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### **ACQuFRR Report for 2013**

The establishment of ACQuFRR has integrated teaching and research in quantitative finance, risk and its allied disciplines at UCT. The Unit was afforded a 3-year, provisional accreditation by the University Research Committee (URC) in October 2012. It will be URC reviewed in 2015.

ACQuFRR coordinates the research dissertations for the MPhil in Mathematical Finance and the research projects and progress for “Full” Master’s and PhD students in quantitative finance and risk. It also provides a forum for collaboration and discussion between its academic members, students and industry associates.

The ACQuFRR Advisory Board convened on the 25<sup>th</sup> of February 2013 for its first annual meeting. The minutes from this meeting were circulated in March 2013. In 2013, we had industry representation on the board from Standard Bank, Old Mutual, Riscura and Prescient Securities. The Board plays a vital role in maintaining contact between our industry partners and our research activities, thus fulfilling the mandate of the Unit and justifying its industry funding.

The second annual meeting is scheduled for the 24<sup>th</sup> of February 2014.

#### **Students**

ACQuFRR has 1 Research Master’s student, **Mr Obeid Mahomed**, who is being supervised by Prof Taylor. Mr Mahomed was the top Honours graduate in the Programme in Advanced Mathematics of Finance at Wits in 2004, and spent a number of years in the financial services industry before returning to academia in 2012. Mr Mahomed will register for a PhD when he completes his Master’s dissertation in mid-2014. During 2013 he was our Research Administrator and he will be lecturing on the MPhil in 2014.

ACQuFRR also has 3 continuing PhD students. **Mr Michael Kateregga**, who is being jointly supervised by Prof Taylor and Dr Mataramvura. Mr Kateregga is a Master’s graduate of Stellenbosch University and studied at AIMS prior to that. **Mr Chun-Sung Huang**, who is being supervised by Dr Mataramvura. Mr Huang is a Lecturer in the Dept. of Finance and Tax at UCT, and a Master’s graduate of UKZN. **Mr Dennis Ikpe**, who is being supervised by Dr Mataramvura and Prof Ronnie Becker of AIMS. Mr Ikpe is an Honours graduate from the Programme in Advanced Mathematics of Finance at Wits, a Master’s graduate from UNISA and is currently employed at UNISA. He has been released from duty for three years to pursue a PhD at UCT.

We have registered 2 students from the current MPhil class, **Mr Alex Backwell** and **Mr Ralph Rudd** for PhDs in 2014. Mr Backwell is spending the first 4 months of 2014 attending classes in Mathematical Finance at the Université d'Évry-Val-d'Essonne, France with Prof Stephane Crépey. Mr Rudd was appointed in January as ACQuFRR’s Research Administrator and is assisting us with tutoring on the MPhil. Mr Backwell, Mr Kateregga and Mr Ikpe will also tutor on the MPhil.

We have also recently registered one further part-time PhD student, **Mr Daniel Acres**, who is being jointly supervised by Dr Kruger and Prof Taylor.

We had the pleasure of hosting a 6-month visit from **Mr Nadim Sah** in 2012/3, which was funded by the DAAD in Germany. Mr Sah is a PhD student at the Technical University, Berlin and arrived in November 2012. He assisted with tutoring the 2013 MPhil class and presented seminars and workshops in our local series and in Kenya at a mathematical conference we attended (see below).

All of our MPhil and research students are housed in the RMB Loft on the 6<sup>th</sup> Floor of the Leslie Commerce building.

## **Publications**

ACQuFRR produced seventeen research publications in 2013. The titles and publication details appear on our website [www.acqufrr.co.za](http://www.acqufrr.co.za). The website also hosts our new Working Paper Series, an exciting development that will attract research and collaborators to the Unit and disseminate the initial results of our endeavours. The website will host all the details of our Executives, Advisors and Research Associates, along with descriptions of our current research interests and projects.

We believe that quantitative finance at UCT is in a strong position. The addition of new staff members through the MPhil degree and the variety of visitors that we host, enhances the profile of the area in the university and South Africa. Additional staff and research students create a “critical mass” that allows the programme to expand and flourish in its activities.

## **Seminars, Workshops, Retreats & Conferences**

Seminars, workshops and conferences are part of the normal activities of a research Unit. However, the industry alignment of ACQuFRR means that we have an obligation to offer our research and discussion to a wider audience. Such events help to create awareness of the Unit and to publicise its contribution in a broader context.

A weekly seminar series was held throughout 2013 during term-time. The MPhil students are expected to attend these, along with the Research Master’s and PhD students affiliated with the Unit. The seminar is hosted jointly by ACQuFRR and the Department of Finance and Tax, and held in the Department of Finance and Tax’s seminar room (LS4J) on Tuesdays at lunchtime. It brings together research-minded academics in Finance and Actuarial Science with industry participants. Research students are also expected to present dissertation and thesis work in this forum. The series will undergo a shift in focus in 2014. We will ask all of our associated members to present a sequence of talks in the 1<sup>st</sup> semester in which they outline and discuss their current research projects. This will allow the MPhil students to identify potential dissertation supervisors and topics. During the 2<sup>nd</sup> semester, we will request the research students to present their recent results, and invite practitioners to present their latest findings.

The 1<sup>st</sup> Prescient Securities/ACQuFRR Quant Conference took place in Cape Town in February, 2013. This is an annual, non-academic event and attendance is by invitation only. Members of ACQuFRR are naturally included in this invitation. ACQuFRR sources and invites prominent academics to deliver a two-day series of lectures on a topic pertinent to quantitative professionals in the investment industry. This year’s conference was co-presented by Prof Carol Alexander & Dr Jacques Pezier of the University of Sussex Business School, UK and was well attended. The 2<sup>nd</sup> conference will take place in April 2014.

ACQuFRR is involved in the annual Summer School in Mathematical Finance held each February at the African Institute for Mathematical Sciences (AIMS) in Muizenberg. The director of ACQuFRR plays a key role in inviting the 3 speakers for this event and uses this opportunity to create and strengthen ties with leading international academic figures. It is often possible to persuade the presenters to extend their stay in South Africa and to offer further research seminars at UCT. This was the case in 2013, and Dr Nick Webber of De Montfort University, UK and Prof Stéphane Crépey of the University of Evry, France gave two seminars at UCT in the week after AIMS. Prof Alexander and Dr Pezier also extended their stay and held discussions with students and staff about their research interests. ACQuFRR also paid for Dr Frednard Gideon to attend the Summer School. Dr Gideon is the Head of the Department of Mathematics at the University of Namibia (and is now the Dean of Science). ACQuFRR research students are encouraged to attend the Summer School. The School is free for full-time students at South African universities.

ACQuFRR held a 1-day Research Retreat in August. We had an off-campus day during which we explored the various research activities of our academic staff and sought to find areas of commonality that could be exploited. We invited some of the Mathematical Finance lecturing staff, our colleagues in Finance and Tax and our current and prospective research students. Their reaction was positive and we will repeat the exercise as frequently as possible in the future.

During a visit to the Department of Risk Management and Insurance at Georgia State University (GSU) in May, I invited Prof Vikas Agarwal of GSU's Department of Finance to visit UCT. Prof Agarwal is a world-renowned expert on hedge funds and is a sought after speaker at international industry-focused conferences and workshops. We hosted a four-day visit from him in September during which he presented a seminar to a combined audience from industry and academia titled, "Institutional Investment and Intermediation in the Hedge Fund Industry".

### **Conference & Workshop Attendance**

One of ACQuFRR's goals is to initiate research with African academics working broadly in Quantitative Finance or Risk research. In 2011, while I was still leading the financial mathematics group at the University of the Witwatersrand, I was invited to attend the Strathmore University International Mathematics research meeting in July 2012, in Nairobi. I was asked to give a general plenary talk, to convene a Mathematical Finance stream, and to give a keynote speech and a research seminar in this stream. By the time I attended the conference, I was working at UCT. Two of my colleagues Dr Sure Mataramvura (UCT) and Prof Conrad Labuschagne (Wits) accompanied me. The meeting was successful and we made some initial contacts in mathematical and statistical finance at Strathmore and Nairobi Universities. We also met a wide range of students and staff engaged in quantitative finance-related research in Kenya and East Africa.

In 2012, I received a similar invitation for the 2013 conference. This time I was accompanied by two UCT staff members (Dr Mataramvura and Dr McWalter, both from Actuarial Science) and a research Master's student (Mr Obeid Mahomed); Prof Labuschagne and three MSc students from the Wits Programme in Advanced Mathematics of Finance, and three international collaborators: Prof Stéphane Crépey - Université d'Évry-Val-d'Essonne, France, Mr Nadim Sah - TU Berlin, Germany and Dr Andrea Macrina - University College London, UK. On this occasion, the programme included a pre-conference school. The Mathematical Finance school was taught by Prof Crépey, Mr Mahomed, Dr Mataramvura, Dr Macrina, Mr Sah and Dr Philip Ngare from Nairobi University.

At the conference we had lengthy discussions around collaborating with Strathmore and Nairobi Universities. We have all been approached to co-supervise PhD students and to act as post-graduate External Examiners for Strathmore and Nairobi. In a very positive development, Dr Ngare has asked me to mentor him in the creation and coordination of a Mathematical Finance programme in Kenya. This indicates to me that this enterprise may become truly collaborative.

I invited Dr Ngare and Dr Ivivi Mwaniki, also of Nairobi University, to UCT. ACQuFRR is funding these visits. Dr Mwaniki enjoyed a 5-week research visit to UCT in September/October, 2013. Dr Ngare is currently at UCT for a 2-week research visit, which coincides with an ACQuFRR Masterclass we are holding in Johannesburg and the AIMS Summer School in Cape Town.

ACQuFRR paid for Mr Obeid Mahomed to attend the 23rd Annual Southern African Finance Association (SAFA) conference in Cape Town in January, 2013. Mr Mahomed presented a paper titled "Aggregational Gaussianity in the South African Equity Markets: Implications for the Pricing of Risk", which is joint work with Dr Daniel Polakow, one of ACQuFRR's Research Associates.

The Unit also funded a 3-week trip to Toronto in October/November, 2013 for Mr Chun-Sung Huang to attend the Quantitative Finance Retrospective Workshop and the Mathematics for New Economic Thinking Workshop at the Field's Institute. There were no invited papers for these events so Mr Huang could not present his research, but it was felt that Mr Huang and ACQuFRR would benefit greatly from his attendance. We are keenly interested in the current progress of research at the intersection between economics, insurance mathematics and mathematical finance. One of the key points of overlap is the study of Systemic Risk, which will play a critical role in research in the foreseeable future. We want to be part of this development.

#### **Dr Andrea Macrina**

Dr Macrina is the convenor of the MSc in Financial Mathematics at University College London, one of the world's leading universities. Dr Macrina is a great supporter of Mathematical Finance in South Africa and has visited us on many occasions over the past 8 years. At the time of his first visit in 2005, he was a PhD student of Prof Lane Hughston at King's College, London. Prof Hughston is an influential figure in Mathematical Finance globally, and is also a steadfast supporter of South Africa. Dr Macrina went on to lecture at King's and to finally convene their MSc, before taking up his current position at UCL in 2012.

Dr Macrina has shown his commitment to our endeavours by attending and speaking at the triennial MiF conferences in the Kruger Park, co-supervising one of our PhD students and by initiating and funding his visits to Johannesburg and Cape Town. He regularly and enthusiastically promotes our work and facilitates contact with a variety of international academics. He attended the 2013 conference in Kenya, where his visit was wholly financed by their local organising committee. In February, 2013 he was one of the 3 presenters at the AIMS Summer School and travelled to the SA Reserve Bank after the School to give a seminar to their research team. We have scheduled 3 visits to South Africa for him in 2014.

Dr Macrina affords us a connection with a community of cutting-edge Financial Mathematicians in the UK, USA and Europe. He also assists us in accessing the extensive funding opportunities available in these countries. In recognition of his contribution to UCT, he was appointed in Actuarial Science as an Adjunct Associate Professor in October this year.

A/Prof David R Taylor