FRANCISCO MUÑOZ ARRIOLA

7140 S. 31st PL
Lincoln, NE 68516
Phone (858) 568-5644
E-mail: fmunoz@unl.edu
https://engineering.unl.edu/bse/faculty/francisco-muñoz-arriola/
Hydroinformatics and Integrated Hydroclimate Research Group
https://engineering.unl.edu/hih/

EDUCATION

Ph.D. - Duke University, Civil and Environmental Engineering, 2007

Dissertation: *Hydrological Response to Precipitation Discrepancy and Land-Use Changes in the Yaqui River Basin*. Committee members: Roni Avissar, Ana P. Barros, Amilcare Porporato, Miguel Medina Jr., and Henry P. Gavin.

M.Sc. - Universidad Autónoma de Baja California, Coastal Oceanography, 1997

Thesis: *Ni and Vanadyl Porphirins: Distribution and Use as Indices of Oil Activity*

B.Sc. - Universidad Autónoma de Baja California, Oceanography, 1994

Thesis: *Variability of Wastewater loads of Cd, Cu, and Pb to the Todos Santos Bay.*

RESEARCH EXPERIENCE

University of Nebraska-Lincoln, Biological Systems Engineering Department

Associate Professor, since July 2019

Associate Professor, School of Natural Resources, since July 2019

Courtesy appointment at the Earth and Atmospheric Sciences Department

University of Nebraska-Lincoln, Biological Systems Engineering Department

Assistant Professor, since February 2013

Courtesy appointment at the School of Natural Resources

Courtesy appointment at the Earth and Atmospheric Sciences Department

Universidade do Sao Paulo, Luiz Quiroz College of Agriculture, Department of Biosystems Engineering.

Visiting/Adjunct Professor, since July 2018

United States Geological Survey, California Water Science Center-San Diego

Volunteer for Science, December 2010 to December 2018

University of California, San Diego, Scripps Institution of Oceanography, Division of Climate, Atmospheric Science, and Physical Oceanography

Postdoctoral Fellow, October 2010-January 2013

University of Washington, Department of Civil and Environmental Engineering

Research Associate, May 2007-September 2010

Duke University, Department of Civil and Environmental Engineering

Research Assistant, 2003 to 2007

Universidad Autónoma de Baja California, Instituto de Investigaciones Oceanológicas

Research Scientist, 1999

Universidad de Sonora, Departamento de Investigación Científica y Tecnológica

Researcher, 1996-1998

Universidad Autónoma de Baja California, Instituto de Investigaciones Oceanológicas

Research Assistant, 1994-1996

Universidad Autónoma de Baja California, Facultad de Ciencias Marinas

Technician, 1993

AWARDS AND HONORS

University of Nebraska-Lincoln, College of Engineering Research - Annual Recognition Teaching Award, Recipient (2020)

University of Nebraska-Lincoln-Inclusion and Diversity Faculty fellow, (2018-now)

University of Nebraska-Lincoln, College of Engineering Research - Annual Recognition Award, Recipient (2018)

National Science Foundation-Interdisciplinary Methods (for Disaster Research), Fellow, Recipient (2015-16)

National Science Foundation-Enabling the Next Generation of Hazards and Disasters Researchers Fellow, Recipient (2015-16)

University of Nebraska-Lincoln, Parent Association and Teaching Council-Contributions to Students Award, Recipient (2015)

America Meteorological Society/National Science Foundation-Summer Policy Colloquium Fellow, Recipient (2014)

Dougherty Water for Food Global Institute, Faculty Fellow, Recipient (since 2014)

University of Nebraska-Lincoln-Layman Award, Recipient (2014)

University of Nebraska-Lincoln-Research Development Fellows Program, Recipient (2013-2014)

World Meteorological Organization, Consultant (since 2011)

Science and Technology National Council, National Scientist System Award, Mexico (since 2010)

GRANTS

Pending

US Geological Survey 104G (Submitted March 2020). *Implementation and evaluation of ET estimation approaches in agricultural applications of groundwater flow and transport models*. Co-PI, $600,000.

United States Department of Agriculture-NIFA Foundational's Food and Agriculture Cyberinformatics and Tools (Submitted August 2019). *Predictive, geospatial and network analytics of groundwater levels for innovation in cross-scale agriculture and water management in the High Plains Aquifer*. PI, $1,000,000.

Funded

($4,183,000, my share is $1,183,000 since 2013)

University of Nebraska-Lincoln-Agriculture Research Division and Daugherty Water for Food Global Institute (2019-2020). *Irrigation Sustainability*. PI, $40,000.

University of Nebraska-Lincoln-Agriculture Research Division (2019-2020). *Predictability and resilience of groundwater systems in Nebraska: coupling natural-human systems*. PI, $30,000.

United States Department of Agriculture-NIFA Foundational's Plant Breeding for Agricultural Production (2018-2021). *Gene-to-Global Hydroclimatic Controls on Hybrid Performance Forecast*. PI, $490,000.

National Science Foundation-Research Training (NRT) (2017-2022). *Training in Theory and Application of Cross-scale Resilience in Agriculturally Dominated Social Ecological Systems*. One of five Co-PIs, $3,000,000.

University of Nebraska-Lincoln-Water for Food Institute-Institute of Agriculture and Natural Resources (2017-2019). *Irrigation Sustainability*. Co-PI, $200,000.

University of Nebraska-System Science (2017-2018). *Modeling Resilient Interdependent Systems for Data-driven Decision Support*. Co-PI, $20,000.

US Geological Survey 104B (2017). *Impact of Variable Rate Irrigation on Consumptive Use of Water Resources*. Co-PI, $20,000.

University of Nebraska-Lincoln-Office of Research and Economic Development (2016-2017). *Dynamics and Trade-offs among Social, Economic, and Ecological Components of Resilience in Working Agricultural Landscapes*. Co-PI, $100,000.

United States Department of Agriculture-Foundational-HATCH Project (2016-2020). *Predictability of Water Distribution and Transport across Spatial and Temporal Scales:*

An Application on Cropland Management. PI-Four Co-PIs (Approved - No funds provided and valued in $3,200,000).

CONACYT-SEMARNAT (2015-2017). *Heterogeneity and Scalling of Land Surface-Atmosphere Water and Energy Fluxes In Regional Climate Systems of the Mexican Plateau*. PI, $300,000 (my share $20,000).

United States Department of Agriculture-Foundational-ARS Northern Plains Regional Climate Hub and Nebraska Extension (2015-2016). *Generating Nebraska Climate Information for Extension Use in Addressing Clientele Needs*. PI, $10,000.

Robert B. Daugherty Water for Food Global Institute-University of Nebraska. (2015-2018). *Engineering Informed Water Resources-Decision Making and Sustainable Development for Agriculture in the Northern High Plains of the United States: The Physical Dimension*. PhD fellowship. PI, $142,000.

Robert B. Daugherty Water for Food Global Institute-University of Nebraska. (2014-2017). *Software Development for Water- and Agriculture-resources Data and Information Access: the case of the Water for Food Interoperability System (WaFIS)*. Postdoctoral Fellowship. PI, $126,000.

US Geological Survey 104B (2014-15). *Hydroclimatic controls on the conjunctive use of surface and ground water in the Platte River Basin*. PI, $45,000.

University of Nebraska-Lincoln-Layman Award (2014-2015). *Sources of Agricultural Drought Predictability in the Central Great Plains*. PI, $10,000.

FEMSA Foundation (2015-2016). *Short-term Hydrometeorological Forecast System with emphasis in Flood Forecasts*. PI, $690,000 (withdrawn).

Consejo Nacional de Ciencia y Tecnologia-REDESCLIM (2013). *Hydrometeorologic and Climate Digital Resources: Storage and Use*. PI, $10,000.

Consejo Nacional de Ciencia y Tecnologia-REDESCLIM (2012-2013). *Toward an Improved Database for Hydrometeorological and Hydroclimatological Assessments in México*. Co-PI, $30,000.

Consejo Nacional de Ciencia y Tecnologia-REDESCLIM (2012-2013). *Diagnostic of Hydrometeorological Extreme Events in México: Current State and Perspectives*. PI, $26,000.

Comisión Nacional del Agua (2011). *Hydroclimatology of Southern River Basins*. $50,000. PI. Instituto Mexicano de Tecnología del Agua (2010). Applications of a coupled Atmospheric-Land Surface Modeling System for Flood Prediction in Mexico. Co-PI, $81,000.

Competitive Fellowships

($275,000, including undergraduate research experiences since 2013)

Water Advance Research and Innovation (2020). *Flood forecast and adaptive management*, fellow: Dr Vishal Singh (Hydrologist). National Institute of Hydrology, India. Co-PI, $50,000.

Water Advance Research and Innovation (2019). *Hydropower generation in the Himalayas*. Vidyasar University, internship: Kausik Ghosh (PhD student). PI, $20,000.

Water Advance Research and Innovation (2018). *Operational Meteorological Drought Monitoring across India using Multisatellite High Resolution Grid*, fellow: Dr Raaj Ramsankaran (Associate Professor). Indian Institute of Technology-Bombay. Co-PI, $25,000.

Water Advance Research and Innovation (2018). *Analysis and simulation of relevant water quality climate scales using global climate model and remote sensing*. Indian Institute of Technology-Guwahati, internship: Ashutosh Sharma (PhD student). PI, $20,000.

Consejo Nacional de Ciencia y Tecnología (2017-2018). *Information technologies, data mining and visualization for the Nexus Food-Energy-Water in a Changing Climate*, Sabbatical year: Gabriel Lopez-Morteo (PhD and Professor), Co-PI, $32,000.

Water Advance Research and Innovation (2017). *Water Quality changes in a Changing Climate.* Indian Institute of Information Technology, Hyderabad, fellow: Dr Shaik Rehana (Assistant Professor). Co-PI, $25,000.

Water Advance Research and Innovation (2017). *Improving Drought Monitoring and Forecasting: Assimilation of Satellite-based Soil Moisture into a Hydrological Model*. Banaras Indo University, internship: Swati Grant (PhD student). PI, $20,000.

Water Advance Research and Innovation (2017). *Real Time Flood Estimation using Satellite based Rainfall Estimates for Krishna Basin (India) and Upper Missouri Basin (USA)*. Indian Institute of Technology-Bombay, internship: Ashish Sharma (PhD student). PI, $20,000.

Consejo Nacional de Ciencia y Tecnología (2017). *Development of a platform of software for climate-data storage and management*. Universidad Autonoma de Baja California, Mexico. Internship Jesus Donaldo Osornio-Hernandez: $10,000. (Master Student in Computer Sciences).

Consejo Nacional de Ciencia y Tecnología (2017). *Development of a platform of software for analytics and visualization of Extreme Hydrometeorological and Climate Indices*, Universidad Autonoma de Baja California, Mexico. Internship Luis Alejandro Herrera-Leon: $10,000. (Master Student in Computer Sciences).

Water Advance Research and Innovation (2016). *Assessment of Water Quantity and Quality in Testa River Basin using Remote Sensing Data and Hydrologic Modeling*. Indian Institute of Technology, Guwahati, fellow: Manish Kumar Goyal (Assistant Professor). Co-PI, $25,000.

Water Advance Research and Innovation (2016). *Enhancing Agricultural Water Management through High Resolution Remotely Sensed Drought Monitoring data and*

Hydrologic Modeling. Indian Institute of Technology, Gandhinagar, fellow: Vimal Mishra (Assistant Professor). Co-PI, $25,000.

Consejo Nacional de Ciencia y Tecnología (2016). *Groundwater costs and risks in the Mexican Valley*. Universidad Autonoma de Chapingo, Mexico. Internship Yessica Gomez: $7,000. (Master Student in Agricultural Engineering).

Consejo Nacional de Ciencia y Tecnología (2015). *Information Technologies for Water and Agricultural Resource Management*. Universidad Autonoma de Baja California. Internship: Antonio Rosales: $10,000. (Master Student in Computer Sciences).

Consejo Nacional de Ciencia y Tecnología (2015). *Information Technologies in Climate Modeling*. Universidad Autonoma de Baja California. Internship: Carlos Ancona Villarreal: $10,000. (Master Student in Computer Sciences).

Consejo Nacional de Ciencia y Tecnología (2014-2016). *Drought Predictability*. $7,000. PI (PhD fellowship).

ACCEPTED AND PUBLISHED ARTICLES

[1]*Graduate student;* [2]*Research Associate;* [3]*Visiting scholar*

Amaranto[1], A., F. Pianosi, D. Solomatine, G. Corzo-Perez, and F. Munoz-Arriola (2020). *Sensitivity Analysis of Hydroclimatic Controls of Data-driven Groundwater Forecast in Irrigated Croplands*. *Journal of Hydrology*. https://doi.org/10.1016/j.jhydrol.2020.124957.

Ashish Kumar[1], RAAJ Ramsankaran[3], Luca Brocca, Francisco Munoz-Arriola (2019). A Machine learning approach for improving near-real-time satellite-based rainfall estimates by integrating soil moisture. Remote Sensing. doi:10.3390/rs11192221.

Amaranto[1], A., F. Munoz-Arriola, G. Corzo-Perez, and D. Solomatine (2019). *A Spatially enhanced data-driven multi-model to improve semi-seasonal groundwater forecasts in the High Plains aquifer, USA*. Water Resources Research. DOI:10.1029/2018WR024301.

Khan[1], M., F. Munoz-Arriola, R. Shaik[3], and P. Greer[1] (2019). *Spatial heterogeneity of temporal shifts in extreme precipitation across India*. Journal of Climate Change. DOI: 10.3233/JCC190003.

Ou[2], G., F. Munoz-Arriola, D. Uden[2], D. Martin and C. Allen (2018). *Climate change implications for irrigation and groundwater in the Republican River Basin, USA*. Climatic Change. https://doi.org/10.1007/s10584-018-2278-z.

Amaranto[1], A., F. Munoz-Arriola, G. Meyer, D. Solomatine, and G. Corzo (2018). Semi-seasonal Predictability of Water-table Changes Using Machine Learning Methods in Response to Integrated Hydroclimatic and Management Controls. Journal of Hydroinformatics. doi: 10.2166/hydro.2018.002.

Uden[2], D.R., C.R. Allen, F. Munoz-Arriola, G. Ou[2], and N. Shank (2018). *A Framework for Tracing Social–Ecological Trajectories and Traps in Intensive Agricultural Landscapes*. Sustainability. doi:10.3390/su10051646.

Rudnick, D.R., T. Lo, J. Singh[1], R. Werle, F. Muñoz-Arriola, T.M. Shaver, C.A. Burr, and T.J. Dorr (2018). *Reply to comments on "Performance assessment of factory and field calibrations for electromagnetic sensors in a* loam soil". 203:272-276. DOI:10.1016/j.agwat.2018.02.036.

Singh[1], J., T. Lo, D.R. Rudnick, T.J. Dorr, C.A. Burr, R. Werle, T.M. Shaver, and F. Muñoz-Arriola (2018). *Performance Assessment of Factory and Field Calibrations for Electromagnetic Sensors in a Loam Soil*. Agricultural Water Management.196: 87-98.

Das, A., F. Munoz-Arriola, S. Singh, and M. Kumar[3] (2017). *Nutrient Dynamics of Brahmaputra (Tropical River) during Monsoon Period*. Desalinization and Water Treatment.doi:10.5004/dwt.2017.20788.

Avery, W.A., C. Finkenbiner, T. E. Franz, T. Wang, A. L. Nguy-Robertson, A. Suyker, and T. Arkebauer, and F. Munoz-Arriola (2016). *Incorporation of globally available datasets into the roving cosmic-ray neutron probe method for estimating field-scale soil water content*. Hydrol. Earth Syst. Sci., 20, 3859–3872.

Livneh, B., T. Bohn, D. Pierce, F. Munoz-Arriola, B. Nijssen, R. Vose, D. Cayan, L. Brekke (2015): *A spatially comprehensive, hydrometeorological data set for Mexico, the U.S., and southern Canada 1950-2013*. Nature - Scientific Data, doi:10.1038/sdata.2015.42.

Perez-Morga[1], N., T. Kretzshmar, T. Cavazos, S. Smith, and F. Munoz-Arriola (2013). *Variability of Extreme Precipitation in coastal River Basins of the Southern Mexican Pacific Region*. Geofisica Internacional. 52(3): 277-291.

Frans, C, Istanbulluoglu, E., M. Vimal, F. Munoz-Arriola y D. P. Lettenmaier (2013). *On runoff trends in the Upper Mississippi River Basin: influences of climate and land use*. Geophysical Research Letters. 40, doi:10.1002 /grl.50262, 2013.

Tang, Q., E. Vivoni, F. Munoz-Arriola, and D. P. Lettenmaier (2012). *Predictability of evapotranspiration patterns using remotely-sensed vegetation dynamics during the North American monsoon*. Journal of Hydrometeorology, 13(1), 103-121.

Preisler, H. K., A. L. Westerling, K. M. Gebert, F. Munoz-Arriola, and T. P. Holmes (2011). *Spatially Explicit Forecasts of Large Fire Probability and Suppression Costs for California Federal and State Lands*. International Journal of Wildland Fire, 20(4), 508-517.

Muñoz Arriola, F. J. H. Salgado Rabadán, H. M. Rocchiccioli, S. Shukla, A. Güitrón De los Reyes, y R. Lobato Sánchez (2011). *Surface Hydrology in the Grijalva River Basin: Calibration of the Variable Infiltration Capacity Model*. Aqua-LAC, 3(1), 68-79.

Sheffield, J, E. Wood and F. Munoz-Arriola (2010). *Long-term regional estimates of evapotranspiration for Mexico based on downscaled ISCCP data*. Journal of Hydrometeorology, 11(2), 253-275.

Munoz-Arriola, F., D.P. Lettenmaier, Zhu, C. and R. Avissar (2009). *Water resources sensitivity of the Rio Yaqui Basin, México to agriculture extensification under multi-scale climate conditions*. Water Resources Research, 45, W00A20, doi:10.1029/2007WR006783.

Munoz-Arriola, F., Shraddhanand Shukla, Theodore J. Bohn, Chunmei Zhu, Ben Livneh, Dennis P. Lettenmaier, René Lobato Sánchez, and Ana Wagner Gomez (2009). *Forecasting Surface Hydrology in North America. Border Climate Summary, July 2009*: 1-5.

Munoz-Arriola, F., D. P. Lettenmaier, C. Zhu, A. W. Wood, R. Lobato Sánchez, and A. Wagner Gomes (2008). *Extended West-wide Seasonal Hydrological System: Seasonal Hydrological Prediction in the NAMS region*. CLIVAR Exchanges, 43: 24-25.

Muñoz Arriola, F., J. D. Carriquiry-Beltran, E. Nieto-Garcia, and M. Hernandez-Ayon (1999). *Colorado River Delta*, In: Mexican and Central American Coastal Lagoon Systems: Carbon, Nitrogen and Phosphorus Fluxes. S.V. Smith. LOICZ Reports and Studies No. 13, pp 59-69.

BOOKS, CHAPTERS AND WHITE PAPERS ACCEPTED OR PUBLISHED

[1]Graduate student; [2]Research Associate; [3]Visiting scholar

Munoz-Arriola, F. and J.V. Macias-Zamora (Submitted). Biogeochemical Attributions of Porphyrins to Oil Pollution using Liquid Chromatography and Geospatial Analytics. In Resilience, Response, And Risk In: Water Systems: Shifts In Natural Forcings And Management Paradigms. Ed Springer.

Kumar, M., F. Munoz-Arriola, H. Furumai, and T Chaminda (Submitted) RESILIENCE, RESPONSE, AND RISK IN WATER SYSTEMS: SHIFTS IN NATURAL FORCINGS AND MANAGEMENT PARADIGMS. Springer Transactions in Civil and Environmental Engineering.

Shaik[3] R., F. Munoz-Arriola, D. A. Rico[1], and S. L. Bartelt-Hunt (2019). *Modelling Water Temperature's Sensitivity to Atmospheric Warming and River Flow*. In Environmental Biotechnology: for sustainable future (Eds. R. B. Sobti, N. Arora, and R. Kothari) ISBN 978-981-10-7283-3.

Lawrence-Dill, C.J., Patrick Schnable, Nathan Springer, and: Natalia de Leon, Jode Edwards, David Ertl, Shawn Kaeppler, Nick Lauter, John McKay, Francisco Munoz-Arriola, Seth Murray, Duke Pauli, Nathalia Penna Cruzato, Colby Ratcliff, James Schnable, Kevin Silverstein, Edgar P. Spalding, Addie Thompson, Ruth Wagner, Jason Wallace, Justin Walley, and Jianming Yu (2018). White paper: High Throughput, Field-Based

Phenotyping Technologies for the Genomes to Fields (G2F) Initiative. 2018 NIFA FACT Workshop. January 28-30, 2018, 8 pp.

Shekhar, S., J. Colleti, F. Munoz-Arriola, L. Ramaswamy, C. Krinz, L. Varshney, D. Richardson (2017). *Intelligent Infrastructure for Smart Agriculture: An Integrated Food, Energy and Water System*. eprint arXiv:1705.01993. 2017arXiv170501993S. A Computing Community Consortium (CCC) white paper, 8 pp.

Munoz-Arriola, F. D. Martin, and D. Eisenhauer (2014). *Nebraska's Water Resources in Changing Climate. In: Understanding and Assessing Climate Change: Implications for Nebraska*.

Wilder, M., G. Garfin, P.Ganster, H. Eakin, P. Romero-Lankao, F. Lara-Valencia, A. Cortez-Lara, S. Mumme, C. Neri, and F. Munoz-Arriola (2013). *Impacts of Future Climate Change in the Southwest on Border Communities*. In: National Climate Assessment Southwest.

Muñoz Orozco A. and F. Munoz-Arriola (2010). *Water, Climate, and Agro-ecological Systems: Past, Present, and Challenges. In: Lectures in Etnobotany*. Ed. J.A. Cuevas Sanchez. (In Spanish).

PROCEEDINGS

Banda, M. M., D. M. Heeren, D. L. Martin, F. Munoz-Arriola, and L. G. Hayde. 2019. *Economic analysis of deficit irrigation in sugarcane farming: Nchalo Estate, Chikwawa District, Malawi*. ASABE Annual International Meeting, Paper No. 1900852, Boston, Mass. 19 pages.

Korus, J.T., K. Cameron, C.M. Hobza, N-P.Jensen, D. A. Rico, and F. Munoz-Arriola (2018). Integrating AEM and borehole data for regional hydrogeologic synthesis: tools and examples from Nebraska, USA. AEM 2018/7th International Workshop on Airborne Electromagnetics. June 20 2018, Fjordvej, Denmark.

Munoz-Arriola, R. Shaik[4], and M. Kahn[2] (2017). Toward a Food-Energy-Water-Ecosystem Services Nexus for Rapid Growing Cities in a Changing Climate. International Symposium on Sustainable Urban Environment (ISSUE 2017). Tezpur University, Assam, 23-24 June 2017. 5pp.

SOFTWARE AND DATABASE DEVELOPMENTS

[1]Graduate student; [2]Research Associate; [3]Visiting scholar;[4]Undergraduate

Isaak Arslan[4], Jake Field[4], Cale Harms[4], Hallie Hohbein[4], Miracle Modey[4], B. Ramamurthy, D. Benet. Y-C Chen, and F. Munoz-Arriola (2019). NEO-SAT: An information support system for flood-disaster management.

Cantú-Guerrero[1], J., Craven, J., A. Amaranto[1], G. Corzo-Perez, F. Munoz-Arriola (2018). *Prototype of Software Platform to Forecast Semiseasonal Well-Level Responses to Climate and Irrigation Scheduling in the High Plains*.

Herrera-Leon[1], L. A., M. Khan[1], G. Lopez-Morteo[3], and F. Munoz-Arriola (2018). *Unified-access mechanisms for Weather, Climate, Water data with geospatial constrains and resolutions*.

Osornio-Hernandez[1], J. D., G. Lopez-Morteo[3], and F. Munoz-Arriola (2018). *Database management for multi-dimensional data storage*.

Rico[1], D. A., J. Korus, and F. Munoz-Arriola (2017). *Mining Alphanumerical Stratigraphic Data for Aquifer Diagnosis and Ground water-level Forecast*.

Rico[4], D. and F. Munoz-Arriola (2016). *Seasonal Hydrological Forecast System: A Prototype. Funded by the Daugherty Water for Food Institute and UNL.*

Munoz-Arriola, F. and G. Lopez-Morteo[3]. *(1) Two data-collectors of data via web services programed in Python and Java; (2) six APIs that standardize/translate/deliver data in multiple formats (CSV, JSON, netCDF, postgreSQL, SPSS, HDF and text); (3) three apps (2 for smart phone and webpage); (4) analytics to address crop, livestock, and community needs.*

POLICY AND OUTREACH COMMUNICATIONS

Munoz-Arriola, F., C. Allen, D. Martin, G. Ou, J. Carroll (*2018). Crafting an Irrigation Sustainability Framework for Nebraska.* Project and questionnaire accepted by University of Nebraska-Lincoln Institutional Review Board (July 24, 2018). IRB Number # 51403.

Water Resources Committee. Water Resources in the 21st Century. AMS's Water Resources Policy Statement (2017). American Meteorological Society-Water Resources, Committee Member and contributor. https://www.ametsoc.org/ams/index.cfm/about-ams/ams-statements/statements-of-the-ams-in-force/water-resources-in-the-21st-century1/.

Greer, H., S. Rehna, A. Kumar, M. Ou, and F. Munoz-Arriola. *Editorial on extreme events and climate change*. Lincoln Journal Star (06/06/2017).

ARTICLES SUBMITTED AND IN REVIEW

[1]Graduate student; [2]Research Associate; [3]Visiting scholar

Pandey, V., P. K. Srivastava, R. K. Mall, F. Munoz-Arriola, D. Han. Evaluation of the Multi-Satellite Precipitation Products for Meteorological *Drought Assessment and Forecasting in Central India*. (Submitted to *Water Management*)

Carrillo-Cruz[2], C. M. and F. Munoz-Arriola. *Sources of semi seasonal-to-seasonal predictability of rainfall in cross-scale hydroclimatic patterns in the Northern High Plains*. (To be resubmitted to *Journal of Applied Climate and Meteorology* in March of 2020).

Reed, C., F. Munoz-Arriola, N. Shank, T. Abdel-Monem, and A. Amaranto[1]. *Water-system changes in response to policy and environmental changes*. (To be re-submitted to *Water Resources Research*).

Ashish Kumar[1], RAAJ Ramsankaran[3], Luca Brocca, Francisco Munoz-Arriola. Expanding Machine learning modeling for improving near-real-time satellite-based rainfall-runoff forecasts in India. (To be submitted to the *International Journal of applied earth observations*).

Alves de Oliveira[2], L., F. Munoz-Arriola, D. Martin, and C. Allen. *Crafting an irrigation sustainability framework in the Northern High Plains (USA) using stakeholders' opinions* (Invited Journal of *Science of the Total Environment* in May 2020).

Munoz-Arriola, F. K. Werner[1], F. D. Rico[1], D. Rudnick, J.C. Chacon, A. A. Swamy, and G. Corzo. *Large-scale Resilient Agroecosystems after the Effect of Dry and Wet Spells* (Invited to be submitted to the Journal of *Science of the Total Environment* in May 2020).

Ghosh, K[3]. and F. Munoz-Arriola. Intraseasonal and interannual effects of hydropower expansion in the Northeast Himalayas. (To be submitted to *Nature Scientific Reports*).

Jaimes-Correa[1], F. Munoz-Arriola, C. Zimmer[1], M. Khan[1], and J.C., S. Bartelt-Hunt. Emergent contaminants in *streamflows and their response to Extreme Hydrometeorological and Climate Events in an Intensive Agricultural Watershed*.

Lopez-Morteo[3], G.A. and F. Munoz-Arriola. *How to introduce data science training in Biological Systems and Agriculture Engineering Majors: A conceptual Framework*. (to be submitted to *Computers & Education* in December of 2019).

Romanelli[3], T. and F. Munoz-Arriola. *Toward a Conceptual Framework to Assess Socio-technical Drivers of Decision-making for Technology Adoption in Irrigated Landscapes of the Midwest*. (to be submitted to Precision Agriculture).

Shaik[3] R., M. Khan[1], A. Herrera-Leon[1], and F. Munoz-Arriola. *Observational Evidence of Interdependent Precipitation and Temperature Extreme Events over India*. Nature's Scientific Reports.

Khan[1], k., S. Majumder, L. Alves-de Oliveira[2], and F. Muñoz-Arriola. *A nonstationary assessment of annual runoff generation in response to integrated climate and land-use changes at basin scale*.

Singh[1], V., M. Kumar Goyal[3], R., and F. Munoz-Arriola. *Snowpack and snowmelt change assessment by implementing elevation bands and parameters sensitivity analysis over highly hilly terrains of Himalayan catchments*. Journal of Hydrology. (To be re-submitted to *Water*).

ARTICLES IN PREPARATION

[1]Graduate student; [2]Research Associate; [3]Visiting scholar; [4]Research Faculty

Sarzaeim[1], P., D. Jarquin[4], and F. Munoz-Arriola. *Hydroclimate drivers of* uncertainty in phenotype predictability *across-scale agricultural landscapes*.

Rico[1], D. A., C. Detweiler, and F. Munoz-Arriola. *A power-tethered atmospheric temperature acquisition drone system*.

Sarzaeim[1], P., W. Ou[1], L. Alves de Oliveira[2], and F. Munoz-Arriola. *Spatiotemporal diagnostics and prognostics of major crops' vulnerabilities to flooding in the Northern High Plains*.

Munoz-Arriola, F., P. Sarzaeim[1], C. Wanderline[1], W. Ou[1], M. Khan[1], L. Alves de Oliveira[2]. *The paradigm shift and complexities of designing standards for climate-resilient water and agricultural infrastructure* (to be submitted to Proceedings of the National Academy of Sciences or the Bulletin of the American Meteorological Society).

Wilson, A., Parzybok, T. Cielli, R. and F. Munoz-Arriola. *Toward Building Infrastructure Resiliency to Future Hydroclimate Extremes: A Case Study Investigation.*

Khan[1], M. R. Shaik[3], J. Clarke, and F. Munoz-Arriola. *Geospatial attributions of climate and urban growth on extreme precipitation in India*.

Luna[3], I., D. Jarquin[4], and F. Munoz-Arriola. *Statistical approach to estimate the number of ensembles required to improve the predictability of extreme precipitation.*

SOFTWARE AND DATABASE DEVELOPMENTS IN PREPARATION

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Munoz-Arriola, F., W. Lavado, R. J. Oglesby, C. M. Rowe, J. L. Vazquez-Aguirre. *Transcontinental hydrometeorological extremes and streamflow generation in the Pacific Coast*. American Geophysical Union, Fall Conference, San Francisco, CA. December 10th 2013.

Munoz-Arriola, F., M. Dettinger, R. Hanson, C. Faunt, and D. Cayan. *Modeling the Conjunctive use of Surface Water and Groundwater in California's Central Valley*. 2013 Water for Food Conference, Lincoln, Nebraska. May 5th 2013.

Munoz-Arriola, F., M. Dettinger, R. Hanson, C. Faunt, and D. Cayan. *Hydroclimatic Limits on Conjunctive use of Surface Water and Groundwater in California's Central Valley*. Vulnerability and Adaptation to Extreme Events in California in the Context of a Changing Climate: New Scientific Findings, San Diego, CA. December 13th 2011.

Munoz-Arriola, F., M. Dettinger, R. Hanson, C. Faunt, and D. Cayan. *Climate Variability and Water-Regulation Effects on Surface Water and Groundwater Interactions in California's Central Valley*. American Geophysical Union, Fall Conference, San Francisco, CA. December 5th 2011.

Frans, C. E. Istanbulluoglu, V. Mishra, F. Munoz-Arriola, D. P. Lettenmaier. *Examining the role of climate and land use change on hydrologic trends in the Upper Mississippi River Basin*. American Geophysical Union, Fall Conference, San Francisco, CA. December 8th 2011.

Munoz-Arriola, F., M. Dettinger, R. Hanson, and D. Cayan. *Surface Water and Groundwater interactions: Natural vs Human Factors in Central Valley CA*. Groundwater-Surface Water Interaction: California's Legal and Scientific Disconnect. Sacramento CA. June 14th 2011.

Munoz-Arriola, F. R. Hanson, M. Dettinger, and D. Cayan. *Interdependence of Climate and Land Surface Hydrology in the Central Valley: The use of modeling and remote sensing*.

California Water and Environmental Modeling Forum 2011. Monterey CA March 1st 2011.

Tang, Q., F. Munoz-Arriola, E. Vivoni, and D. P. Lettenmaier. *Effects of vegetation dynamics on evapotranspiration and soil moisture in Northwestern Mexico*. American Meteorological Society, Seattle, WA, USA. January 24th 2011

Frans, C. F. Munoz-Arriola, E. Istanbulluoglu, D. P. Lettenmaier. *Impacts of Agricultural Extensification on Regional-scale Hydrology: the case of the Mississippi River Basin*. American Meteorological Society, Seattle, WA, USA. January 24th 2011.

Munoz-Arriola, F. R. Hanson, Q. Tang, T. Das, M. Dettinger, and D. Cayan. *Surface hydrology-climate interdependency in the Central Valley Agrosystem*. American Geophysical Union, Fall Conference, San Francisco, CA. December 17th 2010.

Frans, C. F. Munoz-Arriola, E. Istanbulluoglu, D. P. Lettenmaier. *Impacts of variable agricultural expansion and contraction on regional scale hydrology: The case of the Upper Mississippi River and Ohio River Basins*. American Geophysical Union, Fall Conference, San Francisco, CA. December 13th 2010.

Perez-Morga, N., T. Kretzschmar, F. Munoz-Arriola, and T. Cavazos. *Climate Variability in Southern Mexico: the case of the Oaxacan Pacific Coast Basins*. American Geophysical Union, Fall Conference, San Francisco, CA. December 13th 2010.

Munoz-Arriola, F., A. Wagner-Gomez, S. Shukla, T. Bohn, and D. P. Lettenmaier. *Streamflow Forecast with Agriculture Applications in Northwestern México*. Steve Burges retirement symposium. Hydrology in the 21st Century: Links to the past, and a vision for the future. University of Washington, Seattle, WA, March 25th, 2010.

Munoz-Arriola, F., S. Shukla, T. Bohn, D. P. Lettenmaier, R. Lobato-Sanchez, and A. Wagner-Gomez. *Predicción Hidrológica y de Sequía en Norte América*. 2º Taller sobre Variabilidad y Cambio Climático en la Costa Oeste de América del Norte. IMTA and University of Arizona, Jiutepec, Morelos, July 22 del 2009.

Munoz-Arriola, F., Q. Tang, C. Zhu, E.R. Vivoni, and D.P. Lettenmaier. *Interannual and intraseasonal interactions between greening process and soil moisture in the North American monsoon region in northwestern Mexico*. American Geophysical Union, Fall Conference, San Francisco, CA.

Shukla, S., F. Munoz-Arriola, T. Bohn, A. C. Steinemann, and D. P. Lettenmaier. *Assessment of ESP based Drought Prediction Skill*. CPDW Meeting, Nebraska, USA October 23rd 2008.

Munoz-Arriola, F., S. Shukla, T. Bohn, A. Ray, R. Labato Sanchez, A. Wagner Gomes, and D. P. Lettenmaier. *Intraseasonal-to-interannual hydrologic prediction and water resource applications in the NAME Tier 1 core area*. Climate Prediction Program for the Americas Meeting, Maryland, MD, USA. Sept. 2008.

Bohn, T., Francisco Munoz, S. Shukla, B. Livneh, and D. P. Lettenmaier. *Incorporating multi-model ensemble techniques into a real-time drought monitoring system*. Climate Prediction Program for the Americas Meeting, Maryland, MD, USA. Sept. 2008.

Munoz-Arriola, F., C. Zhu, A. Ray, and D. Lettenmaier. *Hydrological drought sensitivity to land use changes in a Northwestern Mexico River Basin*. Regional Climate Forum for Northwest Mexico and Southwest United States, Abril 10 del 2008. Ensenada, BC, México.

Zhu, C. F. Munoz-Arriola, A. Wood, A. Wagner-Gomez, R. Lobato-Sanchez and D. P. Lettenmaier. *The Extended University of Washington West-wide Hydrological Seasonal Forecast System: Covering Mexican Territory*. Regional Climate Forum for Northwest Mexico and Southwest United States, Abril 10 del 2008. Ensenada, BC, México.

Munoz-Arriola, F., G. Thomas, A. Wood, A. Wagner-Gomez, R. Lobato-Sanchez, and D. P. Lettenmaier. *Hydrological Forecasting in Mexico: Extending the University of Washington West-wide Seasonal Hydrologic Forecast System*. American Geophysical Union, Fall Conference 2007, San Francisco, CA.

Wei Li, A. P. Barros, D. Hyuk-Kang, O. P. Prat, P. Shrestha, K. Tao, J. Giovannettone, F. Munoz, W. Patrick, C. Peters-Liddard, and T. Jackson. *Surface fluxes and convective instability in boundary layer in the summer Fort Cobb experiment, CLASIC*. American Geophysical Union, Fall Conference 2007, San Francisco, CA.Munoz-Arriola, F. and D. Lettenmaier. *Hydrological drought sensitivity to land use changes in the Yaqui River Basin*. 2007 Joint Assembly (AGU), Acapulco, México.

INVITED TALKS

Genomes to Fields initiative. *Plugin-based architecture of software to predict corn phenotypes*. 2020 G2F GxE Collaborator's Meeting at the Phenome Meeting. February 24, 2020.

American Meteorological Society-Water Resources Committee. *2019 Midwest Flood Event: complexities, effects, and resilience*. Water Resources Committee. September 25, 2019.

University of Nebraska-Lincoln. *The water continuum: predictability of a resilient complex system in a changing environment*. Stout Lecture. Earth and Atmospheric Sciences Department. October 19, 2018.

University of Nebraska-Lincoln. *From paper to BIG Data: the NEXUS Water-Food-Energy Ecosystem services in the era of information*. Department of Biological Systems Engineering. Lincoln, NE. September 12th 2018.

The Ohio State University. *Extreme precipitation: predictability and transitions to nonstationary design*. Department of Civil, Environmental and Geodetic Engineering. Columbus, Ohio, February 2nd 2018.

Computing Community Consortium (Computing Research Poster). Munoz-Arriola, F., S. Shekhar, J. Colleti, L. Ramaswamy, C. Krinz, L. Varshney, and D. Richardson. *Toward*

a Resilient Food-Energy-Water-Ecosytem Services Nexus: Analytics and Synthesis. Computing Community Consortium. Computing Research: Addressing National Priorities and Societal Needs. Washington D.C. October 22nd 2017.

National Institute of Hydrology. *Engineering a Resilient Food-Water-Energy Nexus in a Changing Climate*. Roorkee, India, June 26th 2017.

Tezpur University. *Toward a Food-Energy-Water-Ecosystem Services Nexus for Rapid Growing Cities in a Changing Climate*. ISSUE-2017 Tezpur University, Tezpur, India, June 22nd 2017.

National Weather Service (NWS-NOAA) Training Center. *The Continuum Research-Information-Operations-Society*. Eighth Annual Missouri Basin River Forecaster's Meeting. January 26th 2017.

Daugherty Water for Food Institute-UNL. *From paper to BIG DATA: Interoperability of the NEXUS Water-Food-Energy Data*. DWFI-Research Forum. May 12th 2016.

Universidad Auntonoma de Chapingo. *Cambio Climático y el Nexo Agua-Alimento-Energía: Monitoreo, Modelación, y Predicción*. Chapingo, Mexico City. June 9th 2015.

Universidad Nacional Auntonoma de México. *Predictability of Hydrometeorologic and Climate Extreme Events*. 3rd Climate and Meteorologic North West Regional Meeting 2015. Mexico City, June 4th 2015.

Daugherty Water for Food Institute-UNL. *From paper to BIG DATA: Interoperability of the NEXUS Water-Food-Energy Data*. DWFI-Research Forum. May 28th 2015.

Colegio de Postgraduados. *Flood and Drought Forecast.* Montesillo, México. November 24th 2014.

Universidad Autónoma de Chapingo. *Nexus Water-Food-Energy: Challenges and Oportunities*. Texcoco, México. November 24th 2014.

School of Natural Resources-UNL. *Engineering Water Sustainability: Leveraging Sources of Predictability of Water States*. Lincoln, NE. September 10th 2014.

Department of Civil Engineering-UNL. *Engineering Water Sustainability in a Changing Climate*. Lincoln, NE. February 21st 2014.

Department of Statistics-UNL. *Diagnosis and Prognosis of Extreme Events through the Atmosphere-to-aquifer Continuum*. Lincoln, NE. November 6th 2013.

Centro de Investigaciones en Materiales Avanzados-Mexico. *Water Sustainability and Climate*. Chihuahua, Mexico. October 26th 2013.

Centro de Investigaciones en Meteriales Avanzados y Gobierno del Estado de Chihuahua. *Water and Food under Climate Variability and Change*. Chihuahua, Mexico. December 6th 2012.

Wageningen University and Research Center. *Modeling the Terrestrial Hydrological Cycle*. Wageningen, The Netherlands. September 25th 2012.

University of Nebraska, Lincoln. Hydrological Perspective of the Water-Food-Energy-Climate Nexus in the Era of Information Technology. Lincoln, NE. September 20th 2012.

New Mexico State University. *Modeling the Hydrologic Cycle for Integrated Water Resources Management*. Las Cruces, NM. September 12th 2012.

Consejo Nacional de Ciencia y Tecnología. *Hydroclimatological Networks: Current Status and Future Enhancement*. Hydrometeorological and Climate Disasters Network Meeting, Puerto Vallarta, México. November 9th 2011.

Universidad Nacional Autónoma de México. *Water Resources Sustainability: Science and Engineering*. Centro de Geociencias, Juriquilla, Queretaro. México, September 8th 2011.

Universidad Autónoma de Baja California. *Modeling the Hydrological Cycle*. Instituto de Investigaciones Oceanológicas, Ensenada, BC. México, June 15th 2011.

Colegio de Postgraduados. *Hydrological Perspective of Climate Variability and Change in Mexico*. Texcoco Estado de México. April 11th 2011.

Centro de Investigaciones Científicas y Educación Superior de Ensenada. *Water System: Science and Engineering*. Ensenada, BC, México. April 8th 2011.

Centro de Investigaciones Científicas y Educación Superior de Ensenada. *Hidrometeorología: Ciencia y Tecnología para el Estudio de los Recurso Hídricos en México*. Ensenada, BC, México. July 9th 2010.

Scripps Institution of Oceanography, University of California, San Diego. *Toward a Scientific and Technological Hydrological Framework in North America: Implementing Hydroclimatological Monitoring, Modeling, and Forecast Tools in Mexico*. San Diego CA. July 6th 2010.

University of Washington. *Water Resources in México: A Historical Perspective of Multi-scale Hydrology*. Environmental/Water Resources Seminar at the Department of Civil and Environmental Engineering. Seattle, WA. Abril 29 del 2010.

University of Washington. *Hydroclimatology in Mexico: Past, Present, and Future*. Climate Impacts Group Seminar Series. Seattle, WA. Feb. 23rd 2010.

Universidad Autónoma de Baja California. *Hydrology in Mexico: Applications and Perspectives.* Instituto de Investigaciones Oceanológicas, Ensenada, BC. México, May 27th 2009.

Universidad Autónoma de San Luis Potosí. *Hydrology in a Climatological and Meteorological Contexts*. Department of Engineering, San Luis Potosí, SLP, México. March 4th 2009.

Duke University. *Hydrological Response to Rainfall Uncertainty in Northwestern Mexico*. Graduate Students Seminar, Durham, NC, November 16th 2004.

Duke University. *Surface Hydrology in Northwestern Mexico: the case of Observational Variability in Precipitation*. Department of Civil and Environmental Engineering at Duke University. Graduate Students Seminar, Durham, NC, October 21th 2005.

TEACHING/ADVISING EXPERIENCE

UNIVERSITY OF NEBRASKA-LINCOLN

Courses

Department of Biological Systems Engineering

*Soil and Water Resources Engineering** (Falls of 2015-now)-Undergraduate (~25 students)

Small Watershed Hydrologic Modeling (Spring 2015)-Graduate (8 students)

Seminar I (Fall 2014)-Graduate (15 students)

School of Natural Resources, Departments of Earth and Atmospheric Sciences and Biological Systems Engineering

Complexity Science in Food, Energy, Water, and Ecosystem Services Systems (Fall of 2019)-Graduate (5 instructors and 18 students)

*Hydroclimatology** (Springs of 2016-2019)-Undergraduate/Graduate (~12 students)

Physical Hydrology (Spring 2014 and 2015)-Undergraduate/Graduate (~30 students)

Special Topics

Hydraulic Systems in Europe (Summer 2019; 3-week field trip to the Netherlands, France and Spain) – Graduate; co-organizer with Delft Institute for Water Education, Delft-IHE (9 graduate students).

Attribution Science (Spring 2019)-1 Graduate student

Statistics of Extremes in Water Resources (Fall 2016 and Spring 2017)- 1 Graduate student

Water-Food-Energy Nexus in a Changing Climate: Science and Engineering (offered but not taught in the Spring 2014 and 2015)-Undergraduate/Graduate

*Periodically taught

Current Advising

Research Associates

Alves de Oliveira, Luciano (08/2016-now). *Predictive analytics of surface water-groundwater interactions using machine learning in irrigated landscapes.*

Graduate Students

Kumar, Ashish (PhD in Civil Engineering: 08/2015-expected graduation 08/2020). *Flood forecast and uncertainty in Krishna River Bain, India.* Indian Institute of Technology-Bombay (Co-advised with Dr. RAAJ Ramsankaran).

Sarzaeim, Parisa (PhD in Biological Systems Engineering: start date 08/2018). *Hydroclimate controls of phenotype predictability.*

Rico, Daniel A. (MSc in Computer Sciences and Engineering: 01/2017-now). *Robotics and unman aircraft development for cross-scale agrometeorological modeling*. Co-Advised with Dr. Carrick Detweiler. **National Science Foundation Research Traineeship**.

Jagriti, Jain (PhD in Civil Engineering: 08/2019). *Predictive and mining analytics of machine learning for flood-resilient water resources in small communities in India*. Indian Institute of Technology-Roorkee (Co-advised with Dr. Deepak Khare).

Grier, Hellen (in training for MSc in Natural Resources: Applied Climate Sciences; 07/2016-now). *Understanding and Communication and Attribution of Extreme Precipitation to Climate Changes*.

Undergraduate Research Experience

Ntaganda, P. (Bs. Natural Resources: 08/2019 to now). Data science for groundwater yield predictability.

Williams, G. (Bs. Biological Systems Engineering: 08/2019 to now). Data science for phenotype predictability.

Visiting Scholars

Singh, Vishal (Researcher at the National Institute of Hydrology, India: June-December 2020) *Flood forecast and adaptive management.* **Funded by the Water Advance Research and Innovation** (2020).

Former Members

Graduated

Amaranto, Alessandro (PhD in Biological Systems Engineering: 08/2015-now). *Hydroclimatic Controls in Predictability of Conjunctive Use of Surface Water and Ground Water*. Co-Advised with Dimitri Solomatine (IHE-Hydroinformatics, The Netherlands). **Robert B. Daugherty Water for Food Institute PhD-Fellow**.

Jaimes-Correa, Juan C. (PhD in Civil Engineering: July 25th 2017). *Modeling the Sensitivity of Emerging Contaminants to Drought and Extreme Precipitation*. Co-Advised with Shannon Bartelt-Hunt (Civil Engineering). **Fulbright Fellow**. Now postdoc at Duke University.

Osornio-Hernandez, Jesus-Donaldo (MSc in Computer Sciences: June 16, 2018). *Desarrollo de una plataforma de software para la gestión de datos climáticos.* Co-Advised with Gabriel Lopez-Morteo, Instituto de Ingenieria at Universidad Autonoma de Baja California, México. **Consejo Nacional de Ciencia y Tecnologia Fellow**.

Herrera-Leon, Luis-Alejandro (MSc in Computer Sciences: June 16, 2018). *Desarrollo de una plataforma para el analisis de extremos y su incertidumbre.* Co-Advised with Gabriel Lopez-Morteo, Instituto de Ingenieria at Universidad Autonoma de Baja California, México). **Consejo Nacional de Ciencia y Tecnologia Fellow**.

Smith, Katherine. (M. Sc. in Agricultural and Biological Systems Engineering). *Extreme Hydrometeorological and Climate Event Resiliency*. April 20, 2016. Water Resources Planning and Management. Research experience-NASA Fellowship. Now at the US Army Corp of Engineers.

Williams, Gregory. (M. Sc. In Advanced Water Management for Food Production). *Effects of Drought on Water Management in Protected Areas of Guayana*. May 2015. University of Nebraska-Lincoln and UNESCO's Institute of Water Education (The Netherlands). IHE-UNL Fellowship. Consultant.

Cantú, Joel (M Sc Hydroinformatics: October 30, 2018). *Spatiotemporal analysis of groundwater levels in Nebraska, USA*. Committee Member (Advised by Dimitri Solomatine; IHE-Hydroinformatics, The Netherlands). **Delft Institute for Water Education and Consejo Nacional de Ciencia y Tecnologia Fellow**.

Osman, Ahmed (M Sc Hydroinformatics: April 6th 2018). Spatiotemporal Analysis and Prediction of Crop Yield using Data-driven Models and Drought Areas.

Ernest, Jason C. (M Sc Hydroinformatics: April 3rd 2018). Online Flood Information System for the Yuna River Basin Dominican Republic.

Singh, Jasreman (M. Sc. in Agricultural and Biological Systems Engineering). *Soil Water Proximal Sensing and Optimal Irrigation*. November 21 2017. Committee Member.

Valles, Jose (M Sc Hydroinformatics: 4/2017). *Fuzzy Committees of conceptual hydrological models, and impact of the mean areal rainfall calculation on their performance, Case study: Jiboa catchment in El Salvador*. Committee Member.

Suridwerianto, Yogi (M Sc Hydroinformatics: 4/2017). *Flash Flood Modelling using Data-driven Models: Case studies of Kathmandu Valley (Nepal) and Yuna Catchment (Dominican Republic)*. Committee Member.

Avery, William (M. Sc. Natural Resources). *Improving the Operability of the Cosmic-ray Neutron Probe Method for Estimating Field Scale Soil Moisture*. May 13th 2016. Committee Member.

Mulet, Maria A. (M. Sc. Biological Systems Engineering). *Evapotranspiration and groundwater in Nebraska*. July 7th 2016. Committee Member.

Perez Morga, Nancy (PhD in Geosciences). *Surface Hydrology of the Southern Mexico: Multi-scale Climate Interactions and Processes*. Centro de Investigación y Educación Superior de Ensenada, May 2013. Ensenada, Baja California. Mexico. Now faculty at Universidad Autónoma del Carmen, Mexico.

Undergraduate Research Experience

Hauger, Allison (Bs. Biological Systems Engineering: 10/2018 to 04/2019). Decision support systems for groundwater mapping.

Zimmer, Carly E. (Bs. Biological Systems Engineering: 10/2016 to 12/2018). *Energy-Water Nexus: Water Quality*. IANR Undergraduate Research Experience Fellowship.

Bowman, Erika (Bs. Biological Systems Engineering: 08/2017 to now). *Soil Moisture Measurements: from Field to Remote Sensing*. **NASA Fellowship.**

Rico, Daniel (Bs. Now in Electrical Engineering: 09/2013-12/2017). *Software Development for Semi-seasonal Forecast of Water Availability*. **AMS-travel award, 2015**; **IANR, MacNair, and UCARE Fellowships**.

Pamperin, Megan (Bs. Biological Systems Engineering: 08/2017 to 01/2018). *Statistical Predictability of Extreme Precipitation*.

Woldstad, Patrick (Bs. Biological Systems Engineering: 2016 to 2017). *Modeling Nitrogen Responses to Hydroclimatic Pulses*. **IANR fellowship**.

Lane, Merrett (Bs. Biological Systems Engineering: 2016 to 2017). *Nexus Water-Energy: Hydropower generation*. **UCARE Fellowship.**

Frischmeyer, Mitchell (Bs. Biological Systems Engineering: Spring of 2017). *Energy-Water Nexus: Wind scaling*.

Tang, Wei (Bs. Natural Resources: 09/2015-05/2016). *Mechanisms of Streamflow Generation in the Platte and the Sacramento River Basins*. **IANR-Fellowship**. Lab Technician at University of Nebraska-Lincoln.

Lindsey Hollmann (Bs. Biological Systems Engineering: 2016). *Engineering Water Availability and Quality Integration Based on Sensitivity of Nitrogen Levels to Fluctuating Hydroclimatological Events in the Platte River Basin*. **UCARE Fellowship**.

Maguire, Mitchel (Bs. Biological Systems Engineering: 09/2015-08/2016). *Large-scale Parameterization of Irrigation*. **UCARE-Fellowship**. Graduate student at University of Nebraska-Lincoln.

Qiu, Ling (Bs. Electrical Engineering: 09/2015-08/2016). *Modes of Variability of Extreme Precipitation in the High Plains*. **UCARE-Fellowship**. Graduate Student at Clemson University.

Guzek, Paulina (Bs. Biological Systems Engineering: 09/2015-05/2016). *Nexus Water-Food-Energy in Irrigation*.

Grier, Devin (Bs. Biological Systems Engineering: 09/2015-08/2016). *Soil Moisture Active Passive (SMAP) sensor*. **NASA Fellowship**.

Yun, Xiaoming (Natural Resources: 05/2015-10/2015). *Hydrologic and Agricultural Drought in the San Joaquin River Basin*. Graduate student Wagenigen University (The Netherlands).

Morton, Mallory (Bs. In Biological Systems Engineering: 09/2013-12/2014). *Ecosystem's Resilience to Droughts and Floods in the Platte River Basin*. **Best student poster AMS 2015**; **NASA and UCARE Fellowship**. Olson Associates (consultant).

Research Associates and Assistants

Otte, Martin (07/2016-12/31/2017). *Climate Modeling and Extreme Precipitation Forecast: model improvement*.

Ou, (Michael) Gengxin (Postdoc: 04/2017-04/2018). *Irrigation Sustainability, Model-parameterization, and Forecast*. Co-advised with Craig Allen and Derrel Martin.

Uden, Daniel (Postdoc: 02/2017-02/2018). *Systems Resiliency Theory and Applications*. Co-advised with Craig Allen and Nancy Shank.

Carrillo Cruz, Carlos (Postdoc: 03/2015-07/2016). *Climate Modeling and Analytics for Water and Agricultural Resources in Nebraska*. Now postdoc at Cornell University.

Castro Garcia, Lorena (Postdoc: 03/2014-06/2015). *Development of Information Technologies for Water and Agricultural Resources in Nebraska*. Now postdoc at University of Iowa.

Khan, Manas (PhD in Biological Systems Engineering: 06/2017-now). *Spatiotemporal suitability of hydroclimate analytics for resilient complex landscapes*. Co-advised with Jennifer Clarke (UNL-Statistics). Now at University of Illinois Urbana-Champaign.

Abadi, Azar Mohammad (PhD in Applied Climate Sciences: 10/2013-06/2014). *Predictability of Extreme Precipitation*. Now at UNL's Earth and Atmospheric Sciences.

Torres-Alavez, Abraham (PhD in Applied Climate Sciences: 01/2014-08/2014). *Drought predictability*. **Consejo Nacional de Ciencia y Tecnología Fellowship**. Now at UNL's Earth and Atmospheric Sciences.

Visiting Scholars

Ghosh, Kausik (PhD students and Faculty in the Department of Geography and Environment at Vidyasar University, India: June-December 2019) *Sediment and streamflow sensitivity to climate change in the shared basins (India and Bangladesh)*. **Funded by the Water Advance Research and Innovation** (2019).

Ramsankaran, RAAJ (PhD and Associate Professor in Civil and Environmental Engineering, Indian Institute of Technology-Bombay: June-August 2018) *Operational Meteorological Drought Monitoring across India using Multisatellite High Resolution Grid.* **Funded by the Water Advance Research and Innovation** (2018).

Lopez-Morteo, Gabriel (PhD and Professor in Computer Science, Universidad Autónoma de Baja California, Campus Mexicali: September 2017-August 2018). *Data Science and Engineering for Non-computer Science/Engineering Majors*. **Funded by Consejo Nacional de Ciencia y Tecnología-México**.Cantú, Joel (M Sc Hydroinformatics: 02/2018 to 04/2018). *Big data analysis to understand the interaction of irrigation and groundwater levels on a real time online system in Nebraska, USA*. Committee Member. Funded by the Delft Institute for Water Education and Consejo Nacional de Ciencia y Tecnología.

Shaik, Rehana (Assistant Professor, International Institute of Information Technologies, Hyderabad, India: May-July 2017). *Water Quality changes in a Changing Climate.*

Funded by Indian Department of Science and Technology, the Government of India, the University of Nebraska-Lincoln, the Water for Food Institute, and the Indo-US Science and Technology Forum.

Romanelli, Thiago (Associate Professor, Universidad de Sao Paulo, Brazil August-December 2017). Sociotechnical drivers in cropping systems for food and energy production. Funded by Fulbright.

Grag, Swati (PhD student in Energy and Climate, Banaras Hindu University: May-October 2017). *Improving Drought Monitoring and Forecasting: Assimilation of Satellite-based Soil Moisture into a Hydrological Model*. Funded by Indian Department of Science and Technology, the Government of India, the University of Nebraska-Lincoln, the Water for Food Institute, and the Indo-US Science and Technology Forum.

Kumar, Ashish (PhD student in Civil Engineering, Indian Institute of Technology- Bombay: May-October 2017). *Real Time Flood Estimation using Satellite based Rainfall Estimates for Krishna Basin (India) and Upper Missouri Basin (USA)*. Funded by Indian Department of Science and Technology, the government of India, the University of Nebraska-Lincoln, the Water for Food Institute, and the Indo-US Science and Technology Forum.

Goyal, Manish-Kumar (Assistant Professor, Indian Institute of Technology- Guwahati). *Assessment of Water Quantity and Quality in Testa River Basin using Remote Sensing Data and Hydrologic Modeling*. Funded by Indian Department of Science and Technology, the government of India, the University of Nebraska-Lincoln, the Water for Food Institute, and the Indo-US Science and Technology Forum.

Mishra, Vimal (Assistant Professor, Indian Institute of Technology- Gandhinagar). *Enhancing Agricultural Water Management through High Resolution Remotely Sensed Drought Monitoring*. Funded by Indian Department of Science and Technology, the government of India, the University of Nebraska-Lincoln, the Water for Food Institute, and the Indo-US Science and Technology Forum.

Gomez-Perez, Yessica (2nd year M. Sc student in Irrigation Engineering: 05/2016-09/2016). *Groundwater costs and risks in the Mexican Valley*. Funded by the Consejo Nacional de Ciencia y Tecnología.

Lobato Sanchez, René (Researcher, Instituto Mexicano de Tecnología del Agua-Mexico: 11/2015). *Drought Monitoring and Forecast*. Funded by the Mexican Commission of Water.

Ancona, Carlos E. (1st year M.Sc. in Computer Sciences at Universidad Autónoma de Baja California-Mexico: 01/2015-05/2015). *Information Technologies in Climate Modeling*. Funded by the Consejo Nacional de Ciencia y Tecnología.

Rosales, Antonio A. (1st year M.Sc. in Computer Sciences at Universidad Autónoma de Baja California-Mexico: 01/2015-05/2015). *Information Technologies for Water and*

Agricultural Resource Management. Funded by the Consejo Nacional de Ciencia y Tecnología.

Gonzalez Sosa, Enrique (Full Professor in Civil Engineering at Universidad Autónoma de Queretaro-Mexico: 03/2014). *Land Surface-Atmosphere Interactions*. Funded by the Consejo Nacional de Ciencia y Tecnología.

Lopez-Morteo, Gabriel (Full Professor in Computer Sciences at Universidad Autónoma de Baja California-Mexico: 06/2013). *Information Technologies and Education and Research*. Funded by the Consejo Nacional de Ciencia y Tecnología.

Lopez-Lopez, Alberto (Researcher in Power-generation Infrastructure at Instituto de Investigaciones Eléctricas-Mexico). *Power-generation Risks to Extreme Weather*. Funded by the Consejo Nacional de Ciencia y Tecnología.

UNIVERSITY OF WASHINGTON

Department of Civil and Environmental Engineering

Instructor

Second Hydrologic Modeling and Forecast Workshop/Course. Instituto Mexicano de Tecnología del Agua, Cuernavaca, México. April 2009. Theoretical and practical 40-hours course to researchers and professionals (10 students).

First Hydrologic Modeling and Forecast Workshop/Course. Instituto Mexicano de Tecnología del Agua (IMTA), Cuernavaca, México. December 2008. Theoretical and practical 40-hours course to researchers and professionals (30 students).

Development of a virtual center for hydrological modeling and forecast learning. Instituto Mexicano de Tecnología del Agua, Cuernavaca, México (México).

Mentor

Two postdoctoral fellows and a master student on hydrology modeling and forecast.

Coordinate two students in research, development, and operations of hydrological and drought forecast at the University of Washington.

Three Research Scientists on hydrological and hydrometeorological modeling and forecast at the Coordination of Hydrology at the Instituto Mexicano de Tecnología del Agua, Cuernavaca, México.

DUKE UNIVERSITY

Department of Civil and Environmental Engineering

Mentoring/Teaching

Invited Lectures

Water Resources. Taught three lectures (2004; Responsible: Miguel Medina Jr.).

Fluid Mechanics. Prepared and taught the laboratory class, graded assignments and lab reports of the course (2004 and 2007; Responsible: Zbigniew Kabala).

Tutor

Tutored undergraduate Spanish courses at different levels (2003-2004).

UNIVERSIDAD DE SONORA

Centro de Investigaciones Científicas y Tecnológicas de la Universidad de Sonora

Mentoring/Teaching

Advisor

Ramirez-Siqueiros, Maria G. (1997). Nutrient and Organic Matter Impacts in the Phytoplankton Communities in the Guaymas Bay, Sonora. Universidad de Sonora, Departamento de Ciencias Quimico Biologicas, Universidad de Sonora. B.S. degree in Biological Chemist. 78 pp.

Tejeda-Valenzuela, Lourdes G. (1997). Effects of Nutrient and Organic Matter on the Benthos Communities in the Guaymas Bay, Sonora. Universidad de Sonora, Departamento de Ciencias Quimico Biologicas, Universidad de Sonora. B.S. degree in Biological Chemist. 82 pp.

UNIVERSIDAD AUTONOMA DE BAJA CALIFORNIA

Instituto de Investigaciones Oceanológicas

Mentoring/Teaching

Instructor

Pigment Analysis in Phytoplankton Cultures Using High Performance Liquid Chromatography. Theoretical and practical course (1995).

OUTREACH/EXTENSION EXPERIENCE

INTERDISCIPLINARY GROUPS

Team Formation

Groundwater Analytics and Modeling Forecast, founder (since 2019). Advancing theories and applications harnessing data and natural-human interactions. Group formed by mechanical engineers, geographers, geologists and civil engineers from multiple states such as Texas, Oklahoma, Kansas, and Nebraska (1 project pending)

Mapping and Forecast Hybrids, founder (since 2016). Development of theories, perceptual and conceptual models for data integration, modeling and discovery to design adaptive food and water systems. Group formed by Hydroclimatologists, Statisticians, Agronomists, and Computer Scientists (1 project awarded by USDA and 1 Prospectus submitted for NSF-RAISE funding).

Disaster Management and Resiliency, founder member (since 2016). Development of information technologies and modeling capabilities to preparedness and enhance resilient communities in hydrometeorological and climate disasters. Group formed by hydroclimatologist, disaster management, computer and policy scientists (1 internal project funded; 2 proposals submitted for internal and federal funding pending).

System Integration and Resiliency, co-founder member (since 2015). Development of theories, information technologies and modeling capabilities to improve systems' integration and resiliency to hydrometeorological and climate extreme events and their effects on coupled human-natural systems, the nexus water-food-energy-ecosystem services, and the integrated Global Water (quality-quantity) System. Group formed by hydrologists, ecologists, hydrometeorologists, biosystems and civil engineers, and policy and computer scientists (2 Projects funded, internal and federal; 6 proposals submitted, 2 federal, and 1 international).

Climate, Weather, Water Analytics and Synthesis, founder member (2016-2018). Development of architectures, methodologies and theories for non-stationary management of resources. UNL collaborations with the Department of Computer Sciences and Engineering Department of Chemistry, and IntelliFarms (private sector).

Hydroinformatics (Since 2013). International collaborations with the Delft Institute for Water Education (IHE DELFT in the Netherlands), the Universidad Autónoma de Baja California's Instituto de Ingeniería, International Institute of Information Technology (Hyderabad), Indian Institute of Technology-Gandhinagar, Indian Institute of Technology-Bombay, and the National Institute of Hydrology at Rourke on areas of data analytics and synthesis, diagnosis and prognosis of Extreme Hydrometeorological and Climate Events, environmental change, and Resilient Food-Energy-Water-Ecosystem Services. Group formed by Water-related experts on water quality, Hydrometeorology, Climatology, Irrigation, and Computer Scientists (3 Projects funded; 5 proposals declined).

Merging Water Quality and Quantity, leader (since 2014). Development of research and extension activities to better understands interdependence of water quality and quantity in rural areas of Nebraska. Group formed by faculty from multiple disciplines.

UNL-Extension's Climate Resiliency Leadership (CRL), Research Advisor (2014-2016). Development of extension activities toward increasing awareness and preparedness in Nebraska's farming activities (1 project funded).

Research Networks

Red de Desastres Hidrometeorológicos y Climáticos-México (REDESCLIM), member 2010-2016. (2 Projects funded).

California Nevada Applications Program (CNAP), member since 2010.

Climate Impacts Group-Washington (CIG), member from 2007 to 2010.

Climate Hydrology Academic Network for Governance and the Environment (CHANGE), member since 2009.

North American Drought Briefing Network, participation from 2008 to 2010.

National Network on Hydrometeorological and Climate Disasters in México, member since 2011.

National Network on Space Science and Technology in México, member since 2011.

INVITED TALKS - EXTENSION/OUTREACH

UNL-Extension Office. *Simplifying Information and Accessing Big Data for Climate-informed Decisions in Crop, Livestock, and Community*. Nebraska Extension's Eureka! 2016 conference. Lincoln, NE, March 16th 2016

UNL-Extension Office. *Climate Science Introduction: What is weather and what is Climate*. Resiliency of Nebraska Agriculture and Communities to a Changing Climate. October 12th 2015.

National Center of Disaster Prevention (Mexico). *Predictibilidad de Eventos Hidrometeorológicos y Climáticos Extremos en Mexico*. Mexico City. June 17th 2015.

Instituto de Investigaciones Electricas. *Hydrometeorologic Extrem events and the Energy sector in México*. Experts meeting on the Energy in Mexico. Cuernavaca, Mexico. June 3rd 2015.

Nebraska Department of Natural Resources. *Leveraging Sources of Predictability to Achieve Water Sustainability*. Lincoln, NE. November 8th 2013.

Nebraska Water Resources Association. *Hydroinformatics and Integrated Hydrology*. Lincoln, NE. October 9th 2013.

Servicio Meteorológico Nacional. *National Program for the Advancement of Hydrologic Sciences and Engineering in México*. México City. March 27th 2013.

Water for Food Robert B. Daugherty Institute. *Irrigation, Hydrology, and Drought monitoring and forecast: Implementing Technological Development and Transfer*. Middle East and North Africa Network of Water Centers of Excellence, Lincoln, NE. March 22nd 2013.

San Diego County Water Authority and The San Diego Foundation. *Climate Change: Evidence for Increased Dryness in Southern California*. Climate Change and Water Tour. San Diego, CA June 7th and 15th 2012.

California and Nevada Applications Program. *Extreme Events and Water Resources in California's Central Valley*. San Diego, CA June 6th 2012.

Comisión Nacional del Agua. *Hydrological Modeling in Mexico: Prediction and Forecast. Plan de Adaptación para la Gestión del Agua en la Cuenca del Río Yaqui*. Ciudad Obregon, Sonora. April 1st 2011.

University of California, San Diego, International Visitor Leadership Program. *Implementing Research on Hydrology and Water Resources in Developing Countries: The Case of México*. San Diego, CA. September 27th 2010.

Columbia River Forecast Group. *Hydrological Forecasts in the Pacific North West: ESP vs CPC Techniques*. Columbia River Forecast Group Annual Meeting. Portland, OR. December 15th 2009.

University of Washington and Idaho Department of Water Resources. *Snake River Basin Seasonal Outlooks for Hydrology and Water Resources: Forecasting under El Niño Conditions*. CIG Annual Fall Forecast Meeting: Idaho Climate and Water Forecast for 2010. Boise, ID. October 22nd 2009.

University of Washington. *Seasonal Outlooks for Hydrology and Water Resources at the Columbia River Basin*. CIG Annual Fall Forecast Meeting: Washington Climate and Water Forecast for 2010. Seattle, WA. October 6th 2009.

Secretaría de Agricultura Ganadería Recursos Pesqueros y Medio Ambiente. *Global Climate and Hydrological Predictability*. IX Foro de Expectativas del Sector Agroalimentario y Pesquero 2009, Mexico City, March 25th 2009.

Servicio Meteorológico Nacional. *The Most Suitable Evapotranspiration Database for México*. México City, México. December 5th 2008.

University of Washington and Idaho Department of Water Resources. *Idaho seasonal outlooks for hydrology and water resources: Streamflow, reservoir, and hydropower forecasts for major western U.S. river systems: the case of the Snake River basins*. Climate and Water Forecast for 2009 Water Year. Boise, ID. October 16th 2008.

University of Washington. *Washington and Oregon Seasonal outlooks for hydrology and water resources: Columbia River Basin streamflow, reservoir, and hydropower forecasts*. CIG Annual Fall Forecast Meeting: Washington Climate and Water Forecast for 2009. Vancouver, WA. October 2nd 2008.

Instituto Mexicano de Tecnología del Agua. *Extended University of Washington Seasonal Hydrological Forecast System*. Jiutepec, Morelos, México. January 16th 2008.

Instituto Mexicano de Tecnología del Agua. *West-wide Seasonal Hydrologic Prediction System in the NAME Tier 1 core area*. Jiutepec, Morelos, México. August 16th 2007.

CONSULTING EXPERIENCE

World Bank. Consultant (finished in May 2010). *Identification and Preliminary Evaluation of Small and Mini Hydro Projects in the Piaxtla River Basin*. Research Responsible: Kerr Wood Leidal Associates LTD, Burnaby, B.C. Canada; co-participants: Francisco Munoz-Arriola, University of Washington and Andrew Wood.

AGROASEMEX. Consultant (finished in April 2009). *Hydrological Modeling in Mexico: Platform Development*. Research Responsible: Francisco Muñoz Arriola.

World Bank and Secretaria de Medio Ambiente y Recursos Naturales. Consultant (finished in December 2008). *The most Suitable Evapotranspiration Database for México*. Research Responsible: Eric F. Woods and Justin Shefield, University of Princeton; Francisco Munoz-Arriola, University of Washington.

SERVICE TO THE PROFESSION

AFFILIATIONS

American Geophysical Union (AGU), since 2005

American Meteorological Society (AMS), since 2008

American Association for the Advancement of Science (AAAS), since 2010

European Geosciences Union (EGU), since 2017

International Association of Hydrogeologists (IAH), since 2019

American Society of Agricultural and Biological Engineers (ASABE), since 2017

Association of California Water Agencies (ACWA), since 2011-2012

Groundwater Resources Association (GRA), since 2011-2015

Union Geofísica Mexicana (UGM), since 2008-2016

COMMITTEES

Inclusion and Diversity Taskforce. University of Nebraska-Lincoln's College of Engineering, since 2019

Diversity and Inclusion Faculty Committee. University of Nebraska-Lincoln, since 2018

Graduate Program Committee, Department of Biological Systems Engineering, UNL, 2013-2019

Search Committee Member for: Data Scientist in Policy, Limnologist, Geohydrologist, Watershed Hydrologist, Hydrogeology and Climate Change, Instrumentation and Sensing Engineer, and Business Administration Officer.

REFEREE ACTIVITIES

Journal Reviewer

Proceedings of the National Academy of Science, Water Resources Research, Agricultural Systems, Journal of Hydrometeorology, Journal of Geophysical Research Atmospheres, Journal of Climate, Journal of Hydrology, Hydrology and Earth System Sciences, Journal of the American Water Resources Association, Natural Hazards and Earth System Sciences, International Journal of Climatology, Journal of Arid Environments, Atmosfera, and Journal of Earth System Sciences.

Associate Editor

Ingenieria del Agua (The International Water Association publishing), since 2019.

Proposal Panelist

National Science Foundation (multiple programs), 2018, 2019, 2020.

US Department of Agriculture-NIFA (multiple programs), 2018, 2019.

Proposal Reviewer

United States Geological Survey, 2013-2015.

Manuals and Report Reviewer

Climate-Resilient Infrastructure: A Manual of Practice on Adaptive Design and Risk Management (CRI-MoP). American Society of Civil Engineers. Chapters 2 (A Changing Climate: Problem Definition) and Chapter 8 (Data and Information Sources). 2017.

TECHNICAL SKILLS

Commercial and Public-Domain Numerical Models

Atmospheric Models

Ocean Land Atmosphere Model (*OLAM*)-coding and development

Land Surface Hydrology models

Variable Infiltration Capacity (*VIC*)-coding and development

Soil Water Assessment Tool (*SWAT*) – user

Hydrologic Modeling System (*HEC-HMS*) - user

Groundwater Models

MODFLOW (-FMP)-use

ArcGIS-hydrological applications

Data-driven Models

Applications in groundwater, hydrometeorological and climate variables-Coding and Development

Hydrological Forecast Systems

UNL's Seasonal Hydrologic Forecast System-Coding and Development

University of Washington's West-wide Hydrological Seasonal Forecast System (NHFS)-Coding

University of Washington's *Surface Water Monitor* (SWM)-coding

Hydrological Forecast Systems

NEO-SAT (see section of software development)

Dataplugin (see section of software development)

Groundwater and drought mapper (see section of software development)

Programming Languages

Fortran

C

UNIX tools (Python, AWK and PERL)

Plotting platforms (NCAR-GRAPHICS, GraDS and GMT)

R

Matlab

Operating Systems

UNIX

Windows

Mac

Instrumentation

Federated Unmanned Tethered Aerial Vehicle System (under construction)

Tethersounde systems and meteorological stations.

High Pressure Liquid Chromatography, Atomic Absorption Spectrometry, Polarography, Gas Chromatography.

FIELDWORK

Cloud and Land Surface Interaction Experiment (CLASIC) 2007. Measurement of meteorological variables in the Atmospheric Boundary Layer in the Southern Great Plains.

Soil Moisture Experiment 2004 (SMEX04) and the North American Monsoon Experiment (NAME) (2004). Measurement of precipitation and Atmospheric Boundary Layer monitoring in mountainous areas in the Northwestern Mexico.

MEGAMARCO II (1997). Universidad Autonoma de Baja California. Geochemistry of Organic Matter in the Gulf of California.

ECOBAC (1991). Sampling of seawater and wastewater for physicochemical and contaminant analyses in the coastal zone of Baja California and Southern California.

LANGUAGES

English (Proficient in writing, speaking, and reading)

Spanish (mother tongue).