List of publications by Andrea Schnepf

21.10.2022

Bauer FM, Larm L, Morandage S, Lobet G, Vanderborght J, Vereecken H, Schnepf A (2022) Development and Validation of a Deep Learning Based Automated Minirhizotron Image Analysis Pipeline. Plant Phenomics 2022. doi: 10.34133/2022/9758532.

Bauke SL, Landl M, Koch M, Hofmann D, Nagel KA, Siebers N, Schnepf A, Amelung W (2017) Macropore effects on phosphorus acquisition by wheat roots - a rhizotron study. Plant and Soil 416: 67-82. doi: 10.1007/s11104-017-3194-0.

Bauke SL, Schnepf A, von Sperber C, Orlowski N, Lewandowski H, Selzner T, Tamburini F, Amelung W (2021) Tracing uptake and translocation of phosphorus in wheat using oxygen isotopes and mathematical modelling. New Phytologist 230: 1883-1895. doi: 10.1111/nph.17307.

Cai GC, Morandage S, Vanderborght J, Schnepf A, Vereecken H (2018) "Construction of Minirhizotron Facilities for Investigating Root Zone Processes" and "Parameterization of Root Water Uptake Models Considering Dynamic Root Distributions and Water Uptake Compensation" (vol 17, 170201, 2018). Vadose Zone Journal 17.

Cai GC, Vanderborght J, Langensiepen M, Schnepf A, Huging H, Vereecken H (2018) Root growth, water uptake, and sap flow of winter wheat in response to different soil water conditions. Hydrology and Earth System Sciences 22: 2449-2470. doi: 10.5194/hess-22-2449-2018.

De Bauw P, Mai TH, Schnepf A, Merckx R, Smolders E, Vanderborght J (2020) A functional-structural model of upland rice root systems reveals the importance of laterals and growing root tips for phosphate uptake from wet and dry soils. Annals of Botany 126: 789-806. doi: 10.1093/aob/mcaa120.

de Moraes MT, Bengough AG, Debiasi H, Franchini JC, Levien R, Schnepf A, Leitner D (2018) Mechanistic framework to link root growth models with weather and soil physical properties, including example applications to soybean growth in Brazil. Plant and Soil 428: 67-92. doi: 10.1007/s11104-018-3656-z.

de Moraes MT, Debiasi H, Franchini JC, Bonetti JD, Levien R, Schnepf A, Leitner D (2019) Mechanical and Hydric Stress Effects on Maize Root System Development at Different Soil Compaction Levels. Frontiers in Plant Science 10. doi: 10.3389/fpls.2019.01358.

de Moraes MT, Debiasi H, Franchini JC, Mastroberti AA, Levien R, Leitner D, Schnepf A (2020) Soil compaction impacts soybean root growth in an Oxisol from subtropical Brazil. Soil & Tillage Research 200. doi: 10.1016/j.still.2020.104611.

de Sosa LL, Glanville HC, Marshall MR, Schnepf A, Cooper DM, Hill PW, Binley A, Jones DL (2018) Stoichiometric constraints on the microbial processing of carbon with soil depth along a riparian hillslope. Biology and Fertility of Soils 54: 949-963. doi: 10.1007/s00374-018-1317-2.

Deckmyn G, Flores O, Mayer M, Domene X, Schnepf A, Kuka K, Van Looy K, Rasse DP, Briones MJI, Barot S, Berg M, Vanguelova E, Ostonen I, Vereecken H, Suz LM, Frey B, Frossard A, Tiunov A, Frouz J, Grebenc T, Opik M, Javaux M, Uvarov A, Vinduskova O, Krogh PH, Franklin O, Jimenez J, Yuste JC (2020) KEYLINK: towards a more integrative soil representation for inclusion in ecosystem scale models. I. review and model concept. Peerj 8. doi: 10.7717/peerj.9750.

Dunbabin VM, Postma JA, Schnepf A, Pages L, Javaux M, Wu LH, Leitner D, Chen YL, Rengel Z, Diggle AJ (2013) Modelling root-soil interactions using three-dimensional models of root growth, architecture and function. Plant and Soil 372: 93-124. doi: 10.1007/s11104-013-1769-y.

Flores O, Deckmyn G, Yuste JC, Javaux M, Uvarov A, van der Linde S, De Vos B, Vereecken H, Jimenez J, Vinduskova O, Schnepf A (2021) KEYLINK: towards a more integrative soil representation for inclusion in ecosystem scale models-II: model description, implementation and testing. Peerj 9. doi: 10.7717/peerj.10707.

Glanville HC, Hill PW, Schnepf A, Oburger E, Jones DL (2016) Combined use of empirical data and mathematical modelling to better estimate the microbial turnover of isotopically labelled carbon substrates in soil. Soil Biology & Biochemistry 94: 154-168. doi: 10.1016/j.soilbio.2015.11.016.

Gryndler M, Beskid O, Hrselova H, Bukovska P, Hujslova M, Gryndlerova H, Konvalinkova T, Schnepf A, Sochorova L, Jansa J (2015) Mutabilis in mutabili: Spatiotemporal dynamics of a truffle colony in soil. Soil Biology & Biochemistry 90: 62-70. doi: 10.1016/j.soilbio.2015.07.025.

Himmelbauer ML, Puschenreiter M, Schnepf A, Loiskandl W, Wenzel WW (2005) Root morphology of Thlaspi goesingense Halacsy grown on a serpentine Soil. Journal of Plant Nutrition and Soil Science 168: 138-144. doi: 10.1002/jpln.200420434.

Horn J, Zhao Y, Wandel N, Landl M, Schnepf A, Behnke S, Ieee Comp SOC (2021) Robust Skeletonization for Plant Root Structure Reconstruction from MRI. 25th International Conference on Pattern Recognition (ICPR), Electr Network.

Khare D, Selzner T, Leitner D, Vanderborght J, Vereecken H, Schnepf A (2022) Root System Scale Models Significantly Overestimate Root Water Uptake at Drying Soil Conditions. Frontiers in Plant Science 13. doi: 10.3389/fpls.2022.798741.

Kuppe CW, Schnepf A, von Lieres E, Watt M, Postma JA (2022) Rhizosphere models: their concepts and application to plant-soil ecosystems. Plant and Soil 474: 17-55. doi: 10.1007/s11104-021-05201-7.

Landl M, Haupenthal A, Leitner D, Kroener E, Vetterlein D, Bol R, Vereecken H, Vanderborght J, Schnepf A (2021) Simulating rhizodeposition patterns around growing and exuding root systems. In Silico Plants 3. doi: 10.1093/insilicoplants/diab028.

Landl M, Huber K, Schnepf A, Vanderborght J, Javaux M, Bengough AG, Vereecken H (2017) A new model for root growth in soil with macropores. Plant and Soil 415: 99-116. doi: 10.1007/s11104-016-3144-2.

Landl M, Schnepf A, Uteau D, Peth S, Athmann M, Kautz T, Perkons U, Vereecken H, Vanderborght J (2019) Modeling the Impact of Biopores on Root Growth and Root Water Uptake. Vadose Zone Journal 18. doi: 10.2136/vzj2018.11.0196.

Landl M, Schnepf A, Vanderborght J, Bengough AG, Bauke SL, Lobet G, Bol R, Vereecken H (2018) Measuring root system traits of wheat in 2D images to parameterize 3D root architecture models. Plant and Soil 425: 457-477. doi: 10.1007/s11104-018-3595-8.

Leitner D, Felderer B, Vontobel P, Schnepf A (2014) Recovering Root System Traits Using Image Analysis Exemplified by Two-Dimensional Neutron Radiography Images of Lupine. Plant Physiology 164: 24-35. doi: 10.1104/pp.113.227892.

Leitner D, Klepsch S, Bodner G, Schnepf A (2010) A dynamic root system growth model based on L-Systems. Plant and Soil 332: 177-192. doi: 10.1007/s11104-010-0284-7.

Leitner D, Klepsch S, Kniess A, Schnepf A (2010) The algorithmic beauty of plant roots - an L-System model for dynamic root growth simulation. Mathematical and Computer Modelling of Dynamical Systems 16: 575-587. doi: 10.1080/13873954.2010.491360.

Leitner D, Klepsch S, Ptashnyk M, Marchant A, Kirk GJD, Schnepf A, Roose T (2010) A dynamic model of nutrient uptake by root hairs. New Phytologist 185: 792-802. doi: 10.1111/j.1469-8137.2009.03128.x.

Leitner D, Meunier F, Bodner G, Javaux M, Schnepf A (2014) Impact of contrasted maize root traits at flowering on water stress tolerance - A simulation study. Field Crops Research 165: 125-137. doi: 10.1016/j.fcr.2014.05.009.

Leitner D, Schnepf A (2008) ROOT GROWTH SIMULATION USING L-SYSTEMS. 18th Conference on Scientific Computing, Podbanske, SLOVAKIA.

Leitner D, Schnepf A (2012) IMAGE ANALYSIS OF 2-DIMENSIONAL ROOT SYSTEM ARCHITECTURE. 19th Conference on Scientific Computing, Vysoke Tatry, SLOVAKIA.

Leitner D, Schnepf A, Klepsch S, Roose T (2010) Comparison of nutrient uptake between three-dimensional simulation and an averaged root system model. Plant Biosystems 144: 443-447. doi: 10.1080/11263501003726334.

Lobet G, Pound MP, Diener J, Pradal C, Draye X, Godin C, Javaux M, Leitner D, Meunier F, Nacry P, Pridmore TP, Schnepf A (2015) Root System Markup Language: Toward a Unified Root Architecture Description Language. Plant Physiology 167: 617-627. doi: 10.1104/pp.114.253625.

Loiskand W, Schnepf A, Roose T, Himmelbauer ML, Klepsch S (2005) Model concepts of metal uptake by plant roots from single root to field scale. European Simulation and Modelling Conference (ESM 2005), Univ Porto, Oporto, PORTUGAL.

Mai TH, Schnepf A, Vereecken H, Vanderborght J (2019) Continuum multiscale model of root water and nutrient uptake from soil with explicit consideration of the 3D root architecture and the rhizosphere gradients. Plant and Soil 439: 273-292. doi: 10.1007/s11104-018-3890-4.

Morandage S, Laloy E, Schnepf A, Vereecken H, Vanderborght J (2021) Bayesian inference of root architectural model parameters from synthetic field data. Plant and Soil 467: 67-89. doi: 10.1007/s11104-021-05026-4.

Morandage S, Schnepf A, Leitner D, Javaux M, Vereecken H, Vanderborght J (2019) Parameter sensitivity analysis of a root system architecture model based on virtual field sampling. Plant and Soil 438: 101-126. doi: 10.1007/s11104-019-03993-3.

Morandage S, Schnepf A, Leitner D, Javaux M, Vereecken H, Vanderborght J (2022) Parameter sensitivity analysis of a root system architecture model based on virtual field sampling (vol 438, pg 101, 2019). Plant and Soil 477: 849-850. doi: 10.1007/s11104-021-05089-3.

Morandage S, Vanderborght J, Zorner M, Cai GC, Leitner D, Vereecken H, Schnepf A (2021) Root architecture development in stony soils. Vadose Zone Journal 20. doi: 10.1002/vzj2.20133.

Oburger E, Leitner D, Jones DL, Roose T, Schnepf A (2012) Response to N. J. Barrow by E. Oburger*, D. Leitner, D. L. Jones, T. Roose, A. Schnepf. European Journal of Soil Science 63: 528-530. doi: 10.1111/j.1365-2389.2012.01458.x.

Oburger E, Leitner D, Jones DL, Zygalakis KC, Schnepf A, Roose T (2011) Adsorption and desorption dynamics of citric acid anions in soil. European Journal of Soil Science 62: 733-742. doi: 10.1111/j.1365-2389.2011.01384.x.

Passot S, Couvreur V, Meunier F, Draye X, Javaux M, Leitner D, Pages L, Schnepf A, Vanderborght J, Lobet G (2019) Connecting the dots between computational tools to analyse soil-root water relations. Journal of Experimental Botany 70: 2345-2357. doi: 10.1093/jxb/ery361.

Phalempin M, Landl M, Wu GM, Schnepf A, Vetterlein D, Schluter S (2022) Maize root-induced biopores do not influence root growth of subsequently grown maize plants in well aerated, fertilized and repacked soil columns. Soil & Tillage Research 221. doi: 10.1016/j.still.2022.105398.

Puschenreiter M, Schnepf A, Millan IM, Fitz WJ, Horak O, Klepp J, Schrefl T, Lombi E, Wenzel WW (2005) Changes of Ni biogeochemistry in the rhizosphere of the hyperaccumulator Thlaspi goesingense. Plant and Soil 271: 205-218. doi: 10.1007/s11104-004-2387-5.

Roose T, Oswald SE, Schnepf A, Szegedi K, Nowack B (2007) Verification and intercomparison of reactive transport codes to describe root-uptake (vol 285, pg 305, 2007). Plant and Soil 301: 327-327. doi: 10.1007/s11104-007-9419-x.

Roose T, Schnepf A (2008) Mathematical models of plant-soil interaction. Philosophical Transactions of the Royal Society a-Mathematical Physical and Engineering Sciences 366: 4597-4611. doi: 10.1098/rsta.2008.0198.

Santner J, Kreuzeder A, Schnepf A, Wenzel WW (2015) Numerical Evaluation of Lateral Diffusion Inside Diffusive Gradients in Thin Films Samplers. Environmental Science & Technology 49: 6109-6116. doi: 10.1021/acs.est.5b00134.

Santner J, Zhang H, Leitner D, Schnepf A, Prohaska T, Puschenreiter M, Wenzel WW (2012) High-resolution chemical imaging of labile phosphorus in the rhizosphere of Brassica napus L. cultivars. Environmental and Experimental Botany 77: 219-226. doi: 10.1016/j.envexpbot.2011.11.026.

Schnepf A, Black CK, Couvreur V, Delory BM, Doussan C, Koch A, Koch T, Javaux M, Landl M, Leitner D, Lobet G, Mai TH, Meunier F, Petrich L, Postma JA, Priesack E, Schmidt V, Vanderborght J, Vereecken H, Weber M (2020) Call for Participation: Collaborative Benchmarking of Functional-Structural Root Architecture Models. The Case of Root Water Uptake. Frontiers in Plant Science 11. doi: 10.3389/fpls.2020.00316.

Schnepf A, Carminati A, Ahmed MA, Ani M, Benard P, Bentz J, Bonkowski M, Knott M, Diehl D, Duddek P, Kroner E, Javaux M, Landl M, Lehndorff E, Lippold E, Lieu A, Mueller CW, Oburger E, Otten W, Portell X, Phalempin M, Prechtel A, Schulz R, Vanderborght J, Vetterlein D (2022) Linking rhizosphere processes across scales: Opinion. Plant and Soil. doi: 10.1007/s11104-022-05306-7.

Schnepf A, He XH (2021) Rhizosphere 5-shining light on the world beneath our feet. Plant and Soil 461: 1-4. doi: 10.1007/s11104-021-04942-9.

Schnepf A, Himmelbauer M, Loiskandl W, Roose T (2005) Modelling the rhizosphere. Comparative Biochemistry and Physiology a-Molecular & Integrative Physiology 141: S222-S222.

Schnepf A, Huber K, Landl M, Meunier F, Petrich L, Schmidt V (2018) Statistical Characterization of the Root System Architecture Model CRootBox. Vadose Zone Journal 17. doi: 10.2136/vzj2017.12.0212.

Schnepf A, Jones D, Roose T (2011) Modelling Nutrient Uptake by Individual Hyphae of Arbuscular Mycorrhizal Fungi: Temporal and Spatial Scales for an Experimental Design. Bulletin of Mathematical Biology 73: 2175-2200. doi: 10.1007/s11538-010-9617-1.

Schnepf A, Leitner D (2008) FEM SIMULATION OF BELOW GROUND PROCESSES ON A 3-DIMENSIONAL ROOT SYSTEM GEOMETRY USING DISTMESH AND COMSOL MULTIPHYSICS. 18th Conference on Scientific Computing, Podbanske, SLOVAKIA.

Schnepf A, Leitner D, Bodner G, Javaux M (2022) Editorial: Benchmarking 3D-Models of Root Growth, Architecture and Functioning. Frontiers in Plant Science 13. doi: 10.3389/fpls.2022.902587.

Schnepf A, Leitner D, Klepsch S (2012) Modeling Phosphorus Uptake by a Growing and Exuding Root System. Vadose Zone Journal 11. doi: 10.2136/vzj2012.0001.

Schnepf A, Leitner D, Klepsch S, Pellerin S, Mollier A (2011) Modelling Phosphorus Dynamics in the Soil-Plant System. In: EK Bunemann, A Oberson, E Frossard (eds) Phosphorus in Action: Biological Processes in Soil Phosphorus Cycling.

Schnepf A, Leitner D, Landl M, Lobet G, Mai TH, Morandage S, Sheng C, Zorner M, Vanderborght J, Vereecken H (2018) CRootBox: a structural-functional modelling framework for root systems. Annals of Botany 121: 1033-1053. doi: 10.1093/aob/mcx221.

Schnepf A, Leitner D, Schweiger PF, Scholl P, Jansa J (2016) L-System model for the growth of arbuscular mycorrhizal fungi, both within and outside of their host roots. Journal of the Royal Society Interface 13. doi: 10.1098/rsif.2016.0129.

Schnepf A, Roose T (2006) Modelling the contribution of arbuscular mycorrhizal fungi to plant phosphate uptake. New Phytologist 171: 669-682. doi: 10.1111/j.1469-8137.2006.01771.x.

Schnepf A, Roose T, Schweiger P (2008) Growth model for arbuscular mycorrhizal fungi. Journal of the Royal Society Interface 5: 773-784. doi: 10.1098/rsif.2007.1250.

Schnepf A, Roose T, Schweiger P (2008) Impact of growth and uptake patterns of arbuscular mycorrhizal fungi on plant phosphorus uptake - a modelling study. Plant and Soil 312: 85-99. doi: 10.1007/s11104-008-9749-3.

Schnepf A, Scholl P, Bodner G, Leitner D (2012) MODELLING ROOT SYSTEM PHOSPHATE UPTAKE FROM A SOIL COLUMN AS AFFECTED BY ROOT EXUDATION. 19th Conference on Scientific Computing, Vysoke Tatry, SLOVAKIA.

Schnepf A, Schrefl T, Wenzel WW (2002) The suitability of pde-solvers in rhizosphere modeling, exemplified by three mechanistic rhizosphere models. Journal of Plant Nutrition and Soil Science 165: 713-718. doi: 10.1002/jpln.200290008.

Seidel SJ, Gaiser T, Srivastava AK, Leitner D, Schmittmann O, Athmann M, Kautz T, Guigue J, Ewert F, Schnepf A (2022) Simulating Root Growth as a Function of Soil Strength and Yield With a Field-Scale Crop Model Coupled With a 3D Architectural Root Model. Frontiers in Plant Science 13. doi: 10.3389/fpls.2022.865188.

Thonar C, Schnepf A, Frossard E, Roose T, Jansa J (2011) Traits related to differences in function among three arbuscular mycorrhizal fungi. Plant and Soil 339: 231-245. doi: 10.1007/s11104-010-0571-3.

Vanderborght J, Couvreur V, Meunier F, Schnepf A, Vereecken H, Bouda M, Javaux M (2021) From hydraulic root architecture models to macroscopic representations of root hydraulics in soil water flow and land surface models. Hydrology and Earth System Sciences 25: 4835-4860. doi: 10.5194/hess-25-4835-2021.

Vereecken H, Schnepf A, Hopmans JW, Javaux M, Or D, Roose DOT, Vanderborght J, Young MH, Amelung W, Aitkenhead M, Allison SD, Assouline S, Baveye P, Berli M, Bruggemann N, Finke P, Flury M, Gaiser T, Govers G, Ghezzehei T, Hallett P, Franssen HJH, Heppell J, Horn R, Huisman JA, Jacques D, Jonard F, Kollet S, Lafolie F, Lamorski K, Leitner D, McBratney A, Minasny B, Montzka C, Nowak W, Pachepsky Y, Padarian J, Romano N, Roth K, Rothfuss Y, Rowe EC, Schwen A, Simunek J, Tiktak A, Van Dam J, van der Zee S, Vogel HJ, Vrugt JA, Wohling T, Young IM (2016) Modeling Soil Processes: Review, Key Challenges, and New Perspectives. Vadose Zone Journal 15. doi: 10.2136/vzj2015.09.0131.

Vetterlein D, Carminati A, Schnepf A (2022) Special issue: Rhizosphere spatiotemporal organisation: an integrated approach linking above and belowground. Plant and Soil. doi: 10.1007/s11104-022-05716-7.

Wolff J, Hofmann D, Koch M, Bol R, Schnepf A, Amelung W (2020) Bioavailability and -accessibility of subsoil allocated P-33-labelled hydroxyapatite to wheat under different moisture supply. Scientific Reports 10. doi: 10.1038/s41598-020-74225-3.

Zhou XR, Lacointe A, Leitner D, Lobet G, Schnepf A, Vanderborght J, Vereecken H, Ieee (2018) Presentation of CPlantBox: a whole functional-structural plant model (root and shoot) coupled with a mechanistic resolution of carbon and water flows. 6th International Symposium on Plant Growth Modeling, Simulation, Visualization and Applications (PMA), Hefei, PEOPLES R CHINA.

Zhou XR, Schnepf A, Vanderborght J, Leitner D, Lacointe A, Vereecken H, Lobet G (2020) CPlantBox, a whole-plant modelling framework for the simulation of water- and carbon-related processes. In Silico Plants 2. doi: 10.1093/insilicoplants/diaa001.

Zhuang LY, Schnepf A, Unger K, Liang ZY, Bol R (2022) Home-Field Advantage of Litter Decomposition Faded 8 Years after Spruce Forest Clearcutting in Western Germany. Soil Systems 6. doi: 10.3390/soilsystems6010026.