Interview with Dr Pei Yu

Could you share with us your education background?

I received my bachelor’s degree in Computer Science in 1999 from Nanjing University (NJU) in China and was exempted from the entrance examination for the postgraduate programme at NJU for outstanding performance. Two years later, I started my doctoral study at the same university and worked on the problem of model checking software systems for temporal properties, under the supervision of Prof. Guoliang Zheng and Prof. Xuandong Li. I successfully defended my dissertation and got my diploma in Computer Software and Technology from NJU in 2004.

During my study at NJU, I had a chance to visit the United Nations University International Institute for Software Technology (UNU/IIST) at Macau for one year. I joined Macau University of Science and Technology (MUST) as an Assistant Professor at the Faculty of Information Technology in 2004. A few years later, I was attracted by both the topic and the research group led by Prof. Bertrand Meyer at ETH Zurich, Switzerland and decided to do a PhD there on automated programme repair. I started at ETH Zurich in 2009 and obtained my second PhD in Software Engineering for my work on automatic fixing of faults in programmes with contracts in 2015.
We know that your research areas lie in automated programme repair and automated software testing. Are there any incidents or people which/who inspire you to dedicate yourself to these areas?

I have always been interested in facilitating the production of high-quality software systems. I devised at NJU techniques and tools to model check software systems against temporal properties. Such techniques and tools are useful, but they require considerable mathematical expertise from the users. When I saw the project title “Programmes that Fix Themselves” on Prof. Bertrand Meyer’s webpage for the first time, my reaction was “No, this can’t be possible.” But then my next thought was “Wow, it would be awesome if it becomes true.” The feeling at that moment is one of the reasons why I decided to work on the topic and why I will continue doing that. Another reason is that the results of that work will be easily accessible to every programmer.

During my PhD at ETH Zurich, I was greatly influenced by my supervisor Prof. Bertrand Meyer. He always encouraged us to have bigger and more ambitious dreams, and then work hard to make those dreams come true. I strongly believe automated software testing and programme repair tools will greatly change how programmers work and how programmes get produced one day. Now we have seen some initial progress in automated programme repair. Next, we just need to work hard to make this dream comes true earlier.

Could you tell us your current research? Please share insights on major trends in these topic areas?

In project “Programmes that Fix Themselves”, I co-developed techniques and tools to generate fixes to faults in programmes automatically. Currently, I am working towards enhancing those techniques to handle more faults and improve the quality of the proposed fixes, regarding both correctness and desirability. One promising way to make the proposed fixes more desirable to programmers is to learn from the human-written fixes in the past. Human-written fixes can tell us about not only which errors our programmes had but also what changes programmers made to fix the errors successfully. Knowledge like that is particularly valuable in automated generation of fixes. Thanks to software repository hosts like Bitbucket and GitHub, we now have access to a large amount of human-written fixes. But to find out which information the fixes provide is useful, how the knowledge can be extracted from the information, and how such knowledge should be applied appropriately in fixing is challenging.
Could you share with us your contributions/achievements during your PhD studies? How have your educational experiences prepared you to work in our Department?

As I mentioned already, at NJU I devised techniques to model check software systems against temporal properties; at ETH Zurich I co-developed the AutoFix approach to generate fixes to programmes automatically. The AutoFix approach was among the first ones that enables fully automatic suggestion of quality fixes to programme source code. It was in our work that the notion of proper fix was first introduced into automated programme repair to characterize fixes that are indeed corrected by the standard of programmers. This notion was largely overlooked by other researchers and only recently was it acknowledged as a major measure of quality for proposed fixes. My work has been published in TSE and top tier software engineering conferences like ICSE, ASE, VMCAI, and ISSTA. Conducting high-quality research work constitutes a major part of the academic life at COMP. With the training I received over the years, I am ready for it.

In terms of teaching, I obtained some experience already before I went to Switzerland. At ETH Zurich, I had the chance to observe in close distance and participate in teaching related activities and learned a lot. For example, it was instructive to me to see how much professors there emphasize the importance of students having enough practice on course subjects and exposure to real-world projects in the area. On the one hand, such experience makes me think more about how to engage students and teach effectively; on the other hand, it gives me more confidence in teaching. Now I am looking forward to knowing more about students at COMP and finding an effective way to teach that suits both of us.
What do you enjoy most about working in COMP?

What I enjoy the most about working in COMP includes the research atmosphere and the relationship between colleagues. The Department provides many facilities to help us accomplish more. For example, besides visitors, researchers from all over the world are regularly invited by the Department to give talks. Such constant exposure to world class research work and frequent face-to-face interaction with top researchers help us stay curious, inspired, and motivated. The PRA system is also a great endeavor of the Department to encourage our colleagues to participate more in scholarly activities. Our colleagues are talented, hard-working, enthusiastic about their work, and supportive of each other. I joined the Department recently, yet I have learned many stories about how they achieved excellence in research, teaching and providing professional services. Jim Rohn said “You are the average of the five people you spend the most time with.” COMP provides an excellent environment for me to grow and pursue my goals. I really enjoy working here and these people around me are another reason for me to stay inspired and motivated.

What is your career plan in five years?

In the long term, my career goal is to become a widely-recognized researcher leading an active research group in software engineering. Correspondingly, I set a few short-term goals for the next five years. First and foremost, I need to be academically and professionally well-prepared and eligible for tenure by that time. The preparation effort will include conducting more high-quality research work, acquiring more local and national funding, developing greater proficiency in teaching, and doing more services to the community. Then I should also have established a close connection and conducted productive work in collaboration with other researchers or research groups. Such connection and collaboration can only last and grow if they are based on our excellent research work and they are beneficial to all parties. Therefore, in collaboration, we need to think from the perspective of not only ourselves but also others. Last but not least, I should have accumulated considerable experience in running a research group involving students, assistants, and staff.
Interview with Dr Zhao Miao

Could you highlight your education background and experiences?

I received my PhD from Department of Electrical and Computer Engineering at State University of New York, Stony Brook, New York in 2010. Before that, I obtained my bachelor degree and master degree from Department of Electronic and Information Engineering at Huazhong University of Science and Technology, Wuhan, China. After completing my PhD study, I joined Media Lab of Huawei US Advance Research Center, Santa Clara, California and worked there as a Research Scientist for almost six years. In summer 2016, I joined our Department with great honor.

What are your research interests? Why are you interested in these areas? Could you name a person/a few people or any incident that inspired you to start your research in these areas?

My research interests fall in quite a wide range due to my diversified experience in both academia and industry. During my graduate study, our team focused on wireless networking and mobile computing. We identified a bunch of interesting problems in various wireless/mobile networks and explored utilizing optimization-based, algorithm-based
What is the impact of your research to the society?

My recent research is about utilizing big-data analytics approach to mine user’s emotion, mood, stress and other conditions. In particular, we try to use cross-media data sources, including video, audio, text, physiological signals, and employ multimodal deep learning approach to derive user’s affective information. The outputs can be leveraged in various applications, such as personalized recommendation and advertisement, and can also become an indispensable component in any artificial intelligence systems. This research contains a series of challenging issues, ranging from dataset acquisition, multimodal learning model design, to feature fusion scheme, which all need a great effort. Our research will help society to understand user’s feels and the related issues in a more comprehensive manner, which has a wide range of benefits from improving personal wellbeing, enhancing user experience of services to the commercial growth of user-centric intelligent business. We are lucky to have the chance to devote our enthusiasm, effort and expertise to this kind of promising research work, which may lead to some un-ignored benefits to the society.
Could you describe your future career plan?

Generating high impact research and applying them into practice are the ultimate targets for most researchers, either do I. The journey to achieve the target is full of challenges and requires persistent efforts step by step. Regarding my research, I will continue to work on big data analytics, its applications in social media and artificial intelligence services. The research typically sets a high standard for computation environment and involves a large volume of processing and computing tasks. I feel lucky that our department is now updating the research infrastructure platform, which provides powerful facilities to make our research feasible. In the short term, we will work on large-scale cross-media datasets, design and establish innovative models or framework to achieve specific intelligent functionalities, and validate their effectiveness through large-scale open datasets or crawled datasets. For the long term, we hope to have the chance to implement our models into real intelligent systems, making our research demo-able and producing a certain level of real value in use.

Please share some of your memorable and remarkable research and industry work experiences.

Research is a kind of work that needs people having a high level of curiosity and never afraid of failure. It is undeniable that when you meet some obstacles on the way, and meanwhile most people are not optimistic about your research, you may feel quite frustrated. However, if the research is among your great interests and you believe in your professional sense about the technology development, you should stick to it.

When you gradually carry out the in-depth study, you may find your work is fruitful. I did have such experience when I worked in Huawei US Central Research. One time, our team submitted a proposal to work on Software Defined Network (SDN) which enabled multicasting for multi-party video conferencing through multiple data centers. At that time, SDN was just emerging as a new network paradigm, typically used in local area networks or within data centers. No one is completely sure about applying it to link up data centers. And most researchers focused on SDN infrastructure and signaling issues, without much attention on how to use it for multimedia services. Considering the technology was far from mature, upper management considered the research was too risky. However, our team held strong belief that just because of the vacancy of the field, we can have the chance to do some solid work and become the pioneer in the domain. Finally, we strived to persuade upper management and obtained the chance to continue the project.

Through hard working in several months by the colleagues and intern students, we invented the entire system architecture and related algorithms to realize using SDN-
Have you got teaching experiences? Please share us with your teaching philosophy.

Holding the dream in childhood to be a professor, I always have a passion for teaching. During my study at State University of New York, I have been a Teaching Assistant (TA) for around 4 years for the courses of Electrical Circuit Analysis and Digital System Design. My TA duties included conducting recitation sessions, supervising labs, holding office hours, and grading exams and homework. From the very beginning, I found myself enjoy the TA job immensely because it is a great experience of helping and enlightening people.

The part I care most about the teaching work is how to guide effectively and interact with students. In particular, during lecture and lab sessions, I always first gave a brief introduction to the topics we would focus on, and then encouraged students to solve some problems independently. I also love giving challenges to students who are willing to accept them. Different students may meet different difficulties on their way for solutions. I am willing to inspire them with some investigations and help them derive the principles. I am happy to see students, who came into the classroom or lab with a little bit confused, but come out with the joy of having learned something. Meanwhile, the feedback from students instructively gave me the hints on how to improve my teaching method, communication skill and my understanding of students’ real needs. I hope to have the chance to accumulate more experiences in future's teaching duties.