

## Resume

### Personal details

Name : Brendan Philip Malone  
Title : Research Fellow  
Address : Rm. 115. 1 Central Ave, Eveleigh, NSW 2015,  
Australia  
Telephone (Work) : +61 2 8627 1124  
Mobile : +61 4 2344 9911  
E-mail : [brendan.malone@sydney.edu.au](mailto:brendan.malone@sydney.edu.au)  
Website : <http://smartdigiag.com/>

### Academic qualifications

2005-2008 Bachelor of Science in Agriculture (1<sup>st</sup> Class Hons.)  
Faculty of Agriculture and Environment, the University of Sydney  
2009-2012 Doctor of Philosophy (Soil Science).  
Faculty of Agriculture and Environment, the University of Sydney.

### Statement of Research

My research focus is in using quantitative methods to precisely understand how soils function and change— spatially, and through time. Such methods are far from developed but I believe some combination of mechanistic and statistical modelling is required to do this. I research methods for comprehensive digital soil mapping aiming to characterize soil both in the lateral and vertical dimensions. Additionally I contribute methodology for quantifying (and validating) measures of uncertainty for these comprehensive soil information systems. Outputs of this sort of work are intended for feeding into environmental modeling and monitoring programs, where precise land management decision making is required at all manner of spatial scales. Furthermore, I investigate innovative systems for soil measurement, which includes that associated with remote and proximal and soil sensing. I have particular interest in infrared and x-ray spectroscopy. The importance of all these research interests have been recognized by successful funding grants from both the Australian Research Council and Australian Government Department of Agriculture.

### Academic & Research Experience

Position held	Organisation	Period
Research Fellow	The University of Sydney	2012-
Visiting Scholar	Texas A&M University	2013 (3 months)

### Honors & Awards

- The Australian Society of Soil Science CJ Stephens Award in 2013 for the best soil science PhD Thesis in the calendar year.

- Deans Award for Outstanding Post-Graduate Research in 2011: Faculty of Agriculture and Environment, University of Sydney

### **Research Grants**

- *Optimised field delineation of contaminated soils*; McBratney A, Minasny B, Malone B, Bishop T, Horta A, Mulvey P; Australian Research Council (ARC)/Linkage Projects (LP). (2015-2018) (\$500000)
- *Securing soils for posterity. An international research and training collaboration to investigate efficient approaches to assessing and improving global soil carbon sequestration*; Malone B, Stockmann U, Chen Z; DVC International/IPDF Grant. (2015) (\$15000)
- *A general soil spatial scaling theory*; McBratney A, Minasny B, Malone B; Australian Research Council (ARC)/Discovery Projects (DP). (2013-2016) (\$300000)
- *Farm scale assessment of SOC from disaggregated national/regional scale models*; McBratney A, Minasny B, Malone B; Department of Agriculture and Water Resources (Federal)/Carbon Farming Futures - Filling the Research Gap Program. (2013-2016) (\$300000)

### **Professional Service**

#### *Office bearer of Professional Society*

- Advisory board member of the Pedometrics Commission of the International Union of Soil Sciences 2013-.
- Sydney representative of the NSW Branch of Soil Science Australia (professional soil science society of Australia. 2015-).

#### *Editorial board member of international scholarly journals*

- Member of the Editorial board of *Geoderma*, (2013-)
- Editor of ASA, CSSA, SSSA Books (2016-)

### **Conference & meetings**

- Member of the organizing committee for the 5<sup>th</sup> Global Workshop on Digital Soil Mapping Sydney, 10-13 April 2012.
- Member of the scientific committee for Pedometrics 2017. June 26 – July 1, 2017.

### **Dissemination of research, scholarly work from the last 5 years**

#### *Books*

Malone, B.P., Minasny, B., McBratney, A.B., 2017. Using R for Digital Soil Mapping. Springer, The Netherlands.

#### *Edited Books*

Minasny, B., Malone, B., McBratney, A. (Eds.), 2012. Digital Soil Assessments and Beyond. Digital Soil Assessments and Beyond. CRC Press, Leiden, The Netherlands.

#### *Book Chapter*

- Adhikari, K., Bou Kheir, R., Greve, M., Bocher, P.K., Greve, M.H., Malone, B., Minasny, B., McBratney, A., 2012. Progress towards GlobalSoilMap.net soil database of Denmark. In: B. Minasny, B.P. Malone, A.B. McBratney (Eds.), *Digital Soil Assessments and Beyond*. CRC Press, Leiden, The Netherlands, pp. 445-451.
- Adhikari, K., Bou Kheir, R., Greve, M.B., Greve, M.H., Malone, B., Minasny, B., McBratney, A., 2014. Mapping soil pH and bulk density at multiple soil depths in Denmark. In: D. Arrouays, N. McKenzie, J. Hempel, A. Richer de Forges, A.B. McBratney (Eds.), *GlobalSoilMap: Basis of the global spatial soil information system*. CRC Press, London, pp. 155-160.
- Hughes, P., McBratney, A., Malone, B., Minasny, B., 2012. Development of terrons for the Lower Hunter Valley wine-growing region. In: B. Minasny, B.P. Malone, A.B. McBratney (Eds.), *Digital Soil Assessments and Beyond*. CRC Press, Leiden, The Netherlands, pp. 31-36.
- Kidd, D.B., Webb, M.A., Grose, C.J., Moreton, R.M., Malone, B., McBratney, A., Minasny, B., 2014. Operational digital soil assessment for enterprise suitability in Tasmania, Australia. In: D. Arrouays, N. McKenzie, J. Hempel, A. Richer de Forges, A.B. McBratney (Eds.), *GlobalSoilMap: Basis of the global spatial soil information system*. CRC Press, London, pp. 113-119.
- Kidd, D.B., Webb, M.A., Grose, C.J., Moreton, R.M., Malone, B., McBratney, A., Minasny, B., Viscarra Rossel, R., Cotching, W.E., Sparrow, L.A., et al., 2012. Digital soil assessment: Guiding irrigation expansion in Tasmania, Australia. In: B. Minasny, B.P. Malone, A.B. McBratney (Eds.), *Digital Soil Assessments and Beyond*. CRC Press, Leiden, The Netherlands, pp. 3-8.
- Malone, B., McBratney, A., Minasny, B., 2012. Some methods regarding manipulations of scale for digital soil mapping. In: B. Minasny, B.P. Malone, A.B. McBratney (Eds.), *Digital Soil Assessments and Beyond*. CRC Press, Leiden, The Netherlands, pp. 135-138.
- McBratney, A., Minasny, B., Wheeler, I., Malone, B., van der Linden, D., 2012. Frameworks for digital soil assessment. In: B. Minasny, B.P. Malone, A.B. McBratney (Eds.), *Digital Soil Assessments and Beyond*. CRC Press, Leiden, The Netherlands, pp. 9-14.
- Minasny, B., Malone, B., Stockmann, U., Odgers, N., McBratney, A., 2014. Pedometrics. In: S.A. Elias (Ed.), *Reference Module in Earth Systems and Environmental Sciences*. Elsevier, Netherlands, pp. 1-10.
- Minasny, B., McBratney, A., Malone, B., Lacoste, M., Walter, C., 2014. Quantitatively Predicting Soil Carbon Across Landscapes. In: A.E. Hartemink, K. McSweeney (Eds.), *Soil Carbon*. Springer, New York, pp. 45-57.
- Waring, C., Stockmann, U., Malone, B., Whelan, B., McBratney, A., 2014. Is Percent 'Projected Natural Vegetation Soil Carbon' a Useful Indicator of Soil Condition? In: A.E. Hartemink, K. McSweeney (Eds.), *Soil Carbon*. Springer, New York, pp. 219-227.

Webb, M.A., Kidd, D.B., Grose, C.J., Moreton, R.M., Malone, B., McBratney, A., Minasny, B., 2014. Integrating climate into the Digital Soil Assessment framework to assess land suitability. In: D. Arrouays, N. McKenzie, J. Hempel, A. Richer de Forges, A.B. McBratney (Eds.), *GlobalSoilMap: Basis of the global spatial soil information system*. CRC Press, London, pp. 393-399.

#### *Journal Articles*

- Malone, B. P., Styc, Q., Minasny, B., & McBratney, A. B. (2017). Digital soil mapping of soil carbon at the farm scale: A spatial downscaling approach in consideration of measured and uncertain data. *Geoderma*, 290, 91-99. doi:<http://dx.doi.org/10.1016/j.geoderma.2016.12.008>
- McDaniel, M. D., Simpson, R. G., Malone, B. P., McBratney, A. B., Minasny, B., & Adams, M. A. (2017). Quantifying and predicting spatio-temporal variability of soil CH<sub>4</sub> and N<sub>2</sub>O fluxes from a seemingly homogeneous Australian agricultural field. *Agriculture, Ecosystems & Environment*, 240, 182-193. doi:<http://dx.doi.org/10.1016/j.agee.2017.02.017>
- Minasny, B., Malone, B. P., McBratney, A. B., Angers, D. A., Arrouays, D., Chambers, A., . . . Winowiecki, L. (2017). Soil carbon 4 per mille. *Geoderma*, 292, 59-86. doi:<http://dx.doi.org/10.1016/j.geoderma.2017.01.002>
- Ng, W., Malone, B. P., & Minasny, B. (2017). Rapid assessment of petroleum-contaminated soils with infrared spectroscopy. *Geoderma*, 289, 150-160. doi:<http://dx.doi.org/10.1016/j.geoderma.2016.11.030>
- De Gruijter, J., McBratney, A., Minasny, B., Wheeler, I., Malone, B., & Stockmann, U. (2016). Farm-scale soil carbon auditing. *Geoderma*, 265, 120-130.
- Horta, A., Malone, B., Stockmann, U., Minasny, B., Bishop, T. F. A., McBratney, A. B., Pozza, L. (2016). Reply to "Comment on "Potential of integrated field spectroscopy and spatial analysis for enhanced assessment of soil contamination: A prospective review" by Horta et al". *Geoderma*, 271, 256-257. doi:<http://dx.doi.org/10.1016/j.geoderma.2015.11.015>
- Jang, H., Minasny, B., Stockmann, U., & Malone, B. P. (2016). Spatial Pedological Mapping Using a Portable X-Ray Fluorescence Spectrometer at the Tallavera Grove Vineyard, Hunter Valley. *Korean Journal of Soil Science and Fertilizer*, 49(6), 635-643.
- Malone, B., Jha, S. K., Minasny, B., & McBratney, A. (2016). Comparing regression-based digital soil mapping and multiple-point geostatistics for the spatial extrapolation of soil data. *Geoderma*, 262, 243-253.
- Somarathna, P. D. S. N., Malone, B. P., & Minasny, B. (2016). Mapping soil organic carbon content over New South Wales, Australia using local regression kriging. *Geoderma Regional*, 7(1), 38-48. doi:<http://dx.doi.org/10.1016/j.geodrs.2015.12.002>
- Taghizadeh-Mehrjardi, R., Ayoubi, S., Namazi, Z., Malone, B. P., Zolfaghari, A. A., & Sadrabadi, F. R. (2016). Prediction of soil surface salinity in arid region of central Iran using auxiliary variables and genetic programming. *Arid Land Research and Management*, 30(1), 49-64. doi:10.1080/15324982.2015.1046092

- Zolfaghari, A. A., Taghizadeh-Mehrjardi, R., Moshki, A. R., Malone, B., Weldeyohannes, A. O., Sarmadian, F., & Yazdani, M. R. (2016). Using the nonparametric k-nearest neighbor approach for predicting cation exchange capacity. *Geoderma*, 265, 111-119.
- Horta, A., Malone, B., Stockmann, U., Minasny, B., Bishop, T., McBratney, A., Pozza, L. (2015). Potential of integrated field spectroscopy and spatial analysis for enhanced assessment of soil contamination: A prospective review. *Geoderma*, 241-242, 180-209.
- Kidd, D., Malone, B., McBratney, A., Minasny, B., & Webb, M. (2015). Operational sampling challenges to digital soil mapping in Tasmania, Australia. *Geoderma Regional*, 4, 1-10.
- Kidd, D., Webb, M., Malone, B., Minasny, B., & McBratney, A. (2015). Digital soil assessment of agricultural suitability, versatility and capital in Tasmania, Australia. *Geoderma Regional*, 6, 7-21.
- Kidd, D., Webb, M., Malone, B., Minasny, B., & McBratney, A. (2015). Eighty-metre resolution 3D soil-attribute maps for Tasmania, Australia. *Soil Research*, 53, 932-955.
- Malone, B., Kidd, D., Minasny, B., & McBratney, A. (2015). Taking account of uncertainties in digital land suitability assessment. *PeerJ*, 3, 1-21.
- Stockmann, U., Malone, B., McBratney, A., & Minasny, B. (2015). Landscape-scale exploratory radiometric mapping using proximal soil sensing. *Geoderma*, 239, 115-129.
- Kidd, D., Malone, B., McBratney, A., Minasny, B., & Webb, M. A. (2014). Digital mapping of a soil drainage index for irrigated enterprise suitability in Tasmania, Australia. *Soil Research*, 52, 107-119.
- Malone, B., Hughes, P., McBratney, A., & Minasny, B. (2014). A model for the identification of terrons in the Lower Hunter Valley, Australia. *Geoderma Regional*, 1, 31-47.
- Malone, B., McBratney, A., & Collins, J. (2014). Soil-landscape endemism: The Glasserton Rigs of the Machars Peninsula, Scotland. *Geoderma Regional*, 2-3, 72-81.
- Malone, B., Minasny, B., Odgers, N., & McBratney, A. (2014). Using model averaging to combine soil property rasters from legacy soil maps and from point data. *Geoderma*, 232-234, 34-44.
- Taghizadeh-Mehrjardi, R., Minasny, B., Sarmadian, F., & Malone, B. (2014). Digital mapping of soil salinity in ardakan region, central Iran. *Geoderma*, 213, 15-28.
- Adhikari, K., Bou Kheir, R., Greve, M., Bocher, P., Malone, B., Minasny, B., Greve, M. H. (2013). High-Resolution 3-D Mapping of Soil texture In Denmark. *Soil Science Society of America Journal*, 77, 860-876.
- Malone, B., McBratney, A., & Minasny, B. (2013). Spatial scaling for digital soil mapping. *Soil Science Society of America Journal*, 77, 890-902.
- Minasny, B., McBratney, A., Malone, B., & Wheeler, I. (2013). Digital Mapping of Soil Carbon. *Advances in Agronomy*, 118, 1-47.
- Malone, B., McBratney, A., Minasny, B., & Wheeler, I. (2012). A general method for downscaling earth resource information. *Computers and Geosciences*, 41, 119-125.
- Malone, B., de Gruijter, J., McBratney, A., Minasny, B., & Brus, D. (2011). Using Additional Criteria for Measuring the Quality of Predictions and

- Their Uncertainties in a Digital Soil Mapping Framework. *Soil Science Society of America Journal*, 75, 1032-1043.
- Malone, B., McBratney, A., & Minasny, B. (2011). Empirical estimates of uncertainty for mapping continuous depth functions of soil attributes. *Geoderma*, 160, 614-626.
- Cattle, S., Malone, B., & McKenzie, D. (2009). The effect of dust on topsoil variation in the Orange wine region. *Australian & New Zealand Grapegrower & Winemaker*, 550, 22-24.
- Malone, B., McBratney, A., Minasny, B., & Laslett, G. M. (2009). Mapping continuous depth functions of soil carbon storage and available water capacity. *Geoderma*, 154, 1780-1152.

### Teaching and Extension

I have co-developed training materials and conducted training workshops that cover topics related to digital soil mapping and soil spectral inference.

- 30 August – 3 September 2010, Ispra, Italy: The first DSM workshop at European Union Joint Research Centre in Ispra, Italy attended by 15 staff. We designed the curriculum which used our latest research findings, and the course was designed as an active learning using authentic problems. Funded by JRC-EU.
- 21-23 February 2011, Sydney. Digital Soil Mapping Training for ACLEP, 19 agency representatives from states and territories and Geosciences Australia and the CSIRO.
- 2 April 2012, Sydney. Digital soil mapping training, 1-day workshop prior to the 5th Global Workshop on Digital Soil Mapping.
- 7–15 March 2013, Sydney. Digital soil mapping training for soil scientists from the Indonesian Agency for Agricultural Research and Development (9 participants). Funded by the Ministry of Agriculture, Indonesia.
- 4–5 April 2013, Sydney. Soil Spectral Inference workshop, 26 participants including researchers and scientists from government agencies and PhD students from Australia and overseas.
- 18–20 June 2013, Sydney: Digital soil mapping training for soil scientists from Australian State and Federal soil agencies, Australian Collaborative Land Evaluation Program (ACLEP).
- 22-24 April 2014, Sydney. Digital Soil Mapping Training Workshop. 20 participants, researchers and scientists from government agencies and PhD students.
- 26-28 May, 2014, Soil Spectral Inference workshop, 5 participants including technical officers from Tasmanian Govt and researchers from University of Tasmania. Funded by ARC Linkage project.

- 15-19 June, 2015, Intensive Digital Soil Mapping Training Workshop for researchers and post-graduate students of National Taiwan University (NTU). 25 participants (additionally included 5 Taiwan Govt researchers). Funded by International Program Development Fund (IPDF USYD).
- 23-26 November, 2015, Palmerston North, New Zealand. Digital Soil Mapping for Soil Carbon Auditing Short Course at Landcare Research. 16 Participants from NZ government institutions. Part of the DAFF-NZ research program.
- 27 November - 2 December 2015, Moscow. Digital soil mapping for Russian postgraduate students and young scientists. 25 participants. Requested and funded by the Dokuchaev Institute.
- 30 March–1 April 2016, Sydney. Soil Spectral Inference workshop, 22 participants including researchers and scientists from government agencies and PhD students from Australia and overseas, and private consultants.
- 24-28 August 2016, Moscow. Digital soil mapping for Russian postgraduate students and young scientists. 25 participants. Requested and funded by the Dokuchaev Institute.
- 30 January- 3 February 2017. Vancouver, Canada. Digital soil mapping for Canadian Provincial scientists, University faculty and post-graduate students. 27 participants. Requested and funded by the Agri-Food Canada.

Drawing upon my skills in digital soil mapping, pedometrics and soil spectroscopy, I have provided guest lecturing and technical assistance in the following units of study offered at the University of Sydney:

- SOIL2004 (The Soil Resource)
- SOIL3009 (Contemporary Field and Lab Soil Science)
- ENVX3001 (Environmental GIS)