CASE studentship in the directional reflectance of desert sands and salt pans for the vicarious calibration of satellite remote sensing.

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A CASE PhD studentship to work at the National Physical Laboratory and Royal Holloway University of London.

The aim is to measure and model the bidirectional reflectance, BRDF, of proxy sand and salt pan surfaces for the inter-calibration of optical space sensors on satellites used for long-term remote sensing data. The output will be a BRDF(bidirectional reflectance distribution function) of sand and salt pan at the bottom and top of atmosphere as a function of changing conditions for calibration and validation of Earth Observation satellites. There is the opportunity for field work.

Earth Observation allows regular and synoptic observation of large areas and is extremely useful for monitoring planetary change or providing data products e.g. soil moisture. Accurate calibration of satellite sensors is needed for data products, and precise inter-calibration of successive instruments is crucial to provide reliable time series for processes such as climate change. Calibration of a flying satellite is by "vicarious calibration", the observation of Earth Surface targets which are reflective, spatially uniform over large areas and constant e.g. deserts and sand dunes. The reflectivity of natural surfaces is not isotropic and a function of the viewing and illumination angles. The BRDF of these surfaces must be characterised.

Initial work will be measuring the BRF of proxy sand surfaces (different mineral quantities dehydrated in $1m^2$ trays of authentic, sand from gravel plains and dunes from CAL/VAL sites already procured) using a goniometer and with SI-traceability. 12 months at NPL as part of NPL's postgraduate institute for training in measurement science, with access to National Reference Reflectometer for standards calibration and work on the uncertainty in BRDF measurements. The roughness will be measured and modelled to develop models using PlanarRad, LayerTran, libRadtran and Mie codes to reproduce the experimental surfaces as a function of particle size, absorption and surface roughness. The roughness will require specialist development of the code(project partner). A cross-compared and validated model will produce top and bottom of atmosphere BRDFs as function of particle size, roughness, impurity content, and typical atmospheric conditions – the product for remote sensors. Then RHUL for writing papers and submit PhD by concurrent publication.

Applications from students with a good upper second class degrees or better in remote sensing, chemistry, physics or engineering (or related subjects) are encourage to apply. You should be keen to script code and conduct experiments You will receive training in radiative transfer and develop strong skills in experimental science, and metrology, with potential field trips to CAL/VAL sites. You will be expected to attend international conferences. Your thesis will be written up by concurrent publication (i.e. your scientific papers). The position would suit a motivated individual who can work well with others in collaborative science, your supervisors are all expert in the different aspects of the work.

Interested – please contact Martin King (01784 414048, m.king@rhul.ac.uk) for further discussions. Eligibility for this studentship is restricted to UK citizens and applicants who have been ordinarily resident in the UK throughout the 3-year period preceding the date of application for an award, and has settled status in the UK within the meaning of the Immigration Act 1971 (ie is not subject to any restriction on the period for which he/she may stay). Further information can be found from the Science Technology Facilities Research Council.

*Details on how to apply can be found here **www.rhul.ac.uk/studyhere/postgraduate/applying***
*Please contact the Postgraduate Programmes Co-ordinator, if you have additional questions about the department or application procedures (email: **pgadmin@es.rhul.ac.uk** ; fax: 01784-471780; tel: 01784-443581).*
Applicants are requested to send an additional copy of their CV directly to the lead supervisor of the project in which they are interested. Please also contact the supervisor if you have any questions about the project itself