

DR. QASSIM ABDULLAH



Dr. Qassim Abdullah, Ph.D., CP, PLS, is an accomplished scientist with more than 40 years of combined industrial, research and development, and academic experience in analytical photogrammetry,

digital remote sensing, and civil and surveying engineering. His current responsibilities include designing and managing strategic programs to develop and implement new remote sensing technologies focused on meeting the evolving needs of geospatial users.

Currently, Abdullah is the Chief Scientist for Woolpert Geospatial Services and a member of Woolpert Labs team. In addition, he serves as an adjunct professor at the University of Maryland, Baltimore County, and at Penn State University, teaching graduate courses on unmanned aircraft systems (UAS), photogrammetry and remote sensing.

His latest accomplishments include evaluating and introducing Geiger and single photon lidar to the geospatial industry and leading Woolpert research activities in the field of UAS, its sensor calibration, and its workflow development.

He was elected as an ASPRS Fellow in 2017 and he is the recipient of several prestigious ASPRS awards, such as the Lifetime Achievement Award, the Photogrammetric (Fairchild) Award, the Outstanding Service Award for publishing the monthly column "Mapping Matters" for more than 10 years, the Presidential Citation Award in recognition to his contributions in co-authoring the new "Positional Accuracy Standards for Digital Geospatial Data," and the ASPRS Outstanding Workshop Instructor award.

He is an ASPRS-certified photogrammetrist and a licensed professional surveyor and mapper with the states of Florida, Oregon, Virginia, and South Carolina. He is also a certified thermographer by the FLIR Infrared Training Center and a Certified GEOINT Professional in Remote Sensing and Imagery Analysis (CGP-R) by the United States Geospatial Intelligence Foundation (USGIF).

What has been your most fulfilling accomplishment as a scientist / engineer? Why?

My most fulfilling accomplishment so far has been authoring the new "ASPRS Positional Accuracy Standards for Digital Geospatial Data." The last standards were published in the early 1980s, so this was truly a lifetime opportunity. I was glad that I was ready and well qualified for the task. It provided a constructive and impactful conduit for the theoretical and practical knowledge I have learned over 40 years of professional experience.

What significant changes have you seen in your field during your career?

The digital revolution has been the most significant change that I've experienced, and I have embraced it. It has introduced an exciting era that has transformed our business. It transitioned us from an industry relying solely on film cameras and analogue stereo plotters to the new era of digital cameras, lidar, GPS, IMU, UAS, IFSAR, multispectral and hyperspectral sensors, machine learning, image processing software, big data, cloud hosting and processing, etc. Truly, there are no limits to our new capabilities when it comes to sensor design and data processing.

What would you consider to be the most important advice you could offer a younger, upcoming scientist/engineer?

My sincere advice for young professionals is to embrace changes in technology and be prepared for difficult challenges through hard work, the pursuit of knowledge and a strong work ethic. Knowledge is not a status you reach and conquer; it is an evolving process that does not age or retire. Practice your profession with integrity and selflessness and be there for others when they need you.

What do you think are the most pressing scientific needs that should be met in the coming years? What would you like to see scientific research accomplish?

Data analytics and data mining are going to be our biggest challenges. As big data gets even bigger with the advancement of smart sensors, smart transportation, smart cities, smart infrastructure and smart everything, the need for analytical tools and algorithms grows even stronger. Mining big data is the way to improve citizens' lives and the environment we live in.

Have you seen many changes in ethical conduct within your field during your career?

The change and ease of use of geospatial sensors and processing software have drawn a new generation of mapping professionals, some of whom do not fully understand the profession or the ethical commitments that come with it. For example, the community of UAS-operators-turned-mappers. Due to UAS affordability and the ease of use of the processing software, some individuals started practicing mapping activities. Often, they try to sell products with false accuracy statements derived from their ignorance and detour from the reality of mapping practices. I advise them to invest in themselves and gain the necessary knowledge they need to qualify them for the title of mapping professionals.

AN INTERVIEW

How important do you think interdisciplinary collaboration will be for solving some of the challenges that lie ahead in science?

We are witnessing a time of great scientific achievement and vastly improved channels for communicating thoughts and capabilities. The internet of things (IoT) made it possible for any person, with the click of a mouse, to search a bank of giant libraries on the other side of the world. Such open and easy communication channels have made it possible for scientists and researchers from different disciplines to exchange ideas and thoughts and therefore cooperate toward greater innovation. A good example on the interdisciplinary collaboration is the introduction of UAS into our industry. This presented a challenge to our photogrammetric community and the current tools we are using. Because of the cooperation between computer scientists, machine learning techniques and photogrammetrists, a new generation of algorithms and processing software were developed to solve the challenges we are faced with in processing UAS-based imagery. It is always beneficial to investigate any problem from different perspectives to enrich the experience and to develop a creative solution.

What is the biggest open question in your field of photogrammetry that will require the most attention in the future?

I would not call it a question, but one of the biggest challenges we are against or will be faced with is the need for machine learning-based methods in data mining and data analytics. Today's space-based, ground and aerial sensors are acquiring massive amounts of data, but we can only utilize a portion of that data through our manual analyses and interpretation routines. The intelligence community is already in dire need of new ways of information extraction. The industry must pay careful attention to this need by allocating enough resources and grants for universities and research institutes to develop smart and automated methods of information extraction.

Tell us about your educational background including your doctoral research.

I obtained my bachelor's degree in civil engineering from the University of Basrah, Iraq. I came to the United States to complete my master's and doctoral degrees in photogrammetry and geodetic engineering at the Civil Engineering Department of the University of Washington, Seattle.

Do you have a particular teacher or professor who inspired your love of science? Why?

I've had several of them over the years. In my youth, my father was my mentor and biggest influence when it came to my interest in how things work. He was a self-made inventor and he got me interested in civil engineering when I helped him with his construction contracting business. I am also grateful to my PhD program supervisor, the late Dr. Sandor Veress of the University of Washington. In more recent years, I have had great admiration for my friend and colleague, Dr. Riadh Munjy

of CSU-Fresno, whom I consider a role model and a mentor when it comes to learning. He is a genius in applied mathematics and geodetic sciences, including photogrammetry

What is the focus of your current research?

My focus is on anything that involves sensors and product quality and accuracy. After GPS-controlled aerial triangulation, lidar continues to fascinate me. Today, I spend a lot of my research time on enhancing the quality of UAS-derived products and thermal survey for energy modeling and analysis.

Tell us about something we might see in our daily lives that directly correlates to your work.

These days, a lot of people, articles, and specifications reference the new "ASPRS Positional Accuracy Standards for Digital Geospatial Data." If you see that, it should remind you of me. I am proud to be part of the team that authored it.

Give us an example of how multi-disciplinary research directly contributed to your work.

My research on energy modeling and analysis using aerial thermal cameras combined our mapping methods and techniques with that of mechanical engineering through the joint research project I pursued with students and faculty of the University of Dayton. Woolpert developed the "Heat Score Map" to educate consumers of power companies on the heat efficiency of their homes.

What has your ASPRS membership meant to you?

ASPRS membership has provided me with a natural environment for my professional and technical development. Through the ASPRS journal, publications, webinars and technical conferences, I have found opportunities to polish my skills and knowledge.

Has ASPRS helped further your career? If so, how?

ASPRS offered me the opportunity to publish my monthly column "Mapping Matters." Answering the questions, I receive through the column has pushed me to read, investigate and learn how to provide solutions or ideas. When you are out there entertaining readers' questions, you need to be ready to provide guidance and advice to the people who seek it. Such guidance and advice must be communicated precisely, accurately and in a timely manner. There is a lot at stake when you claim to be an authority on any subject; you must earn respect and repeatedly prove yourself. The column and that presence helped my career because it pushed me to excel.

When you're not working on your research, what do you do in your free time?

I enjoy running in my free time. It's a great way to meet new people, and I enjoy the challenge of trying to improve my times or increase my distance. I'm fortunate to have several great places to run near my home. I also enjoy hiking, gardening, cooking, and artisan bread baking when I have the time.