**CURRICULUM VITAE (~ last 6 years and all publications) WILLEM J. D. VAN LEEUWEN**

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# CHRONOLOGY OF EDUCATION

1995 Ph.D., University of Arizona, Tucson, Arizona. Major: Soil and Water & Remote Sensing (Dept. of Soil, Water and Environmental Science).

Dissertation Title: *Biophysical Interpretation of Spectral Indices for Semi-Arid Soil and Vegetation Types in Niger*

Advisor: Dr. Alfredo R. Huete

1988 M.S., Wageningen University, University for Life Sciences, Wageningen, The Netherlands.

Major Field: *Soils and Remote Sensing.* Department of Soil Science (1988)

Thesis*: Isolation of Soil, Vegetation, and Atmosphere Signals over Maricopa Agricultural Center*

Advisors: Drs. Toon Janse and Hein ten Berge

1986 B.S., Wageningen University, University for Life Sciences, Wageningen, The Netherlands.

Major Field: *Soils.* Department of Soil Science (1986)

# CHRONOLOGY OF EMPLOYMENT

2017 – Professor, School of Natural Resources and the Environment & School of Geography and Development, University of Arizona, Tucson. Joint appointments: Arid Lands Resource Sciences, Remote Sensing & Spatial Analysis (Chair).

2011 – Director, Arizona Remote Sensing Center, University of Arizona, Tucson.

2011 – 17 Associate Professor, School of Natural Resources and the Environment & School of Geography and Development, University of Arizona, Tucson.

2013. *Visiting Professor*, Universidad de Sonora, División de Ciencias Biológicas y de La Salud, Departamento de Investigaciones Científicas y Technológicas, Hermosillo MX. Feb-May, 2013.

2012. *Visiting Professor*, Universidad Católica de Chile (UC), Centro Cambio Global UC. Departamento de Ecosistemas y Medio Ambiente, Santiago, Chile, August-December, 2012.

2010 – 11 *Associate Director, Arizona Remote Sensing Center,* University of Arizona, Tucson, AZ

2009 – 11 *Assistant Professor, School of Natural Resources and the Environment - Office of Arid Lands Studies,* University of Arizona, Tucson, AZ.

2005 – 11 *Assistant Professor, School of Geography and Development,* University of Arizona, Tucson, AZ. (shared appointment)

2005 – 09 *Assistant Professor, Office of Arid Lands Studies,* University of Arizona, Tucson, AZ.

2002 – 05 *Research Scientist*, University of Arizona, Office of Arid Lands Studies, Tucson, AZ.

2000 – 02 *Research Scientist*, Météo France, Centre Nationale de la Recherche Scientifique (NSF

equivalent), Toulouse, France.

1999 – 00 *Research Scientist*, Météo France, Centre Nationale de Recherches Météorologiques, Toulouse, France.

1995 – 99 *Assistant Research Scientist*, Department of Soil, Water and Environmental Science, University of Arizona, Tucson, AZ.

1990 – 95 *Graduate Research Associate*, Department of Soil and Water and Environmental Science, University of Arizona, Tucson, AZ.

# HONORS AND AWARDS

*Individual:*

2012 Visiting Professor Award, Pontificia Universidad Católica de Chile, Facultad de Agronomía e Ingeniería Forestal, Santiago, Chile.

*Students’ Honors and Awards While Under My Supervision:*

Bailey Bellavance – 1st price - poster awards in the UA-ALRS program (2018)

Jahan Kariyeva - 3rd place for best Remote Sensing paper award at AAG conference 2009. NASA Goddard summer internship (2009).

Roy Petrakis - Graduate Student Travel Awards 2014/2015.

Jeff Gillan – University of Arizona Fellow; ARCS Fellowship awarded for 2016/17, $9,000 stipend plus tuition.

Pratima KC - Natural Resources Tuition Scholarship; CALS Graduate College Fellowship; Lionel D. Drake Scholarship; Fannin, Joe K Scholarship; Pistor-Stanley Scholarship in Agriculture; Clifford W. Carstens, Jr. Endowment; Ervin H. Zube Scholarship (20015-2016).

Jayanti Pokhrel - Honorable Mention Award for Poster Presentation in Earth Week (Title: Effect of Land Use and Land Cover Change in Buffer Zones of Chitwan National Park); Clifford W. Carsten’s, Jr. Endowment Award by Agriculture and Life Sciences for the academic year 2016- 2017.

# SERVICE/OUTREACH (LIMITED TO PERIOD IN CURRENT RANK)

***(last 5 years. Period [.] indicates completed, hyphen [*–*] ongoing)***

*Local/state Outreach*

*National/international service/outreach*

2014. *Co-Chair Oral and Poster Sessions*: B53. Multi-Sensor Long-Term Data Records of Land Surface Parameters for Global Change Research, San Francisco, Dec 15-19, 2014. American Geophysical Union (AGU).

2013. *Co-Chair Oral and Poster Sessions*: B33M. Multi-sensor Long-Term Land Surface Data Records, San Francisco, Dec 11-12, 2013. American Geophysical Union (AGU).

2012 – 13 *Chair and member of the organizing committee* for the NASA MEASURES International Vegetation Index and Phenology Workshop - 30 Years of VI and Phenology Observations. Tucson, Arizona. Jan 23-24, 2013.

2012 – 17 *Associate Editor* of Ecological Applications.

*University Committees*

2016. GIDP Faculty Director search committee.

2015 – 16 Review/Search committee “Imaging” cluster hire (5 faculty), University of Arizona.

2014 – *Chair* Graduate Interdisciplinary Graduate Programs Advisory Council (GIDPAC), University of Arizona.

2009 – *Chair* Remote Sensing and Spatial Analysis Graduate Interdisciplinary Program (RSSA GIDP), University of Arizona.

2006 – *Faculty member,* Arid Lands Resource Sciences Graduate Interdisciplinary Program (ALRS GIDP), University of Arizona.

2007 – Faculty member of Graduate Certificate in Geographic Information Science at the University of Arizona.

*Departmental Committees*

2018 – Faculty Member, Graduate Committee (School of Geography and Development).

2017 – 18 Chair Faculty status/P&T Committee (School of Natural Resources and the Environment). 2016 – 17 Technology Committee (School of Geography and Development).

2015 – Executive Committee – Strategic Planning Committee (School of Natural Resources and the Environment).

2014 –16 Faculty status/P&T Committee (School of Natural Resources and the Environment). 2014 – IT committee, School of Natural Resources and the Environment.(chair since 2017)

2009 – Faculty member Curriculum Development Committee (School of Natural Resources and the Environment).

2006 – Annual Performance Review Committee (Office of Arid Lands Studies/ SNRE).

2014 – 15 Move Committee (Biosc. East to ENR2; School of Natural Resources and the Environment). 2006 – 16 Faculty Member, Graduate Committee (School of Geography and Development).

*College and University Committees*

2016 – Dean’s Research Advisory Counsel (CALS)

2017. CALS Post Tenure Review Committee, Chair. 2016 - CALS Post Tenure Review Committee co-chair. 2015 –16 CALS Post Tenure Review Committee Member.

2013 Chair Review committee of Agricultural Experiment Station - CRIS proposal (UA/CALS). 2009 – Institute of the Environment (University of Arizona; faculty member).

*Other committees (internal/external)*

2015. Board of Directors, Toleo LCC; UAV’s William Aymard.

2010 – 15 Board of Directors, International Center for Remote Sensing of Environment, Tucson, Arizona, USA.

*Journal Reviewer (2005-present)*

2008 – 17 Ecological Applications (Subject editor 2012-2017) 2005 – Remote Sensing of Environment (16)

2012 – Remote Sensing (6)

2013 Catena

*Proposal reviewer*

2018 NSF review panel Coupled Human and Natural Systems.

2015 NSF review panel Coupled Human and Natural Systems.

2013 NSF Geography proposal review.

2012 Panelist on NASA proposal review panel “NASA Water Resources” January 10-13, Washington DC. (3 primary reviews; 2 secondary reviews, 11 total).

*Societies*

1992 – American Geophysical Union (AGU).

2005 – Association of American Geographers (AAG). 2012 – Ecological Society of America (ESA).

2005 – 13 American Society of Photogrammetry and Remote Sensing (ASPRS).

# PUBLICATIONS/CREATIVE ACTIVITY (PUBLISHED OR ACCEPTED)

*Note: \* = substantially based on work done as a graduate student.*

***Note: bold*** *= My name and the names of students mentored who are co-authors are identified in* ***bold*** *to facilitate identification during the review process*

*Note: # = chapters presenting original research not reported elsewhere. H-index=26; 4957 citations*

*Chapters in scholarly books and monographs*

#Nagler, P., B. Sridhar, A. Olsson, W. Van Leeuwen and E. Glenn (2018). Hyperspectral Remote Sensing Tools for Quantifying Plant Litter and Invasive Species in Arid Ecosystems: 97-129. In: Advanced Applications in Remote Sensing of Agricultural Crops and Natural Vegetation Edts. Prasad Srinivasa Thenkabail; J G Lyon; Alfredo Huete; CRC Press. 10.1201/9780429431166-6

#Romo Leon, J.R., **Willem J.D. van Leeuwen**, A.E. Castellanos Villegas, 2013. Percepción Remota Para el Análisis de la Distribución y Cambios de Uso de Suelo en Zonas Áridas y Semiáridas. **In**

E. Sánchez Flores and R.E. Díaz Caravantes (Eds.), Dinámicas locales del cambio global Aplicaciones de percepción remota y análisis espacial en la evaluación del uso del territorio. Translation: Remote Sensing Analysis of the Land Use Distribution and Change in Arid and Semi-arid land. In: Local dynamics of global change. Remote sensing applications and spatial analysis of land use evaluation. Ciudad Juárez, Mexico: Universidad Autónoma de Ciudad Juárez Press.

*#*Pamela Lynn Nagler, B.B. Maruthi Sridhar, Aaryn Dyami Olsson, **Willem J.D. van Leeuwen**, and Edward P. Glenn, 2012. Hyperspectral Remote Sensing Tools for Quantifying Plant Litter and Invasive Species in Arid Ecosystems In: Hyperspectral remote sensing of vegetation Edts. Prasad Srinivasa Thenkabail; J G Lyon; Alfredo Huete; Boca Raton, FL, CRC Press.

Huete, A., Didan, K., **Willem J.D. van Leeuwen,** Miura, T., Glenn, E., 2010. PART V: MODIS Vegetation Indices. In: *Land Remote Sensing and Global Environmental Change: NASA’s Earth Observing System and the Science of ASTER and MODIS*. B. Ramachandran, C. Justice and M. Abrams (Editors). Springer-Verlag, New York. 750 pp.

*#***van Leeuwen, Willem J.D.,** 2009. Chapter 3: Visible, Near-IR & Shortwave IR Spectral Characteristics of Terrestrial Surfaces. In: *Handbook of Remote Sensing*. Editors: T. Warner, D. Nellis and G. Foody. SAGE. 33-50.

*Refereed journal articles (published or accepted in final form) –*

1. Gillan, J., Karl, J., **van Leeuwen Willem J.D.** 2020,Integrating low cost drone imagery with existing rangeland monitoring programs. Environmental Monitoring and Assessment, Accepted.
2. Broxton, P. D., **van Leeuwen, W.J.D**., Biederman, J. A., 2020. Forest Structure and Topography Regulates the Thin, Ephemeral Snowpacks of the Semiarid Southwest US, Ecohydrology, doi: 10.1002/eco.2202
3. Kautz, M. A., C. D. Holifield Collins, D. P. Guertin, D. C. Goodrich, **Willem J.D. van Leeuwen** and C. J. Williams, 2019. Hydrologic model parameterization using dynamic Landsat-based vegetative estimates within a semiarid grassland. Journal of Hydrology 575: 1073-1086.
4. Broxton, P. D., **van Leeuwen, W. J. D**., & Biederman, J. A.,2019. Improving snow water equivalent maps with machine learning of snow survey and lidar measurements. Water Resources Research, 55. <https://doi.org/10.1029/2018WR024146>
5. Carter, Forest, **van Leeuwen Willem J.D**., 2018. Mapping saguaro cacti using digital aerial imagery in Saguaro National Park. Journal of Applied Remote Sensing, 12(3). <https://doi.org/10.1117/1.JRS.12.036016>
6. Wilcox, Bradford P, Andrew Birt, Steven R Archer, Samuel D Fuhlendorf, Urs P Kreuter, Michael G Sorice, **Willem J D van Leeuwen**, Chris B Zou (2018). Viewing Woody-Plant Encroachment through a Social–Ecological Lens; BioScience, Volume 68, Issue 9, 1 September 2018, Pages 691–705, https://doi.org/10.1093/biosci/biy051
7. **Hartfield, K.A.; van Leeuwen, Willem.J.D.** (2018). Woody Cover Estimates in Oklahoma and Texas Using a Multi-Sensor Calibration and Validation Approach. Remote Sens, 10, 632.
8. **Barnes, M.L**., Breshears, D.D., Law, D.J., **van Leeuwen, W.J.D**., Monson, R.K., Fojtik, A.C., Barron-Gafford, G.A., & Moore, D.J.P. (2017). Beyond greenness: Detecting temporal changes in photosynthetic capacity with hyperspectral reflectance data. PLOS ONE, 12, e0189539
9. **Petrakis, R., van Leeuwen, Willem J.D**., Villarreal, M.L., Tashjian, P., Dello Russo, R., & Scott, C., 2017. Historical Analysis of Riparian Vegetation Change in Response to Shifting Management Objectives on the Middle Rio Grande. Land, 6, 29
10. **El-Vilaly, M.A.S.**, Didan, K., Marsh, S.E., **van Leeuwen, Willem J.D.**, Crimmins, M.A., & Munoz, A.B. 2017. Vegetation productivity responses to drought on tribal lands in the four corners region of the Southwest USA. Frontiers of Earth Science, pp 1-15. 10.1007/s11707-017- 0646-z
11. **Glade, F.E**., Miranda, M.D., Meza, F.J., & **van Leeuwen, Willem J.D.** (2016). Productivity and phenological responses of natural vegetation to present and future inter-annual climate variability across semi-arid river basins in Chile. *Environmental Monitoring and Assessment, 188*, 676
12. **Wu, J.**, Cecilia Chavana-Bryant, Neill Prohaska, Shawn P. Serbin, Kaiyu Guan, Loren P. Albert, Xi Yang, **Willem J.D. van Leeuwen**, Anthony John Garnello, Giordane Martins, Yadvinder Malhi, France Gerard, Raimundo Cosme Oliviera, and Scott R. Saleska, 2016. Convergence in relations among leaf traits, spectra and age across diverse canopy environments and two contrasting tropical forests, *New Phytologist doi:10.1111/nph.14051.*
13. **Xu, C**., Zeng, W., Huang, J., Wu, J. and **Willem J**.D.**van Leeuwen,** 2016. Prediction of Soil Moisture Content and Soil Salt Concentration from Hyperspectral Laboratory and Field Data*. Remote Sensing* 8: 42.
14. [**Czyzowska-Wisniewski, E. H., Willem J. D. van Leeuwen**, K. K. Hirschboeck, S. E. Marsh, andW. T. Wisniewski. 2015. Fractional snow cover estimation in complex alpine-forested](http://dx.doi.org/10.1016/j.rse.2014.09.026) [environments using an artificial neural network. *Remote Sensing of Environment, 156:403-417.*](http://dx.doi.org/10.1016/j.rse.2014.09.026)[*doi*:10.1016/j.rse.2014.09.026.](http://dx.doi.org/10.1016/j.rse.2014.09.026)
15. Flesch, A. D., Hutto, R. L.**, van Leeuwen, Willem J. D.**, Hartfield, K. and Jacobs, S. 2015. Spatial, Temporal, and Density-Dependent Components of Habitat Quality for a Desert Owl*. PloS one* 10: e0119986.
16. **Romo-Leon, J.**R.**, Willem J.D. van Leeuwen**, and A. Castellanos-Villegas, Land Use and Environmental Variability Impacts on the Phenology of Arid Agro-Ecosystems. *Environmental Management*, 2015: p. 1-15.
17. [**Shepard, C., M. G**. Schaap, M. A. Crimmins, **Willem J. D. van Leeuwen**, and C. Rasmussen.](http://dx.doi.org/10.1016/j.geodrs.2014.12.003) [2015. Subsurface soil textural control of aboveground productivity in the US Desert Southwest.](http://dx.doi.org/10.1016/j.geodrs.2014.12.003) [*Geoderma Regional* 4:*44-54. doi:*10.1016/j.geodrs.2014.12.003.](http://dx.doi.org/10.1016/j.geodrs.2014.12.003)
18. Carrière, Y., B. Degain, K. A. Hartfield, K. D. Nolte, S. E. Marsh, C. Ellers-Kirk, **Willem J.D. van Leeuwen**, L. Liesner, P. Dutilleul, and J. C. Palumbo, 2014. Assessing Transmission of Crop Diseases by Insect Vectors in a Landscape Context. *Journal of Economic Entomology*, Forum, 107:1-10. [http://dx.doi.org/10.1603/EC13362.](http://dx.doi.org/10.1603/EC13362)
19. [**Romo Leon, J. R., Willem J.D. van Leeuwen**, A. Catellanos-Villegas, 2014. Using Remote](http://dx.doi.org/10.1016/j.jaridenv.2014.03.002) [Sensing Tools to Assess Land Use Transitions in Unsustainable Arid Agroecosystems. *Journal*](http://dx.doi.org/10.1016/j.jaridenv.2014.03.002)[*of Arid Environments, 106:27-35.* doi:10.1016/j.jaridenv.2014.03.002.](http://dx.doi.org/10.1016/j.jaridenv.2014.03.002)
20. **Sanchez-Mejia, Z. M**., S. A. Papuga, J. B. Swetish**, Willem J. D. van** Leeuwen, D. Szutu, and K. Hartfield. 2014. Quantifying the influence of deep soil moisture on ecosystem albedo: The role of vegetation*. Water Resources* Research 50:4038-4053.
21. **van Leeuwen, Willem J.**D., Kyle Hartfield, Marcelo Miranda, Francisco J. Meza, 2013. Trends and ENSO/AAO driven variability in NDVI derived productivity and phenology alongside the Andes Mountains. In: Monitoring Global Vegetation with AVHRR NDVI3g Data (1981-2011)*, Remote Sens.*, 5, 1177-1203.
22. Casady, G.M.**, Willem J.D. van Leeuwen**, Reed, B.C., 2013. Estimating Winter Annual Biomass in the Sonoran and Mojave Deserts with Satellite- and Ground-Based Observations*. Remote Sensing*, 5, 909-926.
23. **Landau, K.I., Willem J.D. van Leeuwen**, 2012. Fine scale spatial urban land cover factors associated with adult mosquito abundance and risk in Tucson, Arizona*. Journal of Vector Ecology*, 37(2):407-418.
24. **Kariyeva, J., Willem J. D. van Leeuwen**, C. A. Woodhouse, 2012. Impacts of climate gradients on the vegetation phenology of major land use types in Central Asia (1981-2008*) Frontiers of Earth Science*, 6(2):206-225.
25. **Kariyeva, J., Willem J.D. van Leeuwen**, 2012. Phenological dynamics of irrigated and natural drylands in Central Asia before and after the USSR collapse*. Agriculture, Ecosystems &* Environment, 162, 77-89.
26. **Romo Leon, J. R., Willem J.D. van Leeuwen, G. M. Casady**, 2012. Using MODIS-NDVI for the Modeling of Post-Wildfire Vegetation Response as a Function of Environmental Conditions and Pre-Fire Restoration Treatments*. Remote Sensing*. 4(3): 598-621.
27. **Villarreal, M.L., Willem J.D. van Leeuwen, Jose Raul** Romo-Leon. 2012. Mapping and monitoring riparian vegetation distribution, structure and composition with regression tree models and post-classification change metrics*, International Journal of Remote* Sensing, 33:13, 4266-4290.
28. Hartfield, K.A.**, Landau, Katheryn I., Willem J.D. van Leeuwen**, 2011. Fusion of High Resolution Aerial Multispectral and LiDAR Data: Land Cover in the Context of Urban Mosquito Habitat*. Remote Sensing,* 3(11): 2364-2383.
29. Olsson, A.**, Willem J.D. va**n **Leeuwen**, and Stuart E. Marsh. 2011. Feasibility of Invasive Grass Detection in a Desertscrub Community Using Hyperspectral Field Measurements and Landsat TM Imagery*. Remote Sensing*, 3(10):2283-2304.
30. **Davison, J.E**., Breshears, D.D**., van Leeuwen, W.J.D**., & Casady, G.M., 2011. Remotely sensed vegetation phenology and productivity along a climatic gradient: on the value of incorporating the dimension of woody plant cover*. Global Ecology and* Biogeography, 20, 101–113.
31. **van Leeuwen, Willem J.D**, Chuck Hutchinson, Sam Drake, Brad Doorn, Verne Kaupp, Tim Haithcoat, Vladislav Likholetov, Ed Sheffner, and Dave Tralli, 2011. Benchmarking enhancements to a decision support system for global crop production*, Expert Systems with Applications* 38(7): 8054-806.
32. **Kariyeva, Jahan**, **and Willem J.D. van Leeuwen**, 2011. Environmental Drivers of NDVI-based Vegetation Dynamics in Central Asia, Special Issue Remote Sensing in Climate Monitoring and Analysis *- Remote* Sensing, 3(2), 203-246.
33. **Casady, G.M., Willem J.D. van Leeuwen**, S.E. Marsh. 2010. Evaluating post wildfire vegetation dynamics as a response to multiple environmental determinants*. Environmental Modeling and* Assessment. 15(5): 295-307.
34. Gu, Yingxin, Jesslyn F. Brown, Tomoaki Miura**, Willem J.D. van Leeuwen**, and Bradley C. Reed. 2010. Phenological classification of the United States: A geographic framework for extending multi-sensor time-series *data, Remote Sens*., 2, 526-544.
35. **van Leeuwen, Willem J.**D.**, Davison J.E., Casady, G.**M., and Marsh S.E., 2010. Phenological Characterization of Desert Sky Island Vegetation Communities with Remotely Sensed and Climate Time Series Data*. Remote* Sens., 2, 388-415.
36. **van Leeuwen, Willem J.**D.**, G. M.** Casady, D. G. Neary, S. Bautista, J. A. Alloza, Y. Carmel, L. Wittenberg, D. Malkinson, B. J. Orr, 2010. Monitoring post-wildfire vegetation response with remotely sensed time-series data in Spain, USA and Israel*. International Journal of Wildland* Fire, 19: **75-93.**
37. **Huang, C**., Geiger, E.**, Willem J.D. van Leeuwen**, and Marsh, S., 2009. Discrimination of invaded and native species sites in a semi-desert grassland using MODIS multi-temporal data*. International Journal of Remote Sensing*, Vol. 30, No. 4, pp 897**–917.**
38. Michael A. White, Kirsten M. de Beurs, Kamel Didan, David W. Inouye, Andrew D. Richardson, Olaf P. Jensen, John Magnuson, John O’Keefe, Gong Zhang, Ramakrishna R. Nemani**, Willem J.D. van Leeuwen**, Jesslyn F. Brown, Allard de Wit, Michael Schaepman, Xioamao Lin, Michael Dettinger, Amey Bailey, John Kimball, Mark D. Schwartz, Dennis D. Baldocchi, John T. Lee, William K. Lauenroth, 2009. Intercomparison, interpretation, and assessment of spring phenology in North America estimated from remote sensing for 1982 to *2006. Global Change* Biology, Volume 15, Number 10, October 2009, pp. 2335-2359(25*).*
39. **van Leeuwen, Willem J**.D., 2008. Monitoring the Effects of Forest Restoration Treatments on Post-Fire Vegetation Recovery with MODIS Multitemporal Data*.* Sensors, 8, 2017-2042.
40. **van Leeuwen, Willem J.**D., B. Orr, S. Marsh**, S.** Herrmann, 2006. Multi-Sensor NDVI Data Continuity: Uncertainties and Implications for Vegetation Monitoring Applications*. Remote Sensing of* Environment, 100(1):67*–*81.
41. **van Leeuwen, Willem J.**D., Barron J. Orr, 2006. Spectral Vegetation Indices and Uncertainty: Insights from a User’s Perspective*. IEEE Transactions on Geoscience and Remote* Sensing. 44(7):1931–1933.
42. Fang, H, S. Liang, M. P. McClaran**, Willem J.D. van Leeuwen**, S. Drake, S. E. Marsh, A. Thomson, R. C. Izaurralde, J. Norman, 2005. Biophysical characterization and management effects on semiarid rangeland observed from Landsat ETM+ data*. IEEE Transactions on Geoscience and Remote* Sensing, 43(1):125–134.
43. **van Leeuwen, Willem J.**D. and J-L. Roujean, 2002. Land Surface Albedo from the Synergistic use of Polar (EPS) and Geo-Stationary (MSG) Observing Systems: An Assessment of Physical Uncertainties*. Remote Sensing of* Environment, 81(2–3):273–289.
44. **van Leeuwen, Willem J.**D., A. R. Huete and T. W. Laing, 1999. MODIS Vegetation Index Compositing Approach: A Prototype with AVHRR data*. Remote Sensing of* Environment, 69:264–280.
45. Miura, T., Huete, A.R.**, Willem J.D. van Leeuwen**, Didan, K., 1998. Vegetation detection through smoke-filled AVIRIS images: An assessment using MODIS band passes*. Journal of Geophysical* Research, 103, 32001– 32011.
46. Justice, C., Hall, D., Salomonson, V., Privette, J., Riggs, G., Strahler, A., Lucht, W., Myneni, R., Knjazihhin, Y., Running, S., Nemani, R., Vermote, E., Townshend, J., Defries, R., Roy, D.,Wan, Z., Huete, A., **Willem J.D. van Leeuwen**, Wolfe, R., Giglio, L., Muller, J-P., Lewis, P., and Barnsley, M, 1998. The Moderate Resolution Imaging Spectroradiometer (MODIS): Land remote sensing for global change research*. IEEE Transactions on Geoscience and Remote* Sensing. 36(4):1228–1249.
47. Huete, A.R., H.Q. Liu, K. Batchily, and **Willem J.D. van Leeuwen**, 1997. A Comparison of Vegetation Indices over a Global Set of TM Images*. Remote Sensing of Environment*, 59:440– 451.
48. **\*van Leeuwen, Willem J.D.**, A.R. Huete, C.L. Walthall, S.D. Prince, A. Begué and J.L. Roujean, 1997. Deconvolution of remotely sensed spectral mixtures for retrieval of LAI, fAPAR and soil brightness*. Journal of* Hydrology. 188–189:697–724.
49. **\*van Leeuwen, Willem J.D.** and A.R. Huete, 1996. Effects of standing litter on the biophysical interpretation of plant canopies with spectral indices*. Remote Sensing of Environment*, 55:123– 138.
50. Franklin, J., J. Duncan, A.R. Huete, \***Willem J.D. van Leeuwen**, X. Li, and A. Begué, 1994. Radiative transfer in shrub savanna sites in Niger – preliminary results from HAPEX-II-Sahel: Modeling surface reflectance using a geometrical approach. Agricultural and ForestMeteorology, 69:223–245.
51. \***van Leeuwen, Willem J.D**., A.R. Huete, J. Duncan, and J. Franklin, 1994. Radiative transfer in shrub savanna sites in Niger – preliminary results from HAPEX-II-Sahel: 3. Optical dynamics and vegetation index sensitivity to biomass and plant cover. Agricultural and Forest Meteorology, 69:267–28
52. Huete, A.R., G. Hua, J. Qi, A. Chehbouni, and \***Willem J.D. van Leeuwen**, 1992. Normalization of Multispectral Red and NIR Reflectances with the SAVI. Remote Sensing of Environment, 41:143–154.
53. Kustas, W.P., D.C. Goodrich, M.S. Moran, S.A. Amer, L.B. Bach, J.H. Blanford, A. Chehbouni, H. Claassen, W.E. Clements, P.C. Doraiswamy, P. Dubois, T.R. Clarke, C.S.T. Daughtry, D.I. Gellman, T.A. Grant, L.E. Hipps, A.R. Huete, K.S. Humes, T.J. Jackson, T.O. Keefer, W.D. Nichols, R. Parry, E.M. Perry, R.T. Pinker, P.J. Pinter, Jr., J. Qi, A.C. Riggs, T.J. Schmugge,, A.M. Shutko, D.I. Stannard, E. Swiatek, \***Willem J.D. van Leeuwen**, J. van Zyl, A. Vidal, J. Washburne, and M.A. Weltz, 1991. An Interdisciplinary Field Study of the Energy and water Fluxes in the Atmosphere-Biosphere System over Semiarid Rangelands: Description and some Preliminary Results. Bulletin of the American Meteorological Society, 72(11):1683-1706.

*Scientific report (peer-reviewed by scientific panel)*

Huete, A.R., Justice, C. and **Willem J.D. van Leeuwen**, 1999. MODIS Vegetation Index (MOD13) - Algorithm Theoretical Basis Document. Version 3. April 30, 131 p. [http://modis.gsfc.nasa.gov/data/atbd/atbd\_mod13.pdf.](http://modis.gsfc.nasa.gov/data/atbd/atbd_mod13.pdf) Accessed June 2016.

*Chapters in peer-reviewed proceedings (original research)*

# Orr, B.J., G.M. Casady, D.G. Tuttle, Willem J.D. van Leeuwen, L.E. Baker, C.L. McDonald, and S.E. Marsh. 2005. Phenology and trend indictors derived from spatially dynamic bi-weekly satellite imagery to support ecosystem monitoring. In: Gottfried, G.J., Gebow, B.S., Eskew, L.G., and Edminster, C.B. (compilers). *Connecting Mountain Islands and Desert Seas: Biodiversity and Management of the Madrean Archipelago II.* May 11–15, 2004; Tucson, AZ. Proceedings RMRS-P-36. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, pp. 206–211.

*Electronic publications (web development)*

**Van Leeuwen, Willem J.D.**, Mike Crimmins, Kyle Hartfield, Stuart Marsh, Jeremy Weiss, Pratima KC, Yuta Torrey, Matt Rahr*, 2014- present. DroughtView - Keeping an Eye on Drought: Satellite Based Drought Monitoring and Assessment*. Tucson, AZ: Arizona Remote Sensing Center, University of Arizona. Online: [http://DroughtView.arizona.edu.](http://DroughtView.arizona.edu/) Accessed June 2016.

Marsh, S., B. Orr, **Willem J.D. van Leeuwen**, A. Thwaits, A-M. White, W. Grunberg, K. Jain, C. Baker, J. Dale, L. Baker, Y. Yang, C-L. Kao, N. Lerman, J. Saints, A. Olsson, M-S. Kang, G. Casady,G. Oldham, C. Wallace, C. McDonald, M. Hertzfeld, D. Tuttle, E. Benally, K. Mauz, S. Herrmann, C. Hutchinson, B. Hutchinson, G. Ruyle, L. Howery, and P. Krausman. 2000 – 2006. *RangeView: Geospatial Tools for Natural Resource Management*. Tucson, AZ: Arizona Remote Sensing Center, University of Arizona. Online: [http://rangeview.arizona.edu.](http://rangeview.arizona.edu/) 321 indexed web pages. Accessed May 2010.

*Electronic publications (online articles/report, not peer-reviewed)*

Kamel Didan, Armando Barreto Munoz, Tomoaki Miura, Javzandulm, Tsend-Ayush, Xiaoyang Zhang, Mark Friedl, Josh Gray, **Willem J.D. van Leeuwen**, Jeffrey Czapla-Myers, Stacie Doman Bennett, Calli Jenkerson, Tom Maiersperger, David Meyer, 2015. Multi-Sensor Vegetation Index and Phenology Earth Science Data Records Algorithm Theoretical Basis Document And User Guide - Version 4.0 <https://vip.arizona.edu/documents/VIP_ESDRs_ATBD_UsersGuide_03_22_2016_V4.pdf> Accessed 6-16-2016.

**van Leeuwen, Willem J.D.**, Kyle Hartfield, Marcelo Miranda, Francisco J. Meza, 2013. Línea de investigación en monitoreo ambiental. Pp 29-32. In: Fortalecimiento de capacidades para enfrentar los desafíos del cambio global en Chile. Edt F. Meza. [http://cambioglobal.uc.cl/index.php/en/component/docman/doc\_download/128-booklet-ccg-](http://cambioglobal.uc.cl/index.php/en/component/docman/doc_download/128-booklet-ccg-corfo.html.%20Accessed%20June%202016) [corfo.html. Accessed June 2016.](http://cambioglobal.uc.cl/index.php/en/component/docman/doc_download/128-booklet-ccg-corfo.html.%20Accessed%20June%202016)

Villarreal, M. L., **van Leeuwen, Willem J.D**., Romo, J.R., and Hubbard, J. A. 2011. Assessing landscape dynamics using multitemporal remotely sensed imagery in the Sonoran Desert Network.Natural Resource Technical Report NPS/SODN/NRTR—2011/513. National Park Service, Fort Collins, Colorado. [https://irma.nps.gov/App/Reference/DownloadDigitalFile?code=442962&file=SODNLandsca](https://irma.nps.gov/App/Reference/DownloadDigitalFile?code=442962&amp;file=SODNLandscapeDymanicsImagery_NRTR2011513_2176700.pdf)  [peDymanicsImagery\_NRTR2011513\_2176700.pdf.](https://irma.nps.gov/App/Reference/DownloadDigitalFile?code=442962&amp;file=SODNLandscapeDymanicsImagery_NRTR2011513_2176700.pdf) Accessed June, 2016.

Losleben, Mark and **Willem J.D. van Leeuwen**,2007. Our changing biological and climate calendar, or, what is phenology and why should we care? *Arid Lands Newsletter* No. 59, August, 2007. <https://ag.arizona.edu/OALS/ALN/aln59/losleben.html>Accessed June 2016.

Morisette, Jeffrey, Jaime E. Nickeson, Sebastien Garrigues, Fréderic Baret, Alfredo Huete, Kamel Didan, Tomoaki Miura, **Willem J.D. van Leeuwen**, Mark Friedl, Report from the CEOS Land Product Validation – Topical Workshop on the Validation of Global Vegetation Indices and their Time Series. *The Earth Observer*, 18(6), November – December, 2006. <http://onlinelibrary.wiley.com/doi/10.1029/2006EO500009/pdf>Accessed June, 2016.

Huete, Alfredo R., Karl F. Huemmrich, Tomoaki Miura, Xiangming Xiao, Kamel Didan, **Willem J.D. van Leeuwen**, Forrest Hall, Compton J. Tucker, Vegetation Index greenness global data set. White Paper for NASA ESDR/CDR, April, 2006. <http://cce.nasa.gov/mtg2008_ab_presentations/VI_Huete_whitepaper.pdf>Accessed June 2016.

# MEDIA

# 2015 Research videos – BS-GIST and MS-GIST programs e.g. <https://youtu.be/2TeVg0zS94Q>

# CONFERENCES/ SCHOLARLY PRESENTATIONS (~LAST 5 YEARS)

*Invited Presentations*

2019 **Van Leeuwen WJ**. Advances in UAV Imagery for Management Decisions. Arizona Pecan Grower’s; 2019 Sep.<https://extension.arizona.edu/sites/extension.arizona.edu/files/documents/> 2019az-pecan-growers-conf-agenda.pdf

2016 **van Leeuwen, Willem J.D**, “REMOTE SENSING OF BIODIVERSITY.” 17-10-2016. Geospatial Workshop, Centro del Cambio Global y la Sustentabilidad en el Sureste, Villahermosa, Mexico

2015 **van Leeuwen, Willem J.D**, “REMOTE SENSING LAND SURFACE PHENOLOGY AND LAND COVER CHANGE.” 24-9-2015. Geospatial Workshop, Centro del Cambio Global y la Sustentabilidad en el Sureste, Villahermosa, Mexico.

2013 **van Leeuwen, Willem J.D.** “Trends and ENSO/AAO driven variability in productivity and phenology in South America: comparing NDVI-VIP and NDVI3g results” Vegetation Index and Phenology Workshop - 30 Years of VI and Phenology Observations. Tucson, Arizona. Jan 24, 2013.

*Seminars (Invited)*

2013 **van Leeuwen, Willem J.D.,** Bioclimatic Variability and Change in the Americas- Multi-Scale Case Studies, Universidad de Sonora, Departamento de Investigaciones Científicas y Technológicas y su programa de posgrado, May 3, 2013.

*Conference presentations*

Patrick D Broxton, **Willem J.D van Leeuwen**, JA Biederman,The impact of forest cover on snowpack in the semi-arid southwestern US, AGU San Francisco, 2019.

Patrick D Broxton, **Willem J.D van Leeuwen**, JA Biederman, A Satellite Data and Model Driven Decision Support Tool for monitoring snowpack, precipitation, and streamflow, American Water Resources Association Annual Water Resources Conference, 2019

Patrick D Broxton, **Willem J.D van Leeuwen**, JA Biederman SnowView: A satellite data and model driven decision support tool for water resource management. 99th American Meteorological Society Annual Meeting, 2019.

Elisabeth vander Leeuw**, Willem J.D. van Leeuwen**, Kyle Hartfield, Stuart Marsh, Remotely Sensed Vegetation Cover and Species Information for Detecting Vegetative States on Ecological Sites – Preliminary Results, RISE Symposium, Tucson, 2019

Van Leeuwen WJ, Biederman J, Broxton P. Snowpack Monitoring along Arizona’s Mogollon Rim. SRP; 2018 Nov.

Wang X, Yang D, Dannenberg M, Jones M, Kimball J, Moore DJ, **Van Leeuwen WJ**, Didan K, Smith WK. B54C-07 Comparisons of Global Land Surface Phenology Derived from Vegetation Greenness, Optical Depth, and Solar-induced Chlorophyll Fluorescence. 2018. https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/417477

Patrick D Broxton, **Willem J.D van Leeuwen**, JA Biederman; SWANN: The Snow Water Artificial Neural Network Modelling System; AGU Fall Meeting New Orleans, 2017.

**Willem J.D. van Leeuwen**, Kyle Hartfield, Remotely Sensed Identification, Monitoring and Assessment of Natural Response and Disturbance Processes at Yearly and Decadal Scales. AGU Conference, Dec 9-13, 2013 San Francisco, CA, USA.

# AWARDED GRANTS AND CONTRACTS

*Federal/Agency*

2019 – 20 Developing a Near Real-time Seasonal Streamflow Forecasting System Using State of the Art Gridded Snow and Seasonal and Sub-seasonal Weather Forecasting Data $108,471 **W. van Leeuwen (PI)**. Co-I’s Patrick Broxton. My effort: 50% research; Award Period: 12/2019 – 7/2020; Sponsor: Salt River Project.

2019 – 20 Maintaining Field and Web-based Snow Pack Monitoring of the Verde and Salt River Basins; $25,175 **W. van Leeuwen (PI)**. Co-I’s Patrick Broxton. My effort: 50% research; Award Period: 8/2019 – 7/2020; Sponsor: Salt River Project.

2019 – 20 SRP SWANN LiDAR Data Acquisition and Processing; $30,000 **W. van Leeuwen (PI)**. Co-I’s Patrick Broxton. My effort: 50% research; Award Period: 8/2019 – 3/2020; Sponsor: Salt River Project.

2018 – 19 Snow Water with Artificial Neural Network (SWANN); $182,766; **W. van Leeuwen (PI)**. Co-I’s Patrick Broxton and Joel Biederman. My effort: 50% research; Award Period: 12/2018 – 11/2019; Sponsor: Salt River Project.

2017 – 19 Science Support to Assist the Desert LCC Science Working Group and Landscape Conservation Design Teams; PI Larry Fisher (**co-I Willem van Leeuwen**); Y1 $90.000 Y2 $45,000 (My Effort 40%) Sponsor: CESU, Fish and Wildlife Service

2017 – 20 Framework for Addressing Culture Resource Vulnerabilities in the NPS Intermountain Region; PI Brooks Jeffrey (co-I’s Greg Garfin, **Willem van Leeuwen**) My Effort 25%;Y1 $99,782; Y2 99,654.00 Y3 $59,766 Sponsor: National Park Service

2016 – 21 Lower Gila River Vegetation Mapping Using Novel LiDAR and Multispectral Data Fusion and Classification Techniques to Inform Riparian Habitat Restoration; **W. van Leeuwen (PI)**, K Hartfield and T. Swetnam Co-PI’s. $249,999.00 My effort 80% research; Award Period: 8/2016 – 7/2021 Sponsor: Bureau of Land Management (BLM).

2016 – 19 Inspiring the Next Generation Naval Scientists and Engineers in NROTC Battalions Through UG Navy-Relevant Geospatial Experiences; S.P. Chavarria (PI); **W. van Leeuwen (Senior Personnel)**; $747,843.00. My effort: 8% teaching. Award Period: 10/2016 – 9/2019. Sponsor: Office of Naval Research.

2015 – 19 Snow Water with Artificial Neural Network (SWANN); $845,000; **W. van Leeuwen (PI)**. K. Hirschboeck Co-PI. My effort: 75% research; Award Period: 12/2015 – 11/2019; Sponsor: Salt River Project.

2014 – 17 Collaborative Research: Slowing the Expansion of Woodlands and Increasing the Resilience of Grasslands in the Southern Great Plains; $1,370,000 Brad Wilcox (PI @ TAMU); $237,500 subcontract to **W. van Leeuwen (PI @UA**; My effort: 80% research; S. Archer Co-PI @ UA) 1/09/14-8/31/17. Sponsor = NSF

2013 Land Cover for the Tijuana River Watershed; $24,998.00, PI S. Marsh, **Co-PI W. van Leeuwen.** My effort 50% research. Sponsor = Environmental Protection Agency.

2008 – 13 Vegetation Phenology and Enhanced Vegetation Index Products from Multiple Long Term Satellite Data Records. PI = K. Didan; **Co-PIs W. van Leeuwen** and J. Czapla-Meyers; M. Friedl (Univ. Boston, T. Miura (Univ. of Hawaii), Calli Jenkersen (USGS), $3,099,782 8/2008– 7/2013*.* My effort: 12% research. Sponsor = NASA.

*UA or Private Foundations*

2018 UAS-based Integrated LiDAR-Hyperspectral Instrument; PI = Bill Smith. Co-I’s: Greg Barron-Gafford, **W. van Leeuwen**. My effort: 20% research. Sponsor Water, Environmental, and Energy Solutions-TRIF; Equipment Grant $ 112,375

2018 Understanding Global Carbon and Water Cycles: New florescence measurement capability to take advantage of forthcoming NASA missions; PI – Dave Moore Co-I’s: Greg Barron- Gafford, **W. van Leeuwen**. My effort: 10% research. Sponsor Water, Environmental, and Energy Solutions-TRIF; Equipment Grant $ 113,983.

2016 Coupled above- and belowground instrumentation arrays to support the development of Local Elevational Network Sites (LENSES) $67,220. 2016. PI = Greg Barron-Gafford, **Co-I’s** D. Moore, R. Gallery, **W. van Leeuwen**. My effort: 25% research. Sponsor = Water, Environmental, and Energy Solutions (WEES) at Univ. of Arizona.

2014 Drought Assessment and Ecological Forecasting for the Southwest Through Improved Data Integration and Analysis. $45,000. 2014-2015**. PI = W. van Leeuwen**. My effort: 40% research. Sponsor: Water, Environmental, and Energy Solutions (WEES) at Univ. of Arizona.

2013 Ground Penetrating Radar: A New Perspective on the Carbon Cycle? $10,000. 2013-2014. PI = Steve Archer, **Collaborators: W. van Leeuwen**, S. Marsh and C. Rasmussen. My effort: 25% research. Sponsor = Faculty Exploratory Research Grant Proposal, UA Institute of the Environment.

*International*

2012 – 17 Innovative Science and Influential Policy Dialogues for Water Security in the Arid Americas.

PI F. Meza (Chile, Universidad Catolica) Co-PI C. Scott (UA); Elma Montaña (Co-PI – Argentina), Alfredo Ribeiro Neto (Co-PI – Brazil), Nicolás Pineda (Co-PI), **Co-investigator:**

**W. van Leeuwen**, $800,000. 2012-2017. My effort: 10% research. Sponsor: Inter American Institute for Global Change Research.

2013 – 14 Estequiometria ecológica y percepción remota para el análisis de la distribución espacial e invasibilidad de zacate Buffel (Cenchrus ciliaris), en zonas prioritarias del Noroeste de México, Alejandro E. Castellanos V. (PI, Universidad de Sonora), José R. Romo L. (co-PI),

**W. van Leeuwen (Collaborator)**. MX$410,500. My effort: 25% research. Sponsor: CONABIO, MX.

Nagler, P., B. Sridhar, A. Olsson, W. Van Leeuwen and E. Glenn (2018). Hyperspectral Remote Sensing Tools for Quantifying Plant Litter and Invasive Species in Arid Ecosystems**:** 97-129.