Dr SAMANTHA JANE LAVENDER

EDUCATION / TRAINING

2012 - 2012 CIEH Level 2 Award in Environmental Principles and Best Practice

2009 - 2011 Undertook modules that can lead to the Institute of Directors award of Chartered Director: Role of the Director and the Board & the Director and the Law; Finance for non-Financial Directors.

2000 - 2001 PgCert, University of Plymouth: Learning and Teaching in Higher Education.

1992 - 1996 PhD, University of Plymouth: Remote Sensing of Suspended Sediment.

1989 - 1992 First Class BSc Honours Degree in Oceanography and Marine Computer Applications, University of Plymouth.

EMPLOYMENT HISTORY

2012 - **Managing Director, Pixalytics Limited (www.pixalytics.com).**
Specialises in the transition of academic knowledge to commercial opportunity and public understanding. Activities include consultancy services, research expertise, software development, bid support, project management and a variety of teaching and training options.

2015 - 2018 **Trustee, Sir Alister Hardy Foundation for Ocean Science.**
SAHFOS was an internationally funded independent research organisation responsible for the operation of the Continuous Plankton Recorder survey, which has since merged with the Marine Biological association.

2013 - 2017 **Director, Ocean Nourishment (UK) Limited.**
Aims to conduct underpinning research in collaboration with universities and marine institutions to investigate the potential of Ocean Nourishment in different regions of the worlds' oceans.

2009 - 2019 **Honorary Reader, School of Marine Science and Engineering,** Plymouth University.
Support for remote sensing research activities including supervision of MSc and PhD student projects. Member of the Institute for Sustainability Solutions Research and Geomatics Research Grp.

2007 - 2012 **Managing Director, ARGANS Limited.**
A research active UK SME formed around a growing core of customer-focused scientists and software engineers.

2005 - 2009 **Reader in Geomatics, School of Earth, Ocean and Environmental Sciences (SEOES),** University of Plymouth.
Module leader on undergraduate and postgraduate modules within the primary subject areas of geodesy, remote sensing, satellite positioning and surveying mathematics. Member of the School's Research Team & 2007 RAE Shadow Coordinator. Co-ordinator of the Geomatics Research Group.

2000 - 2005 **Lecturer and then Senior Lecturer in Geomatics, Institute of Marine Studies**. University of Plymouth.

1997 - 2000 **HSO Remote Sensing Scientist, Plymouth Marine Laboratory.** Natural Environment Research Council.

1995 - 1997 **Manager of the NERC Remote Sensing & GIS Unit (RAGU)**. Natural Environment Research Council.

1992 - 2000 **Part-Time Lecturer and Demonstrator, Institute of Marine Studies**. University of Plymouth.

PERSONAL MEMBERSHIP

2009 - 2012   The Geological Remote Sensing Group (UK based)
2008 -   The Oceanography Society (USA based)
2001 -   The Hydrographic Society (UK based)

1992 -   Remote Sensing and Photogrammetry Society (RSPSoc, UK based) and Challenger Society for Marine Science (UK based)
1989 -   Royal Meteorological Society (Fellow, UK based)

PROFESSIONAL ACTIVITIES
2015 – 2017   Chairman of the British Association of Remote Sensing Companies (BARSC)
2013 – 2017   Member of the UK Space Agency Earth Observation Advisory Committee (EOAC)
2012 – 2016   International Society for Photogrammetry and Remote Sensing (ISPRS) Working Group Chair VIII.3 on Coastal and Ocean Applications
2012 – 2014   Treasurer for the European Association of Remote Sensing Laboratories (EARSeL)
2012 – 2013   Member of the UK Space Innovation & Growth Strategy Markets Theme
2010 – 2012   UK representative and Council member for EARSeL
2010 – 2013   Remote Sensing and Photogrammetry Society (RSPSoc) Chairman
2008 – 2012   RSPSoc Chair of External Affairs & ISPRS Working Group Co-chair VIII.9 Oceans
2007 –   Peer reviewer for the Research Grants Council of Hong Kong
2006 – 2010   Member of the Natural Environment Research Council (NERC) peer-review college
2007 – 2008   Member of the NERC Centre for Earth Observation Instrumentation (CEOI) steering committee
2006 – 2010   Member of the International Ocean Colour Co-ordinating Group (IOCCG)
2004 – 2008   ISPRS Working Group Chair VIII.6 on Coastal Zones Management, Ocean Colour and Ocean State Forecasting
2002 – 2008   Scientific team leader and scientific steering committee member for the NERC Centre for observation of Air-Sea Interactions and fluXes (CASIX)

CONTRACTS / PROJECTS
2018 -   **EcoProMIS (Ecological Production Management Information System) in Colombia**: Project funded by the International Partnership Programme of the UK Space Agency, where Rothamsted Research is the lead.
2018 - 2019   **Life Smart Water 2018-19 project for the Scottish Environmental Protection Agency**: To detect waste material using remote sensing techniques.
2017 -   **Drought and Flood Mitigation Service in Uganda**: Project funded by the International Partnership Programme of the UK Space Agency, where Rhea is the lead.
2015 - 2016   **Optical and Microwave Extension for Floodwater Mapping (OMEF) in Rural and Urban Environments**: Feasibility study funded by the Space for Smarter Government Programme (SSGP) of the UK Space Agency.
2014 -   **EO Consultant** [confidential], working on future sensors and Earth observation applications
2013 - 2016   European Space Agency (ESA) **E-Collaboration for Earth Observation (E-CEO)**, led by Terradue UK, which addressed the technologies and architectures needed to provide a collaborative research platform for automating data mining and information extraction experiments; see http://wiki.services.eoportal.org/tiki-index.php?page=ECEO.
2013 -   **Virtual Water Gauge**: determination of water height and extent from satellite imagery.
2012 -   **EO Consultant** for Telespazio VEGA UK, working on the ESA IDEAS contract (Quality Control of the Landsat reprocessed data) and Ocean Colour Climate Change Initiative project (http://www.esa-oceancolour-cci.org/).
2012 -   **eLearning material** preparation for the Hydrographic Academy: covering the topics of remote sensing and satellite positioning.
2012 -   **Scientific engagement** of the general public via social media: development of a website and Secchi phone apps, www.secchidisk.org - presentation as invited lecture during Ocean Optics, 2014.
2012 – 2014   **EO Consultant for the ESA Mobile Autonomous Scientist for Terrestrial and Extra-terrestrial Research (MASTER) project** where SciSys is the lead.
2012   Development of a **low-cost water quality sensor** in collaboration with Gerald Moore of Bio-Optika.
2012   **Time-series processing** of Landsat imagery in support of a desertification project.

COMPLETED PHD STUDENTS

- Alboabidallah, 2019. A. Uncertainty within remotely sensed data for ecosystem services. Based at Plymouth University.
- Cristina, S. 2016. Study of optical properties of oceanic and coastal water southwest Portuguese coast using remote sensing data acquired by the sensor MERIS ocean colour. Based at the University of Algarve.
- Morakinyo, B. 2016. Flaring and Pollution Detection in the Niger Delta. Based at Plymouth University.
- Zhang, D. 2014. Understanding the potential and limitations of fluorescent imaging of cyanobacteria in freshwater and sea water. Based at Mullard Space Science Laboratory. Based at University College London.
- Krijnen, J. 2013. Remote sensing applied to variability in North Atlantic CO_2 uptake. Based at the University of East Anglia.
- Abdel Hamid, I. 2012. Chromo-Stereoscopic Visualisation in Dynamic Marine Operations. Based at Plymouth University.
- Kay, S. 2011. Sun glint correction of marine satellite imagery by radiative transfer model inversion. Based at the University of Exeter & ARGANS.
- Davey, F. 2011. Research Interests in GIS and remotely sensed data for landscape character assessment. In collaboration with Tamar AONB Service.
- Brewin, R. 2011. Detecting Phytoplankton Size Class using Satellite Earth Observation. Based at the University of Plymouth and in collaboration with Plymouth Marine Laboratory and the UK MetOffice.
- Barker, K. 2009. Novel Techniques for Estimating Primary Production Rates directly from Earth Observation Data. In collaboration with Plymouth Marine Laboratory.
- Fishwick, J. 2008. Biological and Optical Properties of Phytoplankton Assemblages in the Western English Channel. In collaboration with Plymouth Marine Laboratory.
- O'Neill, C. 2008. Identifying and modelling mesoscale processes responsible for deep sea-shelf exchanges over the Rockall Bank.
- Ostnes, R. 2005. To Assess the Opportunities and Benefits of Improved Visualisation of Hydrographic Data. In collaboration with Aalesund University College, Norway.
- Lowe, C. 2005. Satellite Remote Sensing of Characteristic Properties and Photosynthetic Rates of Phytoplankton Ecosystems. In collaboration with Plymouth Marine Laboratory.
- Nagur Cherukuru, R.C. 2004. Remote Sensing of Optically Active Marine Components. In collaboration with Plymouth Marine Laboratory.

I have been an external PhD examiner six times in the UK and four times overseas (Belgium, France, Sweden & Indonesia), and an internal examiner twice in the UK.

RECENT PUBLICATIONS SINCE 2009 (author/co-author on over 90 peer-reviewed publications).

Groom et al., 2019 Satellite Ocean Colour: current status and future perspective. *Frontiers in Marine Science*, https://www.frontiersin.org/articles/10.3389/fmars.2019.00485/full

Kycko, M., Zagajewski, B., Lavender, S. et al. 2018. The impact of tourist traffic on the condition and cell structures of alpine swards. *Remote Sensing* 10 (2), 220

Buchwitz, M., Lavender, S., Chuvieco, E. 2017. Special issue on earth observation of essential climate variables, *Remote Sensing of Environment*, https://doi.org/10.1016/j.rse.2017.09.001

Alboabidallah, A., Martin, J., Lavender, S. et al. 2017. Terrestrial laser scanning for biomass assessment and tree reconstruction: improved processing efficiency. *Proc. SPIE 10444, Fifth International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2017)*, http://dx.doi.org/10.1117/12.2279130

Casal, G., and Lavender, S. 2017. Spatio-temporal variability of sea surface temperature in Irish waters (1982-2015) using AVHRR sensor. *Journal of Sea Research*, https://doi.org/10.1016/j.seares.2017.07.006

Lavender, S.J. 2017. Chapter 10: Remote sensing. In: Uncles, R. and Mitchell, S. (Eds.) *Estuarine and Coastal Hydrography*, Cambridge University Press.

Marcinkowska-Ochtyra, A., Zagajewski, B., Ochtyra, A., Jarocińska, A., Wojtuń, B., Rogass, C., Mielke, C. and Lavender, S. 2017. Subalpine and alpine vegetation classification based on hyperspectral APEX and simulated EnMAP images, *International Journal of Remote Sensing*, 38(7), http://dx.doi.org/10.1080/01431161.2016.1274447

Zhang, D., Lavender, S., Muller, J.P., Walton, D., Karlson, B. and Kronsell, J. 2017. Determination of phytoplankton abundances (Chlorophyll-a) in the optically complex inland water - The Baltic Sea, *The Science of the total environment*, http://dx.doi.org/10.1016/j.scitotenv.2017.05.245

Cristina, S., Cordeiro, C., Lavender, S., Costa Goela, P., Icely, J., and Newton, A. 2016. MERIS Phytoplankton Time Series Products from the SW Iberian Peninsula (Sagres) Using Seasonal-Trend Decomposition Based on Loess, *Remote Sens*. 8(6), http://dx.doi.org/10.3390/rs8060449

Kratzer, S., Alikas, K., Harvey, T., Morozov, E., Mustapha, S.B., and Lavender, S. 2016. Chapter 19: Multi-temporal Remote Sensing of Coastal Waters. In: Ban, Y. (Ed.). *Multitemporal analysis of satellite images*. Springer-Verlag Berlin Heidelberg. http://link.springer.com/chapter/10.1007/978-3-319-47037-5_19

Lavender, S., Boissier, E., Brito, F., Ribeiro, R., Aas, C., Casu, F., Iapaolo, M. 2016. E-Collaboration for Earth Observation: Example Challenge Focused on the Atmospheric Correction of Ocean Colour Data. *ESA Living Planet Symposium*, Prague, Czech Republic, May 2016.

Lavender, S., Haria, K., Cooksley, G., Farman, A. and Beaton, B. 2016. Understanding the Future Market for NovaSAR-S Flood Mapping Products using Data Mining and Simulation. *ESA Living Planet Symposium*, Prague, Czech Republic, May 2016.

Gascon, F., Biasutti, R., Ferrara, R., Fischer, P., Galli, L., Hoersch, B., Lavender, S., Meloni, M., Mica, S., Northrop, A. Paciucci, A., Saunier, S. 2015. Bulk processing of the Landsat MSS/TM/ETM+ archive of the European Space Agency. SPIE 9643, *Image and Signal Processing for Remote Sensing XXI*, October 2015. http://dx.doi.org/10.1117/12.2192847

Lavender, S.J and Lavender, A. 2015. *Practical Handbook of Remote Sensing*. CRC Press, Taylor & Francis Group.

Gascon, F., Biasutti, R., Ferrara, R., Fischer, P., Galli, L., Hoersch, B., Hopkins, S., Jackson, J., Lavender, S., Mica, S., Northrop, A., Paciucci, A., Paul, F., Pinori, S. and Saunier, S. 2014. European Space Agency (ESA) Landsat MSS/TM/ETM+ Archive Bulk-Processing: Processor Improvements and Data Quality, SPIE 9218, *Earth Observing Systems XIX*, 92181C, September 2014. http://dx.doi.org/10.1117/12.2062223

Lavender, S.J. 2014. Multi-sensor ocean colour atmospheric correction for time-series data: Application to LANDSAT ETM+ and OLI data, *EARSeL eProceedings*, 13(2): 58-66.

Lavender, S.J. and Moufaddal, W. 2014. Chapter 23: Remote Sensing Applications to Modeling Biomass and Carbon of Oceanic Ecosystems. In: Wang, G. and Weng, Q. (Eds.) *Remote Sensing of Natural Resources*, CRC Press, Taylor & Francis Group.

Raitsos, D.E., Pradhan, Y., Lavender, S.J., Hoteit, I., McQuatters-Gollop, A., Reid, P.C. and Richardson, A.J. 2014. From silk to satellite: half a century of ocean colour anomalies in the Northeast Atlantic. *Global Change Biology*, http://dx.doi.org/10.1111/gcb.12457

Manakos, I. and Lavender, S. 2014. Remote Sensing Support of the Geoinformation in Europe. In: Manakos I. and Braun M. (Eds.) *Land Use and Land Cover Mapping in Europe.* Springer-Verlag Berlin Heidelberg. http://dx.doi.org/10.1007/978-94-007-7969-3

Font J., Boutin, J., Reul, N., Spurgeon, P., Ballabrera-Poy, J., Chuprin, A., Gabarró, C., Gourrion, J., Guimbard, S., Hénocq, C., Lavender, S., Martin, N., Martínez, J., McCulloch, M., Meirold-Mautner, I., Mugerin, C., Petitcolin, F., Portabella, M., Sabia, R., Talone, M., Tenerelli, J., Turiel, A., Vergely, J.L, Waldteufel, P., Yin, X., Zine, S. and Delwart, S. 2013. SMOS first data analysis for sea surface salinity determination. *International Journal of Remote Sensing,* 34(9-10), pp. 3654-3670.

Kay, S., Hedley, J., and Lavender, S. 2013. Sun glint estimation in marine satellite images: a comparison of results from calculation and radiative transfer modelling. *Appl. Opt.* 52, 5631-5639

Lavender, S. 2013. Ocean Measurements and Applications, Ocean Color. In: Njoku E. (Ed.) *Encyclopaedia of Remote Sensing: SpringerReference (www.springerreference.com).* Springer-Verlag Berlin Heidelberg. http://dx.doi.org/10.1007/SpringerReference_327180

Werdell, P., Franz, B., Bailey, S., Feldman, G., Boss, E., Brando, V., Dowell, M., Hirata, T., Lavender, S., Lee, Z., Loisel, H., Maritorena, S., Mélin, F., Moore, T., Smyth, T., Antoine, D., Devred, E., d'Andon, O. and Mangin, A. 2013. Generalized ocean color inversion model for retrieving marine inherent optical properties, *Appl. Opt.* 52, pp. 2019-2037.

Brewin, R.J.W., Hirata, T., Hardman-Mountford, N.J., Lavender, S.J., Sathyendranath, S., Barlow, R. 2012. The influence of the Indian Ocean Dipole on interannual variations in phytoplankton size structure as revealed by Earth Observation, Deep-Sea Research II, 77-80, pp. 117–127

Lavender, S., Fanton d'Andon, O., Kay, S., Bourg, L., Emsley, S., Gilles, N., Nightingale, T., Quast, R., Bates, M., Storm, T., Hedley, J., Knul, M., Sotis, G., Nasir-Habeeb, R., Goryl, P. and Sentinel-3 L2 Products and Algorithm Team. 2012.

Applying Uncertainties to Ocean Colour Data. *Metrologia*, 49, pp. S17–S20 http://dx.doi.org/10.1088/0026-1394/49/2/S17.

Raitsos, D.E, Walne, A., Lavender, S.J., Licandro, P., Reid, P.C., Edwards, M. 2012. A 60-year ocean colour data set from the continuous plankton recorder J. Plankton Res. http://dx.doi.org/10.1093/plankt/fbs079

Abdel Hamid, I., Abbott, V., Lavender, S. and Kingston, K. 2011. Chromo-stereoscopy for Enhanced Viewing in Opaque Environment. *FIG Working Week 2011: Bridging the Gap between Cultures*, Marrakech, Morocco, May 2011, 14 pp.

Brewin, R.J.W, Devred, E., Sathyendranath, S., Lavender, S.J, and Hardman-Mountford, N.J. 2011. Model of phytoplankton absorption based on three size classes, *Applied Optics,* 50, pp. 4535-4549

Kay, S., Hedley, J., Lavender, S., and Nimmo-Smith, A. 2011. Light transfer at the ocean surface modeled using high resolution sea surface realizations. *Optics Express*, 19(7), pp. 6493-6504

Raitsos, D.E., Lavender, S.J., Maravelias, C.D., Haralabous, J., McQuatters-Gollop, A., Edwards, M. and Reid, P.C. 2011. Macroscale factors affecting diatom abundance: a synergistic use of Continuous Plankton Recorder and satellite remote sensing data. *International Journal of Remote Sensing*, 32 (8), pp. 2081-2094

Brewin, R.J.W., Hardman-Mountford, N.J., Lavender, S.J., Raitsos, D.E., Hirata, T., Uitz, J., Devred, E., Bricaud, A., Ciotti, A. and Gentili, B. 2010. An intercomparison of bio-optical techniques for detecting dominant phytoplankton size class from satellite remote sensing. *Remote Sensing of Environment*, 115, pp. 325–339

Brewin, R.J, Lavender, S.J., Hardman-Mountford. 2010. Mapping size-specific phytoplankton primary production on a global scale. *Journal of Maps Student Edition*, pp. 12-25

Brewin, R.J, Lavender, S.J., Hardman-Mountford, N.J and Hirata, T. 2010. A spectral response approach for detecting dominant phytoplankton size class from satellite remote sensing. *Acta Oceanologica Sinica*, 28(6), pp. 1-19

Brewin, R.J.W., Sathyendranath, S., Hirata, T., Lavender, S.J., Barciela, R.M. and Hardman-Mountford, N.J. 2010. A three-component model of phytoplankton size class for the Atlantic Ocean. *Ecological Modelling*, 221(11), pp. 1472-1483

Lavender, S.J. et al. 2010. Products Definition and Determining Uncertainties; Sentinel-3 Optical Level 2 Prototype Processor. *ESA Living Planet Symposium*, Bergen, Norway, June-July 2010, 5 pp.

Aiken, J., Pradhan, Y., Barlow, R., Lavender, S., Poulton, A., Holligan, P. and Hardman-Mountford, N. 2009. Phytoplankton pigments and functional types in the Atlantic Ocean: A decadal assessment, 1995–2005. *Deep Sea Research Part II: Topical Studies in Oceanography*, 56(15), pp. 899-917

Lavender, S. 2009. Chapter 27: Optical Remote Sensing of the Hydrosphere: From the Open Ocean to Inland Waters. The SAGE Handbook of Remote Sensing, Warner, T; Dunane Nellis, M; Foody, G (eds.), 504 pp.

Lavender, S.J., Moufaddal, W.M. and Pradhan, Y.D. 2009. Assessment of temporal shifts of chlorophyll levels in the Egyptian Mediterranean shelf and satellite detection of the Nile bloom. *Egyptian Journal of Aquatic Research*, 35(2), pp. 121-135.

Kay, S., Hedley, J.D., Lavender, S. 2009. Sun Glint Correction of High and Low Spatial Resolution Images of Aquatic Scenes: a Review of Methods for Visible and Near-Infrared Wavelengths. *Remote Sensing*, 1, pp. 697-730.

Robinson, C., Holligan, P., Jickells, T.D. and Lavender, S. 2009. The Atlantic Meridional Transect programme (1995-2012) foreword. *Deep-Sea Research II*, 56(15), pp. 895-898