
| 61. | Mr KL Stuurman  | 2016-2016 |
| 62. | Mr J Christians | 2017=     |
| 63. | Mr G Chibba     | 2017=     |
| 64. | Mr F White      | 2017=     |

## **Supervised Honours projects completed**

1. A Hoko (2016). Toll bypass in isiXhosa.
2. S-B Adams (2016). Audio & video based tooltips: A case study with signed language videos for Deaf users.
3. KL Stuurman (2016). Video key frame compression for toll bypass.
4. Y Engidawork (2015). Mesh potato with DUNDi Protocol.
5. V Phindiso (2015). SignSupport video notification.
6. SS Sibiyi (2014). SignCollect: Sign language-based data collection w/M Norman.
7. J Patil (2014). Web and mobile audio library.
8. Z Ntuli (2014). Adding a video notification reminder to SignSupport. w/I Venter.
9. C Miya (2014). VibeSense: Song-based vibration and light notification for Deaf people. w/I Venter.
10. LS Duma (2013). Mobile security application for SignSupport.
11. OO Ajayi (2013). Back end for monitoring mesh network. w/M Norman.
12. B Buhle (2013). Mobile reminder to improve medicine compliance in Deaf patients. w/I Venter.
13. S Dayile (2013). Mobile medical information for the Deaf. w/I Venter.
14. Z Tshaka (2013). A mobile application to interact with the mesh billing system. w/I Venter.
15. C Malama (2012). Mobile Packet Monitor: Back end. w/M Norman.
16. J Martins (2012). Mobile Packet Monitor: Front end. w/M Norman.
17. M Chimbwanda (2011). Mesh routing protocol comparison for disaster scenarios. w/I Venter.
18. M Motlhabi (2011). Android based asynchronous sign language.
19. W Nel (2011). Mesh potato phone number lookup.
20. Z Roro (2010). Data mart visualisation.
21. K Adamson (2010). Remote mobile data collection with rich media and visualisation.
22. R Hoorn (2009). Web-based mobile sign language dictionary. w/I Venter.
23. H Kobo (2009). IP-based peer-to-peer push-to-talk. w/M Norman.
24. C Atuchukwu (2009). Web-based Instant Messaging service. w/I Venter.
25. D Zulu (2009). Asterisk-based voice relay.
26. A Kerchhoff (2008). Nomad HTTP-based mobile Instant Messaging (IM) service. w/I Venter.
27. M Mutemwa (2008). Bluetooth vibration to alert Deaf users using PC-based applications with their mobile phone. w/M Norman.
28. AO Poroye (2008). SIP-based IM prototype for mobiles. w/M Norman.
29. ZY Ma (2006). Asynchronous video to support sign language communication.
30. P Legae (2006). Web-based Instant Messaging. w/A Radovanovic.
31. E Diedricks (2006). Generic database API for log collection and visualisation. w/A Radovanovic.
32. F Daniels (2006). PSTN/GSM gateway to support controlled PSTN breakout.
33. M Jooste (2006). PSTN/GSM/GPRS gateway to support event notification and remote data collection.
34. C February (2002). Web Chat/Virtual Reality Bridge.
35. S da Silva (2002). Toll bypass bypass.
36. M Gordon (2002). Scalable Voice/Text Chat.
37. S Libalele (2002). Toll bypass bypass.
38. Y Isaacs (2002). Scalable Voice/Text Chat.
39. A Salie (2001). Online Post-graduate Admissions System.
40. C Parker (2001) Visualisation of IP QoS Metrics.
41. A Benjamin (2001). Voice Chat Arbitration for KEWL Web-touring.
42. G Arries (2001) Cost Modelling for 802.1p Ethernet Priority Queueing Quality of Service for Voice Traffic.
43. MZ Fakier (2000). Using BSP trees for Hidden Surface Removal (HSR) in an OpenGL Rendering Engine.
44. S Byrow (2000). Video streaming over ATM.
45. I Sigasa (1999). UNIX Device driver for video camera.
46. T Paulse (1999). ATM QoS statistics collection with SNMP.
47. R Jacobs (1999). Web-based Virtual Library.
48. M Jeffries (1999). Web-based Examination Environment.
49. S Kwindi (1998). Distance Learning on the Internet.



## RESEARCH FUNDING (2002-present)

Research funding in 000's	CoE (Telkom, Cisco, Aria, THRIP)	SAN-PAD	IDRC	EU	UWC	UWC Author's fund	NRF incen- tive fund	NRF bur- saries	SA gov, e.g. DST	Other
2002	R522k									
2003	R561k									
2004	R443k	R350k								
2005	R1000k		R353k							
2006	R544k									
2007	R600k									
2008	R685k	R450k								
2009	R873k									
2010	R1211k				R49k					
2011	R991k	R668k								
2012	R829k					R48k				
2013	R791k				R25k	R25k	R40k			
2014	R810k			R1200k	R60k		R40k			
2015	R785k				R20k		R40k			
2016	R605k				R348k		R40k	R230k	R470k	R740k
<b>Column totals</b>	<b>R11249k</b>	<b>R1468k</b>	<b>R353k</b>	<b>R1200k</b>	<b>R501k</b>	<b>R73k</b>	<b>R160k</b>	<b>R230k</b>	<b>R470k</b>	<b>R740k</b>
<b>Average</b>	<b>R750k</b>									
<b>Grand total</b>	<b>R16,444,100</b>									
<b>Annual avg</b>	<b>R1,096,273</b>									

## COLLABORATION

### **Internal collaboration**

Prof. J May, 2013–present, UWC Institute for Social Development (ISD) Director and also Director of DST CoE in Food Security; co-supervision of PhD students (Leon Gwaka and Lwando Mdleleni), EC FP7 CONFINE/ICARUS collaborator. Expertise: food security, poverty reduction, ICT4D, socio-economic impact experimental design and analysis.

Prof. R Blignaut, 2013–present, UWC Statistics  
EC FP7 CONFINE collaborator. Expertise: statistical analysis.

Prof. A Bheekie, 2013-present, UWC Pharmacy  
Co-supervision of Mariam Parker (PhD). Expertise: community engagement.

Dr Sharon Penderis, 2016-present, UWC ISD Acting Director  
Co-supervision of Frank Kassongo (PhD). Expertise: community development.

Prof. I Venter, 2008–present, UWC Computer Science  
CoE collaborator, Honours and MSc co-supervision. Expertise: Computer Science education, human computer interaction.

Mr M Norman, 2008–present, UWC Computer Science  
CoE collaborator: Honours and MSc co-supervision. Expertise: Software engineering, project management.

### **National collaboration**

Prof. E Blake, 2001–present, University of Cape Town, Computer Science Department  
Director of UCT's ICT4D Centre; former PhD supervisor, continual research proposal and paper/article co-author, SANPAD project leader, inter-university CoE collaborator. Expertise: ICT4D, human computer interaction, community-based co-design.

Ms M Glaser, 2001–present, Deaf Community of Cape Town (DCCT), Newlands  
Deaf education specialist, on-site consultant for Deaf communication project, frequent co-author and co-presenter, SANPAD collaborator, Deaf literacy (English and IT). Expertise: Deaf adult literacy (English and computer), communication disorder, South African Sign Language.

Prof. G Marsden, 2001–2013 (deceased), University of Cape Town, Computer Science Department  
PhD co-supervisor, research proposal and paper co-author. Expertise: mobile HCI and design for development.

Prof. A Terzoli, 2001–2004, Rhodes University, Computer Science  
Research collaborator, Deaf telephony w/H.323 (J Penton's MSc). Expertise: rural telecommunication networks and their applications and associated business models.

## **International collaboration**

Prof. L Navarro, 2014-present, Polytechnic University of Catalonia, Spain. Expertise: community networks, WiFi networks, testbed management systems, WiFi simulation. Leader of the EC FP7 CONFINE project of which we were round 2 partners, and based a follow-up Horizons proposal on the Zenzeleni approach which was narrowly rejected likely due to too much emphasis on Africa (and not enough benefit for EU).

Prof. JC Diehl, 2014-present, Delft University of Technology, Faculty of Industrial Design, Netherlands Industrial design engineer, PhD co-supervision. Expertise: sustainable development, e.g. toilets for Africa (Gates Foundation recipient) and super-efficient wood burning stoves.

Prof. J Simó-Reigadas, 2012-present, Rey Juan Carlos Universidad, Madrid, Spain, Electrical Engineering. PhD co-supervision (Carlos Rey-Moreno), co-author; Expertise: Layer 2 networking, long distance Wi-Fi, telehealth. Co-director of EHAS which builds long-range WiFi networks in rural Peruvian rain forest, and is now integrating incumbent operator backhaul and last mile.

Prof. A Dearden, 2010-present, Sheffield-Hallam University, United Kingdom. Expertise: Participatory design, software engineering, ethics. Both of us chaired different ACM DEV conferences. Sabbatical visit and IEEE paper co-author in 2015.

Prof. N Bidwell, 2008-present, University of Namibia on-site collaborator on rural communication project; co-author. Expertise: human computer interaction design, ethnography and ethnographic Action Research.

Prof. A Freudenthal, 2008-2014 (deceased)  
Delft University of Technology, Faculty of Industrial Design, Netherlands  
SANPAD collaborator on Deaf project (two 3-year cycles), MSc and PhD co-supervision. Expertise: Industrial design engineering, community-based co-design.

Prof. R Westerveld, 2004-present  
Delft University of Technology, Faculty of Technology, Policy and Management, Netherlands (retired)  
SANPAD collaborator on rural telehealth project, paper co-author. Expertise: inverse infrastructure, particularly in Africa. Annual visits, here or there, since 2004.

Dr M Pearson, 2004-2006  
University of Waikato, Computer Science Department, New Zealand (left in 2008)  
RuralLink, New Zealand (General Manager). Designed and built rural WiFi networks together in Eastern Cape, co-author. Expertise: wireless infrastructure.

Dr Michael Best, 2003-present, United Nations University, Macao, China; Georgia Tech University, Computer Science, Atlanta, GA, USA. Met at first ICT4D conference on African soil, ACACIA in 2003. Founder of ITID Journal while based at MIT, setup MIT Media Lab in India, co-chair of ICTD 2012 at Georgia Tech, and did sabbatical with us 2<sup>nd</sup> semester 2012, when he helped establish ICTDEVERS and gave an Honours course on ICT4D at UWC. Co-edited Gary Marsden Special Issue for ITID. Expertise: ICT and peacekeeping (particularly in Africa, e.g. Liberia), big and/or small data, gender and ICT.

## **LEADERSHIP AND ADMINISTRATION**

### **Bridging Application and Network Gaps (BANG) research group founder and director, 2000-present**

I established the BANG research group in 2000 to design, introduce and evaluate innovative Computing for Development interventions with and for disadvantaged communities. ICT for development (ICT4D) is currently one of the most challenging research problems in the world, specifically for computer scientists because we often lack the socio-economic skills to address technical concerns. BANG addresses such gaps. BANG has a rolling annual postgraduate population average of 12-15 students, including Honours, MSc and PhD students. BANG enjoys multi-disciplinary collaboration with both national and international universities, companies and NGOs; with collaborative expertise in computer science, ethnography and social anthropology, social development, economics, electrical engineering, industrial design engineering, pharmacy, gender studies, and most importantly, communities, via NGOs and local governance structures.

### **Department Postgraduate co-ordinator, 1999-2002**

I designed the Honours programme that our department still uses today, in particular with respect to the yearlong project that is required for every Honours student. The Honours project is based on industry experience in the dot com boom with respect to the traditional software development life cycle: user requirements, requirements analysis, prototype, high level design, low level design, implementation, testing and user documentation. The rest of the Honours programme is course-based, allowing students to take up to 25% of credits from other departments. Because the coursework emphasises research skills in addition to advanced programming skills, our Honours students are prepared for both the workplace and advanced postgraduate studies.

### **Faculty Safety committee, 2000-2002**

This was by and large a token assignment, as our senior technical officer assumes most duties involving safety.

### **Faculty Media & Recruitment committee, 2001-2002**

I attended the Science Festival in 2002 in Grahamstown, and was responsible, with Melody Windvogel, for conceptualising and designing the backdrop that won UWC's display an award that year.

### **Department Postgraduate committee, 2005-present**

All department lecturers belong to this committee.

### **Faculty Postgraduate/Higher degrees committee, 2005-2014**

I help advise with postgraduate and research activities, including but not limited to submitting documentation in the appropriate format in a timely fashion. Served on Exec during 2014.

### **SACBANGers coordinator, 2009-2010**

This monthly meeting alternated between UWC and UCT campuses, comprising the BANG and Socially Aware Computing (SAC) research groups at each university, respectively.

### **ICTDEVers coordinator, 2012-present**

Widened the net to include all Cape Town universities and NGOs operating in the ICT4D space. Our first meeting was held 18 Sep at UWC's new Life Sciences building, and we meet monthly at various locations.

### **Faculty Research and Ethics committee, 2013**

Member of ethics and research application sub-committees.

### **IPLM programme 2015-2016 with new executive. Participated in all workshops.**

### **Faculty Teaching and Learning committee, 2015-present.**

### **Blended Learning Champion, 2016-present (appointed by DVC Academic).**

### **Information, Communication and Technology Portfolio Steering Committee (ICTPSC), 2017-present.**

## COMMUNITY ENGAGEMENT

### **SignSupport with and for Deaf Community of Cape Town (<http://www.signsupport.org>)**

Tucker and his team have been working with Deaf Community of Cape Town (DCCT), a Deaf People's Organisation (DPO), since 2001. DCCT celebrated its 25th anniversary on 15 Sep, 2012, and gave Bill a service award in front of over 1000 people at the CTITT, including DCCT's Deaf and blind founder, Father Cyril Axelrod. The reason for this award is that for so many years we have been designing and developing innovative ICTs for Deaf people with and for DCCT. These ICT prototypes can be roughly grouped into three phases. Phase 1 addressed alternative forms of text relay: a Deaf person's text to speech on a phone for a hearing person, and then speech back to text. We used open source software, and integrated standard Internet chat into the relay system on PCs and also on mobile phones and a custom text device from Telkom called a Teldem. We soon learned that most Deaf people involved with DCCT were actually not all that text literate, and were even somewhat embarrassed by their text, mainly with hearing people. They were perfectly happy to SMS each other in broken English, Afrikaans or isiXhosa. In fact, many disadvantaged Deaf people do not read lips or possess exclusively expensive hearing implants; and they are most literate in South African Sign Language, a non-verbal and non-written language 'spoken' by more people than the two smallest official South African language groups combined. So we started looking at signed language video options on PCs and mobile devices. At that stage, we became interested in 'Deaf to Deaf' communication and built alternatives to off-the-shelf video packages like Skype and Camfrog that were not actually designed for Deaf users. For example, Deaf participants told us we should divide the screen in half, portrait style, instead of using picture in picture. A 50/50 screen split allowed a Deaf person to see from navel to head of both signers simultaneously, which is more natural for them. Besides, Skype prioritises voice, not video; and Deaf people simply don't need voice. The overriding challenges, though, were a) most Deaf people do not possess PCs and even if they did, the data costs for video over PCs and/or mobile phones is prohibitively expensive in South Africa. We looked at low-cost and low-bandwidth alternatives like MobileASL yet that project was developed for outdated Nokia Symbian phones. In Phase 3, we started getting more ideas from Deaf people about how to build ICTs that would do things for them *that they needed*, rather than things *that we thought they needed*. This was a remarkable shift for us, and led us into community-based co-design. The best outcome of that approach is a mobile communication aid called SignSupport (see <http://www.signsupport.org>). The seed idea for SignSupport emerged from generative sessions with an industrial design engineer from TU Delft (the Netherlands): it was a hand drawn picture of a mobile phone that depicted an interaction between a doctor and a Deaf patient with whom the doctor could not communicate. The phone relayed the doctor's instructions to the Deaf patient in pre-recorded signed language videos. That meant we had to script out the entire interaction. One positive consequence was the ability to store the videos on the phone and thereby avoid mobile data costs. Another positive was that we could easily store high resolution and legible signed language videos. However, interactions with a doctor meant a fully-fledged expert system that we were not capable of implementing, and there was no opportunity for on-the-fly Q&A. So we went back to Deaf people and asked them to prioritise a more restrained communication scenario. That is how we came to build and test out SignSupport for pharmacy, which was designed with another industrial design engineer (also from TU Delft), a pharmacist PhD student and a computer scientist to do the programming, together with Deaf participants and interpreters. Alongside this effort, collaborators at UCT built another SignSupport scenario to help Deaf learners with computer literacy training, to walk them through the ICDL (international computer driver's license) certification course. With a limited authoring tool to help populate that SignSupport app, which runs on Android mobile phones and tablets, we began to design a more generalised authoring tool. We now have a prototype that enables a non-programmer who is an expert in any given domain, to design and populate (with the help of a Deaf person and sign language interpreter) a mobile app for a given restricted communication scenario, e.g. getting an ID book or learning how to handle diabetes. Our next goal is to get national ethics permission to carry out clinical trials with such healthcare scenarios that can be supported by SignSupport for pharmacy to provide a well-rounded healthcare tool for Deaf people that is populated by official DoH healthcare information. Once deemed acceptable, we can actually put SignSupport into people's hands for healthcare.

### **Zenzeleni Networks with and for Mankosi Community (<http://zenzeleni.net>)**

Tucker and his team have been working with the Mankosi community, and surrounding areas in the remote rural Eastern Cape, since 2004. We began our work there with a telehealth application running over a wireless network, in concert with provincial and district departments of health in several hospital/clinic pairs: Nessie Knight hospital in Sulenkama with Tsilitwa village clinic (Qumbu area); and Canzibe hospital and Lwandile village clinic (adjacent to Mankosi, in the Libode district). Our top-down approach, driven by the formal government and management structures, with respect to telehealth in general proved to be unsuccessful, mostly for social reasons, e.g. power relations between clinic sisters and 'imported' doctors, sisters viewing the system as 'spying' on them and also the fact that clinic sisters felt their assignments were 'punishment', i.e. being so remote as to be socially untenable. However, our long-range WiFi networks that ran off of solar charged bakkie batteries, remained robust and resilient. We were introduced into the second hospital-clinic pair by an NGO called Transcape, based in Mankosi, and have worked alongside them since 2004. We built PC and mobile based versions of MUTI, a custom telemedicine app 2004-2007 that possessed many of the features found in WhatsApp, Skype and Facebook today. In 2008, collaborator Nicola Bidwell (now at U Namibia) was resident in Lwandile village and commenced ethnographic studies that came to inform our current ICT interventions in the area which have produced a solar powered wireless mesh network that offers voice services over 30 square kilometres; a network that was designed and implemented under the guidance of the Mankosi community Tribal Authority. Zenzeleni Networks (see <http://zenzeleni.net>) currently links 10 of the 12 villages that comprise Mankosi, and is owned and operated by a community cooperative. Zenzeleni is a legal ISP (Internet Service Provider) with full license exemption from ICASA, our national regulator, for almost 2 years. Zenzeleni earns revenue from charging cell phone batteries on the solar stations, and also offers breakout calls to major networks like Vodacom, MTN and Telkom at a fraction of the price of normal cell phone rates. We are now learning how to replicate the model to adjacent communities. It's only a matter of time before the DoH wakes up and leverages such networks in those communities, providing Zenzeleni can maintain its success. In order that the major operators do not attempt to have it shut down, we are collecting data to prove that such 'inverse infrastructure' increases revenues for those operators, rather than cannibalise it as it commonly believed. We have preliminary data that confirms this. In fact, because Mankosi dwellers are using Zenzeleni infrastructure to charge their phones, they are already spending more of their food money on communications. Incredibly enough, they are not using the Zenzeleni network to place calls, despite local calls being free, and 'Skype out' calls at half the price of MTN. This remains a research challenge similar to the social problems we encountered with the MUTI telehealth project. It is often not the technology that fails but the social rigidity that prevents behavioural deviance, no matter how positive it may be.