

CURRICULUM VITAE

WILLEM J. D. VAN LEEUWEN

Professor School of Natural Resources and the Environment (SNRE) &
School of Geography, Development and Environment (SGDE)
Director Arizona Remote Sensing Center (ARSC)
Associate Director Development/Philanthropy in SNRE

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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

- 2023 – Associate Director for Development, School of Natural Resources and the Environment
2020 – 23 Interim Director, School of Natural Resources and the Environment (ended 7-10-23)
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 Tecnológicas, 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:

- 2023 SNRE Interim Directorship – Special Recognition Award
- 2021 SNRE Outstanding Faculty Award
- 2017 GIDP Honored Faculty Award
- 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:

- Kangsan Lee - NASA Develop Program and travel and research awards 2021-23
- Bailey Bellavance – 1st price - poster awards in the UA-ALRS program (2018)
- 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.
- Roy Petrakis - Graduate Student Travel Awards 2014/2015.
- Jahan Kariyeva - 3rd place for best Remote Sensing paper award at AAG conference 2009. NASA Goddard summer internship (2009).

SERVICE/OUTREACH (LIMITED TO PERIOD IN CURRENT RANK)

(Period [.] indicates completed, hyphen [-] ongoing)

Local/state Outreach

Decision support services in the Arizona Remote Sensing Center:

- USA and Pima County - DroughtView decision support system support [DroughtView \(arizona.edu\)](http://DroughtView.arizona.edu)
- Salt River Project - SnowView Decision support system [SnowView \(arizona.edu\)](http://SnowView.arizona.edu)

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

- 2021 – Director Graduate GIS certificate program
- 2021 – Executive committee member - Remote Sensing and Spatial Analysis Graduate Interdisciplinary Program (RSSA GIDP), University of Arizona.
2016. GIDP Faculty Director search committee.
- 2015 – 16 Review/Search committee “Imaging” cluster hire (5 faculty), University of Arizona.
- 2014 – 16 *Chair* Graduate Interdisciplinary Graduate Programs Advisory Council (GIDPAC), University of Arizona.
- 2009 – 20 *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

- 2024 – Annual Performance Review Committee SGDE
- 2024 – Annual Performance Review Committee Chair (SNRE Arid Lands faculty members)
- 2023 – SNRE development/philanthropy committee (maintaining properties and relationships with donated property owners)
- 2023 – Participation in SNRE search committees
- 2023 – P&T committee 3rd year review SGDE
- 2023 – Strategic Planning Committee member SNRE (Arid lands faculty representative)
- 2023 – IT committee, School of Natural Resources and the Environment
- 2018 – 20 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 – 20 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 – 20 IT committee, School of Natural Resources and the Environment.(chair since 2017)
- 2009 – 20 Faculty member Curriculum Development Committee (School of Natural Resources and the Environment).
- 2006 – 20 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

2023. P&T committee member - College of Education
- 2020 – 23 CALS Promotion and Tenure Committee member and co-chair in 2023

- 2016 – 18 Dean’s Research Advisory Council (DRAC - 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 and AIR (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
- 2012 – Remote Sensing
- 2013 Catena

Proposal reviewer

- 2020 NSF review panel
- 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).

PROFESSIONAL DEVELOPMENT

- 2018 – Drone/UAS Pilot License part 107 (renewing every 2 years)
- 2023. NGWA Workshop State-of-the-Art Techniques in Characterizing, Constructing, and Operating Optimum Surface Spreading Groundwater Recharge Projects (short course) April 23, 1- 5 p.m., San Antonio, Texas

Societies

- 1992 – American Geophysical Union (AGU).
- 2005 – Association of American Geographers (AAG).
- 2012 – Ecological Society of America (ESA).
- 2023 – NGWA: National Groundwater Association
- 2024 – IEEE Geoscience and Remote Sensing Society
- 2005 – 13 American Society of Photogrammetry and Remote Sensing (ASPRS).

TEACHING, ADVISING, AND MENTORSHIP

Teaching

- Spring 2024: Geographic Applications of Remote Sensing (GEOG/RNR/PLN/ENVGIST 483/583): 3-units
- Fall 2023: Resource Mapping using Unmanned Aerial Systems (RNR/GEOG422/522) 3-unit, in person

Advising/mentoring

5 Ph.D. students, 5 research scientists, 1 undergraduate student

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=34; 8753 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: Google Scholar Citations 11049; h-index 41;i10-index 70 (1-8-2024)

<https://orcid.org/0000-0002-3188-7172>

1. Holifield Collins C., Skirvin S., Kautz M., Winston Z, Curley, D., Corrales A., Bishop A., Bishop N., Norton C., Ponce-Campos G., G. Armendariz, L. Metz, P. Heilman, **WJD van Leeuwen**; 2023. Brush Estimation Tool (RaBET): An Operational Remote Sensing-Based Application for Quantifying Woody Cover on Western Rangelands, *Remote Sensing* 15 (21), 5102
<https://doi.org/10.3390/rs15215102>
2. Dwivedi, R . JA Biederman, PD Broxton, K Lee, **WJD van Leeuwen**, JK Pearl, 2023. Forest density and snowpack stability regulate root zone water stress and percolation differently at two sites with contrasting ephemeral vs. stable seasonal snowpacks, *Journal of Hydrology* 624, 129915
<https://doi.org/10.1016/j.jhydrol.2023.129915>
3. Broxton, PD., **WJD van Leeuwen**, BM Svoma, J Walter, JA Biederman, 2023 Subseasonal to seasonal streamflow forecasting in a semiarid watershed, *JAWRA Journal of the American Water Resources*

- Association. <https://doi.org/10.1111/1752-1688.13147>
4. Dwivedi, R., JA Biederman, PD Broxton, K Lee, **WJD van Leeuwen**, 2023, Snowtopography quantifies effects of forest cover on net water input to soil at sites with ephemeral or stable seasonal snowpack in Arizona, USA, *Ecohydrology* 16 (2), e2494 <https://doi.org/10.1002/eco.2494>
 5. Hartfield, K.; Gillan, J.K.; Norton, C.L.; Conley, C.; **van Leeuwen, W.J.D.** A Novel Spectral Index to Identify Cacti in the Sonoran Desert at Multiple Scales Using Multi-Sensor Hyperspectral Data Acquisitions. *Land* 2022, 11, 786. <https://doi.org/10.3390/land11060786>
 6. Norton, C.L.; Hartfield, K.; Collins, C.D.H.; **van Leeuwen, W.J.D.**; Metz, L.J. Multi-Temporal LiDAR and Hyperspectral Data Fusion for Classification of Semi-Arid Woody Cover Species. *Remote Sens.* 2022, 14, 2896. <https://doi.org/10.3390/rs14122896>
 7. **Farella, M. M.**, M.L Barnes, D. D Breshears, J.Mitchell, **Willem JD van Leeuwen**, R. E Gallery, 2022. Evaluation of vegetation indices and imaging spectroscopy to estimate foliar nitrogen across disparate biomes. *Ecosphere*. <https://doi.org/10.1002/ecs2.3992>
 8. **Javadian, M.** W.K Smith, K. Lee, J. F Knowles, R. L Scott, J. B Fisher, D. JP Moore, **Willem JD van Leeuwen**, Greg Barron-Gafford, Ali Behrangi Canopy temperature is regulated by ecosystem structural traits and captures the ecohydrologic dynamics of a semiarid mixed conifer forest site. *Journal of Geophysical Research: Biogeosciences*. <https://doi.org/10.1029/2021JG006617>
 9. **Khatri-Chhetri, Pratima**; Hendryx, Sean M.; Hartfield, Kyle A.; Crimmins, Michael A.; **Leeuwen, Willem J.D.v.**; Kane, Van R. 2021. "Assessing Vegetation Response to Multi-Scalar Drought across the Mojave, Sonoran, Chihuahuan Deserts and Apache Highlands in the Southwest United States" *Remote Sens.* 13, no. 6: 1103. <https://doi.org/10.3390/rs13061103>
 10. **Norton, Cynthia L.**; Dannenberg, Matthew P.; Yan, Dong; Wallace, Cynthia S.A.; Rodriguez, Jesus R.; Munson, Seth M.; **van Leeuwen, Willem J.D.**; Smith, William K. 2021. "Climate and Socioeconomic Factors Drive Irrigated Agriculture Dynamics in the Lower Colorado River Basin" *Remote Sens.* 13, no. 9: 1659. <https://doi.org/10.3390/rs13091659>
 11. Hartfield, K., **van Leeuwen, W. J. D.**, & Gillan, J. K. (2020). Remotely sensed changes in vegetation cover distribution and groundwater along the Lower Gila River. *Land*, 9(9). <https://doi.org/10.3390/LAND9090326>
 12. Cornejo-Denman, L.; Romo-Leon, J.R.; Hartfield, K.; **van Leeuwen, W.J.D.**; Ponce-Campos, G.E.; Castellanos-Villegas, A. 2020. Landscape Dynamics in an Iconic Watershed of Northwestern Mexico: Vegetation Condition Insights Using Landsat and PlanetScope Data. *Remote Sens.*, 12(16), 2519. <https://doi.org/10.3390/rs12162519>
 13. **Broxton, P.D.**; **van Leeuwen, Willem J.D.**, 2020. Structure from Motion of Multi-Angle RPAS Imagery Complements Larger-Scale Airborne Lidar Data for Cost-Effective Snow Monitoring in Mountain Forests. *Remote Sens.* 12, 2311. <https://doi.org/10.3390/rs12142311>
 14. **Xian Wang**, Matthew P. Dannenberg, Dong Yan, Matthew O. Jones, John S. Kimball, David J. P. Moore, **Willem J. D. van Leeuwen**, Kamel Didan, William K. Smith, 2020. Globally consistent patterns of asynchrony in vegetation phenology derived from optical, microwave, and fluorescence satellite data. *Journal of Geophysical Research: Biogeosciences*, 125, e2020JG005732. <https://doi.org/10.1029/2020JG005732>
 15. **Broxton, P. D.**, **van Leeuwen, Willem J.D.**, Biederman, J. A., 2020. Forest Structure and Topography Regulates the Thin, Ephemeral Snowpacks of the Semiarid Southwest US, *Ecohydrology*, <https://doi.org/10.1002/eco.2202>
 16. **Gillan, J.**, Karl, J., **van Leeuwen Willem J.D.** 2020, Integrating low cost drone imagery with existing rangeland monitoring programs. *Environmental Monitoring and Assessment*, 192(5), 269. <https://doi.org/10.1007/s10661-020-8216-3>
 17. 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.
 18. 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>
19. 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>
 20. 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>
 21. **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.
 22. **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
 23. **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
 24. **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
 25. **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
 26. **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.
 27. **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.
 28. **Czyzowska-Wisniewski, E. H., Willem J. D. van Leeuwen**, K. K. Hirschboeck, S. E. Marsh, and W. T. Wisniewski. 2015. Fractional snow cover estimation in complex alpine-forested environments using an artificial neural network. *Remote Sensing of Environment*, 156:403-417. doi:10.1016/j.rse.2014.09.026.
 29. 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.
 30. **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.
 31. **Shepard, C., M. G. Schaap**, M. A. Crimmins, **Willem J. D. van Leeuwen**, and C. Rasmussen. 2015. Subsurface soil textural control of aboveground productivity in the US Desert Southwest. *Geoderma Regional* 4:44-54. doi:10.1016/j.geodrs.2014.12.003.
 32. 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.](http://dx.doi.org/10.1603/EC13362)
 33. **Romo Leon, J. R., Willem J.D. van Leeuwen**, A. Catellanos-Villegas, 2014. Using Remote Sensing Tools to Assess Land Use Transitions in Unsustainable Arid Agroecosystems. *Journal of Arid Environments*, 106:27-35. doi:10.1016/j.jaridenv.2014.03.002.
 34. **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.
35. **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.
 36. 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.
 37. **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.
 38. **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.
 39. **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.
 40. **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.
 41. **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.
 42. Hartfield, K.A., **Landau, Kathryn 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.
 43. Olsson, A., **Willem J.D. van 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.
 44. **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.
 45. **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.
 46. **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.
 47. **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.
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 49. **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.
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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. 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 indicators 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>. Accessed June 2016.

Marsh, S., B. Orr, **Willem J.D. van Leeuwen**, A. Thwaites, 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>. 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 Czaplá-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-corfo.html. Accessed June 2016.

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=SODNLandscapeDynamicsImagery_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, Frédéric 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

2019 Faculty Spotlight <https://www.youtube.com/watch?v=QqwETKzOSOU>

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

CONFERENCES/SCHOLARLY PRESENTATIONS

Invited Presentations

2019 **Van Leeuwen WJD**. 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 Tecnológicas y su programa de posgrado, May 3, 2013.

Conference presentations

Kang San Lee, Willem van Leeuwen, Jeffrey Gillan, Donald A Falk, Unraveling the Determinants of Burn Severity: Predictive Regression Analysis of the Bighorn Fire in Santa Catalina, Arizona. AGU Fall Meeting 2023.

Cynthia Norton, Flurin Babst, Willem van leeuw. Fusing Ground and Airborne LiDAR with Tree-Ring Data to Assess Forest Productivity. AGU Fall Meeting 2023.

Tomasz Wlodarczyk, Kamila Murawska-Wlodarczyk, Willem van Leeuwen, Raina M Maier, Alicja Babst-Kostecka, Assessing Plant Metal Adaptation Strategies in a Mining-Impacted Arid Ecosystem. AGU Fall Meeting 2023.

Cynthia Norton Chandra Holifield Collins Kyle Alan Hartfield Loretta Metz Willem J D Van Leeuwen, Multi-Temporal LiDAR and Hyperspectral Data Fusion for Classification of Woody Cover Species at Different NEON Sites AGU Fall Meeting 2022.

Ravindra Dwivedi, Jessie Kathleen Pearl, Joel A Biederman, Kang San Lee, Patrick D Broxton, Jesse Pearl, Willem van Leeuwen, Forest structure controls on water inputs to soils, vegetation water stress, and percolation at sites with contrasting ephemeral or seasonal snowpack AGU Fall Meeting 2022.

Patrick D Broxton, Joel A Biederman, Willem J D Van Leeuwen, Using high resolution modelling to predict the effects of forest change on snowpack in the semiarid Southwest US. AGU Fall Meeting 2022.

R Dwivedi, J Biederman, PD Broxton, WJD Van Leeuwen, K San Lee; Improved understanding of climate-forest-snow interactions in forested ecosystems leads to a better understanding of ecohydrologic processes and informs forest management, AGU Fall Meeting 2021.

M Farella, M Barnes, DD Breshears, WJD Van Leeuwen, JJ Mitchell, R Gallery; High resolution landscape scale predictions of collective soil functioning; AGU Fall Meeting 2021.

PD Broxton, WJD Van Leeuwen, J Biederman; Using high resolution modelling to predict the effects of forest change on snowpack in the semiarid Southwest US; AGU Fall Meeting 2021.

M Farella, M Barnes, WJD van Leeuwen, J Mitchell, D Breshears, R Gallery. Novel Use of Remote Sensing for High Resolution Predictions of Collective Soil Functioning across a Dryland Ecosystem Landscape. ASA, CSSA, SSSA International Annual Meeting 2021

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

2024 – 26 Improving Water Supply Forecasting in the Colorado Basin with 40 years of Gridded Snowpack Data \$893,483 P. Broxton (PI) Co-I W van Leeuwen My effort: 10% research; Sponsor: Bureau of Reclamation

- 2023 – 24 Improving Streamflow Forecasting in Central Arizona with Remotely Sensed Soil Moisture and Other Satellite Observations; \$121,957. **W. van Leeuwen (PI)**. Co-I's Patrick Broxton. My effort: 50% research; Period: 8/2023 – 7/2024; Sponsor: Salt River Project.
- 2020 – 25 Producing an Operational RaBET for Rangelands in the Western U.S. **W. van Leeuwen (UA PI) & Chandra Holifield (ARS PI)**. \$343,167.00/year. Award Period: 9/2020 – 8/2025. Sponsor: Non Assistance Cooperative Agreement with the University of Arizona funded with Natural Resources Conservation Service (NRCS) - Conservation Effects Assessment Project (CEAP) funds
- 2022 – 23 Snowpack Monitoring, Modelling of Snow-Forest Interactions, and Streamflow Forecasting in Northern Arizona's Cragin Watershed \$116,523. **W. van Leeuwen (PI)**. Co-I's Patrick Broxton. My effort: 50% research; Period: 8/2022 – 7/2023; Sponsor: Salt River Project.
- 2021 – 22 Monitoring and modelling the impact of forest change on snowpack in northern Arizona \$119,137. **W. van Leeuwen (PI)**. Co-I's Patrick Broxton. My effort: 50% research; Award Period: 8/2021 – 7/2022; Sponsor: Salt River Project.
- 2020 – 22 Assessing Watershed Impacts of the Bighorn Fire – A collaboration with Pima County Regional Flood Control District **W. van Leeuwen (PI)**. Co-I's Kyle Hartfield and Jeff Gillan. My effort: 50% research; Award Period: 11/2020 – 3/2022; Sponsor: Pima County Flood Control District
- 2020 – 21 Studying Snow-Forest Interactions with an Ultra-high Resolution Snowpack Mass and Energy Balance Model \$160,245 **W. van Leeuwen (PI)**. Co-I's Patrick Broxton. My effort: 50% research; Award Period: 8/2020 – 7/2021; 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: 12/2019 – 11/2020; Sponsor: Salt River Project.
- 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 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. Czaplá-Meyers; M. Friedl (Univ. Boston, T. Miura (Univ. of Hawaii), Calli Jenkerson (USGS), \$3,099,782 8/2008– 7/2013. My effort: 12% research. Sponsor = NASA.

UA or Private Foundations

- 2023 -24 Plant-metal interactions as the basis for remediation of metal-contaminated mine sites in drylands, RII (TRIF) \$82,421. PI: A Babst Babst-Kostecka. Co-PIs: Raina M. Maier, Flurin Babst, Willem van Leeuwen.
- 2022- 23 Enhancing the VIP BEST-CLIM with a belowground perspective on carbon allocation in Southwestern vegetation. PI Flurin Babst, William K. Smith, Donald Falk, Willem van Leeuwen, Babst-Kostecka, AIRE \$8000
- 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.

Submitted Grants

2023 - University of Arizona (UA) DUST Superfund Research Center (SRC) submitted “Hazardous Dust in Drylands: Exposure, Health Impacts, and Mitigation” to the National Institute for Environmental Health Sciences (NIEHS) Superfund Research Program (SRP) (\$10Million) PI Xinxin Ding (Pending)

2023 - Tailoring phytoremediation in mining impacted drylands towards carbon capture and climate mitigation. Sponsor: Sloan Foundation 749,944 PI A Babst Kostecka (Pending)