

Innovation Oasis



Interview with an Inventor:

Haneen Wadi Abdelrazeq,

PhD Student in Chemical Engineering Program,
College of Engineering – Qatar University



One of the Sustainable Development Goals (SDGs) in the State of Qatar is to provide clean water. The State of Qatar always seeks to develop and implement strategies to improve its water security. In this regard, QU plays an active role in order to meet the needs of the water desalination industry through innovative technologies based on scientific research for water treatment, and the exchange of experiences between academia and industry. In this issue, inventor student Haneen Abdelrazeq, a PhD student in the Chemical Engineering Program at QU, shares with us a unique innovation for commercial water purification.

Haneen, How would you present yourself to the University community?

I am a 4th year Chemical Engineering PhD Student at Qatar University. I have been studying in Qatar University since 2008 when I was first accepted for admission in the College of Engineering. I graduated in 2013 for my BSc degree in Chemical Engineering and in 2016 for my MSc in Materials Science and Technology, both from Qatar University. In 2018, I received a Graduate Sponsorship Research Award (GSRA) from Qatar Foundation to commence my studies as a PhD student at Qatar University. My PhD thesis is related to membrane synthesis and its application in pilot-scale wastewater treatment technologies under the supervision of Dr. Majeda Khraisheh, Professor and Head of the Chemical Engineering Department at Qatar University.

There is an urgent need for fresh water on the planet, and since your innovation is in the field of water filtration, please tell us about the concept of innovation with a simple explanation.

As an outcome of my PhD thesis, my work is focused on the contribution of technological innovations in water purification using an innovative microfiltration treatment method in the pilot scale. The idea of my innovation to supply clean water through efficient and advanced portable water systems. The filtration performance was optimized using the innovative system. Experimental data was used to validate the commercial performance of the proposed product.

We have been taught since childhood that water is filtered, what distinguishes your innovation from other filtering methods?

The development of novel materials that are able to withstand the harsh conditions posed by industrial processes is very critical. The mechanical stability of water filtration is the most important specification that I am working on to make my designed product unique and applicable in real-life scaled-up processes. The experimental data findings directly support the implementation of the proposed commercialized product and contribute to satisfying the growing global demand of fresh drinking water.

After the innovation is patented, how would it be applied in the local and global markets?

Qatar has one of the highest domestic water consumption rates in the world where Qatari households consume an average of 430 L of water per day. As an industrial state, seawater desalination (i.e. Qatar's primary source for drinking water) supplies at least 50% of the country's water demand. Recent industrial reports have highlighted that the high rates of water consumption in Qatar have led to the over-extraction of groundwater. Therefore, the advanced portable water systems will help meet long-term water security needs in Qatar. This by default reflects the high market relevance of our innovation in the local and global markets.

From your point of view, how do industrial sectors serve engineering innovations?

Technology and innovation are the driving force for the future of industrial production. The technological developments of the Fourth Industrial Revolution have the potential to effectively tackle global production systems through innovative strategies. Innovative technologies have transformed the designing for manufacturing into the designing for performance and product development. Also, the implementation of business model innovations and the proper understanding of customer segments will lead to a significant rise in new production technologies. This results in the formation of new value chains not only within the industry, but also across other industries.

What are the obstacles and difficulties that hinder any invention?

As a young researcher in this field, I realized that the actual invention was not as hard as commercialization. In fact, a commercialization process requires a lot of time and effort to find the right idea and proper design elements to



Prof. Majeda Khraisheh and student Haneen Abdelrazeq.

avoid any possible misconceptions. It was an eye opener for me to learn how the process of making a new technological invention is ruled by “trial and error.” The more I worked on the commercialized invention plan, the better I understood how having a sustainable competitive advantage will help achieve long-term success. In fact, the whole inventing process is full of obstacles, especially in the fields of advanced science and technology. I believe we need to equip ourselves with the proper knowledge and skills for creating useful technological products.

As a student, how do you evaluate the support provided by QU to prepare outstanding students in research and innovation?

As a student in the College of Engineering, I am thankful for all the efforts of the College and its faculty members in helping the students produce high quality research, which are directly aligned with QU’s research pillars. For all QU students with similar interests in innovative research, commercialization, and entrepreneurship, I highly recommend them

to participate in the innovation programs and workshops offered by Qatar University’s Office of Strategic Innovation, Entrepreneurship & Economic Development (SIEED). Their educational sessions will guide towards the development of research ideas and provide them with all the needed support to turn those ideas into innovative inventions. As a graduate student with keen interest in this field, I consider myself as one of QU’s successful stories with contributions in educational activities combining both technological innovation and advanced engineering methodologies.

Tell us about your future ambitions, and what do you want to achieve with your invention?

The entire innovation process is full of studying and gaining new knowledge in a cutting-edge research topic. However, with dedication and commitment, I aim towards contributing to meet the long-term water security needs in national and global communities. I am working hard on my innovative product to make the biggest impact on society and industry through reaching the commercialization stage.