

ANNUAL REPORT 2020



DIRECTOR'S MESSAGE

Despite the unprecedented uncertainty, difficulty and set of constraints imposed upon us by the COVID-19 pandemic, 2020 was an evolutionary and productive year for AIFMRM.

Shifting our entire academic programme online, a feat we would have previously thought to be impossible, had to be achieved within a year. We managed this through great effort by all involved, being resolute in our cause but flexible with expectations, elastic with regulation but unrelenting on quality, all while being empathetic with the human condition.

While government-imposed restrictions limited many of our activities, we are proud of the achievements, dedication, motivation and levels of innovation, agility and resilience demonstrated

by staff and students alike. Some of these include publishing nine academic papers and a team of students winning the 5th annual FNB Stockbroking and Portfolio Management Trading Game.

All of this would have been impossible without AIFMRM's donors: Absa, FirstRand, Nedbank, Old Mutual, Sanlam and Standard Bank, and each of their representatives: Parin Gokaldas, Miné van Zyl, Nimalin Moodley, Judy Faure, Nersan Naidoo and Steven Davey for their strategic guidance, trust and financial support.


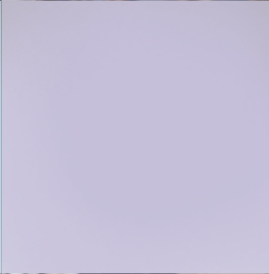

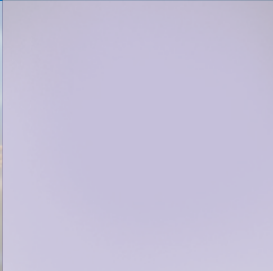

Additionally, we express our gratitude and appreciation to our colleagues, the Dean of Commerce and the various staff in the Faculty of Commerce for their ongoing support of the Institute.

Sincerely,

Obeid Mahomed and Peter Ouwehand

Acting Directors - AIFMRM

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HIGHLIGHTS OF 2020



Standard Bank joins as a new donor for R2 million per year for five years

9

journal articles published

2

appeared in A* journals

2

new academic staff members:

Dr Alex Backwell (Senior Lecturer)
& Mansa Aidoo (Lecturer)

“For me, being an academic boils down to being primarily interested in ideas and concepts. That is not to say that I am not concerned with how theory plays out in practice, or that practical and applied matters are unimportant. But I enjoy abstract thinking and building and expanding on current models of thought and academic theories.”

Dr Alex Backwell



TEACHING



The shift to online learning

AIFMRM acted swiftly in response to the outbreak of COVID-19 and the subsequent lockdowns at the end of March 2020. Acting Director of AIFMRM in 2020, Obeid Mahomed, said it helped that AIFMRM identified a difference between emergency remote teaching (ERT) and online teaching (where more time to plan and resources were available).

“In addition to the time pressure, we also had to work with UCT’s directive of ‘low-tech’ ERT to ensure that students with limited access to data were still able to participate effectively. We alleviated some of this pressure by purchasing mobile data for students and opening access on the learning platform, Vula,” said Mahomed. We assisted some students in areas of poor internet coverage in relocating to Cape Town.

Lecturers restructured content and worked on innovative lecture and presentation styles.

Across the board, feedback from students showed that they were surprised and impressed by how they were able to continue studying in 2020. They particularly mentioned the assistance given by lecturers as well as the psycho-social support provided by Billy Enderstein. “For many students, the experience was gruelling at first and more difficult than with face-to-face classrooms,” she said. Enderstein was available 24/7, on email as well as mobile, to check in with students and to offer advice.

Mahomed said, “Looking back, we believe the 2020 students finished the year as prepared as previous cohorts while also being adaptable and agile enough to manage uncertainty in the real world effectively.”

ONLINE SHORT COURSES



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

Business Risk Management

The course is aimed at individuals already employed in risk management and those interested in entering the field. It provides a sound foundation of theoretical knowledge and the latest tools and techniques for practical application.



10 week
online
short course



Detailed
overview of
enterprise-wide
risk management

Ran
5 times
in 2020

A total of
268
participants



Advanced Business Risk Management

The course covers essential theoretical concepts in the appropriate level of detail, yet the focus is ultimately practical and guides students through the application of industry best practices.



MPhil specialising in Mathematical Finance

What students are saying

“2020 has been a once-in-a-century type year and has presented the entire university with unprecedented challenges. At the same time, for me, this has been the most academically rewarding year of my studies. I cannot thank the staff enough for the expertise they have offered throughout the year in this regard - they have easily been the best lecturers I have had in my time at UCT.”

Keyur Patel

“What sets the AIFMRM lecturers apart is their quality of teaching and their willingness to always assist in any way they can. This year was particularly challenging given the current climate the pandemic has presented. Unfortunately, physical interactions were not possible, but at the same time, this year has taught me to adapt quickly to ever-changing circumstances and better manage my time. Even though at times this degree has tested my limits, I can without a doubt say that pursuing the MPhil has been one of the best decisions I’ve made.”

Ishani Patel

“Amid a worldwide pandemic, AIFMRM stood strong and delivered as they promised. I can certainly vouch for this, knowing that I have learned so much since January. Not only has the MPhil exposed me to a wide range of financial mathematics, but it has also made me realise that education is incredibly important to me. For this reason, I have applied for a PhD in Mathematical Finance through AIFMRM as I am eager to continue learning.”

Noah Beelders



MCom in Risk Management of Financial Markets

What students are saying



“There seems to be no better way to describe this year than ‘simply amazing’. One of the greatest things I’ve learned was that in AIFMRM, there is no such thing as a stupid question. I would highly recommend this degree to anyone looking to increase their technical abilities as well as their soft skills. Nothing taught in the year will be a waste of time; the MCom is undoubtedly a degree of the highest calibre.”

Mulisa Nepile

“By far, my biggest takeaway from the course wasn’t the course content itself but rather the way of thinking. We were forced to use critical thinking and to challenge everything with sound reasoning and thorough analysis. The process of the development of these skills is a constant cycle of ‘hard work, waning confidence, hard work, gaining confidence’. This ultimately keeps us on our toes, never lets us settle for mediocrity, allows us to become the best version of ourselves and gives us a taste of what the real working world might be like.”

Joshua Adams Waite

“My year in the MCom has been one of the best years of my academic career.

The programme is well-rounded and challenging in both the quantitative and qualitative content. I found the content highly relevant and satisfying to study. The content was so useful and relevant that often I found myself thinking, ‘how was this not covered in my undergrad degree?’ The staff at AIFMRM are some of the best in the country, and they are always willing to go the extra mile to make sure that we understand and have support whenever we need it.”

Calum Murphy



MCom research project with RMB

Due to the impact of the pandemic, AIFMRM in 2020 did not run the usual four-week MCom in Risk Management of Financial Markets Externship. More time was allocated for the initial part of the programme, which was spent on the core technical modules, Quantitative Methods, Econometrics and Computing Skills.

These form the technical foundation for the rest of the degree, which many students find the most challenging. Student feedback indicated that they welcomed the additional hours in these study areas. The biggest change, however, was the traditional internships usually offered to students during the winter holiday – and which this year took the form of a research project with Rand Merchant Bank.

Students had to do a mentored problem-solving exercise, working mostly off-site in groups with a company advisor or team of advisors, on a problem that contributed toward the research component of the degree.

Gareth Schumann and Benjamin Goble from Rand Merchant Bank served as external supervisors for all six research groups. The research problem was also posed by Rand Merchant Bank and therefore highly relevant and applicable to industry. It was based on the Fundamental Review of the Trading Book (FRTB), a significant upcoming update to the market risk regulatory capital rules proposed by the Basel Committee on Banking Supervision (BCBS).

The increase in group work had a positive impact on the students. “Ultimately, it is the camaraderie amongst my fellow peers that will stick with me going forward,” commented MCom student Joshua Adams Waite.

He added, “Looking back; I can’t understate how instrumental the class was in getting me through this year, be it from the motivation that comes with working alongside others that are as passionate and hard working as myself or be it the emotional support needed to get each other over the many obstacles 2020 has thrown our way.”

MSc/MPhil specialising in Data Science (Financial Markets)

2020 was the first cohort of the Financial Markets stream of the MSc/MPhil specialising in Data Science. The foundation of this offering is the MSc/MPhil specialising in Data Science programme convened by the Department of Statistical Sciences in the Faculty of Science. The collaboration amongst the departments of Statistical Sciences, Computer Science, Information Systems and AIFMRM (which is now part of the Department of Finance and Tax) enabled the creation of the Financial Markets stream.

It has the following recommended course structure:

Statistical and High-Performance Computing, Supervised Learning, Unsupervised Learning and Exploratory Data Analysis convened by Statistical Sciences

Databases for Data Scientists convened by Computer Science

Financial Systems Design convened by Information Systems and AIFMRM

South African Financial Markets and Risk Management of Financial Instruments convened by AIFMRM



Jonathan Jansen seminar

On 25 February 2020, Professor Jonathan Jansen, distinguished professor of education at Stellenbosch University and president of the Academy of Science of South Africa, presented a seminar to the 2020 AIFMRM students. Professor Jansen gave the students thought-provoking advice on the year and ways to approach being in the world.

The students (and AIFMRM staff) thoroughly enjoyed the talk and appreciated the opportunity to interact with such a well-respected figure in education in South Africa. Professor Jansen, who has taught students for many years, is a strong motivational force and often speaks candidly about how to deal with failure – and preparing for future success.

Professor Jansen sometimes surprises students with the news that he failed his first year at university. And while it was devastating at the time, and he had to hear how he was yet “another one of the Cape Flats kids who didn’t make it”, there were also people who were willing to help him get back in the game. He learnt that failure could teach him about how to be successful.

“You continue to fight the threat of failure even when you are an established professional person, in academics in my case,” he says. So, he tells students and other professionals that success can be a question of individual choice. “What do you do when you are struggling? Do you become a victim, or do you say to yourself: You know what? This is rough, but I’m going to draw on the resources that I have, the support that is available to me.”

“I don’t know of a single person, whether it is Steve Jobs, or a corporate leader or an educational figure, who didn’t at some point in their life mess up.” That is why he says life is about paying attention and showing up. “When an opportunity presents itself, take it.”

MCom team wins trading simulation - again

An AIFMRM team in 2020 again won the fifth annual FNB Securities Challenge. The MCom students competed head-to-head with Wits and Stellenbosch teams in a trading simulation using a live FNB Securities trading simulator. They had a hypothetical US\$100 000 in real-time foreign exchange and global stock markets, with the goal of achieving the highest return over three months.

Abhik Mukherjee of AIFMRM said, “We are delighted that the AIFMRM team has now won twice in a row, but the emphasis has to be on the process. The competition allows them to follow the financial press and to observe in a relatively tangible way the immediate impact of their decisions. The simulation challenges students’ assumptions, making it an exceptional learning experience.”

FNB Portfolio Manager and Stockbroker Richard Levesque agreed. “The 2020 intervarsity trading competition was certainly the most challenging one to date, as the COVID-19 pandemic severely impacted the global economy. Global market volatility spiked considerably higher, which presented teams with an abundance of opportunity. Under very difficult conditions, the teams did incredibly well. And congratulations to the AIFMRM team on winning.”

Team member Calum Murphy said that the team had been very confident in their ability to develop a strategy that would result in superior performance. For Tlotliso Jonas, preparing for the competition took the form of plenty of additional studying and learning about online trading. “I am shy and generally not good at interacting with people, but it helped me make some improvements to my interpersonal skills such as communication.”

Michael Brakspear said the competition had been a lot of fun as well. “I can definitely see myself taking a further interest in trading and targeting it as a career choice.” Each winning team member won R4 000 worth of FirstRand shares in an FNB Securities account - with their very own local JSE stock broking account.



RESEARCH

Impact of COVID-19

The outbreak of the novel coronavirus and the subsequent lockdown restrictions affected all areas of activity at AIFMRM in 2020, especially research-related events. It meant cancelling the year's Financial Mathematics Team Challenge (FMTTC), a second industry masterclass on OIS interest rate curves and a scheduled second edition of The Factory. It also led to the postponement of the triennial Mathematics in Finance conference. AIFMRM is the current lead organiser of the event, which is to be held in the Kruger National Park. Due to the pressures of online teaching, the weekly seminar series was also cancelled.

Machine Learning Masterclass

AIFMRM held a successful industry masterclass in Johannesburg on 5 and 6 March 2020 entitled *Machine Learning for Option Pricing*. Adjunct Associate Professor Jörg Kienitz and his colleague, Dr Nikolai Nowaczyk, presented the masterclass.



The workshop provided a detailed overview of machine learning techniques applied to finance, offering insights into the latest use of such methods for modelling financial markets, focusing on pricing and calibration.

The event had 65 attendees from industry and academia and raised interesting topics for stimulating debate. The event was extremely successful. Afterwards, Steven Davey, Standard Bank's representative on the AIFMRM Board, commented, "The more time I spend in a bank, the more I find my time taken up by routine tasks which require minimal understanding and seem of minor value. Being taken out of this for two days was a real pleasure."

The masterclass led to a media article co-authored by the masterclass presenters, entitled, *What do the pope, x-rays, and the game of Go have in common?* The article explored the impact and influence of machine learning and artificial intelligence in detail.

An excerpt reads: "Machine learning is a phenomenal tool. To fully harness its potential, it is essential to understand what machine learning is – and isn't – and to demystify some of the hype and the fear around what it can and can't be used for."

"We have anthropomorphised computers; we speak about them in terms of intelligence and learning. But in essence, a machine computes – it does not learn. Its algorithms are designed to mimic learning. These algorithms minimise the errors of a complicated function that maps inputs to outcomes, and we interpret that as solving a problem, but the machine doesn't know what problem it is solving or that it is playing a game. The intelligence rests with the humans who design the algorithms and configure them for specific tasks."



Update on The Factory

AIFMRM held a pioneering research event in July 2018 called The Factory. This initiative aimed to assemble and support small teams of researchers to advance knowledge in mathematical sciences on a topic of their choice. The teams consisted of a careful blend of established, mid-career and young scientists. An essential objective of this endeavour was to facilitate collaboration between researchers across career stages and to enhance the mutual benefit team members derive.

In 2020, a group of researchers called “Team Multicurve” from The Factory programme released an expanded version of their research paper on the Social Science Research Network. Further work in this line of research was presented at several seminars and conferences, including London Mathematical Finance Seminar, Cass Business School, City University, London (October 2019); Research in Options 2019 Conference, IMPA, Rio de Janeiro, Brazil (December 2019); UBS, London (February 2020); Marunouchi Quantitative Finance Webinar, Tokyo Metropolitan University, Tokyo, Japan (March 2020); Global Markets GRA Webinar, Bank of America, London (April 2020); and QuantMinds International (November 2020).



Research publications

In 2020, AIFMRM produced nine journal publications and a book chapter. Two journal articles appeared in A* journals – the Journal of Economic Dynamics & Control and the Journal of Banking & Finance, and one in an A journal – Quantitative Finance. The paper that appeared in the Journal of Banking & Finance is Dr Alex Backwell's first publication and is single-authored. This is an outstanding achievement.

The Institute had three full-time PhD students this year – Obeid Mahomed, Andrew Soane, and Qobolwakhe Dube. Tina Koziol graduated in March 2020, and Allan Davids transferred to the School of Economics. The only full-time, postdoctoral research fellow during 2020 was Dr Mesias Alfeus, who resigned in July to take up a Lectureship at the University of Stellenbosch



IN THE MEDIA

<p>LinkedIn</p> <p>684 Followers</p> <p>35 259 Impressions</p> <p>8,6% Average Engagement Rate</p>	<p>YouTube</p> <p>AIFMRM'S MPHIL: SPECIALISING IN MATHEMATICAL FINANCE</p> <p>152 views</p> <p>AIFMRM'S MCOM: RISK MANAGEMENT IN FINANCIAL MARKETS</p> <p>174 views</p>
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Machine learning is a boon, but it still needs a human hand

● We should remember that devices compute only what has been programmed by people

Thomas McWalter and Jörg Kienitz

Advances in computer power, machine learning and predictive algorithms are creating paradigm shifts in many industries. For example, when an algorithm outperformed six radiologists in reading mammograms and accurately diagnosing breast cancer, this raised questions around the role of machine-learning in medicine and whether it will replace, or enhance, the work being done

of the hype and fear around what it can and can't be used for. We have anthropomorphised computers, we speak about them in terms of intelligence and learning. But in essence a machine computes – it does not learn. Its algorithms are designed to mimic learning. In essence, these algorithms minimise the errors of a complicated function that maps inputs to outcomes and we interpret that as solving a problem, but the machine doesn't know what problem it is solving or that it is playing a game. The intelligence rests with the humans who



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OUR PEOPLE

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



Obeid 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
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