

Postgraduate Information Evenings 2020 – *Computer, Data and Mathematical Sciences Transcript*

Anjelica Juturu: Good evening everyone. Thank you so much for joining us today at Western's Postgraduate Information Session. It gives me immense pleasure to welcome you all to the information session conducted by the School of Computer, Data and Mathematical Sciences. I would like to begin today's event by paying our respects to the Aboriginal culture with respect for Aboriginal cultural protocol and out of recognition that its campuses occupy their traditional lands, Western Sydney University acknowledges the Darug, Eora, Dharawal (also referred to as Tharawal) and Wiradjuri peoples and thanks them for their support of its work in their lands in Greater Western Sydney and beyond.

I will now introduce you to our panel for today. We have Professor Simeon Simoff, who is the Dean of the School. We have Dr Quang Vinh Nguyen, who's the Director of Academic Program for a Postgraduate ICT course. We have Professor Yan Zhang, who is in charge of our artificial intelligence discipline. We have Associate Professor Laurence Park, who is in charge of our Data Science discipline. And finally, me - I'm Angelica. I am a final year Bachelor of Information Communication Technology student as well as a staff member at the Contract Service Centre here at Western.

Just as a disclaimer, I would like to let you all know that this event is being recorded for publishing purposes. So, all the video or audio content will be captured. If you participate in the chat question answer or both sections of this zoom meeting, even that will be recorded to build a catalogue for frequently asked questions for the benefit of future students. All the information that's recorded will be maintained as per our privacy policy and privacy management plan. So, if you have any questions please feel free to get in touch with our Events Team to discuss.

Coming to today's presentation agenda, we will begin by talking about the postgraduate study options offered by our Computing and Data Science School. Later, I will talk about Western Sydney University, the facilities we offer and the response we have been taking during COVID- 19. I'll follow up that by talking about the higher degree research options that you can consider. We will also be looking at the application process and the fees related to the courses. Finally, our Academics will present particular presentations about their disciplines, during which you can post your questions in our chat box, or you could also unmute yourself and ask your questions directly to our Academics. I would now like to hand over to Professor Simeon Simoff to begin with the presentation for today.

Professor Simeon Simoff: Thanks, Angelica and hello everyone. I would also like to acknowledge the traditional custodians of the lands on which some of us are residing tonight and pay my respect to their elders past, present and emerging.

Tonight is all about postgraduate study and in this sense, it's studying the era of technology. In front of you is a map of the range of the degrees that we are offering in that space. The label master in this case is actually a master suite of degrees. Each of those programs includes a two-year Master or Advanced Master or Graduate Diplomas. Among all these degrees, the Master of Information and Communication Technology suite also includes a research degree. It is a high-level research degree which is professionally accredited. So, please keep that in mind. It is a research degree that has a professional accreditation by the outstanding Computer Society.

At the moment, this is the only university that offers this degree in Australia at this time, accredited by the Australian Computer Society. You will enjoy the upcoming presentations and conversation with the leaders of each of these areas and degrees.

I will draw your attention to the last Masters degree on this slide, which offers a double Masters degree and covers two extremely important areas. - Data Science and Information and Communications Technologies. So, students will be receiving experienced in both areas. Rather than talking on this slide, the next slide shows a map of these degrees and how they relate to different jobs. There is a lot of text here and you can read it while I'm talking. The map shows the great spectrum of opportunities that you can get and the connections between our degrees. So, first of all, that that crossing the middle, it really shows that each of these degrees is not a standalone thing. But, if you change your mind and want to change from ICT to Artificial Intelligence or Data Science, because you're reading the newspapers, you're watching TV and you're seeing that these two areas are not just hot, but they are the future in the next 10, 20 and even more years you have that opportunity. And vice versa, if you find you are more interested, you can swap from the other side of computing.

The Master of Information Governance at the bottom is a very interesting degree in light of the increased demand for cyber security, not just technical specialists, but also specialists in preparation for cyber security - specialists like Data Privacy Strategists, Information Governance Architects and Cyber Security Analysts. These jobs are described on this slide on each side of the degrees and are grouped into three groups - the technology development side on the lower end; the enterprise of leadership when you're operating in an organisation on the entrepreneurial side (you might have your own consultancy or a start-up); and the MICT and the ICT Research and Development, which offer you the opportunity to go straight into a PhD degree, as it has the right amount of research imbedded in the degree. The other degrees also have a substantial amount of research and they have their own research.

Now I would like to tell you a little bit more about the School in terms of the expertise in the School and the environment in which you will be studying if you come here. That's on the next slide.

First of all, our University as a university managed to get ranked as number 30 in the world on impact. Impact is measured against those 17 United Nations sustainable development goals that are at the bottom of the slide. I have put that at the bottom, to emphasise that every subject, piece of knowledge, assignment, project, and thesis work, is in relation to these sustainable development goals. So, this is the environment in which you operate. And this is a global initiative of highest importance.

On the left side, you can see the world-class areas of expertise and leadership of our Academics. By leadership I mean that they are either contributing to journal editorial boards, journal editors, conference chairs and so on. This constitutes the environment in which the degrees are delivered and the intellectual challenges that you will be having with us during your studies. For instance, in 2018 we organised the ACM Intelligent Virtual Agents Conference, which is the flagship in virtual agents. In 2019 we organised the ACM Virtual Reality Systems and Technology Conference. This year, we are organising the ACM Associated Confidence on Human Agent Interaction.

So, you will have an opportunity to have firsthand to contact with international technology, as well as to gain experience. The features of the School environment are that the staff is known for its creativity, inventiveness, global systems thinking, and its ability to deliver. Our Academics possess

strong leadership and entrepreneurial skills. So, that in this sense highlights again the intellectual environment in which you will operate.

On that point, I will now pass back to Angelica. Thank you for the attention.

Anjelica Juturu: Thank you so much Professor Simeon.

I think one question most of you might have is, how will the classes and everything go during the current pandemic situation? I would just like to give a brief overview of the University before we proceed on to the Academics speaking about specific course areas and their disciplines.

In terms of the COVID-19 response, all classes have been moved online as well as Student Services. Services such as Student Central and some wellbeing services which students most often use are available via live chat or via phone call.

In terms of study assistance, we have the E learning platform where all students can access their study material online and can get support from the Academics and the other Academic support services directly via online, despite studying remotely.

We also set up a Coronavirus Support Line in which students are being supported in terms of financial support, Academic support, grocery vouchers. Academic fee help has also been given by the University to provide support to students to continue with their studies.

The Student Hardship Fund is where these support services were being funded. As I mentioned, grocery vouchers, any advocacy helps or if students are facing any issues in terms of financial hardship, all of that is being supported by this fund. Students were even offered loan laptops so that they can continue their remote learning because of the current situation.

Now heading over to talking about our Higher Degree Research options. These are the degrees, which are separate from the discipline. We have the Master of Research Doctorate, which is like a pathway to a doctorate program. This is a two-year research training degree. In the first year you will be studying a Bachelor of Research Studies and in the second year, you will be studying the Master of Research where you will be doing a project. It offers three core interdisciplinary research units and five disciplinary based subjects and in the second year, you'd be working on the research project.

We also have a PhD that is the Doctor of Philosophy and the Master of Philosophy programs. And there are 3 versions of these courses. The first is like the traditional thesis-based PhD. The second is the PhD by application. And the third is a professional Doctorate, for example a Doctorate of Education or a Doctorate in Creative Arts and so on. The PhD courses is a three-year full-time course and the Master of Philosophy course will be a two-year full-time course. These courses start anytime of the year. You can get in touch with our Higher Degree Research team to get more information about them in case you're interested to work on your own research project and be part of any projects.

And now the application process. We have two main intakes; one is the Summer Q1 and the other is the Autumn intake. The Summer intake starts from 11th of January, whereas the Autumn intake would start from the first of March for the coming year 2021. There are two ways in which you would apply; one is if you're a domestic student (that is, you're an Australian Citizen or a New Zealand Citizen).

Or if you have a Permanent Residency, or you're holding a Humanitarian Visa, then you can apply to Western via UAC or directly via our Western portal.

If you're an international student, you will apply via different that's called the Studylink Portal. And if you're from certain countries, you might need to apply to an agent, just so that they can help you with the visa processing and all this information.

Tonight, we also have our Admissions team available on web chat. If you have any specific questions related to your application in terms of admission requirements, you can head over to that team and chat with them. My colleague has just posted a link to the web. You can just head over there and ask your questions. They are available until 7pm tonight. You can ask your questions during this presentation, and then later head off for the web chat.

We have a page specifically for our closing dates. Not all applications closer on a specific date. There are some courses which have an early closing date. You can visit the website that's listed on this slide. Or you could just search 'Postgraduate closing dates Western Sydney' and you would get this page where you can look at the specific closing dates for each course you're interested in to study.

Coming to fees, the fees would be different if you are a domestic student or if you're an international student. If you are a domestic student, the Postgraduate courses can be deferred using domestic full fee help and all Postgraduate Education courses and most Postgraduate Nursing courses at Western are Commonwealth supported places.

In terms of deferring your fees, you can get a FEE-HELP loan if you are domestic student. For international students the fees would be a bit different and there might be additional costs in terms of getting health insurance or some other requirement checks, such as a health check, and so on.

Apart from these two main courses, we also have the Student Services and Amenities Fee (SSAF), which is common for all our students and that will be charged every semester, depending on whether you're studying full time or part time. Those fees would mainly be to support student services that are offered at the University. You can find all this information on our fees website.

Now I would like to handover to our Academics to speak about the courses, during which you can post your questions in the chat or you can unmute yourself and ask your questions. I would like to hand over to Professor Yan to speak about the Master of Artificial Intelligence.

Yan Zhang: Hello everyone. I'm very glad to have this opportunity to provide some information about Master of AI. Artificial Intelligence is a very hot topic everywhere. Everywhere you see AI information, or you see the concept everywhere in your daily life, but fundamentally AI is a concept of two things: these two things are learning and reasoning. If we talk about AI fundamental. what we want to study is the fundamental knowledge and concept of AI now. We build our course around these two concepts and our course is established in the form of a pyramid.

In the form of a pyramid, you can see from the right-hand side picture. Firstly, AI and ICT of our form the 10 foundation units. Above this you will also have the opportunity to study 4 Specialisation units. Then on top of that, you will study 2 Master projects. When completing these projects, you will have the opportunity to gain some industry-based AI project experience.

That is our top-level course foundation and structure. The units you will study under supervision you can see in more detail in these tables. This course is a two-year Master course, with four semesters. Each semester you will need to study four units in the first year, the most fundamental AI related

units. In the second year, you will study more broad units in or other related units such as Networking Technologies, and you will study the two Master projects also.

Along with this study plan, especially in second year, you can also choose four specialisation units as electives from the following: Data Analytics, Cybersecurity, Networking, Web and Mobile Computing, and Digital Futures. These four specialisations will give you some extra knowledge once you have completed the course.

Now I'll talk about some of the course features. The idea in developing a good course is to breakdown the following: we want to provide solutions, teach the student to be a critical thinker, and build profound knowledge ICT in both principles and practices. Our course is designed to achieve this goal. Another goal is to allow students to develop the capability of problem solving. The mastering of AI technologies. This includes advanced technology in knowledge representation of discovery and learning. Then finally, we also want to students to develop the capability for collaboration. We assume that after the student has completed the course they will go into the industry, where they will take different roles in various companies. They will need to understand AI related business management, decision making and teamwork to succeed. Our two projects will target these specific goals of the course.

Master of AI has a two special industry partner. We have established long term, important industry partnerships with Sydney based leading IT companies, dedicated in AI teaching and research. The first is with IBM Australia: with this company we have a lot of our industry oriented AI application projects available for students to choose to do their Master project on. The other company is Intech Solutions: specialising in Intelligent Data Match, Data and Knowledge Reasoning and Query Answering. They also provide practical industry projects students.

Now, that is the whole of AI, so I will handover to Associate Professor Laurence Park, to discuss the Master of Data Science.

Laurence Park: Hello everyone. My name is Lawrence and I've been a Data Scientist for about 20 years now. A lot of my work has been in Text Analytics, but I've worked with many other groups around the University and external on different projects and I'm going to take you through the Master of Data Science and what we have to offer.

First, I suppose the question is what is Data Science? We hear a lot about Data Science in the media and in the news and many people have different opinions on what it is. But at its core, Data Science is a science of transforming data into information. Many companies now and industries and agencies are collecting data, because they know how important it is and with Data Science methods, we can take that data and extract information out of it. We use that information to answer questions to help us decide directions, and to answer questions that we have.

I've got a list of places where data is used here. We can use environmental data to increase our understanding of the world and the universe. For example, we've got a group here who works in astronomy and I've been working with them to collect data on objects in space, so we can analyse what's going on. Another example is that we will try to estimate the ratio of different sources, so we could determine how far things away from us.

There's also a customer data used to predict customer behaviour. And this is what most industries would be interested in. They are constantly collecting data from people's transactions and phones.

Trying to predict what they want, so that they can sell them things

There's also match data to gain an advantage in sport. If you watch most professional sports these days, all the athletes have some type of tracking device on them. The football players will have the device in their jerseys, which track them around the ground. The sports teams want to use that information to work out how can they be better than the other teams?

There is also medical data to detect disease and improve health. This year that has been particularly relevant in terms of tracking the spread of the Coronavirus and working out ways to reduce it.

So, why would you study Data Science? Understanding data science allows us to design and construct computational entities statistical models to provide insight and predictions for all types of data. It brings together the computational side and the statistical side, in order to give you these very powerful decision-making systems.

Next, who is interested in Data Science? Pretty much every industry is interested in Data Science. Data Science is basically problem solving. A Data Scientist has expertise and statistics and computing. They program computers to analyse data, providing insight into processes, or using the data to make predictions.

Here is just a sample of industries who use data science. Scientists especially are collecting data all the time to analyse what's going on in the world. Utility companies, insurance companies, supermarkets, and finance industries are collecting data in order to provide service to their customers. Advertising companies are constantly gathering data to see how people respond to their ads. Sports teams I mentioned before. Media groups are collecting data to work out what to provide the people. Universities and transportation and even the big data companies as well like Google and Facebook especially - I imagine they would be collecting data about us now being on the web. Data Science allows us to analyse the impact of previous decisions and use data to make good decisions going forward.

This next slide shows some information from indeed.com which they have gathered about the job market. They're using Data Science to put all this information together. This is from last year and it shows Data Scientists. Data Science has been in the top 10 jobs for the past five years. Last year it dropped down to 22, but it had the most job positions out of the top group. This year again, they've got the world rankings, but they haven't got the Australian ones up yet, and Data Science is back at number five in terms of the number of jobs offers and the salary. And we can see here some of the jobs that are listed. And in fact, when went to seek.com to look for a job on it, the top job that came up was for a Data Scientist, so I was wondering if they were manipulating the market therapy.

In the past few years, machine learning has become a big aspect into Data Science. So, remember I said that Data Science is the science of taking data and converting it into information. And so we built these computer models to do that. One of them is for predicting and for classifying and even recently for generating data. This plot here shows neural networks and their advancement over time. And we can see this line – it's an exponential plot. And right now, we can see that the current neural networks are at the size of bee brains, or maybe just above and the trajectory is going up. So, the network should be about human brain size at about 2056. We don't know what that means, but it's going to be interesting!

We can also do silly things with machine learning, like classify the difference between dogs and muffins. And dogs and towels. And dogs and mops. These are pretty hard computer vision problems, so it's really interesting to see these things advancing the way they are.

And finally, generating pictures like this or scenes. We know there are processes used to actually generate people's faces or bedrooms, or things like that.

The course structure of the Master of Data Science is that it is two years. To enrol in a degree, the requirement is that you have a Bachelor's degree from any discipline. It consists of 12 core units and four electives. Two of the core units are the project units. It starts off with Introductory Statistical Programming and Statistics, going into Big Data, Visualisation, moving on to Advanced Statistical Methods, into Machine Learning, then into Social Media Intelligence, which is more in the Social Media side, Probabilistic Graphical Models, and then finally on to Advanced Machine Learning.

In the Postgraduate program project, you'll work with a supervisor one-on-one in a topic that you want to work on. It will be based on what you've done in your degree, but the supervisor will help guide you. There are also four electives that you can choose, and you can choose a specialisation for those electives or any units that you'd like within the Masters level. We also offer a one-year Graduate Diploma or a one semester Graduate Certificate. If you enrol in any of those three, then it's easy to transfer between them if you change your mind. And like Simeon was saying before, you can also transfer through the other degrees. If you've done the units in one degree, then you can get credit for those and another degree if you decide to transfer.

All the lectures that you will have are world-class researchers in Data Science. They're all involved in their own local and international projects so you can get involved in what they're doing. We have people working in astronomy, sport, health, and one of our Academics was the leader of the team who won Robocup a few years ago, so we're all excited! If you want to get involved in our projects, we're happy for you to do so. If you're interested in research, there's a possibility of going on to complete a PhD degree afterwards as well.

That's it for me. I'll now hand you over to Vinh to talk about the Master of ICT.

Quang Vinh Nguyen: Thank you, Lawrence and good afternoon everyone. I hope that you already have got a great deal of information about the Master of AI and the Master of Data Science. I will start with this slide, because I'm so proud of it. We are ranking as the first overall in satisfaction from the recent graduates, as well as the current student experience. Our culture is that we have very helpful, friendly and supportive staff who provide assistance with School activities. And because of this, we can provide supportive environment for our Postgraduate students.

The Master of ICT is among the biggest programs that we have in our School. I should probably have a look through some of the main courses that we have in the Postgraduate ICT. These include: Master of Information and Communications Technology and the Master of Information and Communication Technology (Advanced). In addition, we also have the Graduate Diploma in Information and Communications Technology and Graduate Certificate in Information and Communications Technology. It just depends on your experience and on your background. You can enrol either in MICT or the advanced programs.

And if you are interested in doing research, we have a customised degree which is one of the first of specialising in the ICT field in Australia – The Master of Information and Communications Technology (Research). It includes one year of industry experience for students. Every program we have here,

depends on the degree, can range from 1.5 years for the Masters degrees to 2.5 years, depending on your background.

Our degrees are accredited by the Australian Computing Society. It is such a privilege to look through the Postgraduate course structures. The program is designed to suit every student level and background. If a student comes from perhaps business or from another discipline, he or she may like to enrol in Pathway A. Pathway B is designed for the students who come from non-ICT background, however the student will also get a Masters qualification. Pathway C is for students who come from a computing or ICT background. They can study a more advanced units or they can study the program in the shorter time, depending on their preference.

We have a very wide range of specialisations, focussing on almost every aspect of interest. These include: Artificial Intelligence, Cybersecurity, Data Analytics, Digital Futures, Cloud and Distributed Computing, Health Informatics, Innovation and Entrepreneurship, Information Governance, Management, Networking, Space Science and Web and Mobile Computing.

And also, I really wish to spend a little bit time discussing the Master of ICT (Research). This includes a coursework component, where you can study from 1-1.5 years. It involves a foundation unit in ICT. You can also study Research Design where we prepare you to work through the second phase of this series study which will be one-year full time under the guidance of a supervisor.

There also the opportunity to use a pathway to a PhD or into your chosen industry after you graduate. This degree is fully accredited by the Australian Computing Society, which is very useful for students, especially for international students who want to get accreditations from Australia.

Now, the next one is Information Governance. This is a new degree. Everyone is talking about how we can govern how we manage information. Information Governance is a combination of multiple disciplines of Data Governance, Discoveries, Data Analytics, Risk, Compliance, Cybersecurity, Data Protection, and Information Management - all of the disciplines that we have to assist with an ICT or the ITs background to support, synergise and manage information.

We have redesigned our degrees to suit our students. The course actually is 2 years full time. We also have a Graduate Diploma (1 year) and Graduate Certificate (0.5 years).

In the Information Governance courses, we focus more on Information Technology, we cover the foundations of ICT, we provide a knowledge of Information Security and Cybersecurity, and learn how to analyse the data. We also cover Laws and Regulations, where you can study Commercial Law, Information and Data Governance Law and Policy and learn about Business Management. You also you have the option to choose from a wide range of specialised units in IT, Law and Business as part of your electives. This flexibility allows you to choose what to study to bring together either Business, Law, Data Science, Security, ICT or Information Governance.

Thank you very much everyone.