

LAURA V. ALVAREZ, PhD
Assistant Professor, Department of Earth, Environmental and Resource Sciences,
University of Texas at El Paso

I. CONTACT INFORMATION

Phone: (405) 441-4434

Email Address: alvarez@utep.edu

II. EDUCATION AND TRAINING

Bachelor of Engineering with Honors Aug 2001 - Sept 2007
Civil Engineering, School of Mines
National University of Colombia, Medellin, Colombia

Master of Science in Geography Aug 2008 – Aug 2010
School of Geographical Sciences and Urban Planning
Arizona State University, Tempe, Arizona

Doctor of Philosophy in Geography Aug 2011 – May 2015
School of Geographical Sciences and Urban Planning
Arizona State University, Tempe, Arizona

III. ACADEMIC RESEARCH APPOINTMENTS

Assistant Professor Sep 2020 - Present
University of Texas in El Paso
Department of Earth, Environmental and Resource Sciences

NSF-EAR Postdoctoral Research Fellow Jan 2019 – Aug 2020

University of Oklahoma
Position: Postdoctoral Research Associate Jan 2018- Dec 2018
Center for Autonomous Sensing and Sampling
College of Atmospheric and Geographic Sciences

Arizona State University Aug 2009 – May 2015
Position: Research Assistant
School of Geographical Sciences and Urban Planning
Project: Stability of Fine-Grained, Recirculation Eddy Bars Resulting From Beach
Habitat Building Flows.

New Mexico Tech Jun 2008 – Aug 2008
Position: Research Assistant
Department of Earth and Environmental Sciences
Project: Improved Seasonal Streamflow Forecasts in the Rio Sonora Basin

National University of Colombia Jan 2007 – Apr 2008
Position: GIS Analyst Full-Time
School of Environmental Sciences and Urban Planning
Project: Analysis And Evaluation of Policies Addressed to Air Quality in Itagui County

Water and Energy Government Organization of Medellin - Colombia Jan 2006 – Jun 2006
[Empresas Publicas de Medellin, in Spanish]
Position: Water Resources Internship
Project: Hydraulic Simulation of a Water Supply Net Pipe System in the Aburra Basin

IV. ACADEMIC TEACHING APPOINTMENTS

University of Texas at El Paso Sep 2020 - Present
Department of Earth Environmental and Resource Sciences
Courses:
GEOL 4385/5321/6321 – Introduction to Geographical Information Systems
GEOL 5322/6315 - Advanced GIST
GEOG 1306 – Physical Geography
GEOG 1106 – Laboratory for Physical Geography

University of Oklahoma Jan 2015 – Dec 2017
Department of Geography and Environmental Sustainability
Courses:
GEOG 4201/5201 – Fluvial Geomorphology
GEOG 4203/5203 - Geomorphology
GEOG 1114 – Physical Geography
GEOG 3023 – Principles of Physical Geography

Arizona State University Jan 2010 - Dec 2012
Department of Geographical Sciences and Urban Planning
Teaching Assistant
GPH 111 – Introduction to Physical Geography
GPH 211 - Introduction to Landform Processes (online course)

New Mexico Tech Jan 2009 – May 2009
Department of Earth and Environmental Sciences
Teaching Assistant: EARTH 340 - Global Change Hydrology

National University of Colombia Aug 2004 – Nov 2005
Department of Water Resources and Environmental Sciences
Teaching Assistant: Fluid Mechanics (400 level)

V. HONORS AND AWARDS

- | | |
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| [1]. National Science Foundation (NSF) CAREER Award (\$552,381) | August 2023 |
| [2]. National Science Foundation (NSF) Postdoctoral Fellowship (\$174,000) | January 2019 |
| [3]. 2013-2014 ASU Dissertation Fellowship (\$17,000) | August 2013 |
| [4]. Anthony Brazel Research Exam Award (\$1,000) | April 2012 |
| [5]. Arizona State University Graduate Fellowship (\$5,000) | Aug 2009 |
| [6]. Suma Cum Laude in Civil Engineering, National University of Colombia | Sept 2007 |

VI. FUNDING RECORD

A. FUNDED GRANTS

- [1]. **National Science Foundation.** PI (100% - contribution). CAREER: Understanding the Physics of Turbulent Flow, Erosion and Depositional Patterns in River Systems \$552,381. [08/01/2023 – 07/31/2028]
- [2]. **U.S. Army Research Office (ARO).** PI (50% contribution) with Moreno. Model-based Reinforced Learning for Accurate and Efficient Process Representation of Advection-Diffusion and Turbulent Processes Using Adaptive Domain Redefinition \$150,515/Year 1.
Status: Recommended for funding in the fiscal year 2023.
Notes (“Delays in ARO receiving appropriated funds from Congress have delayed the grant.” (b) Grant could be renewed for Year 2 (additional \$150,000) upon the progress of Year 1.
- [3]. **U.S. Natl. Oceanic and Atmospheric Admin (NOAA).** Co-PI (10% contribution) with Velez-Reyez (PI), Heyman, Tweedy, Roberts, Santiago and Moreno. NOAA EPP/MSI Cooperative Science Center for Earth System Sciences and Remote Sensing Technologies \$1,165,000. [09/01/2022 - 08/31/2027].
- [4]. **U.S. Army Research Office (ARO).** Co-PI (20% contribution) with Gill (Principal), Chaput, Karplus. Collaborative Research: Cohesive Particle Flow Research \$ 457,496. [01/01 2023 – 12/31/2028].
- [5]. **National Science Foundation.** PI (100% - contribution). EAR-Postdoctoral Fellowship: The Mechanics of Turbulence and Sediment Transport: Physically-Based Numerical Modeling of Flow, Sediment and Bed Evolution in the Bedrock Canyons \$174,000. [01/01/2019 – 12/ 31/2021].
- [6]. **U.S. Natl. Oceanic and Atmospheric Admin (NOAA).** Cruz, Ryan A (UG. Student Fellowship), Alvarez (Advisor) "NOAA Experiential Research and Training Opportunities (NERTO)," \$12,000.00. (August 15, 2021 - August 15, 2022).

B. SUBMITTED GRANTS PENDING REVIEW

- [1]. **The International Boundary and Water Commission (IBWC).** Co-PI (35%) with Mayer (PI) and Langford. Sediment Management of the Rio Grande downstream Caballo Lake \$1,100,000.

- [2]. **Department of Energy (DoE).** Co-PI (30%) with PI (Moreno) and Mauritz. An Explainable AI-based Algorithm for Real-Time Partitioning of Sub-hourly Evapotranspiration Rates at Eddy Covariance Systems \$399,826/2YR.

C. GRANTS NOT FUNDED

- [1]. **Alfred P. Sloan Foundation.** Alvarez Rueda, Laura V (Principal), "Sloan Fellowship" \$75,000.00.
- [2]. **National Aeronautics and Space Administration (NASA)** co-PI (40% contribution) with Hurtado (PI). Robotic Field Assistants for Autonomous Documentation of Planetary EVA's and Systematic Data Collection Tasks \$590,078.00.
- [3]. **National Science Foundation (NSF)** co-PI (5% - contribution) with Mayer and Wagler (PIs). RET Site: Water Security & Data Science (H2OData) \$600.00.
- [4]. **UTEP Internal Competition for DoD HBCU/MI: Equipment/Instrumentation Program** co-PI (10%-contribution) with Velez Reyes (PI). Establishment of a Robotics and Autonomous Systems Laboratory (RAS-L) at UTEP \$523,287.00.

VII. ADVISEES

Graduate (chair)

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|---------------------------|--|-------------------------|
| [1]. Fernando Sotelo | M.S. Electrical Engineering. | 2021 – 2022 (graduated) |
| [2]. Rosa Elena España | M.S. Environmental Sciences | 2021 – 2023 (graduated) |
| [3]. Jayanga Samarasinghe | Ph.D. Environmental Science and Engineering. | 2022 - present |

Masters (interns)

- | | | |
|-----------------------|-----------------------------|------|
| [4]. Christian Ibarra | M.S. Electrical Engineering | 2022 |
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Undergraduate (interns)

- | | | |
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| [5]. Ryan Cruz | Mechanical Engineering | 2020 - 2022 |
| [6] Diego Arroyo | Mechanical Engineering | 2022 |
| [7] Gerardo Marquez | Environmental Science | 2022 |

VIII. ARTICLES IN PEER-REVIEWED JOURNALS

A. PUBLISHED MANUSCRIPTS (** with students)

- [1]**Espana, R.E, **Alvarez, L.V (submitted)**: “Grid Independence Studies Of Eddy-Resolving Models At The Scale Of A River Reach Along A Transect In Marble Canyon Of The Colorado River, Arizona.” *Earth Surf. Process. and Landf.*
- [2]**Samarasinghe, J.H, **Alvarez, L.V (submitted)**: “Numerical Investigations Of Plunging Flows Using The Large Eddy Simulation Model In Scale-Down Laboratory Experiments Of Bedrock Rivers.” *Environmental Modelling & Software.*

- [3]. Hong, Z., Moreno, H.A., **Alvarez, L.V.**, Li, Z., Hong, Y (**accepted**). Triple Collocation of Ground-, Satellite- and Land Surface Model-Based Surface Soil Moisture Products in Oklahoma. Part II: New Multi-Sensor Soil Moisture (MSSM) Product. *Remote Sens.*
- [4] ****Sotelo-Torres, F.; Alvarez, L.V.; Roberts, R.C., 2023.** An Unmanned Surface Vehicle (USV): Development of an Autonomous Boat with a Sensor Integration System for Bathymetric Surveys. *Sensors*, 23, 4420. <https://doi.org/10.3390/s23094420>
- [5] Hong, Z., Moreno, H.A., Li, Z.; Li, S., Greene, J.S., Hong, Y., **Alvarez, L.V.**, 2022. “Triple Collocation of Ground-, Satellite- and Land Surface Model-Based Surface Soil Moisture Products in Oklahoma—Part I: Individual Product Assessment”. *Remote Sens.*, 14, 5641. <https://doi.org/10.3390/rs14225641>
- [6] **Alvarez, L.V.**, Grams P.E., 2021. “An eddy-resolving numerical model to study turbulent flow, sediment and bed evolution using Detached Eddy Simulation in a lateral separation zone at the field-scale”. *Journal of Geophysical Research-Earth Surface*, 126, e2021JF006149. <https://doi.org/10.1029/2021JF006149>.
- [7] Grams, P. E., Alvarez, L. V., Kaplinski, M., Wright, S., 2021. Repeat measurements of bathymetry, streamflow velocity and sediment concentration made during a high flow experiment on the Colorado River in Grand Canyon, March 2008. U.S. Geological Survey Data. Release. <https://doi.org/10.5066/P9O00Z44>.
- [8]. **Alvarez L.V**, Moreno H.A, Segales A.R, Pham T.G, Pillar-Little E.A, Chilson P.B, 2018. “Merging Unmanned Aerial Systems (UAS) Imagery and Echo Soundings with an Adaptive Sampling Technique for Bathymetric Surveys”. *Remote Sensing*, 10 (9). <https://doi.org/10.3390/rs10091362>.
- [9]. Moreno H.A, Ogden F.L, **Alvarez L.V**, 2018. “Unstructured-Mesh Terrain Analysis and Incident Solar Radiation for Continous Hydrologic Modeling in Mountain Watersheds”.*Water*,10 (4), p 398 <https://doi.org/10.3390/w10040398>.
- [10] **Alvarez, L.V.**, Schmeckle, M.W., Grams P.E., 2017. “A Detached Eddy Simulation Model for the Study of Lateral Separation Zones Along a Large Canyon-Bound River”. *Journal of Geophysical Research-Earth Surface*, 122(1) pp 25-49. <https://doi.org/10.1002/2016JF003895>.
- [11]. **Alvarez L.V**, Schmeckle M.W, 2013. “Erosion of River Sandbars by Diurnal Stage Fluctuations in the Colorado River in Marble and Grand canyons: Full-Scale Laboratory Experiments”. *River Research and Applications*, 29: 839-854. <https://doi.org/10.1002/rra.2576>.
- [12] Rave C.C, **Alvarez L.V**, Smith R.A, Cadena A.I, Builes L.A, Giraldo J.D, Martinez C.A, Chejne-Janna F, Restrepo J.E. (2007). “Evaluation of the Alternatives to Sustainable Development of the Industry Sector in the Metropolitan Area of the Valley of Aburra”, pg 40 (in Spanish).

B. MANUSCRIPTS IN PREPARATION

- [1] Chaffe, P.L, (*et al.*) Unsolved Problems of Hydrology in Latin America (**in preparation**). *Journal of Hydrologic Sciences*.
- [2]. Moreno H.A., Scott, R., **Alvarez, L. (in preparation)**. A Feature-Selection Approach to the Partitioning of Evapotranspiration. *Water Resour. Res.*

X. PROFESSIONAL SERVICE

Departmental Service at UTEP

- [1] Graduate Admission Committee (member).
[2] GIST Committee (member).
[3] Scholarship Committee (member).
[4]. Earth Science Day, exhibitor.
[5]. UTEP Aware Annual Tour to GeoSenSE-DEERS (2022-present).
[6]. Graduate Committee member:
 (a) Alison Segura (Masters Environmental Sciences),
 (b) Marisol Dominguez (Ph.D. Geological Sciences)
[7] Course revamping:
 (a) Physical Geography, (b) Laboratory for Physical Geography, (c) Intro to GIS/GIST,
 (d) Advanced GIST, and (e) Data Analytics Google Certificate.
[8]. Community Engagement: Art Exhibit: “Rivers and Basins” – Centennial Museum.
[9]. Director GeoSenSE, GeoSenSE remodeling room 124, GeoSenSE website:
<https://www.utep.edu/science/geosense/>

At the National Level

- [12] HydroML Symposium organizer.
[11] NSF service (panels and proposals reviewer).

XI. INVITED TALKS PRESENTATION AND POSTERS (~INVITED TALK, **STUDENTS)

- [27]. **Samarasinghe, J.D, **Alvarez L.V**, Venditti J.G. 2022. “Understanding Plunging Flows Mechanisms in The Fraser River Using a Large Eddy Simulation Model.” Presentation Type: *Poster, American Geophysical Union, 2022 Fall Meeting, Chicago, IL.*
- [26]. **España, R.E, **Alvarez L.V**. 2022. “Grid Independence Studies of Eddy-Resolving Models at The Scale of a River Reach Along a Transect in Marble Canyon of The Colorado River, Arizona.” Presentation Type: *Poster, American Geophysical Union, 2022 Fall Meeting, Chicago, IL.*

- [25]. **Alvarez L.V**, Grams, P.E, Sotelo-Torres, F. 2022. “Integrated Multi Physics-Based Modeling Framework to Quantify River Geomorphologic Changes in Field-Scale Rivers Based on Eddy Resolving Models Combined with Autonomous Systems.” Presentation Type: *Oral Presentation, American Geophysical Union, 2022 Fall Meeting, Chicago, IL.*
- [24] ~**Alvarez L.V**. 2022. Physically-Based Numerical Modeling aided by Machine Learning and Autonomous Systems to Study Fluvial and Water Environments. DoE PNNL HBCU/MSI Seminar Series.
- [23] **Cruz, R., **Alvarez, L.V**, Moreno, H.A. 2022. “Development Of Small Unmanned Aerial Systems For Subpixel Vegetation Activity Monitoring.” *NOAA-CoRP Meeting, Fort Collins, CO.*
- [22] **Cruz, R., **Alvarez, L.V**, Moreno, H.A. 2022. “Development Of Small Unmanned Aerial System For Subpixel Vegetation Activity Monitoring.” Tenth Biennial NOAA EPP/MSI Education and Science Forum at Florida A&M University in Tallahassee, FL.
- [21] ~**Alvarez L.V**. 2021. Merging Physically-Based Numerical Modeling and Autonomous Systems to Study Fluvial and Water Environments. NOAA-CESSRT Seminar Series, NY.
- [20]. **Alvarez L.V**, Venditti J.G, Chilson P.B. 2019. “Eddy Resolving Model of Flow and Sediment Dynamics in Canyon Rivers at the Laboratory and Field Scales”. Presentation Type: *Oral Presentation, American Geophysical Union, 2019 Fall Meeting, San Francisco, CA.*
- [19]. Doyle W, **Alvarez L.V**, Whitehead M.S, Britto G, Chilson P.B. 2019. “Custom Autonomous Watercraft with Improved Transect Heading Accuracy to Ascertain Higher Quality Measurements with the Sontek River Surveyor S5. *American Geophysical Union, 2019 Fall Meeting, San Francisco, CA.*
- [18]. **Alvarez L.V**, 2018. “The Study of Turbulence, Sediment Transport and Bed Evolution in a Canyon River Using an Eddy Resolving Three-Dimensional Model”. *American Geophysical Union, 2019 Fall Meeting, San Francisco, CA.*
- [17] **Alvarez L.V**, P Grams, 2017. Numerical model of turbulence, sediment transport, and morphodynamics tested in the Colorado River at Grand Canyon. *American Geophysical Union, 2017, Fall Meeting, San Francisco, CA.*
- [16] Maples B.L, **Alvarez L.V**, Moreno H.A, Chilson P.B, Segales A. 2017. “Combining Cluster Analysis and Small Unmanned Aerial Systems (sUAS) for Accurate and Low-cost Bathymetric Surveying”. *American Geophysical Union, 2017, Fall Meeting, San Francisco, CA.*
- [15] **Alvarez L.V**, 2017. The Study of Fluvial Processes through Super Computer Models and Full-Scale Laboratory Techniques. Colloquium - National University of Colombia
- [14] **Alvarez L.V**, 2017. Using MBES to Develop a Detached Eddy Simulation (DES) Model in a Canyon-Bound River. Presentation - *MBES in Rivers Workshop.*
- [13]. **Alvarez L.V**, Schmeckle M.W, Grams P.E, Moreno H.A. 2015. “A coupled Turbulence Resolving Model of Turbulence and Sediment Transport of Lateral Separation Zones at Field Scale

using Detached Eddy Simulation”. *American Geophysical Union, 2015 Fall Meeting, San Francisco, CA.*

[12]. **Alvarez L.V**, Schmeeckle M.W, Grams P.E, Moreno H.A. 2015. “A coupled Turbulence Resolving Model of Turbulence and Sediment Transport of Lateral Separation Zones at Field Scale using Detached Eddy Simulation”. *American Geophysical Union, 2015 Fall Meeting, San Francisco, CA.*

[11] Moreno, H.A, Ogden F.L, Steinke, R.C, **Alvarez L.V**. 2015. “A vectorial model to compute terrain parameters, local and remote sheltering, scattering and albedo using TIN domains for Hydrologic Modeling”. *American Geophysical Union, 2015 Fall Meeting, San Francisco, CA.*

[10] Moreno, H.A, Ogden F.L, Steinke, R.C, **Alvarez L.V**. 2015. “A vectorial model to compute terrain parameters, local and remote sheltering, scattering and albedo using TIN domains for Hydrologic Modeling”. *American Geophysical Union, 2015 Fall Meeting, San Francisco, CA.*

[9]. **Alvarez L.V**, Schmeeckle M.W. 2013. “Numerical Model of Turbulence, Sediment Transport, and Sediment Cover in a Large Canyon-Bound River”. Presentation Type: *Oral Presentation* Abstract ID: 1813508. Final Paper Number: EP24B-07. *American Geophysical Union, 2013 Fall Meeting, San Francisco, CA.*

[8] **Alvarez L.V**, Schmeeckle M.W. 2013. “Numerical Modeling of Turbulence and Sediment Transport in Lateral Recirculation Zones along the Colorado River in Grand Canyon”. *Community Surface Dynamics Modeling System (CSDMS) 2013 Annual Meeting, Boulder, CO*

[7]. **Alvarez L.V**, Schmeeckle M.W. 2012. “Laboratory and Numerical Modeling of Sandbar Bank Erosion, Application to Diurnal Stage Variations in Grand Canyon”. *American Association of Geographers, 2012 Meeting, New York city, NY.*

[6]. **Alvarez L.V**, Schmeeckle M.W. 2011. “Laboratory and Numerical Modeling of Sandbar Bank Erosion, Application to Diurnal Stage Variations in Grand Canyon”. *American Geophysical Union, 2011 Fall Meeting, San Francisco, CA.*

[5]. **Alvarez L.V**, Schmeeckle M.W. 2010. “Sandbar Beach Stability under River Stage Fluctuations, Full-Scale Laboratory Experiments”. *American Geophysical Union, 2010 Fall Meeting, San Francisco, CA.*

[4]. Schmeeckle M.W, Akahori R, Travis Q.B, **Alvarez L.V**. 2009. “Sandbars in the Colorado River in Grand Canyon, USA Downstream of Glen Canyon Dam”. *Water Resources University's 50th Anniversary Workshop.*

[3]. Smith R, Rave C, Builes A, Piedrahita C, **Alvarez L.V**. 2008. “Policy assessment in air quality management using an integrated bottom-up modeling approach and environmental and public health externalities estimation”. *International Federation of Operational Research Societies Conference (IFORS), Sandton, Gauten,, South Africa.*

[2]. Smith R, Rave C, Builes A, Piedrahita C, Perez S, **Alvarez L.V.** 2008. “Methodology for Assessment of Environmental Noise as Atmospheric Contaminant in the Aburra Valley Basin”. *International Seminar of Environmental Noise, Medellin, Colombia (in Spanish)*.

[1]. Smith R, Rave C, Builes A, Piedrahita C, **Alvarez L.V.** 2008. “Formulation of Government Policies for the Improvement of Air Quality based on Strategic Modeling of Energy, Environment and Economy”. *XIV Latin Ibero-American Congress of Decision Making, Cartagena, Colombia (in Spanish)*.

XI. PROFESSIONAL AFFILIATIONS

[1]. American Geophysical Union (AGU).

[2]. Association of American Geographers (AAG).

[3]. National Association of Geoscience Teachers (NAGT).

[4]. Latinas in Earth and Planetary Sciences (GeoLatinas).

[5]. National Association of Engineering in Colombia (ANEIC).

[6]. FAA Part 107 Commercial Drone Pilot License.