

Guy Serbin

CURRICULUM VITAE

Birthdate: 17 January 1972
Birthplace: Philadelphia, PA, USA
Citizenship: USA, Israel
Current Position: Crop Condition Analyst
Employer: InuTeq LLC
Date of hire: 17 February 2009
Work address: USDA/FAS/OGA/IPAD, 1400 Independence Ave. SW, Rm. 4646 South Building, Washington, DC 20250 USA
Mailing address: P.O. Box 2893, Silver Spring, MD 20915 USA
Work phone: +1 (202) 720-0143
Cellphone: +1 (401) 207-5041
Email: *guy.serbin@gmail.com*

Career objective:

To obtain positions in teaching, research, and environmental consulting that are related to my areas of expertise.

Education:

- High school diploma, American program at the Agricultural High School in Pardes Hanna, Israel, 1990.
- IDF Military Service (1990-1993) at the Israeli Army Radio Station (Galei Tzahal) (1991-1993).
- Bachelors of Science in Geology and Mineralogy, Ben Gurion University of the Negev, 1996.
- Masters of Science in Geological and Environmental Sciences, Ben Gurion University of the Negev, 2001.
- Ph.D. in Soil Science (Soil Physics), Dept. of Plants, Soils and Biometeorology, Utah State University, 2005.

M.Sc. thesis: Microwave thermodielectric behavior of soil-water mixtures and their potential effects on radar backscatter, 138 pp., 2001.

Project supervisors: Dr. Dan Blumberg and Prof. Jiftah Ben-Asher (in conjunction with Dr. Dani Or of the Department of Plants, Soils and Biometeorology at Utah State University.)

Ph.D. dissertation: Ground-penetrating radar measurement of near-surface hydrologic processes, 313 pp., 2004.

Graduate committee: Dr. Dani Or, Dr. Robert Gillies, Dr. Lynn Dudley, and Dr. Philip Rasmussen of the Department of Plants, Soils and Biometeorology at Utah State

University and Dr. Cynthia Furse of the Dept. of Electrical Engineering and Computer Sciences at the University of Utah.

Focus of research

- Development and evaluation of methodologies for measurement of soil water content and wheat canopy parameters via the use of a manufactured GPR system utilizing horn antennas.
- Evaluation of the accuracy of such systems and development of calibration methods for such devices.
- Measurement of bare-soil wetting-drying cycles over different soil types and determination of the influence of diurnal temperature effects.
- Study of the effects of wheat canopy on radar backscatter.
- Development of the small-scale physics to support modeling and measurements for the previous research.

Research related experience:

Journal papers

- Serbin, G., Or, D., and Blumberg, D.G., 2001. Thermodielectric effects on radar backscattering from wet soils. *IEEE Transactions on Geoscience and Remote Sensing*, 39(4): 897-901.
- Serbin, G., and Or, D., 2003. Near-surface soil water content measurements using horn antenna radar - Methodology and overview, *Vadose Zone Journal*, 2, 500-510.
- Serbin, G. and Or, D., 2004. Ground-penetrating radar measurement of soil water content dynamics using a suspended horn antenna. *IEEE Transactions on Geoscience and Remote Sensing*, 42(8): 1695-1705.
- Serbin, G. and Or, D., 2005. Radar measurement of wheat canopy and underlying surface water content dynamics. *Remote Sensing of Environment*, 96, 119-134.
- Serbin, G., Daughtry, C.S.T., Hunt, E.R., Jr., Reeves, J.B., III, & Brown, D.J., 2009. Effects of soil composition and mineralogy on remote sensing of crop residue cover. *Remote Sensing of Environment*, 113, 224-238.
- Serbin, G., Daughtry, C.S.T., Hunt, E.R., Jr., and Brown, D.J., 2009. Effect of soil spectral properties on remote sensing of crop residue cover. *Soil Science Society of America Journal*, 73(5), 1545-1558.
- Serbin, G., Hunt, E.R., Jr., Daughtry, C.S.T., McCarty, G.W., and Doraiswamy, P.C. 2009. An improved ASTER index for remote sensing of crop residue. *Remote Sensing*, 1(4), 971-991.
- Daughtry, C.S.T., Serbin, G., Reeves, J.B., III, Doraiswamy, P.C., and Hunt, E.R., Jr. 2010. Effects of decomposition on remotely sensed estimates of wheat residue cover, *Remote Sensing*, 2(2), 416-431.
- Serbin, G., Daughtry, C.S.T., Hunt, E.R., Jr., and Brown, D.J., McCarty, G.W., Doraiswamy, P.C. (in preparation). Assessment of spectral indices for crop residue cover Estimation. (journal to be determined).

Published conference proceedings

- Serbin, G., Or, D., and Blumberg, D.G., 2000. Thermodielectric behavior of soil-water mixtures and potential effects on microwave remote sensing. *Fall 2000 American Geophysical Union Meeting*, San Francisco. (Poster presentation)
- Serbin, G., Or, D., and Furse, C., 2001. Radar Backscatter from Layered Wet Soils with a Diurnal Temperature Wave. *7th Annual Rocky Mountain NASA Space Grant Consortium Fellowship Symposium*. University of Utah, Salt Lake City, UT, May 8, 2001. 8 pp.
- Serbin, G. and Or, D., 2002. Diurnal measurements of near-surface water content using ground penetrating radar (GPR). *8th Annual Rocky Mountain NASA Space Grant Consortium Fellowship Symposium*. University of Utah, Salt Lake City, UT, May 8, 2002. 8 pp.
- Serbin G. and Or, D., 2002. Radar measurement of water content dynamics over bare and vegetated soil surfaces. *Fall 2002 American Geophysical Union Meeting*, San Francisco. (Poster presentation)
- Serbin, G., Or, D., and Rasmussen, V.P., 2003. Radar measurement of surface water content dynamics under wheat canopy. *9th Annual Rocky Mountain NASA Space Grant Consortium Fellowship Symposium*. University of Utah, Salt Lake City, UT, May 5, 2003. 8 pp.
- Serbin, G., Or, D., and Rasmussen, V.P., 2004. Horn antenna GPR measurement of crop canopy biophysical and near-surface hydrologic parameters. *AGU-CGU-SEG-EEGS Joint Congress*, Montreal, Canada, May 17-21, 2004. (Oral presentation)
- Or, D., Wraith, J.M., Serbin, G., Chen, Y., and Jones, S.B., 2004. Bound water and thermodielectric phenomena affecting soil water content measurement using time domain reflectometry and radar remote sensing. *AGU- CGU-SEG-EEGS Joint Congress*, Montreal, Canada, May 17-21, 2004. (Oral presentation)
- Serbin, G., Revivo, G., and Blumberg, D.G., 2004. Comparison of synthetic aperture radar (SAR) data with NOAA AVHRR derived NDVI in the Gaza-Negev-Sinai border regions. *AAAS Pacific Division 85th Annual Meeting*, Utah State University, Logan, UT, June 13 - 17, 2004. (Oral presentation)
- Serbin, G., and Or, D., 2004. GPR measurement of crop canopies and soil water dynamics-implications for radar remote sensing. *Tenth International Conference on Ground Penetrating Radar*, Delft, the Netherlands, June 21-24, 2004, pp. 497-500.
- Serbin, G. and Or, D. 2005. GPR measurement of crop canopies and soil water dynamics- Implications for radar remote sensing. *VIIth IAHS Scientific Assembly: Freshwater: Sustainability within Uncertainty*, Foz do Iguacu, Paraná, Brazil. (Poster and oral presentations).
- Serbin, G., Or, D., and Rasmussen, V.P. 2005. Frequency- and time-domain measurement of bare soils and wheat canopy using monostatic horn antenna GPR - Implications and applications for radar remote sensing. *AGU, SEG, NABS and SPD/AAS Joint 2005 Assembly*, New Orleans, May 23-27, 2005.
- Serbin, G., Daughtry, C.S.T., Hunt, E.R., Jr., Doraiswamy, P.C., and Brown, D.J. 2007. Evaluation of the Cellulose Absorption Index (CAI) for estimation of crop residue cover and soil carbon. *The Fourth USDA Greenhouse Gas Conference*, Baltimore, MD, February 6-8, 2007. (Poster presentation)
- Serbin, G., Daughtry, C.S.T., Hunt, E.R., Jr., Doraiswamy, P.C., and Brown, D.J. 2007. Hyperspectral remote sensing estimation of crop residue cover: Soil mineralogy, surface

- conditions, and their effects. *Soil and Water Conservation Society 2007 Annual Conference*, Tampa, FL, July 21-25, 2007. (Poster presentation)
- Serbin, G., Daughtry, C.S.T., Hunt, E.R., Jr., Doraiswamy, P.C., McCarty, G.W., and Brown, D.J. 2007. Improved remote crop residue cover estimation by incorporation of soil and residue information. *ASA-CSSA-SSSA 2007 International Annual Meetings*, New Orleans, LA, November 4-8, 2007. (Poster presentation)
 - Serbin, G., Daughtry, C.S.T., Hunt, E.R., Jr., McCarty, G.W., Doraiswamy, P.C., and Brown, D.J. 2008. Improved remotely-sensed estimates of crop residue cover by incorporating soils information. *2008 IEEE International Geoscience & Remote Sensing Symposium IGARSS'08*, Boston, MA, July 6-11, 2008.
 - Serbin, G., Daughtry, C.S.T., Hunt, E.R., Jr., McCarty, G.W., Doraiswamy, P.C., and Brown, D.J. 2008. Improvement of Remote Sensing of Crop Residue Cover by Accounting for Green Vegetation and Soil Spectral Properties. *ASA-CSSA-SSSA 2008 Joint Annual Meetings*, Houston, TX, October 5-9, 2008. (Poster presentation)
 - Serbin, G., Hunt, E.R., Jr., and Daughtry, C.S.T. 2008. Remote sensing crop residue cover. *Integrating ResourceSat-LISS and AWiFS Data into Multi-Sensor Solutions Seminar*, Greenbelt, MD, October 2008.
 - Serbin, G., Hunt, E.R., Jr., and Daughtry, C.S.T. 2009. Accounting for Green Vegetation and Soil Spectral Properties Improves Remote Sensing of Crop Residue Cover. *ASPRS Annual Conference*, Baltimore, MD, March 9-13, 2009.
 - Serbin, G. Hunt, E.R., Jr., Daughtry, C.S.T., McCarty, G.W., Brown, D.J., and Doraiswamy, P.C. 2009. Effect of water content and organic carbon on remote sensing of crop residue cover. *2009 European Geosciences Union General Assembly*, Vienna, Austria, April 19-24, 2009. (Poster presentation)
 - Serbin, G., Hunt, E.R., Jr., Daughtry, C.S.T., Anderson, M.C., Doraiswamy, P.C., McCarty, G.W., Reeves, J.B., III, and Brown, D.J. 2009. Sensor Needs for Agricultural and Carbon Management. *NASA/JPL Soil Carbon Meeting*, Pasadena, CA, May 26-28, 2009.
 - Serbin, G., Hunt, E.R., Jr., Daughtry, C.S.T., McCarty, G.W., and Doraiswamy, P.C. 2009. Evaluation of ASTER remote sensing indices for estimation of crop residue. *Soil and Water Conservation Society 2009 Annual Meeting*, Dearborn, MI, July 12-14, 2009.
 - West, T., Bandaru, V., Serbin, G., Hunt, E.R., Jr., Daughtry, C.S.T., Anderson, M., and Izaurralde, C. 2009. Using Earth Observations for Ecological Research: Experiences, Challenges, and Future Directions for Agricultural Applications. *2009 IEEE International Geoscience & Remote Sensing Symposium*, Cape Town, South Africa, July 12-17, 2009.
 - Daughtry, C.S.T., Serbin, G., Reeves, J.B., III, Doraiswamy, P.C. and Hunt, E.R., Jr. 2009. Wheat straw composition and spectral reflectance changes during decomposition. *IEEE Whispers First Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing*, Grenoble, France. August 26-28, 2009.
 - Serbin, G., Hunt, E.R., Jr., Daughtry, C.S.T., Brown, D.J., McCarty, G.W., and Doraiswamy, P.C. 2009. Sensor Needs for Effective Measurement of Non-Photosynthetic Vegetation. *Fall 2009 American Geophysical Union Meeting*, San Francisco. December 14–18, 2009. (Poster presentation)
 - Serbin, G., Fortier, J.P., Nawrocki, T.B., and Ludlow, C.D. 2010. Remote Sensing Grain Crops with ENVI. *VISualize 2010: The Data Analysis and Visualization Symposium*, Washington, DC. May 20, 2010.

- Serbin, G., Hunt, E.R., Jr., Daughtry, C.S.T., Brown, D.J., McCarty, G.W., and Doraiswamy, P.C. 2010. Assessment of Spectral Indices for Crop Residue Cover Estimation. *2010 IEEE International Geoscience & Remote Sensing Symposium (IGARSS) 2010*, Honolulu, HI. July 23-31, 2010.
- Serbin, G., Hunt, E.R., Jr., Daughtry, C.S.T., Anderson, M.C. 2011. Advanced Multispectral Sensor Requirements for Remote Sensing of Agriculture and Land Cover. *10th Annual Joint Agency Commercial Imagery Evaluation (JACIE 2011) Workshop*, Boulder, CO, March 29-31, 2011.
- Serbin, G., Hunt E.R., Jr., Brown, D.J., Izaurrealde, R.C., Paustian, K.H, West, T.O., McNairn, H.E., Schumaker, B.L., Rice, C.W., Green, R.O. 2011. Remote Sensing and Modeling of Agricultural Greenhouse Gas Fluxes. *2011 HypsIRI Science Symposium*, Greenbelt, MD, May 17-18, 2011.
- Serbin, G., Hunt E.R., Jr., Brown, D.J., Izaurrealde, R.C., Paustian, K.H, West, T.O., McNairn, H.E., Schumaker, B.L., Rice, C.W., Green, R.O. 2011. Monitoring Agricultural Greenhouse Gas Flux Determination with Remote Sensing. *2011 HypsIRI Science Workshop*, Washington, DC, August 23-25, 2011.
- Serbin, G., Hunt, E.R., Jr., Daughtry, C.S.T., Anderson, M.C., 2011. Agricultural and Land Cover Remote Sensing Requirements for Medium Resolution Advanced Multispectral Sensors. *18th William T. Pecora Memorial Remote Sensing Symposium*, Herndon, VA, Nov. 14-17, 2011.

Book Sections

- Serbin, G. and Or, D., 2006. Frequency-domain analyses of GPR waveforms: Enhancing near-surface observational capabilities. *In: Predictions in Ungauged Basins: Promises and Progress* (Proceedings of symposium S7 held during the Seventh IAHS Scientific Assembly at Foz do Iguaçu, Brazil, April 2005). M. Sivapalan et al., Eds. IAHS Publ. 303, Wallingford, UK. p. 274-285.
- Daughtry, C.S.T., Hunt, E.R., Jr., Beeson, P.C., Lang, M.W., Serbin, G., Alfieri, J.G., McCarty, G.W., Sadeghi, A.M., (in press). Remote Sensing of Soil Carbon and Greenhouse Gas Dynamics Across Agricultural Landscapes. *In: Managing Agricultural Greenhouse Gases: Coordinated Agricultural Research Through GRACEnet to Address Our Changing Climate*. M. Liebig, A.J. Franzluebbers, R.F. Follett, Eds.

Awards

- Third place best poster award, 2008 BARC Poster Day, April, 2008.

Professional society memberships

- American Geophysical Union
- American Society for Photogrammetry and Remote Sensing
- IEEE Geoscience and Remote Sensing Society
- Society of Exploration Geophysicists
- Soil and Water Conservation Society
- Soil Science Society of America

Grants and fellowships

- Rocky Mountain NASA Space Grant Consortium graduate research fellowship, 09/2000-07/2003.
- Grant Proposal Writing Competition - \$500. Provided by the Graduate Student Senate, Utah State University, 2004.
- Travel Grant to *VIIth IAHS Scientific Assembly* in Foz do Iguacu, Brazil - \$1,200. Provided by the American Geophysical Union and National Science Foundation, 2005.
- Travel Grant to *AGU, SEG, NABS and SPD/AAS Joint 2005 Assembly*, New Orleans, May 23-27, 2005. - \$300. Provided by the Graduate Student Senate, Utah State University, 2005.
- 50 TerraSAR-X products for proposal LAN0147 titled “Tree Species Classification Using X-Band Radar” by German Space Agency DLR, 2005.

Technical/ scientific reviewing

Peer-reviewed journals

- Agronomy Journal
- Geoderma
- IEEE Transactions on Geoscience and Remote Sensing
- International Journal of Photogrammetry and Remote Sensing
- Journal of Environmental Management
- Journal of Hydrology
- Remote Sensing of Environment
- Sensors
- Soil Science
- Soil Science Society of America
- Vadose Zone Journal
- Water, Air, & Soil Pollution

Research grant proposals

- Belgian Earth Observation Programme of the Belgian Science Policy Office

Current and previous employment/ positions

Current position

- Crop Production Analyst, ASRC Federal (ASRC Management Services, ASRC Research and Technological Solutions, and InuTeq, LLC), Washington, DC, USA. This position entailed grain crop production analysis utilizing remote sensing imagery and agrometeorological data, and remote sensing map product development for the International Production Assessment Division of the Office of Global Analysis of the U.S. Department of Agriculture’s Foreign Agricultural Service. Furthermore, I conducted research on remote sensing of crop residue cover, soil carbon, and crop yield estimation (02/2009 – present).

Research positions

- Research Soil Scientist, USDA/ARS Hydrology and Remote Sensing Laboratory, Beltsville, MD, USA. The position was a postdoctoral research position, and included research on remote sensing of crop residue cover and soil carbon (09/2006 – 02/2009).

Teaching experience

Geology Dept., Ben Gurion University

- Teaching assistant in course "Introduction to Microcomputers", a basic level course on how to use a PC (covered Microsoft Windows 95 operating system, Microsoft Office, internet use, scanning, printing, peer-to-peer LAN usage, etc.).
- Teaching assistant in course "Image Processing Techniques in Remote Sensing". The course covered basic optical satellite systems (Landsat, SPOT, NOAA AVHRR), GIS data formats, LUT functions, filters, atmospheric correction, modeling, supervised and unsupervised classification, geometric correction, and map generation in ERDAS Imagine 8.3.1.

Dept. of Plants, Soils and Biometeorology, Utah State University

- Teaching assistant in course "Environmental and Agricultural Soil Physics (SOIL 5650/6650)", a graduate level course dealing with physical soil-water interactions, saturated and unsaturated hydraulic conductivity, infiltration, soil temperature, radiation balance, mass transport in soils. As part of my teaching experience I lectured and demonstrated to students on the use of time domain reflectometry (TDR) and ground-penetrating radar (GPR) for soil water content and electrical conductivity measurements.

Visiting Lecturer, Dept. of Geosciences, University of Rhode Island (Fall 2005- Spring 2006)

- Environmental Geology (GEO 100). Spring 2006, 1 section primary lecturer, 2 sections substitute lecturer for 1 month. Geologic processes, how they affect people and vice versa; geologic hazards, earthquake impact, shoreline development, offshore oil, waste disposal, water, energy and other resources, climate change.
- Understanding the Earth (GEO 103). Fall 2005, Spring 2006, primary lecturer for two sections. Course description: Processes operating within and upon the earth. Relationship of plate tectonics to volcanism, earthquakes, and mountain building. Development and modification of landscapes by rivers, glaciers, wind, waves, and ground water. Environmental implications of geologic processes.
- Senior/ Graduate Special Topics in Environmental Soil Science/ Vadose Zone Hydrology (GEO 591). Fall 2005, primary lecturer. Course description: Advanced research and presentation work in environmental soil science/ vadose zone hydrology under the supervision of the instructor, and is designed to suit the individual requirements of the student.

Additional positions

- BGU Geology dept. web site administrator (10/1995-9/1999)
- The BGU Earth and Planetary Imaging Facility (EPIF) web site administrator (8/1996-9/1998)
- BGU Geology dept. computer lab administrator (10/1996-9/98, 4-9/1999). The position entailed installation and maintenance of a computer lab, and technical support for the department, faculty, and students. I installed, configured, and maintained computers running Windows 95/98/NT (Workstation and Server 4.0), MS Office 95/97, ERDAS Imagine, McAfee Antivirus, web browsing software, etc., accessory hardware such as printers,

scanners, Iomega Zip and Jaz drives, a digitizing tablet, and microscope video camera, and set up sharing for network resources with users and user groups.

- Visiting Research Scientist, Soil Physics Lab, Utah State University. (11/1998-03/1999) This position entailed measurement of soil/water dielectric constants as a function of temperature, under the supervision of Dr. Dani Or. As part of my tasks I operated a network analyzer to obtain dielectric spectra of soil-water mixtures in a temperature-controlled environment. I also had to process TDR waveforms in order extract S_{11} parameters for determination of dielectric permittivity.
- Network Administrator, working for a company named 2001 Computing Services, Herzliya, Israel and contracted out to various departments of the Israeli Ministry of Justice in Jerusalem (11/99- 05/00). Position entailed maintenance of several Windows NT servers as well as numerous workstations running Windows 95, MS Office 97, various Israeli legal software packages, and user technical support.

Skills:

Spoken languages: English (mother tongue) and Hebrew fluently; I can read and understand some Spanish and Arabic.

Computer skills

Operating systems: I have installed and maintained computers running MS-DOS 5.0 and higher, Microsoft Windows 3.1x/ 9x/ NT 4.0 (Workstation and Server)/ 2000/ XP/ Vista/ 7, Linux (Red Hat, Fedora, SuSE, etc.), and IBM OS/2 2.1 and 3.0. These included dual or triple boot configurations on the same machine. I am also capable of working with Apple Mac OS and UNIX operating systems.

Network administration: I have connected computers to LANs and the internet via modems and Ethernet, and have facilitated the installation of application software via automated scripting (Kixtart and AutoIt). Furthermore I have connected home-based LAN systems to the internet, and used such a connections to provide server-based internet services (HTTP, FTP, SSH, etc.).

General application software: Microsoft Office (Word, Excel, PowerPoint, Visual Basic for Applications, and Access), Mathcad, Matlab, S-Plus, R, Python, Quicken, Adobe Photoshop and Lightroom, antivirus, web browsers, email, etc.

Geoscience related software: I am familiar with mapping software such as Surfer, ArcGIS, SAGA GIS, and the remote sensing image processing and mapping software packages ERDAS Imagine, ENVI/IDL, and PCI. I use both WinTDR and Campbell Scientific software for configuration, programming, control and data acquisition from time domain reflectometers (TDR), dataloggers and multiplexers. I have used Penetradar IRIS GPR software (Penetradar Corp., Niagara Falls, NY) for radar data acquisition from soils.

Website design: I am also familiar with basic HTML and website design.

Soil testing: Field sampling of gravimetric and volumetric water content, bulk density determination, clay/silt/sand fraction determination, remote and in-situ dielectric permittivity determination using GPR, TDR and network analyzers (via microstrip resonance and *HP 85070B Dielectric Probe Kits*), hydraulic conductivity, infiltration characteristics, solute breakthrough curve determination, and monitoring of soil temperature.

Other skills: Digital and film photography, including SLR photographic skills and infrared photography. I also know how to manually process and print black and white film and pictures in the darkroom.