

# Professor Jeff Walker elevated to IEEE Fellow

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For his outstanding work on airborne and satellite remote sensing of soil moisture, [Jeff Walker, Head of Civil Engineering](#) at Monash University, will soon be named as an Institute of Electrical and Electronics Engineers (IEEE) Fellow. Each year less than 0.1% of the association's voting members receive this highest distinction.

"I knew the nomination was in process and was hopeful," shares Jeff. "I was really delighted when I found out that it had been approved. It's great to receive such recognition for the significance of my contributions to the soil moisture remote sensing community."



Professor Jeff Walker and Dr Ying Gao

Jeff has spearheaded airborne field campaigns for developing and validating new soil moisture satellite missions. Supported by the Australian Research Council, he and his team use remote sensing technology for satellites, which orbit the earth collecting data to create global soil moisture maps. This information can be used to monitor droughts, assess bushfire risk, improve the prediction of storms and heatwaves, and guide farmers in determining how much to irrigate or when to use fertilizers and insecticides.

"While working at NASA on data assimilation, I recognised the need to further develop the satellite technology to provide soil moisture data", says Jeff. Data assimilation combines numerical models with observations to improve the evolving state of hydrologic or atmospheric phenomena, and the observations needed for this were simply not available.

After conceiving one of the first global soil moisture retrieval algorithms, Jeff went on to develop one of only a few airborne simulators of new soil moisture satellite missions world-wide, and the only capability in Australia. Not only that, he established the nation's only extensive soil moisture monitoring network that has been adopted by NASA and ESA as part of their global network of core validation sites. Together, these capabilities have formed the basis of several international airborne field validation experiments in Australia. These open source data sets have subsequently been used to develop and mature algorithms for satellite missions by researchers and government authorities across the world.

The earth naturally emits microwave radiation, which varies depending on how wet or dry a given surface might be, and this has formed the basis of current dedicated soil moisture satellite missions, using observations at L-band (1.4GHz). Jeff has recently begun to explore lower-frequency radiometry (P-band; 740MHz) for use in next generation soil moisture satellite missions. Data at this frequency are expected to be less affected by the overlying vegetation and roughness of the soil making the soil moisture retrieval more accurate, and is expected to provide soil moisture information up to three times deeper in the soil than the currently used L-band. This new technology will no doubt be a game changer when matured.

As a member of the IEEE, Jeff served as Technical Co-Chair for its 2013 International Geoscience and Remote Sensing Symposium in Melbourne. He has also been involved with the Modelling and Simulation Society and the American Geophysical Union.

Jeff will be acknowledged as an IEEE Fellow at the upcoming International Geoscience and Remote Sensing Conference in Yokohama. We extend our warmest congratulations to him on this significant career achievement.