

Bruce Grieve, PhD, BSc(hons), CEng, FIAGrE
Academic (Teaching & Research) Professor
EEE - Academic & Research



Employment

Chair in Agri-Sensors and Electronics

Academic (Teaching & Research) Professor
EEE - Academic & Research
The University of Manchester
1 Aug 2019 → present

BBSRC Agriculture and Food Security Strategy Panel

Biotechnology & Biological Sciences Research Council (BBSRC)
Swindon, United Kingdom
31 Oct 2016 → 31 Oct 2019

Research output

Permuted KPCA and SMOTE to Guide GAN-Based Oversampling for Imbalanced HSI Classification

Miftahushudur, T., Grieve, B. & Yin, H., 3 Oct 2023, (Accepted/In press) In: IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing.

Segmentation of Weeds and Crops Using Multispectral Imaging and CRF-enhanced U-Net

Sahin, H. M., Miftahushudur, T., Grieve, B. & Yin, H., 1 Aug 2023, In: Computers and Electronics in Agriculture.

Electrospinning polyethylene terephthalate glycol

Hassan, M. H., Omar, A. M., Daskalakis, E., Grieve, B. & Da Silva Bartolo, P. J., 5 Mar 2023, (Accepted/In press) In: International Journal of Bioprinting.

Smart nanostructured materials for tissue engineering: Smart biomaterials and constructs for Bone tissue regeneration

Hassan, M., Omar, A., Daskalakis, E., Grieve, B. & Da Silva Bartolo, P. J., 10 Oct 2022, *New Trends in Smart Nanostructured Biomaterials in Health Sciences*. Elsevier BV, p. 177 44 p. (Materials Today).

Multi-layer Biosensor for Pre-symptomatic Detection of Puccinia striiformis, the Causal Agent of Yellow Rust

Hassan, M., Omar, A., Daskalakis, E., Mohamed, A. A., Boyd, L., Blanford, C. F., Grieve, B. & Bartolo, P., 6 Oct 2022, In: Biosensors. 12, 10, p. 829 829.

Early detection of plant virus infection using multispectral imaging and spatial-spectral machine learning

Peng, Y., Dallas, M., Ascencio-Ibanez, J., Hoyer, S., Legg, J., Hanley-Bowdoin, L., Grieve, B. & Yin, H., 24 Feb 2022, In: Scientific Reports.

Ensemble Synthetic Oversampling with Manhattan Distance for Unbalanced Hyperspectral Data

Miftahushudur, T., Grieve, B. & Yin, H., 23 Nov 2021, *Proceedings of International Conference on Intelligent Data Engineering and Automated Learning*. Springer Nature, Vol. 13113. p. 54-64

Recent Advances in Enzymatic and Non-Enzymatic Electrochemical Glucose Sensing

Hassan, M., Vyas, C., Grieve, B. & Da Silva Bartolo, P. J., 8 Jul 2021, In: Sensors. 21, 14, 26 p.

Fabrication and electrochemical response of pristine graphene ultramicroelectrodes

Goodwin, S., Coldrick, Z., Heeg, S., Grieve, B., Vijayaraghavan, A. & Hill, E. W., 26 Feb 2021, In: Carbon. 177, p. 207-215 9 p.

The Potential of Polyethylene Terephthalate Glycol as Biomaterial for Bone Tissue Engineering

Hassan, M., Omar, A., Daskalakis, E., Hou, Y., Huang, B., Strashnov, I., Grieve, B. & Bartolo, P., 18 Dec 2020, In: Polymers. 12, 12, 12 p.

Development of a Passive Spore Sampler for Capture Enhancement of Airborne Crop Pathogens

Blackhall, J., Wang, J., Nabawy BSc, MSc, PhD, MRAeS, SMAIAA, FHEA, M., Quinn, M. & Grieve, B., 18 Jun 2020, In: Fluids. 5, 97, 14 p.

High Speed Crop and Weed Identification in Lettuce Fields for Precision Weeding

Elstone, L., How, K. Y., Brodie, S., Zulfahmi Ghazali, M., Heath, W. & Grieve, B., 14 Jan 2020, In: Sensors. 20, 455, 15 p.

Automatic Multispectral Image Classification of Plant Virus from Leaf Samples

Sahin, H. M., Grieve, B. & Yin, H., 2020, *International Conference on Intelligent Data Engineering and Automated Learning*. Springer Nature, p. 374-384 11 p.

The challenges posed by global broadacre crops in delivering smart agri-robotic solutions: A fundamental rethink is required

Grieve, B., Duckett, T., Collison, M., Boyd, L., West, J., Yin, H., Arvin, F. & Pearson, S., 1 Dec 2019, In: Global Food Security. 23, p. 116-124 9 p.

Electrical impedance tomography as a tool for phenotyping plant roots

Corona López, D., Sommer, S., Rolfe, S., Podd, F. & Grieve, B., 21 May 2019, In: Plant Methods. 15, 1, 49.

Multispectral imaging for presymptomatic analysis of light leaf spot in oilseed rape

Veys, C., Chatziavgerinos, F., Bin Ghaith Alsuwaidi, A. R. S. A., Hibbert, J., Hansen, M., Bernotas, G., Smith, M., Yin, H., Rolfe, S. & Grieve, B., 2019, In: Plant Methods. 15, 40, p. 1-12 12 p., 4.

A method for real-time classification of insect vectors of mosaic and brown streak disease in cassava plants for future implementation within a low-cost, handheld, in-field multispectral imaging sensor

Fennell, J., Veys, C., Jose, D., Nwezeobi, J., van Brunscot, S., Colvin, J. & Grieve, B., 20 Sept 2018, In: Plant Methods. 14, 82, p. 1-12 12 p.

Combining Spectral and Texture Features in Hyperspectral Image Analysis for Plant Monitoring

AlSuwaidi, A., Grieve, B. & Yin, H., 23 Aug 2018, In: Measurement Science and Technology. 29, 10

Agricultural Robotics: The Future of Robotic Agriculture

Duckett, T., Pearson, S., Blackmore, S. & Grieve, B., 21 Jun 2018, London: EPSRC UK Robotics and Autonomous Systems (RAS) Network. 36 p.

Low-cost Turbidity Sensor for Low-power Wireless Monitoring of Fresh-Water Courses

Wang, Y., Rajib, S. M. S. M., Collins, C. & Grieve, B., 1 Jun 2018, In: IEEE Sensors Journal. 18, 11, p. 4689-4696 8 p.

Photometric stereo for three-dimensional leaf venation extraction

Zhang, W., Hansen, M., Smith, M., Smith, L. & Grieve, B., Jun 2018, In: Computers in Industry. 98, p. 56-67 12 p.

Towards on-farm pig face recognition using convolutional neural networks

Hansen, M., Smith, M., Smith, L., Salter, M. G., Baxter, E. M., Farish, M. & Grieve, B., Jun 2018, In: Computers in Industry. 98, p. 145-152

Towards Phosphate Detection in Hydroponics Using Molecularly Imprinted Polymer Sensors

Storer, C., Coldrick, Z., Tate, D., Donoghue, J. & Grieve, B., 10 Feb 2018, In: *Sensors*. 18, 2, p. 531-11 p.

Feature-Ensemble Based Novelty Detection for Analysing Plant Hyperspectral Datasets

AlSuwaidi, A., Grieve, B. & Yin, H., 2018, In: *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*. 11, 4, p. 1-15 p., 99.

An Ultra-Low-Cost Active Multispectral Crop Diagnostics Device

Veys, C., Davies, P., Hibbert, J. & Grieve, B., 6 Nov 2017, p. 1005-1007. 3 p.

Floor Sensors of Animal Weight and Gait for Precision Livestock Farming

Vaughan, J., Green, P., Salter, M., Grieve, B. & Ozanyan, K., 6 Nov 2017, p. 978-980. 3 p.

Portable, In-field, Multispectral Imaging Sensor for Real-time Detection of Insect Viral-Vectors

Grieve, B., Veys, C., Jose, D., Colvin, J. & Nwezeobi, J., 6 Nov 2017, p. 990-992. 3 p.

Unsupervised Learning for Spectral Data Analysis as a Novel Sensor for Identifying Rodent Infestation in Urban Environments

Costilla Reyes, O., Coldrick, Z. & Grieve, B., 6 Nov 2017, p. 993-995 p.

Spectral-texture approach to hyperspectral image analysis for plant classification with SVMs

AlSuwaidi, A., Grieve, B. & Yin, H., 1 Oct 2017, *2017 IEEE International Conference on Imaging Systems and Techniques (IST)*. p. 1-6 6 p.

'IoT-ready' Sensor Technology for Connected Farms

Ozanyan, K. & Grieve, B., 21 May 2017.

Active, Close-Proximity, Multispectral Imaging (MSI) for Agriculture

Grieve, B., 2017

Towards Spectral-Texture Approach to Hyperspectral Image Analysis for Plant Classification

AlSuwaidi, A., Grieve, B. & Yin, H., 2017, *Intelligent Data Engineering and Automated Learning -- IDEAL 2017*. Yin, H., Gao, Y., Chen, S., Wen, Y., Cai, G., Gu, T., Du, J., Tallón-Ballesteros, A. J. & Zhang, M. (eds.). Cham: Springer Nature, p. 251-260 10 p. (Lecture Notes in Computer Science; vol. 10585).

Hyperspectral Selection Based Algorithm for Plant Classification

Alsuwaidi, A., Veys, C., Hussey, M., Grieve, B. & Yin, H., 10 Nov 2016, *IEEE International Conference on Imaging Systems and Techniques*. Chania, Greece: IEEE, 6 p.

Hyperspectral Feature Selection Ensemble for Plant Classification

AlSuwaidi, A., Veys, C., Hussey, M., Grieve, B. & Yin, H., 2016. 4 p.

Supplemental Blue LED Lighting Array to Improve the Signal Quality in Hyperspectral Imaging of Plants

Mahlein, A. K., Hammersley, S., Oerke, E. C., Dehne, H. W., Goldbach, H. & Grieve, B. G., 1 Jun 2015, In: *Sensors*. 15, p. 12834-12840 6 p.

Sensor

Gleeson, H., Dierking, I., Grieve, B., Woodyatt, C. & Brimicombe, P., 28 Apr 2015

Localized Multispectral Crop Imaging Sensors Engineering & Validation of a Cost Effective Plant Stress and Disease Sensor

Grieve, B., Gurkan, D. (ed.) & Baglio, S. (ed.), 11 Apr 2015, *IEEE 2015 Sensors Applications Symposium*. Gurkan, D. & Baglio, S. (eds.). Piscataway, New Jersey, USA: IEEE

Handheld multispectral imager for crop disease sensing

Grieve, B., 2015

Process compliant electrical impedance instrumentation for wide scale exploitation on industrial vessels

Lionheart, W., Grieve, B., Davidson, J. L. & Mann, R., 2015, In: Proc. 3rd World Congr. Industrial Process Tomography. p. 2-5

Minimizing flight time and fuel consumption for airborne crop spraying

Grieve, B., Jackman, P. & Syed Shariq, S., Jun 2014, p. 89. 95 p.

Electrical impedance imaging of water distribution in the root zone

Newill, P., Karadaglić, D., Podd, F., Grieve, B. D., York, T. A. & Karadaglić, D., 2014, In: Measurement Science and Technology. 25, 5, 055110.

Plant Characteristic Measurement System

Grieve, B. D. & Hammersley, S., 13 Dec 2013, Patent No. PM332340GB

Modelling of Likely Sclerotinia Disease Incidence in Oilseed rape Fields in the United Kingdom

Grieve, B., Jackman, P., West, J., Varrailon, T., Canning, G., Heard, S. & Lawal, N., 27 Jun 2013.

Processing online crop disease warning information via sensor networks using ISA ontologies

Jackman, P., Gray, A. J. G., Brass, A., Stevens, R., Shi, M., Scuffell, D., Hammersley, S. & Grieve, B., 2013, In: Agricultural Engineering International: CIGR Journal. 15, 3, p. 243-251 8 p.

POF based moisture and pH sensor in soils for e-Agriculture applications.

Fiadzomor, P., Hamza, B., Scully, P., Benyezzar, M., Qiao, C., Vaughan, J., Grieve, B., Ozanyan, K. & Pearson, D., 4 Sept 2012, *Proceeding of Photon12*. London, UK: IOP Publishing Ltd

Capacitively-coupled impedance measurements for ERT

Hayes, R., Podd, F., Newill, P., Grieve, B. & York, T., 26 Mar 2012, *6th International Symposium on Process Tomography*. 7 p. (International Symposium on Process Tomography).

Capillary zone electrophoresis for the analysis of glycoforms of cellobiohydrolase

Gupta, R., Baldock, S. J., Fielden, P. R. & Grieve, B. D., 5 Aug 2011, In: Journal of Chromatography A. 1218, 31, p. 5362-5368 6 p.

Sensing Method and Apparatus for Detecting Plant Nodes

Grieve, B. D. & Woodyatt, N. C. P., 17 Feb 2011, Patent No. WO2011/018402

A specific, robust, and automated method for routine at-line monitoring of the concentration of cellulases in genetically modified sugarcane plants

Gupta, R., Baldock, S. J., Fielden, P. R. & Grieve, B. D., Feb 2011, In: Applied Biochemistry and Biotechnology. 163, 4, p. 528-539 11 p.

Developing new technology platforms for new business models: Syngenta's partnership with the University of Manchester

Malik, K., Georgiou, L. & Grieve, B., Jan 2011, In: Research Technology Management. 54, 1, p. 24-31 7 p.

Distributed polymer optical fibre sensing of moisture and pH in soils: Feasibility for e-agriculture

Qiao, C., Fiadzomor, P., Hamza, B., Scully, P., Benyezzar, M., Grieve, B., Ozanyan, K. & Pearson, D., 2011, *POF 2011: 20th International Conference on Plastic Optical Fibers - Conference Proceeding|POF: Int. Conf. Plast. Opt. Fibers - Conf. Proc.*. Bilbao, Spain, p. 557-562 5 p.

Isotachophoresis-based sample preparation of cellulases in sugarcane juice using bovine serum albumin as a model protein

Gupta, R., Baldock, S. J., Fielden, P. R., Prest, J. E. & Grieve, B. D., 17 Dec 2010, In: *Journal of Chromatography A*. 1217, 51, p. 8026-8031 5 p.

Distributed Polymer Optical Fibre Sensing of Moisture and pH in soils: Feasibility for e-Agriculture

Qiao, C., Fiadzomor, P., Hamza, B., Scully, P., Benyezzar, M., Grieve, B. D., Ozanyan, K. & Pearson, D., 16 Sept 2010, *POF2011 20th International Polymer Optical Fiber Conference*. Spain

Sensor

Grieve, B. D., Gleeson, H. F., Dierking, I., Kaur, S., Woodyatt, N. C. P. & Brimicombe, P. D., 9 Sept 2010, Patent No. WO2010/09279

Exploiting Sensors & ICT to "Change the Rules of the Game" for Global Agriculture and Food Security

Grieve, B. D., 1 Jul 2010.

e-Agri; Exploiting on-line sensing and ICT to Change the Rule of the Game for Global Agriculture and Food Security

Grieve, B. D., Bushell, M. & Lant, M., 28 Apr 2010.

An accessible electrical impedance tomograph for 3D imaging

Grieve, B. D., Murphy, S., Burnett-Thompson, A. & York, T. A., 2010, In: *Transactions of the Institute of Measurement and Control*. 32, 1, p. 31-50 19 p.

An investigation into the use of a mixture model for simulating the electrical properties of soil with varying effective saturation levels for sub-soil imaging using ECT

Hayes, R. R., Newill, P. A., Podd, F. J. W., York, T. A., Grieve, B. D. & Dorn, O., 2010, In: *Journal of Physics: Conference Series (Print)*. 255, 1, 012002.

An investigation into the use of a mixture model for simulating the electrical properties of soil with varying effective saturation levels for sub-soil imaging using ECT

Hayes, R. R., Newill, P. A., Podd, F. J. W., York, T. A., Grieve, B. D. & Dorn, O., 2010, *Journal of Physics: Conference Series/J. Phys. Conf. Ser.*. Institute of Physics Publishing Ltd, Vol. 255. 15 p.

Investigation of PCB microstrip patch receiving antenna for outdoor RF energy harvesting in wireless sensor networks

Sim, Z. W., Shuttleworth, R. & Grieve, B., 8 Dec 2009, *Loughborough Antennas and Propagation Conference, LAPC 2009 - Conference Proceedings/Loughborough Antennas Propag. Conf., LAPC - Conf. Proc.*. IEEE, p. 129-132 3 p.

Toward a microfluidic-based rapid amylase assay system

Holmes, R. J., Summersgil, P., Ryan, T., Brown, B. J. T., Mockbil, A., Grieve, B. D. & Fielden, P. R., Aug 2009, In: *Journal of Food Science*. 74, 6, p. N37-N43

Affordable sensors to support food provision

Grieve, B., Jun 2009, In: *Food Science and Technology*. 23, 2, p. 29-31 2 p.

Changing the rules of the game for future agriculture, the university innovation centre (UIC) model

Grieve, B., Bushell, M., Lant, M., Georghiou, L. & Malik, K., 2009, *PICMET: Portland International Center for Management of Engineering and Technology, Proceedings/PICMET: Portland Int. Cent. Manage. Eng. Technol., Proc.*. Oregon: IEEE, p. 288-298 10 p.

Methods and Systems for Ad-hoc Sensor Network

Grieve, B. D., Wright, P. & Green, P. R., 18 Sept 2008, Patent No. WO2008063939

System for Distributing Perishable Goods

Grieve, B. D. & Waltham, M., 24 Jul 2008, Patent No. WO2008087396

Plant Images

Grieve, B., Dalton, I. P. G. B. D. & Weiss, M., 5 Jun 2008, Patent No. WO2008065355

Pest Detector

Grieve, B. D., Wright, P., Hoppe, M. & Sawafta, R., 29 May 2008, Patent No. WO2008110801

Regression analysis for supply chain logged data: A simulated case study on shelf life prediction

Doan, X. T., Kidd, P. T., Goodacre, R. & Grieve, B. D., 2008, *International Conference on Signal Processing Proceedings, ICSP/Int Conf Signal Process Proc.* IEEE, p. 2717-2720 3 p.

Towards process tomography for monitoring pressure filtration

York, T. A., Davidson, J. L., Mazurkiewich, L., Mann, R. & Grieve, B. D., Apr 2005, In: *IEEE Sensors Journal.* 5, 2, p. 139-151 12 p.

Three-dimensional electrical impedance tomography applied to a metal-walled filtration test platform

Davidson, J. L., Ruffino, L. S., Stephenson, D. R., Mann, R., Grieve, B. D. & York, T. A., Nov 2004, In: *Measurement Science and Technology.* 15, 11, p. 2263-2274 11 p.

Integration and Exploitation of Microsystems (MEMS) Sensor Technologies

Crookel, A., Kemp, M., Burgess, A., Deacon, J., Grieve, B. D., Hazelden, R., Hoyle, C., Lawes, R., Qader, W. A. & Wittamore, K., 2004, Department of Trade and Industry . (., London)

On-line Electrical Impedance Tomography for Industrial Batch Processing

Grieve, B., May 2002, University of Manchester Institute of Science and Technology. 172 p.

Foresight Sensors Task Force; A strategic framework for 2015

McGeehin, P., Deacon, J., Gardner, J., Grieve, B. D., Holdaway, R., Jones, R., Prosser, S. & Whitaker, G., 2002, Department of Trade and Industry .

Method for Monitoring Chemical Processes

Grieve, B. D., Hurwood, T. V., Wiffen, J. W., Wellings, D. A. & Wells, I., 8 Aug 2001, Patent No. GB2358921

Detecting filter-cake pathologies in solid-liquid filtration: Semi-tech scale demonstrations using electrical resistance tomography (ERT)

Vlaev, D., Wang, M., Dyakowski, T., Mann, R. & Grieve, B. D., 15 Apr 2000, In: *Chemical Engineering Journal.* 77, 1-2, p. 87-91 4 p.

Electrochemical issues in impedance tomography

McNaughtan, A., Meney, K. & Grieve, B., 15 Apr 2000, In: *Chemical Engineering Journal.* 77, 1-2, p. 27-30 3 p.

Monitoring System

Grieve, B. D., Hoyle, B. S., Mann, R. & York, T. A., 11 Oct 1999, Patent No. WO200028286

Fluid Transfer Apparatus

Grieve, B. D., 11 Sept 1998, Patent No. WO/1998/039630