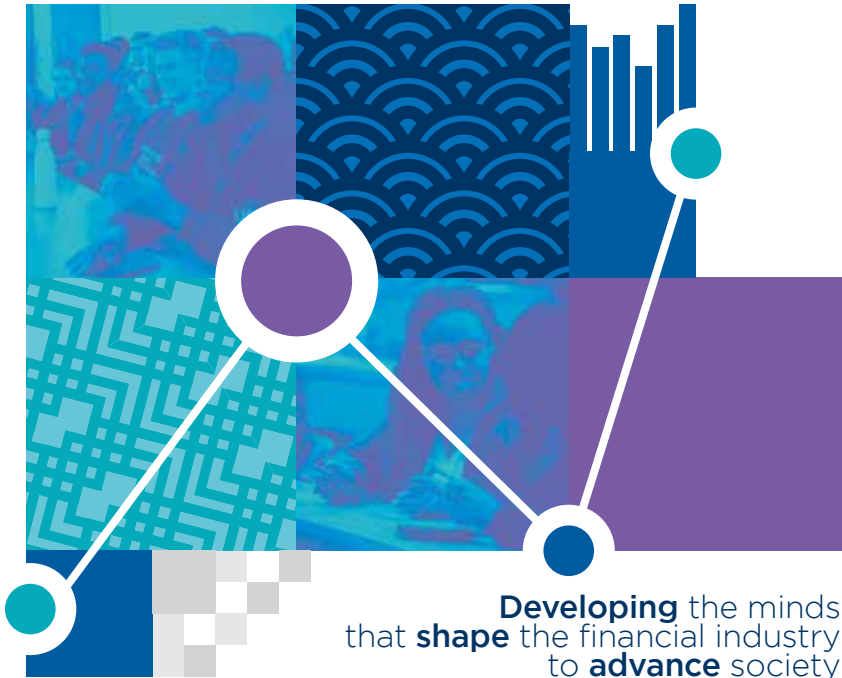


# ANNUAL REPORT 2019



Developing the minds  
that **shape** the financial industry  
to **advance** society

# DIRECTOR'S MESSAGE

The year in review has been energetic, optimistic and productive. Two highlights stand out: AIFMRM staff and students published two papers in A-rated journals this year – one in Insurance: Mathematics and Economics, and one in Economics Letters; and a team of MCom specialising in Risk Management of Financial Markets students won the fourth annual FNB Stockbroking and Portfolio Management Trading Game.

I want to take this opportunity to express my gratitude and appreciation to AIFMRM's donors – Absa, FirstRand, Liberty, Nedbank, Old Mutual and Sanlam – and each of their representatives: Colin Iles and Parin Gokaldas, Miné van Zyl, Brian Kipps, Anél Bosman, Judy Faure and Nersan Naidoo, for their strategic guidance, trust and financial support as we pursue our vision and purpose.

I would also like to express my appreciation to my colleagues in AIFMRM, who work tirelessly to teach, support and encourage our students and enable them to excel, the Dean of Commerce and staff in the Faculty of Commerce who supported the Institute during this year.

Sincerely,



Professor David Taylor

Director – AIFMRM



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# AIFMRM TEACHING HIGHLIGHTS 2019

AIFMRM continues to work closely with industry partners to develop scarce skills through its specialised Master's degrees and short courses.

## PROGRAMMES AND COURSES

# 2

specialised Master's degrees offered



# 1

new Financial Markets stream launched



# 2

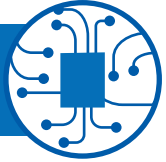
online short courses offered



## New financial markets stream launches in 2020

**4**  
students

will take the new  
**MSc specialising in Data Science**  
(Financial Markets stream) in 2020



AIFMRM successfully implemented a new Financial Markets stream in the MSc specialising in Data Science (offered by the Faculty of Science). Students taking this specialisation will complete the Data Science core courses and register for three electives: South African Financial Markets, Risk Management of Financial Instruments and Financial Systems Design.

The first two are core courses from the MPhil specialising in Mathematical Finance, and the last is a new course that we co-designed with the Department of Information Systems. Students will complete their minor dissertations under AIFMRM supervision and will be regarded as AIFMRM students in all our activities.

## Two online short courses for working professionals

AIFMRM offers two non-credit bearing, online short courses in collaboration with the Faculty of Commerce's online learning partner, GetSmarter.

### Business Risk Management

A 10-week course providing a comprehensive overview of enterprise-wide risk management, a sound foundation of theoretical knowledge and the latest tools and techniques for practical application.

Ran **5 times** in 2019  
**171 participants** in total

### Advanced Business Risk Management

An 8-week, advanced course providing a comprehensive simulation of the risk management process and application of industry best practices.

Ran **2 times** in 2019  
**30 participants** in total

## AIFMRM welcomes new staff

Two new academic staff members were appointed towards the end of 2019 and will join AIFMRM on 1 January 2020.



**Dr Alex Backwell** is well-known to all - he was the top MPhil student in 2013, a PhD student with AIFMRM from 2014 to 2018, and a Postdoctoral Research Fellow with AIFMRM from 2018 to 2019. Alex has been appointed as a Senior Lecturer.



**Ms Mansa Aidoo** is also an AIFMRM alumna. She was an MCom student in 2018 and spent 2019 at Nedbank on their Graduate Programme. Mansa is returning “home” to take up a Lecturer position and pursue her PhD.

# MPhil specialising in Mathematical Finance



**Ranked #60 in the world**

on the Eduniversal Best Masters Ranking in Financial Markets 2019.



**13**

students completed



**4**

received distinctions for their dissertations



**2**

completed an **internship** during the June/July break at LibFin

**8**

participated in the **Financial Mathematics Team Challenge**

Companies employing 2019 graduates are LibFin, FirstRand, Standard Bank, Investec, Allan Gray, Riskworx and Quantum.

**1**

will pursue a **PhD** with AIFMRM



FIRSTRAND



LONG-TERM INVESTING

riskworx



**10**

secured employment

## MPhil dissertation topics in 2019

The Lifted  
Heston  
Stochastic  
Volatility Model

Flexible Risk-  
Based Portfolio  
Optimization in  
South Africa

Parameter  
Learning with  
Particle Filters

Local Stochastic  
Volatility - The  
Hyp Hyp Model

Applications  
of Gaussian  
Process Regression  
to the Pricing and  
Hedging of Exotic  
Derivatives

Calibrating  
Term Structure  
Models with  
Stochastic  
Volatility

A Review of  
Multilevel Monte  
Carlo Methods

The impact of  
the FRTB on Market  
Risk Capital for  
the South African  
Interbank Interest  
Rate Market

The Ensemble  
Carr-Pelts  
Volatility Surface

Pricing American/  
Bermudan-style  
Options under  
Stochastic  
Volatility

Hedging Volatility:  
Different  
Perspectives  
Compared

Volatility Level  
Dependence  
and the CEV  
Market Model



## What our students had to say

“Not only is each staff member of AIFMRM exceptionally diligent, they are also very friendly and supportive. No question is left unanswered, and no problem is left unresolved. The entire programme runs like a well-oiled machine and what this machine produces is in high demand by many top-class companies. Over only a single year, I have developed as a critical thinker and I can undoubtedly say that I do indeed have something to offer.”

**Vegan Pather**

“What I have found most valuable is not just the outstanding presentation and content of the courses, but the style of lecturing and the ability of our lecturers to encourage us to think. Deciding to do the MPhil was the best decision I’ve made – what I’ve learned has been so integral and core to my personal development that I would whole-heartedly recommend this programme to any student contemplating it.”

**Matthew Sylvester**

# MCom in Risk Management of Financial Markets



**152 applications** for the MCom in 2019  
up **20%** from 2018



**22**  
students



**All**  
completed  
the **MCom**  
**Externship**  
**Programme**

**19**  
secured  
employment

A team of **4**  
won the 4th annual  
**FNB Stockbroking**  
**and Portfolio**  
**Management**  
**Trading Game**

**1**  
student  
will study  
further

**2**  
taking  
a gap  
year

Companies employing this year's graduates are RMB, Investec, Merrill Lynch, Nedbank, Aspect Advisory, FirstRand, Sanlam Investments, STANLIB, Monocle, Absa and AT Kearney.

## What our students had to say

“This year has advanced my technical knowledge of financial markets significantly and it has also aided in the development of my soft skills. However, what stood out the most from this degree was not the content of the curriculum, but the strong reputation AIFMRM has with potential employers. It really is a privilege being a part of AIFMRM.”

**Keagan Brown**

“The overall learning experience is elevated – it is transformed from a rote learning culture to a culture of critical thinking and problem-solving. The degree involved a mix of both quantitative and qualitative problems for which no particular structure was prescribed. This led me to understand different problems that needed to be solved and to implement methods that will solve those problems. I became strong at being attentive to detail without losing sight of the bigger picture.”

**Kebeiloe Sello**

## MCom Externship Programme now forms part of the degree

This year the MCom Externship became part of the assessment of the degree, a change from previous years where it was not formally assessed.

Now in its fourth year, this successful and highly collaborative course sees teams of students working with a company to solve a problem over four weeks – three weeks of research and problem-solving and one week of assessment and feedback. Participating companies pose the questions, supervise and mentor the student teams.

Students are exposed to practical business or social problems – and tasked with finding an innovative approach to analysis and problem-solving, thus developing their strategic thinking capabilities.

“The challenge for the teams is to apply their common sense, knowledge, resources and analytical skills to a real-life problem and determine a viable outcome. The result could be a single solution or a range of solutions or approaches. It is also possible that no solution emerges – but that does not take away from the learning process. The exercise essentially mimics what students can expect in the real world of work.”

**Professor David Taylor,  
Director of AIFMRM**

This year, five teams worked on problems posed by FirstRand, Satrrix, Liberty, Nedbank and MMI.


## Helping SA's financial services to get serious about creating shared value

Not all externship projects focus exclusively on internal solutions. One team worked on a problem that challenged companies to shake up the way they are doing things to create shared value in society and help solve some of South Africa's more intractable social challenges.

The student research team set out to investigate how financial services companies could track and measure their Environmental, Social and Governance (ESG) initiatives.

A key finding was that companies need a better framework for implementing and adjusting key performance indicators that relate to the organisation's ESG targets – and also to find more effective ways to link these to the aspirations of individual employees.

Because mobile technology offers new avenues to achieve this integration, students proposed an app to create easy access to both individual employees' environmental and social aspirations and those of the organisation – allowing them to set shared goals and track their progress towards attaining these in real-time.



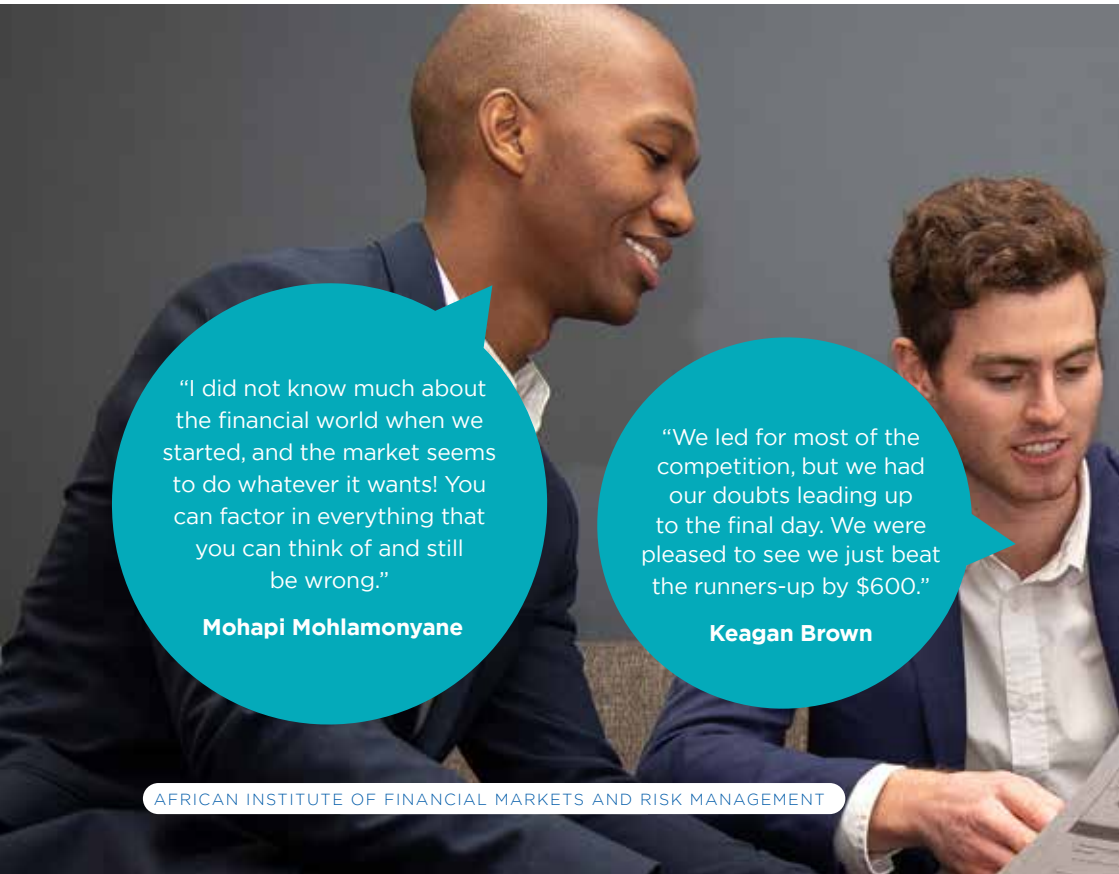
“Setting aside a portion of a company’s revenue to use in charitable donations is the old way of thinking about social responsibility, and merely doing this does not constitute shared value. There is so much more that can be done by South African companies to create shared value.”

**Mohapi Mohlamonyane**

## MCom team trades its way to success

A diverse team of four AIFMRM MCom students beat out stiff competition from Stellenbosch University and the University of the Witwatersrand to **win the fourth annual FNB Stockbroking and Portfolio Management Trading Game.**

The competition aims to give students a taste of the world of trading in global financial markets and provides an opportunity for students to work together, compete against one another and learn about trading in real-time. After the three-month trading simulation challenge, utilising a demo trading platform, the AIFMRM team had generated the highest return on the initial capital of \$100 000.

A photograph of two young men in business suits sitting at a desk, looking at a laptop screen. The man on the left is smiling and looking towards the right. The man on the right is looking down at the laptop. Two teal speech bubbles are overlaid on the image, containing quotes from the men.

"I did not know much about the financial world when we started, and the market seems to do whatever it wants! You can factor in everything that you can think of and still be wrong."

**Mohapi Mohlamonyane**

"We led for most of the competition, but we had our doubts leading up to the final day. We were pleased to see we just beat the runners-up by \$600."

**Keagan Brown**



**FNB**

“The competition draws participants into the real world of stockbroking, aimed at helping them to understand the stockbroking process from start to finish, and the risks involved. While the system is a simulation, it works on real-time prices and data. For example, if the dollar weakens in the real world, the change is adapted in the simulation too.”

**Richard Levesque,**  
**Portfolio Manager at FNB Stockbroking**  
**and Portfolio Management**

“Our team consisted of two members from an engineering background and two from a business science background, and this was great in creating diversity. I loved the competitive element it brought out in us!”

**Lindi-Jane**  
**Janse van Rensburg**

“We quickly realised each other’s strengths and weaknesses and used that to our advantage. The way a person trades reveals a lot about how they view risk and everyday decisions in life.”

**Rakhee Kooverjee**

# RESEARCH HIGHLIGHTS 2019

AIFMRM continues to work closely with industry to drive research and to advance the theory and application of quantitative, statistical and mathematical techniques that shape the financial sector.

A robust research thread runs through everything that we do. AIFMRM's research unit, the African Collaboration for Quantitative Finance and Risk Research (ACQuFRR), continues to hold a weekly seminar series during term-time presented by UCT and visiting academics from local and international universities, and industry practitioners. In 2019, AIFMRM hosted a four-day research retreat, which contributed to several papers. And, building on the success of The Factory, a pioneering research event initiated in July 2018, one of the participating teams, Team Multicurve, now have a working paper available on Social Science Research Network (SSRN) and members have presented their work at four international research events.

In total, AIFMRM staff and students published four journal articles last year, two of these in A-rated journals – one in *Insurance: Mathematics and Economics*, and the other in *Economics Letters*.

*To boost our research capacity going forward, we recruited a new Postdoctoral Research Fellow in 2019, Dr Mesias Alfeus, from Namibia.*





**5**

**PhD students**

Obeid Mahomed,  
Andrew Soane,  
Tina Koziol,  
Allan Davids, and  
Qobolwakhe Dube

**3**

full-time  
**postdoctoral**  
research fellows



**4**

journal  
publications

**2**

published  
in A-rated  
journals



**24**

Weekly Seminars  
held in 2019

**6<sup>th</sup>**

Annual  
Financial  
Mathematics  
Team Challenge

# SIX OF THE BEST: THE FMTC IS GOING STRONG

There was much excitement when the UCT Vice-Chancellor Professor Mamokgethi Phakeng and the Dean of Commerce, Associate Professor Linda Ronnie paid a visit to AIFMRM in July to experience the Financial Mathematics Team Challenge (FMTC) first hand.

FMTC is a highly successful collaboration between AIFMRM and University College London, which provides students with the opportunity to focus on an industry-relevant research project and collaborate with international students and academics.



This was the sixth time that AIFMRM has staged the FMTC, which took place from 24 June to 5 July 2019. Five teams of Master's and PhD students from UCT, University of Technology Sydney, London School of Economics, McMaster University, Imperial College London, University College London and Sanlam Investments took part. Additionally, for the first time, three students from the University of Zimbabwe participated.

Each FMTC team wrote a report containing a critical analysis of their research problem and the results. The research problems tackled in the 2019 FMTC included:

1

**Robust Pricing and Hedging of Basket Options**

2

**On Level Dependence of Volatility and the CEV Market Model**

3

**Financing the Green Revolution**

4

**Option Pricing and Hedging with Deep Learning**

5

**Inferring OIS Discount Factors in the South African Market**

## **Global Impact**

For the second year running, AIFMRM exported the FMTC concept to Brazil. The FMTC Brazil took place from 24 July to 3 August 2019, at the Fundação Getulio Vargas - Escola de Matemática Aplicada (School of Applied Mathematics) in Rio de Janeiro. It too was a great success!



# RESEARCH RETREAT

This year AIFMRM held a retreat to give researchers a much-needed opportunity to interact and collaborate in an environment free from the usual disturbances and interruptions.

Ten researchers attended the retreat from 12 to 16 April, including academic staff, recent PhD graduates and PhD students.

Over the four days, participants discussed and worked on various topics including multicurve interest rate modelling, LIBOR swaption expansions, unspanned volatility, particle filtering, enlargement of filtrations, modelling of dilution effects and employee stock options.

Work performed during this time has contributed to several papers that are now either submitted to journals or are in a preparation stage.

## WOMEN IN FINANCE



The Women in Finance event helped reach **an increase in female applicants** for AIFMRM's degrees.

AIFMRM teamed up with the UCT student society, InvestSoc, to host the Women in Finance event on 1 August 2019. The event was another success, with 163 attendees, aimed at encouraging UCT female undergraduate students to consider a career in finance.

A panel of six leading women in the financial services sector convened for a frank discussion about the opportunities in the industry and the

challenges it poses for women. They also offered advice to aspiring finance professionals on how to overcome the obstacles they may encounter.

Feedback on the event was unanimously positive with many commenting that it was useful to engage directly with women in the industry about how they cope with working in a male-dominant field and how they deal with specific situations. Many who attended commented that they felt inspired after the event.

## Advice from the panellists

### **Kaluba Chikonde**

**MPhil student specialising in  
Financial Technology at UCT**

“Having successful women as role models in the industry is essential. You can’t aspire to be what you’ve never seen.”

### **Jessica Endekovski**

**Graduate Trainee at Standard  
Bank Global Markets**

“Many women may not be aware that their particular skills are highly sought-after in the industry. There are many transferable skills from all sorts of degrees that are valuable in financial services.”

### **Makhotso Ramphele**

**Vice President, Sales and  
Relationship Management at  
JPMorgan Chase & Co**

“Finding a mentor can be a critical turning point for many women. Use your resources and your network to find a mentor, and don’t be afraid to ask for introductions.”

### **Meeta Gosai**

**Portfolio Manager at Old Mutual**

“When looking for a job, find a space where you will be celebrated for who you are – look at the culture of the organisation, as well as the role that you are offered.”

**Tsistsi Hatendi Matika**

**Head Retail Investment Specialist  
for Wealth and Investment  
Management at Absa**

“You can find a space to be your authentic self – focus on doing your job well and do not be afraid to stand up for what you believe in.”

**Monei Pudumo-Roos**

**CEO and founding member of  
Ngwedi Investment Managers**

“Leaders who are confident in who they are, are comfortable with diversity, including gender – they see that people will bring their best if they are allowed to be themselves.”

**What attendees had to say**

“The event gave me more insight into the world outside the university. It was motivating to speak to the women.”

“I learned a lot from the event. I even got a brochure with finance postgraduate programmes for graduates without much financial background. I do not think I would have gotten to know about the programmes otherwise.”

“The panellists shed light on different industries and how we as women can work in those environments, particularly when they are male-dominated. It also helps with deciding whether or not to enter the industry.”



# AIFMRM DEGREES AND CAREERS IN FINANCIAL MARKETS

On 18 July 2019, AIFMRM and the UCT Careers Service jointly hosted the fifth annual event to promote AIFMRM's Master's degrees to UCT students and to inform them about career options in the financial industry. The event was well-attended, with 141 students present.

The event began with a welcome and introduction by Associate Professor David Taylor, followed by a talk by Cathy Sims, the Executive Director of the South African Graduate Employers Association (SAGEA), on careers in financial markets.

AIFMRM academics presented on the Master's degrees; Associate Professor David Taylor on the MPhil specialising in Mathematical Finance, and Obeid Mahomed on the MCom in Risk Management of Financial Markets and the new Financial Markets stream in the MSc specialising in Data Science.

## Cathy Sims' perspective: How to stand out in a competitive job market

In a country with high unemployment and low economic growth, there is a silver lining. According to the 2019 South African Graduate Employers Association (SAGEA) Employer Benchmarks and Candidate Insights surveys, employers expect there to be 5.3% more vacancies for graduates in 2020. However, competition is tough.

While having the right qualification is an obvious prerequisite for a successful job hunt, employers are on the look-out for skills over and above what's written on the graduation certificate. There are skills every employer is looking for – notably creativity, problem-solving, and critical thinking. And these are skills employers struggle to find among graduates entering the workplace – it's a global phenomenon. These skills just aren't nurtured in our education system. Only at a Master's level are people taught how to probe and analyse problems effectively, and then seek novel ways to solve them.

The SAGEA survey also indicates that job hunting early can be a crucial differentiator. Many of the candidates who said they had secured a position with their most preferred employer, started their job search early. They had the opportunity to develop a clear understanding of what was on offer, while those who did not join their most preferred organisation were very likely to have left their job-hunting until their final year.

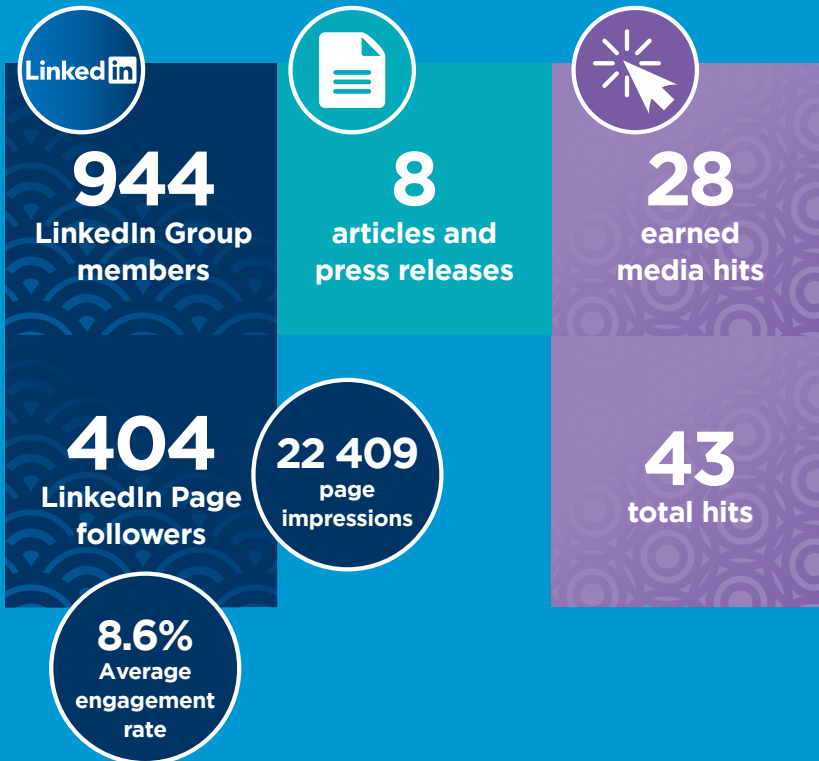


# Events in 2019

MAR	8	3rd Annual Donor Day
APR	12-16	Research retreat
JUN	24 Jun to 5 Jul	6th Financial Mathematics Team Challenge (FMTC) Cape Town
JUL	16	AIFMRM participated in the Actuarial Science Postgraduate Studies evening
	18	5th AIFMRM Careers Fair - Degrees and Careers in Financial Markets
	23	AIFMRM Master's Degrees Information Session: 4th-year Actuarial Science students
	24 Jul to 3 Aug	Financial Mathematics Team Challenge (FMTC) Brazil
	25 Jul	2nd annual UCT Postgraduate Showcase
	AUG	1
OCT	17	AIFMRM Class of 2020 Information Session

# REACHING BEYOND THE UNIVERSITY

AIFMRM maintains an active media presence by providing commentary and analysis in key media channels. AIFMRM also curates a LinkedIn group to stimulate discussion among industry, academia, regulators and industry bodies and to share events and media coverage with its members.



# THE PEOPLE

The Institute employs additional part-time staff including: Helga Halvorson as Project Manager and Lily Roos as Financial Manager. AIFMRM's PhD students and Postdoctoral Research Fellows assist with student tutoring and teaching.



**David Taylor**  
Director



**Peter Ouwehand**  
Associate Professor



**Alex Backwell**  
Senior Lecturer



**Abhik Mukherjee**  
Senior Lecturer



**Obaid Mahomed**  
Lecturer



**Mansa Aidoo**  
Lecturer



**Thomas McWalter**  
Adjunct Associate  
Professor



**Tanja Tippett**  
Adjunct Associate  
Professor



**Dr Jörg Kienitz**  
Adjunct Associate  
Professor



**Prof Erik Schlögl**  
Honorary Professor



**Billy Enderstein**  
Student Psycho-  
Socio Welfare  
Counsellor



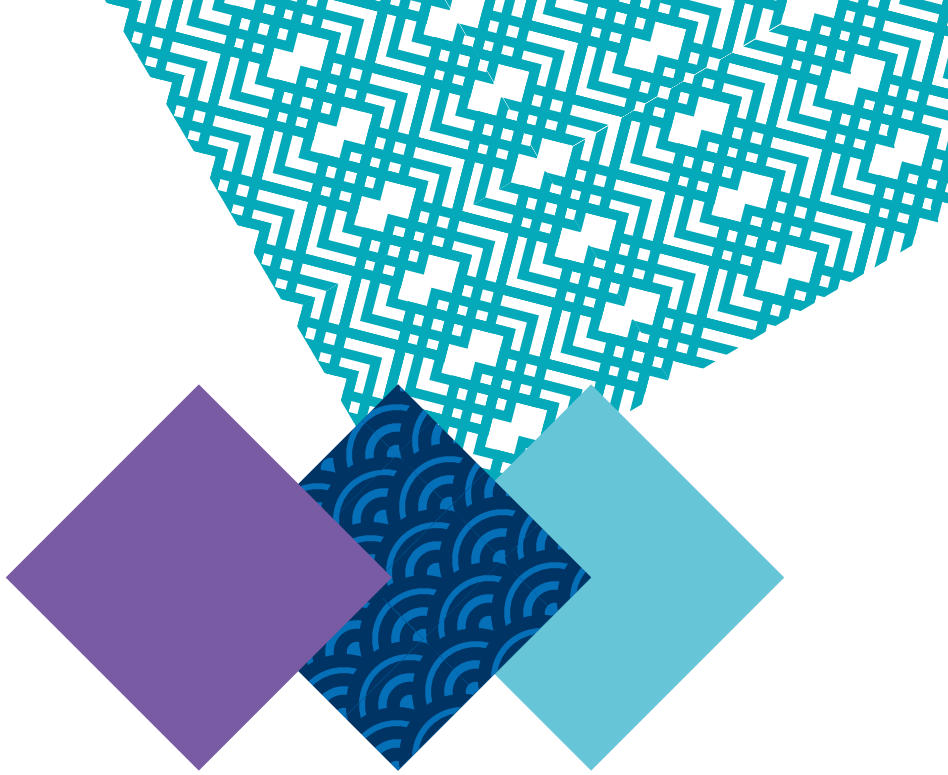
**Dr Andrea Macrina**  
Adjunct Professor



**Lizzy Starck**  
Administrative Officer



**Lameez Fakier**  
Administrative Officer



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