

## Obituary

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# Shaban Wanis Al-Rmalli: A life dedicated to application of chemistry for improving the environment and saving human lives

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It is with tremendous sadness we report the death of Dr. Shaban Wanis Al-Rmalli (Fig. 1 and Fig. 2) at his home in Tripoli, Libya. He died on Friday 8th January 2021. Shaban was born on the 24th of January 1968 in Derna, Libya. He obtained his Bachelor degree in Chemistry from Naser and Tripoli University (1987–1991). Thereafter, he worked as a researcher at the Institute of Technological Training in Tripoli (1992–1996) before moving to work as a demonstrator in analytical chemistry at Tripoli University (1997–2001). After completion of his PhD, Shaban became Assistant Professor of Analytical Chemistry at Tripoli University. Shaban was exceptionally talented and was actively engaged in research, publishing his first paper in 1993 [16]. This paper was on the determination of cadmium in water using co-precipitation and neutron activation analysis whilst he was working at Tripoli University. His high intellectual calibre and brilliant practical skills were recognised and he received a scholarship to pursue an MPhil degree and subsequently a PhD degree in the UK.

In 2002, Shaban was awarded a scholarship from the Ministry of Higher Education in Libya and he travelled to the UK to study for his MPhil degree (2002–2004) in environmental analytical chemistry at De Montfort University. His MPhil thesis was entitled “Arsenic speciation in foodstuffs from Bangladesh and a method for arsenic removal from water.” Shaban was an exceptionally brilliant student and this is evident from the fact he managed to publish two high quality research papers during his MPhil degree. Both of these papers are highly cited and widely used by researchers from around the world. One of these papers demonstrated, for the first time, the use of dried water hyacinth roots for the removal of

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Fig. 1. Dr. Shaban Al-Rmalli worked tirelessly in the laboratory analysing diverse environmental, food and human samples. This picture shows him preparing samples for Inductively Coupled Mass Spectrometry (ICP-MS) analysis (photograph taken by his laboratory colleague and friend Dr. Antonio Signes-Pastor on 17th March 2010 at De Montfort University, Leicester, UK).

arsenic from water [3]. The other, demonstrated the presence of arsenic in Bangladeshi foods sold in the UK which is a pioneering study on safety of imported foods [2]. The latter study raised concerns regarding exposure to arsenic from foods and has been extensively cited. During his MPhil degree he was supervised by Dr. Mohammed Ayub, Dr. Chris Harrington, and one of us (PIH). After completion of his MPhil degree, Shaban returned to Libya. There he contributed to teaching and research at Tripoli University. Despite limited facilities, he carried out a study demonstrating the biosorption of mercury from aqueous solutions by powdered leaves of castor tree [1]. This is a highly cited paper. It became his third paper [1,3,16] related to water analysis and his second paper on the use of plants for removing toxic metals from water. Shaban was able to demonstrate to his University authorities that he was a high calibre scientist who took advantage of his time in the UK and worked hard to gain new skills and experiences which he implemented in his research in Libya. This was highly impressive and it is not a

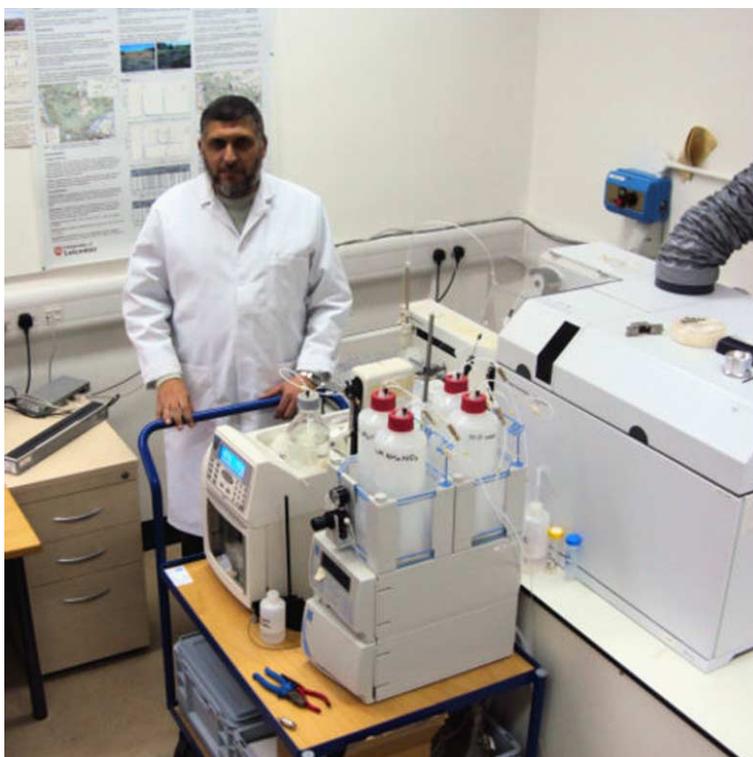


Fig. 2. Dr. Shaban Al-Rmalli was an outstanding bioanalytical chemist who was experienced in the use of many different analytical techniques including ICP-MS. This picture shows him working in the lab carrying out HPLC-ICP-MS analysis. The photograph was taken in ~2010.

surprise that he was awarded a second scholarship from the Ministry of Higher Education in Libya to go to the UK and pursue a PhD degree. In 2008 he returned to De Montfort University, where his PhD thesis was supervised by two of the authors of this article (PIH and ROJ).

Shaban had a very challenging PhD project that involved addressing water pollution and human exposure to arsenic and other toxic elements from water and foods in Bangladesh. The study focused on Bangladesh since that country faced many environmental disasters, including arsenic contamination of its drinking water and entry of toxic elements in foods such as rice and vegetables. The project involved the analysis of hundreds of food and other samples using inductively coupled plasma mass spectrometry (ICP-MS). Shaban took on the challenge bravely and worked tirelessly to produce a huge volume of data that resulted in the publication of several scientific papers. These studies have made unique contributions to the field of environmental science and public health. For example, he was the first to report the presence of arsenic in clay consumed by some women in an ancient practice of geophagy [10]. This led to various public health bodies warning the public about the dangers of eating clay. He was also the first to highlight the risks of exposure to manganese and other toxic elements from betel quid chewing in the Bangladeshi population [6,7]. He showed that the total daily intake of cadmium by the Bangladeshi population is the highest in the world, raising concerns regarding cadmium toxicity in the Bangladeshi population [8]. Finding ways to reduce human exposure to arsenic and other toxic elements pre-occupied Shaban for much of his PhD. He identified low arsenic aromatic rice from Bangladesh that is also ben-

eficial in terms of higher selenium and zinc content [11]. He contributed towards a better understanding of arsenic and selenium intake in the Bangladeshi population [17].

At De Montfort University Shaban Al-Rmalli, played a pivotal role in helping many other PhD students as well as masters and undergraduate students. The fact he was involved in the training of other students, including PhD students from Libya, is evident from publications where he has been included as a co-author [9,12,13,15].

Presented below are some thoughts from four authors of this article (ASP, CC, AB, EIB) who had the experience of working with Shaban and one author (AS) who was inspired by him.

- (1) Dr. Antonio Signes-Pastor (ASP) with whom he published a paper on arsenic bioaccessibility from rice [9]:

*“I had the privilege to meet Shaban W. Al-Rmalli at De Montfort University, Leicester, UK. We were pursuing our PhD thesis under the supervision of Prof. Parvez Haris. Shaban was an outstanding scientist and I learned a lot from him while collaborating on various research projects. We spent a lot of time together in the laboratory performing our experiments but also debating a wide variety of topics. We talked about how different the lifestyles were in our home countries (Libya and Spain) and as residents in the UK. However, we always agreed on how similar our core values were. I will always admire his persistence, his work ethic and love for his family to whom I express my sincere sympathy. Shaban will never be forgotten and I will always remember him as a great colleague and friend.”*

- (2) Dr. Claudia Cascio (CC):

*“Dr. Shaban Al Rmalli was a good man and a good scientist. I meet him back in 2008 when we were both PhD students at De Montfort University in Leicester. I came from Sicily and he came from Libya so the places we were from are closer to each other than to the UK. We met thanks to Prof. Parvez Haris who gave us the chance to carry out research on arsenic and develop our skills as PhD students. We spent many hours working on experiments in the lab: he was always preparing some food for the experiments! He had a great passion and dedication for science and was a great colleague; always helpful and respectful. Though he was dedicated to his work he was always keen to share his knowledge. His achievements aside from his beloved family include the publication of numerous useful and high-quality scientific papers and teaching students. He also became an assistant professor in bio-analytical chemistry at Tripoli University. I hope that more young scientists from Libya can and will be inspired to follow his footsteps and invest in their education to contribute to the progress of science. Shaban passionately believed that improving human health was the main issue to be addressed in this world. We have a precious need for kind and outstanding scientists like Shaban. May his soul rest in peace.”*

- (3) Dr. Eid I. Brima (EIB):

*“Dr. Shaban Al-Ramalli was an exceptionally brilliant and dedicated scientist. I have known him since 2003, at the time he was an MPhil student at De Montfort University. At that time, I was a PhD student, we were both under the supervision of Professor Parvez I. Haris. Since that time, we kept in touch until two months before his death. I have found him to be a sincere, honest, kind, generous and a hardworking scientist. He contributed to the field of research through numerous publications. In his field, he addressed the safety limits of elements in foods, specifically arsenic. Such an important area of research, which has a tangible impact on our daily life. His contribution to knowledge is crucial as it serves all humanity. Missing such a pioneer scientist is not only sad but is also a great loss to our communities. However, this is the norm of life, and my friend Shaban will want us to continue with life and make the world*

*a better place through the application of science and knowledge. May his soul rest in peace and our sincere condolence to his family members and colleagues.”*

(4) Dr. Aisha Bsher (AB):

*“Dr. Shaban Al-Rmalli was a good friend of mine and a smart scientist. I met him in the UK in 2010 and we were both from the same country (Libya). At De Montfort University, he was my best friend and I received valuable advice from him about science and life in the UK He introduced me to Prof. Parvez Haris who gave me the chance to carry out research on arsenic and develop my skills as a PhD student. Despite being very busy and dedicated to his work, Dr. Shaban was always keen to share his knowledge. He will be greatly missed by many people around the world, but his research contributions will continue to benefit humanity.”*

(5) Almokhtar Salem (AS):

*“Although I did not meet Dr. Shaban Al-Rmalli but I came to know so much about him through friends and colleagues in the Libyan community in the UK. In Leicester, Dr. Shaban was a friend to many people in the Libyan community and everybody was witness to his kindness, modesty, honesty and his soft words to people which encouraged them and provided relief from stress while they were far from their home country. Everybody is proud of his hard work and his dedication to scientific research. He inspired many younger scientists like myself to carrying out research and contribute towards improving the environment and human health.”*

As one of us (CC) already stated, Shaban was a dedicated family man and it was not surprising that he dedicated his PhD thesis to his loving mother, wife and children. The following is taken from his PhD thesis:

*“The thesis is dedicated to my loving mother, Mrs. Salma Matouk, who gave her love and prayers, for everything she sacrificed in her life for me. Without her love and prayers, it would not have been easy for me to come this far. It is also dedicated to my beloved wife Mrs. Hawa Takali, who gave me continuous support during this time. Finally my thanks go to my children Fatima, Wafa, Osama, Aya, Dwaa who have been constant source of joy and pleasure. Without their love and prayers I would never have made it this far.”*

He also acknowledged his brothers and sisters in the following way:

*“My greatest debt is to my mother Hajja Salma, my wife Hawa Takali, my children (Fatima, Wafa, Osama, Aya and Dwaa), my brothers (Saleh, Hassan, Ahmed, Jumah and Mahmoud), my sisters (Fatima and Mouna).”*

After completion of his PhD in 2012, Shaban returned to Libya at a time when the country was going through great political instability. It was a worrying time for him and his family; some Libyan students decided to stay in the UK for safety reasons. However, Shaban wanted to go back, despite the political turmoil and dangers, to be with his family and contribute towards the development of his country. The resilience and determination of this brave, dignified and proud man is evident from the fact he continued to carry out research with his colleagues in Tripoli University and published several papers that made unique contributions with respect to the Libyan population. The skill and experience he gained in environmental, food and human biomonitoring were fully applied after he returned to Libya. For example, he has the first study in the literature to report on blood cadmium concentration for a Libyan population [5]. He is also the first to report the daily intake of copper, iron, manganese and zinc from cereals in Libya [4]. He led another study with four other researchers from Tripoli University to investigate the biosorption of mercury from water using *Moringa oleifera* bark [14]. These publications

provide clear evidence that Shaban was not only highly active in research but was also involving other academics, early career researchers, and students to work with him and generate high quality research outputs. What is truly amazing is that he did all this despite limited facilities, access to chemicals and the difficult working environment in the country. There is no doubt that Shaban would have contributed towards further advancing scientific research and education in his country which he dearly loved. A search of the scientific publications (ISI Web of Science) reveals that one of his publications [1] is one of the most cited paper from the Chemistry Department at Tripoli University (for the period 1970–2021). Importantly, he did not rely on researchers from outside Libya to generate this publication. This clearly shows that Shaban was the top most cited scientist from the Chemistry Department of Tripoli University. Various constraints, including lack of access to advanced analytical techniques, did not deter him from carrying out his research. He conducted independent research in Libya without depending on collaboration from abroad, demonstrating his independence, resilience, determination, and confidence. This is a source of pride for Libyans and an inspiration for the next generation of scientists.

Shaban dedicated his scientific life carrying out high quality research, applying physical and chemical methods for the analysis of environmental, food and human samples. He was passionate about improving the quality of water and food consumed by human beings and this motivated him to tirelessly work in collecting, cleaning, processing, and analysing thousands of samples. Physically he was a strong man who would often spend many hours working in the laboratory, sometimes very late in to the evening and even on the weekend. He would work meticulously to clean, prepare and analyse each sample with the utmost care, ensuring that the quality of the analysis was of the highest standard possible. He was a highly reliable and trustworthy man who would not publish anything before ensuring that the measurements have been performed accurately and reliably.

Both of his PhD supervisors (PIH and ROJ) are proud of Shaban and his achievements. They found him to be an extremely hard-working student who was able to work on his own and required little supervision. Both were highly impressed by his research skills, ability to work independently and also by his politeness and respect for everyone.

Shaban was a very humble and a gentle giant, always going out of his way to help other students and researchers in the laboratory. Some of the scientists he helped and co-operated with are now leading researchers in Asia, Europe and USA. He never argued about authorship and he was not interested in name and fame. He simply wanted to do high quality research work that benefited humanity, even if he did not get any credit for it. Shaban proved through his actions that he was a very humble, polite and gentle person who showed great respect for others irrespective of their background. He always showed gratitude, had respect for those who taught him, and he kept in touch with his teachers, friends and colleagues. In an email sent to one of us (PIH) on the 17/2/2015, Shaban wrote the following: *“I am trying to do something here, but it is still a bit difficult. By the way, I become a grandfather, my daughter Fatima has a new baby (girl) and I feel I am an old man now”*. Since then, the number of his grandchildren has increased to six (3 boys and three girls). He sent PIH a message on the 23 May 2020 telling him that the situation in Tripoli was very bad due to *“fighting everywhere and most Libyans were staying inside their houses and universities and schools were closed”*. The twin burden of armed conflict and the Covid-19 pandemic has been overwhelming for many Libyans. Therefore, the last seven months of Shaban’s life must have been immensely sad and stressful, and this may have contributed towards his premature death.

Considering his untimely death and his huge contribution in advancing scientific research in Libya, and indeed the world, the authors of this article believe that Shaban is worthy of receiving a posthumous award from the Libyan government. We also believe that he deserves to be remembered as the father

of environmental and bioanalytical chemistry in Libya. Therefore, we suggest the establishment of an annual prize entitled “Dr. Shaban Al-Rmalli Prize for Excellence in Environmental and Bioanalytical Chemistry”.

Shaban will be missed and the world will be a lonelier and a poorer place without him. However, his legacy will live on forever thanks to his outstanding and world class research contributions and through his children and grandchildren and numerous students and researchers he trained.

### Conflict of interest

The authors declare that they have no conflicts of interest to report.

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