

## I. Education

1992-1997

UNIVERSITEIT VAN AMSTERDAM (UVA), THE NETHERLANDS.

M.S. in Physical Geography (Faculty of Science)

*Major Field:* Soil Physics and Soil Chemistry

*Major Professor:* W. Bouten

*co-Major Professor:* T.J. Heimovaara

*Master's thesis:* "Frequency dependent dielectric permittivity of soils measured with time domain reflectometry"

1998-2002

UNIVERSITEIT VAN AMSTERDAM (UVA), THE NETHERLANDS.

Ph.D. in Soil Physics and Soil Chemistry (Faculty of Science)

*Major Professor:* W. Bouten

*co-Major Professors:* J.M. Verstraten and G.B.M. Heuvelink

*Dissertation:* "Measuring soil water content with time domain reflectometry and ground penetrating radar: accuracy, reproducibility and feasibility"

## II. Professional Experience

1995-1997

UNIVERSITEIT VAN AMSTERDAM (UVA), THE NETHERLANDS.

*Research Assistant:* Responsibilities included inverse modelling of root density profiles from water content and pressure head measurements, analysis of throughfall measurements to establish water budgets of forests.

1998-2002

UNIVERSITEIT VAN AMSTERDAM (UVA), THE NETHERLANDS.

*Ph.D. researcher:* Responsibilities included assessment of accuracy, reproducibility and feasibility of meso-scale ground penetrating radar measurements of soil water content and modelling of time domain reflectometry wave propagation.

2002-2005

JUSTUS-LIEBIG-UNIVERSITY GIESSEN, GERMANY

*Postdoctoral Researcher:* Responsibilities included modelling the effects of land use change on hydrological and biogeochemical fluxes with the Soil Water Assessment Tool (SWAT) model, automatic calibration and uncertainty assessment of distributed hydrological models and methods for improved validation of hydrological models.

2005-2007

FORSCHUNGSZENTRUM JÜLICH, GERMANY

*Postdoctoral Researcher:* Responsibility focused on the use of non-invasive (hydrogeophysical) measurement techniques to determine effective fluxes of CO<sub>2</sub> and H<sub>2</sub>O.

2007-2010

FORSCHUNGSZENTRUM JÜLICH, GERMANY

*DFG Project Leader:* Leader of research group consisting of 1 postdoctoral researcher, 1 PhD student and 1 scientific programmer focussing on the quantitative integration of non-invasive (hydrogeophysical) measurement techniques in field-scale hydrological models.

2010-now

FORSCHUNGSZENTRUM JÜLICH, GERMANY

*Senior Researcher:* Leader of a research group consisting of 4 PhD students focussing on the development and application of electrical hydrogeophysical measurement methods for the improved characterisation, modeling and monitoring of terrestrial hydrosystems.

2012-now

UNIVERSITY OF STUTTGART, GERMANY

*Professor:* Appointed as professor for hydrogeophysics (Jülich Model) in the faculty of Civil and Environmental Engineering, Institute for Modelling Hydraulic and Environmental Systems.

### III. Teaching Contributions

#### Courses Taught

- Measurements in the water cycle at the University of Stuttgart (2013 – now)
- Contaminated site remediation and investigation technologies at the University of Stuttgart (2013-now)
- Fundamentals of Soil Physics, co-teacher at the University of Bonn (2006-2012)
- Soil and Groundwater Hydrology, co-teacher at the University of Bonn (2006-2012)
- Bayesian Inverse Modelling and Data Assimilation Methods in Earth and Environmental Science, co-teacher of this week long short course. Once a year, at a different university in Europe (2008-2012)
- TDR master class for Ph.D. students at the Université Catholique de Louvain (2007)
- SWAT Beginners Summer School, co-teacher at the University Giessen (2004)
- SWAT Advanced Summer School, teacher at the University Giessen (2004)
- Geoinformatics, co-teacher at the Justus-Liebig-University Giessen (2003-2004)
- Geostatistics one-week short course, teacher at the University Giessen (2004)
- Soil Chemistry, assistant teacher at the Universiteit van Amsterdam (1998-2002)
- Soil Physics, assistant teacher at the Universiteit van Amsterdam (1998-2002)

#### Student Advising Activities

*Ph.D. students (\* indicates main advisor, otherwise co-adviser)*

Sadam Al-Hazaimay\* (graduated in 2015 from RWTH Aachen). Using the anisotropy of electrical properties for the characterization of sedimentological structures and preferential flow processes.

Jana Bauer (graduated in 2009 from University of Bonn). Temperature and moisture sensitivity of heterotrophic soil respiration.

Michel Bechtold (graduated in 2011 from University of Bonn). Solute transport in unsaturated heterogeneous porous media during upward flow conditions.

Katrin Breede\* (graduated in 2012 from University of Bonn). Relationship between spectral induced polarization and hydraulic parameters for sand-clay mixtures.

Cosimo Brogi\* (expected graduation in 2018 from the University of Stuttgart, Germany). Use of geophysical data to improve subsurface conceptualization and parameterization in soil-vegetation-atmosphere models.

Miltin Cho Mboh\* (graduated in 2012 from University of Bonn). Coupled hydrogeophysical inversion for soil hydraulic property estimation from time-lapse geophysical data.

Holger Fröhlich (graduated in 2008 from the JLU Giessen). Using geogenic tracers to identify spatial water source areas at the regional scale.

- Zhan Gao (expected graduation in 2017 from the University of Stuttgart). Non-invasive characterization of biochar in unsaturated soil.
- Mirco Grimm (graduated in 2008 from the JLU Giessen, Germany). Modelling of agricultural measures for the mitigation of nitrate leaching in the water protection area Getelo-Itterbeck in Lower Saxony - Germany.
- Matthias Kelter\* (expected graduation in 2016 from the University of Stuttgart, Germany). Inverse modelling of soil hydraulic property patterns from non-invasive electrical measurements.
- Sebastian Krahe (graduated in 2005 from the JLU Giessen, Germany). The fate of the endocrine disruptor Nonylphenol in terrestrial ecosystems for potential uptake of plants.
- Shirin Moradi\* (expected graduation in 2018 from the University of Stuttgart, Germany). Integrating geophysical and wireless sensor network data from landslide-prone hillslopes in hydromechanical models.
- Thorsten Pohlert (graduated in 2006 from the JLU Giessen). Modelling of nitrogen balance for water-protection of meso-scale river catchments.
- Wei Qu (graduated in 2015 from the University of Bonn). Characterization of soil water content variability at the catchment scale using sensor network and stochastic modelling.
- Stefan Reichenberger (graduated in 2006 from the JLU Giessen). Field-scale risk assessment for diffuse-source pesticide inputs into German surface waters.
- Ulrike Rosenbaum (graduated in 2011 from the University of Bonn). Analysis of spatial soil moisture dynamics using wireless sensor networks.
- Katrin Schneider (graduated in 2008 from the JLU Giessen). Water fluxes on different spatial and temporal scales in a semi-arid steppe environment: experimental and modelling approaches.
- Enrique Torres (graduated in 2009 from the University of Castilla - La Manca, Spain). Modeling bare soil evaporation with HYDRUS-1D and FAO56.
- Andrea Treichel\* (expected graduation in 2016 from the University of Bonn). Field evaluation of electrical impedance tomography.
- Inge Wiekenkamp\* (expected graduation in 2016 from the University of Stuttgart). Monitoring and modelling the impact of land use change on hydrological fluxes in the Wüstebach catchment.
- Yulong Zhao (expected graduation in 2016 from the University of Bonn). Correction procedures for accurate field electrical impedance tomography measurements.

*M.Sc. students (\* indicates main advisor, otherwise co-advisor)*

- Nele van Gaelen\* (graduated from K.U. Leuven in 2009). Use of electrical resistivity measurements to improve identification of hydraulic parameters in a well permeameter experiment.
- Mark van der Gulik\* (graduated from the University of Amsterdam in 2001). The soil depth that influences the ground wave of ground penetrating radar.
- Helene Husser (graduated from the Philipps-Universität Marburg, Germany in 2004). GIS-based modelling of diffuse pesticide loads in the Zwesten Ohm with the SWAT model.
- Songlin Lu (graduated from University of Stuttgart in 2014). Investigation of the factors influencing the degradation of sulfadiazine in variably saturated soils.
- Jie Mao\* (graduated from University of Stuttgart in 2017). Determination of soil moisture from gamma radiation monitoring networks.
- Behzad Mohebbi (graduated from University of Stuttgart in 2017). Evaluation of profile NMR-MOUSE measurements for quantification of liquids inside porous materials.
- Shirin Moradi\* (graduated from University of Stuttgart in 2015). Geo-electrical characterization of goethite nanoparticles.

Amirpasha Mozaffari\* (graduated from University of Stuttgart in 2015). Effect of borehole design on cross-borehole electrical impedance tomography (EIT) measurements.

Inge Wiekenkamp\* (graduated from University of Amsterdam in 2013). Possibilities and limitations of using global search algorithms for Electrical Resistivity Tomography (ERT) inversion.

*B.Sc. students (\* indicates main advisor, otherwise co-adviser)*

Thomas Keller (graduated from the JLU Giessen, Germany in 2005). Impact of a conversion from cropland to grassland on C and N storage and related soil properties: analysis of a 60-year chronosequence.

Francois Lavoue (internship Forschungszentrum Jülich in 2009). Electromagnetic induction calibration using apparent electrical conductivity modelling based on electrical resistivity tomography.

## IV. Research Contributions

### Grant Awards

Bouten, W and J.A. Huisman. 1998. Linking spatio-temporal dynamics of soil water content at different scales by combining ground penetrating radar and time domain reflectometry. Ph.D. grant of the Netherlands Organization for Scientific Research (NWO). €150,000.

Huisman, J.A. 1999. Travel Grant Netherlands Organization for Scientific Research (NWO) to visit SSSA annual meeting in Salt Lake City, UT. €750.

Breuer, L and J.A. Huisman. 2003. Tracer studies in the meso-scale Dill catchment. Young Scientists Grant of the Justus-Liebig University Giessen. €5,000.

Huisman, J.A. 2007. An integrated data fusion approach to use geophysical measurements in hydrological models. Deutsche Forschungsgemeinschaft (DFG). €450,000.

Huisman, J.A. and A. Furman. 2009. Advanced inversion in hydrogeophysics. Umbrella cooperation program. €10,000.

Kemna, A., J.A. Huisman, E. Zimmermann and T. Fechner. 2010. 4D Spectral Electrical Impedance Tomography (EIT) - a diagnostic imaging tool for the characterization of subsurface structures and processes. Geotechnology program of the Bundesministerium für Bildung und Forschung (BMBF). €560,000.

Kemna, A., and J.A. Huisman. 2010. Inverse modelling of soil hydraulic property patterns from non-invasive electrical measurements. Subproject A3 of SFB-TR32: Patterns in soil-vegetation-atmosphere systems: monitoring, modelling and data assimilation. €465,200.

Breuer, L., and J.A. Huisman. 2014. Monitoring and modeling of water and related nutrient fluxes in rice-based cropping systems. Subproject SP7 of Research Unit FOR 1701: Introducing non-flooded crops in rice-dominated landscapes: Impact on carbon, nitrogen, and water cycles. €34,800.

van der Kruk, J. A. Kemna, J.A. Huisman. 2014. Geophysical characterization of patterns in functional and structural soil properties and processes. Subproject B6 of SFB-TR32: Patterns in soil-vegetation-atmosphere systems: monitoring, modelling and data assimilation. €563,500.

Huisman, J.A., A. Kemna, M. Schiek, H. Boga, E. Zimmermann, H. Class, R. Kunkel. 2015. Characterization, monitoring and modelling of landslide-prone hillslopes (CMM-SLIDE) –Towards improved early warning of slope instability using near real-time monitoring with geophysical and wireless sensor network data and physically-based hydromechanical models. BMBF proposal in framework of the Geotechnologien program. €763,000.

Huisman, J.A. 2015. Geo-electrical characterization of low pH concrete. Research funded within the project CEBEMA: Cement-based materials, properties, evolution, barrier functions within the Horizon2020 program of the European Union. €15,000.

### **Awards and Recognition**

Editors Citation for excellence in reviewing from Vadose Zone Journal (2003)

Editors Citation for excellence in reviewing from Soil Science Society of America Journal (2004).

S1-Early Career Award for excellence in research from the soil physics section of the Soil Science Society of America (2006).

Editors Citations for excellence in reviewing from IEEE Transactions on Instrumentation & Measurement (2010).

### **Committee Assignments**

American Geophysical Union: Hydrogeophysics Technical Committee (2010-now).

Early Career Award committee of the Soil Physics section of the Soil Science Society of America (2015-2018)

European Geophysical Union: Unsaturated Zone Committee (2009-now).

### **External PhD Examiner**

Julien Minet (Université catholique de Louvain, Belgium), High-resolution soil moisture mapping by a proximal ground penetrating radar, 2011.

Bartel van Nieuwenhuysse (Katholieke Universiteit Leuven, Belgium), Measuring and modelling hydrological surface connectivity, 2012.

Vicente David Vasquez (University of Aarhus, Denmark), Profile soil water content measurements for estimation of groundwater recharge in different land uses, 2013.

Uwe Niethammer (University of Stuttgart), UAV-basierte Fernerkundungsmethoden der Aerogeophysik für die hochauflösende Beobachtung von alpinen Rutschhängen, 2013.

## **V. Contributions to the Profession**

### **Membership in professional societies**

American Geophysical Union

Deutsche Bodenkundliche Gesellschaft

European Association of Geoscientists and Engineers

European Geosciences Union

Soil Science Society of America

Society of Exploration Geophysicists

### **Editorial activities**

Associate Editor of Water Resources Research (2014 – now)

Associate Editor of Journal of Hydrology (2-year term, 2014 – 2015)

**Manuscripts and Proposals Reviewed**

*Reviewed over 100 manuscripts* for Advances in Water Resources, Canadian Geotechnical Journal, Catena, European Journal of Soil Science, Geophysical Research Letters, Geophysics, Geophysical Journal International, Geophysical Prospecting, Geotechnical Testing Journal, Hydrogeology Journal, Hydrological Processes, Hydrological Sciences Journal, Hydrology and Earth System Sciences, Inverse Problems in Science and Engineering, IEEE Transactions on Instrumentation & Measurement, IEEE Transactions on Microwave Theory and Techniques, Journal of Applied Geophysics, Journal of Geophysical Research, Journal of Hydrology, Journal of Plant Nutrition and Soil Science, Measurement Science and Technology, Near Surface Geophysics, Soil Science Society of America Journal, Vadose Zone Journal, Water Research and Water Resources Research.

*Reviewed over 15 research proposals* for the German Science Foundation (DFG), Swiss National Science Foundation (SNF), US – Israel Binational Science Foundation (BSF), US Department of Agriculture (USDA), US Army Research Office (ARO) and the US Department of Energy (DOE).