Beth Tellman

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website: https://beth-tellman.github.io/index.html

Current Position
Assistant Professor, University of Arizona, School of Geography, Development, and Environment
Affiliated faculty in the Department of Hydrology & Atmospheric Sciences

Education
Ph.D, Geography, 2014-2019
Arizona State University School of Geographical Science and Urban Planning, Advisors: Drs. B. L. Turner II & Hallie Eakin
MS., Environmental Science, 2012-2014
Yale School of Forestry and Environmental Studies, Advisor: Advisor: Dr. James E. Saiers
BSc., Individual Studies (Sustainable Globalization) & Environmental Studies, 2005-2009, Magna Cum Laude
Santa Clara University, Advisor: Dr. Leslie Gray

Publications
Refereed Articles
Leach, Popien, Goodman, **Tellman**. 2022. *IEEE International Geoscience and Remote Sensing Symposium IGARSS.* Leveraging convolutional neural networks for semantic segmentation of global floods with PlanetScope imagery.

Colosio, Paolo, Marco Tedesco, and Elizabeth **Tellman**. 2022. *Remote Sensing.* Flood Monitoring Using Enhanced Resolution Passive Microwave Data: A Test Case over Bangladesh. 14, no. 5 (February 27, 2022): 1180. https://doi.org/10.3390/rs14051180.

Tellman, Lall, Islam, Bhuyan. *2022. Earth's Future.* Regional Index Insurance using Satellite-based Fractional Flooded Area. **https://doi.org/10.1029/2021EF002418**

Tellman, Eakin, Turner. 2022. *Journal of Land Use Science.* Identifying, projecting, and evaluating informal urban expansion spatial patterns. 00, 1–13. https://doi.org/10.1080/1747423X.2021.2020919.

Karimzadeh, Han, Tellman, and Nielsen. 2021. **Spatial Data Science Symposium.** Classifying Narcotrafficking Spatial Event Documents using Transformers. https://doi.org/10.25436/E2B88Q

Tellman, McSweeney, Manak, Devine, Sesnie, Nielsen, Anayasi. 2021. *Journal of Illicit Economies and Development.* Narcotrafficking and Land Control in Guatemala and Honduras. 3(1), pp. 132–159 https://doi.org/10.31389/jied.83

Tellman, B.*, J. A. Sullivan*, C. Kuhn, A. J. Kettner, C. S. Doyle, G. R. Brakenridge, T. A. Erickson, and D. A. Slayback. 2021. *Nature.* Satellite Imaging Reveals Increased Proportion of Population Exposed to Floods. 596, no. 7870 (August 5, 2021): 80–86. https://doi.org/10.1038/s41586-021-03695-w. *equal first authors

Magliocca, Torres, Marguiles, McSweeny, Arroyo-Quiroz, Carter, Curtain, Easter, Gore, Hubschle, Masse, Rege, **Tellman.** 2021. *Journal of Illicit Economies and Development.*

Comparative Analysis of Illicit Supply Network Structure and Operations: Cocaine, Wildlife, and Sand. 3(1), pp.50–73 http://doi.org/10.31389/jied.76

Yague-Martinez, Nestor, Nicholas R Leach, Antara Dasgupta, **Elizabeth Tellman**, and Jason S Brown. 2021. **2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS**. Towards Frequent Flood Mapping with the Capella SAR System. the 2021 Eastern Australia Floods Case. https://doi.org/10.1109/IGARSS47720.2021.9554825.

Devine, Wrathall, Aguilar-Gonzalez, Benessaiah, **Tellman**, Ghaffari, Ponstingel. 2021. *World Development.* Narco-Degradation: Cocaine Trafficking's Environmental Impacts in Central America's Protected Areas. *144.* Doi: 10.1016/j.worlddev.2021.105474

Tellman, Eakin, Janssen, De Alba, and Turner. 2021*. World Development.* Institutional Entrepreneurs and Urban Land Transactions in Mexico City. *140*. Doi: https://doi.org/10.1016/j.worlddev.2020.105374

Akiva, P., Purri, M., Dana, K., **Tellman, B.,** & Anderson, T. 2021. H2O-Net: Self-Supervised Flood Segmentation via Adversarial Domain Adaptation and Label Refinement. *Proceedings of the 2021 IEEE Winter Conference on Applications of Computer Vision (WACV).* http://arxiv.org/abs/2010.05309

Hawker, L., Neal, H., **Tellman,B.,** Liang,J., Schumann, G., Doyle, C.S., Sullivan, J.A., Savage,A., and Tshimanga., R. 2020. Comparing Earth Observation and Inundation Models to Map Flood Hazards. *Environmental Research Letters*. https://doi.org/10.1088/1748-9326/abc216.

Tellman, B., Schank, C., Schwarz, B., Howe, P. D., & Sherbinin, A. De. 2020. Using Disaster Outcomes to Validate Components of Social Vulnerability to Floods: Flood Deaths and Property Damage across the USA. *Sustainability*, *15*(12), 1–28. https://doi.org/10.3390/su12156006

Tellman, B., Sesnie, S.E., Magliocca, N.R., Nielsen, E.A., Devine, J.A., McSweeney, K., Jain, M., Wrathall, D.J., Dávila, A., Benessaiah, K., Aguilar-Gonzalez, B., 2020. Illicit Drivers of Land Use Change: Narcotrafficking and Forest Loss in Central America. *Global Environmental Change*. 63. https://doi.org/10.1016/j.gloenvcha.2020.102092

Wrathall, D., Devine, J., Aguilar-Gonzalez, B., Benessaiah, K., **Tellman, E.,** Sesnie, S., Nielsen, E., Magliocca, N., McSweeney, K., Pearson, Z., Ponstingel, J., Sosa, A.R. 2020. The impacts of cocaine trafficking on conservation governance in Central America. *Global Environmental Change*. 63 doi: 10.1016/j.gloenvcha.2020.102098.

Bonafilia, D., **Tellman, B.,** Anderson, T., Issenberg, E. 2020. Sen1Floods11: a georeferenced dataset to train and test deep learning flood algorithms for Sentinel-1. *The IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops.* DOI: 10.1109/CVPRW50498.2020.00113

Tellman, B., Magliocca, N.R., Turner II, B.L., Verburg, P.H., 2020. Understanding the role of illicit transactions in land-change dynamics. *3*(3*)*,175-181. *Nature Sustainability.* https://doi.org/10.1038/s41893-019-0457-1

Kugler, T., Grace, K. de Sherbinin, A., Wrathall, D., Van Riper, D., Adamo, S., Aubrecht, C., Cervone, G., Comer,D., Engstrom, R., Hultquist, C., Gaughan, A., Linard, C., Moran, E., Stevens,F. Tatem, A., **Tellman, B.** Van Den Hoek, Jamon. 2019. People & Pixels 20 years later: The current data landscape and research trends blending population and environmental data. *Population & Environment.* DOI: 10.1007/s11111-019-00326-5

Manuel-Navarrete, D., Morehart, C., **Tellman, B**., Eakin, H., Siqueiros-García, J. M., & Aguilar, B. H. 2019. Intentional disruption of path-dependencies in the Anthropocene: Gray versus green water infrastructure regimes in Mexico City, Mexico. ***Anthropocene***, *26*, 100209.

Magliocca, N., McSweeney, K., Sesnie, S., **Tellman**, E., Devine, J., Nielsen, E., Pearson, Z., Wrathall, D. 2019. NarcoLogic: Modeling cocaine traffickers and counterdrug interdiction forces as a complex adaptive system. ***Proceedings of the National Academy of Sciences.*** https://doi.org/10.1073/pnas.1812459116

Kettner, A. J., Schumann, G. J.-P, and **Tellman, B.** 2019. The push toward local flood risk assessment at a global scale, ***Eos, 100,*** https://doi.org/10.1029/2019EO113857.

Tellman B., Goldstein J., McDonald R.I. , Shemie D., Vogl A., Dudley R., Petry P., Vigorstol K.l, Florke M., Dryden R., Lehner B., Veiga F. 2018*.* Opportunities for natural infrastructure to improve urban water security in Latin America. ***PLOS ONE***. https://doi.org/10.1371/journal.pone.0209470

Lerner, A.M., Eakin, H., **Tellman**, B., Bausch, J., Hernández Aguilar, B. 2018. Governing the gaps in water governance and land-use planning in a megacity: The example of hydrological risk in Mexico City. ***Cities.*** https://doi.org/10.1016/j.cities.2018.06.009

Devine, J., Wrathall, D., Curritt, N., **Tellman**, B., Reygadas Langarica, W. 2018. Narco Cattle Ranching in Political Forests. ***Antipode.*** https://doi.org/10.1111/anti.12469

Goldblatt, R., M. F. Stuhlmacher, **B. Tellman**, N. Clinton, G. Hanson, M. Georgescu, C. Wang, F. Serrano-Candela, A. K. Khandelwal, W.-H. Cheng, and R. C. Balling. 2018. Using Landsat and nighttime lights for supervised pixel-based image classification of urban land cover. ***Remote Sensing of Environment*** 205(November 2017):253–275. https://doi.org/10.1016/j.rse.2017.11.026

Tellman, B., Eakin, H., Bausch, J., Manuel-Navarette, D., Anderies, J.M., Redman, C. 2018. Adaptive Pathways and Coupled Infrastructure: adaptations to water risk, and the production of vulnerability in Mexico City since 1325. ***Ecology and Society*** *23 (1): 1* https://doi.org/10.5751/ES-09712-230101

Puritty, C., L. R. Strickland, E. Alia, B. Blonder, E. Klein, M. T. Kohl, E. McGee, M. Quintana, R. E. Ridley, **B. Tellman**, and L. R. Gerber. 2017. Without inclusion, diversity initiatives may not be enough. ***Science*** 357(6356):9–11.

Vogl, A. L, Goldstein, J., Daily G.C, Vira B., Bremer L., McDonald, R.I., Shemie, D., **Tellman, B.**, and Jan Cassin. 2017. Mainstreaming Investments in Watershed Services to Enhance Water Security: Barriers and Opportunities. ***Environmental Science & Policy*** 75: 19–27. doi:https://doi.org/10.1016/j.envsci.2017.05.007.

Sesnie, S., **Tellman B.**, Wrathall D., McSweeney K., Nielsen E., Bennesaiah K., Wang O., and Ray, L. 2017. A Spatio-Temporal Analysis of Forest Cover Loss Related to Cocaine Trafficking in Central America. ***Environmental Research Letters*** 12. doi:https://doi.org/10.1088/1748-9326/aa6fff.

Eakin, H., Lerner, A.M., Manuel-Navarrete, D., Aguilar, B.H., Martínez-Canedo, A., **Tellman, B.**, Charli-Joseph, L., Álvarez, R.F. and Bojórquez-Tapia, L. 2016. Adapting to risk and perpetuating poverty: Household's strategies for managing flood risk and water scarcity in Mexico City. ***Environmental Science & Policy*** 66: 324-333. DOI 10.1016/j.envsci.2016.06.006

Wentz, E. A., Rode S., Li X., **Tellman E.M**, and Turner II, B.L. 2016. Impact of Homeowner Association (HOA) landscaping guidelines on residential water use
Water Resources Research 52:2. Pp 3373-3386 DOI 10.1002/2015WR018238

Tellman B., Saiers J., and Ruiz O. 2015*.* Quantifying the impacts of land use change on flooding in data poor watersheds in El Salvador with community based model calibration. *Regional Environmental Change* 16 (4): 1183-1196. DOI: 10.1007/s10113-015-0841-y

Tellman B., Gray L.C. , and Bacon C.M. 2011. Not Fair Enough: Historic and Institutional Barriers to Fair Trade Coffee in El Salvador. *Journal of Latin American Geography* 10(2): 107-128. DOI: 10.1353/lag.2011.0037

In revision and/or submitted

Thomas, **Tellman,** Osgood, DeVries, Islam, Steckler, Goodman, Billah. *In revision- Journal of Selected Topics in Applied Earth Observations and Remote Sensing.* Strengthening remote sensing applications in data poor environments: criteria-based validation of Sentinel-1 flood maps for flood index insurance.

Refereed Book Chapters

Hernández, Lerner, **Tellman**. *In Press.* El costo de la informalidad: el acceso al agua en cinco asentamientos de la Ciudad de México.
Desigualdad en el acceso al agua potable entre los hogares en México. Eds. Dr. Daniel A. Revollo Fernández, Dra. Lilia Rodríguez Tapia, Dr. Jorge Morales Novelo. Universidad Autónoma Metropolitana, Unidad Azcapotzalco. Mexico City, Mexico.

Ho, J.C, Vu, W., **Tellman, B**., Dinga, J.B, N'diaye, P.I., Weber, S., Bauer, J.M., Schwarz, B., Doyle, C., Demuzere, M., Anderson, T., Glinskis, E. 2021. From cloud to refugee camp: a satellite-based flood analytics case-study in Congo-Brazzaville. In *Earth Observation for Flood Applications* edited by G. J-P. Schumann, 131–45. Cambridge, MA, USA: Elsevier, 2021.

Tellman, B, Sullivan, J. and Doyle C. 2021. "Global Flood Observation with Multiple Satellites: Applications in Rio Salado, Argentina, and the Eastern Nile Basin." In *Global Drought and Flood: Monitoring, Prediction, and Adaptation*, edited by Huan Yu, Dennis P. Lettenmaier, Teng Quihong, and Philip J Ward, 352. AGU Books. Wiley, 2021.

Schwarz, B., Pestre, G., **Tellman, B**., Sullivan, J., Kuhn, C., Mahtta, R., Pandey, B., Hammett, L., 2018. Mapping Floods and Assessing Flood Vulnerability for Disaster Decision-Making: A Case Study Remote Sensing Application in Senegal - Earth Observation Open Science and Innovation, in: Mathieu, P.-P., Aubrecht, C. (Eds.), . Springer International Publishing, Cham, pp. 293–300. https://doi.org/10.1007/978-3-319-65633-5_16

Tellman, B. 2018. Transferencia de riesgos sociohidrológicos y vulnerabilidad emergente en el Valle de México: un modelo conceptual basado en agentes. Las paradojas de la megalopolis: un debate actual a distintas voces. Ed. Felipe de Alba. https://agua.org.mx/biblioteca/las-paradojas-la-megalopolis-debate-actual-a-distintas-voces/

Non-referred Articles, Reports, and Other Media

Tellman, Beth, and Hallie Eakin. 2022. "Risk Management Alone Fails to Limit Hazard Impact," *Nature.* News and Views. 608 (41-43). *doi: https://doi.org/10.1038/d41586-022-02031-0*

Chief, K., R. Arnold, A. Curley, J. Hoover, M. Kacira, V. Karanikola, K. Simmons-Potter, **and E. Tellman.** 2021. Addressing food-energy-water insecurities of the Navajo Nation through university-

community collaboration. Megdal, S. and L. Beutler (ed.) Wicked Water Problems. Water Resources IMPACT Magazine 23(1):31-33. https://online.flippingbook.com/view/167753/32/

Tellman, B, and many others! 2019. Captación de Lluvia en la CDMX: Un analisis de las desigualdades espaciales. *Oxfam.* https://www.oxfammexico.org/sites/default/files/Captacion%20de%20agua%20en%20la%20CDMX.pdf

Tellman, B. 2019. May 2019. Mapping and Modeling Illicit and Clandestine Drivers of Land Use Change: Urban Expansion in Mexico City and Deforestation in Central America. *Doctoral Dissertation. Arizona State University, ProQuest Dissertations Publishing, 2019. 13862723.*

Schumann, G., Kettner, A., & **Tellman, B.** 2019. NASA Flood Risk Workshop 2018.

Gonzalez, S., Charli-Joseph, L., and **Tellman, B**. April 25 2018. Mapping a transforming world in the Sierra Huichol, Mexico. *Steps Centre Blog.* https://steps-centre.org/blog/mapping-transforming-world-sierra-huichol-mexico/

Schwarz, B., **Tellman, B**., Sullivan, J., Kuhn, C., Mahtta, R., Pantey, B., … Pestre, G. 2016. *Socio-physical Vulnerability to Flooding in Senegal: An Exploratory Analysis with New Data & Google Earth Engine* (p. 76). Cloud to Street and AFD. Retrieved from http://librairie.afd.fr/en/nt25-va-vunerability-flooding-senegal/

Schwarz, B., **Tellman, B**., Sullivan, J., Mahtta, R., & Pantey, B. 2016. *Assessing Biophysical and Social Vulnerability to Flooding in Uttarakhand, India: An Exploratory Google Earth Engine Model and Analysis* (p. 57). Cloud to Street and Disaster Risk & Climate Change Unit - South Asia Region Social, Urban, Rural & Resilience Global Practice World bank.

Tellman, B., J. Cazares, and E. R. Vivoni. 2016. *Quantifying the Role of Natural Infrastructure in Mitigating Flood Peaks by combining Google Earth Engine and Hydrologic Modeling Case Study of the Santa Catarina Watershed Upstream of Monterrey, Mexico*. SNAP, TNC, ASU.

Tellman, Schwarz, Burns, Adams. 2015. Big Data in the Disaster Cycle: Overview of use of big data and satellite imaging in monitoring risk and impact of disasters. Contribution to the report. Available at GSDR website: https://sustainabledevelopment.un.org/globalsdreport/2015.

Tellman, B. 2015. "Land Use Change and Ecosystem Service Sheds: Where does Deforestation Impact Flooding in El Salvador." *Yale Tropical Resources Bulletin. Vol 32-33.*

Tellman, B., Alaniz, R., Rivera, A., Contreras, D. 2014. Violence as an obstacle to livelihood resilience in the context of climate change. UNU-EHS Working Paper Series, No.3. Bonn: United Nations University Institute of Environment and Human Security (UNU-EHS). Available: https://www.ehs.unu.edu/file/get/11945

Tellman, B. 2014. "Hotspots for People: A New Conservation Strategy." *SNAP Magazine.* http://www.snap.is/magazine/hotspots-for-people-new-conservation-strategy/

Tellman, B. 10 December 2013. "First United Nations Resilience Academy Held in Bangladesh. *Yale Climate and Energy Institute.* Available:/ /climate.yale.edu/news/first-united-nations-resilience-academy-held-bangladesh#sthash.JHDQRYSP.dpuf.*"*

Tellman, E. 2011. "Community Resilience and Hurricane Ida: How Marginalized Salvadorans Lacking NGO and Governmental Support Cope with Climate Shock." Climate Change and Migration: Rethinking Policies for Adaptation and Disaster Risk Reduction. UNU-EHS (United Nations University Environment and Human Security). *SOURCE* issue 15. Pp. 32-46. Available: http://www.ehs.unu.edu/article/read/source-152011.

Honors/Awards

Leading Woman in Machine Learning for Earth Observation. 2022. Radiant Earth Foundation.

Earth Institute Postdoctoral Fellow, 2019-2021. Columbia University, with mentors Upmanu Lall and Dan Osgood.

Land 2019 Travel Award, 2019. $800, Award to attend Global Land Programme Open Science Meeting, Bern, Switzerland to present my paper, "Illicit-clandestine land transactions - linking pattern to process in narcodeforestation"

CLAG Travel Award, 2018. $500, Conference of Latin Americanist Geographers (CLAG) meeting in San Jose, Costa Rica to present my paper "An empirical approach to quantify the effects of narcotrafficking on deforestation in Central America."

NSF GROW (Graduate Research Opportunities Worldwide) Fellowship, 2017. Collaboration with LANCIS (National Laboratory of Sustainability Science) UNAM (National Autonomous University of Mexico) for project "Projecting the Influences of Political Incentives on Urban Land Conversion and Hydrologic Consequences in the Mexico City Metropolitan Area." $8,000

Allianz Climate Risk Finalist (2nd place), 2017. 5000 Euros for research that advances insurance and reduces vulnerability titled "Detecting floods globally from public satellites and modeling social vulnerability to flood damage."

ASU Faculty Women's Association Distinguished Graduate Student Award, 2017.

Echoing Green Fellowship, 2016-2018. Social Entrepreneurship Fellowship to support Start up Company, Cloud to Street. $90,000

Gilbert F. White Environment and Society Fellowship (ASU), 2014. Tuition plus stipend for first year of doctoral studies

Best Graduate Student Paper Award, Dimensions of Political Ecology Conference, 2013. Community resilience in El Salvador

Fulbright US Student Fellow El Salvador, 2009-2010. Founded local community development NGO CEIBA and published research project "Community Resilience and Hurricane Ida: Marginalized Salvadorans Coping with Climate Shock."

Presidential Scholarship, Santa Clara University, 2009. $2,500 tuition scholarship

Hackworth Ethics Fellow at Santa Clara University, 2008-2009. $4,000 to study the ethics of food justice, instigate lively campus discussion, and plan provocative events

Bannan Merit Scholarship, Santa Clara University, 2005-2009. $11,000 annual tuition scholarship for four years.

Phi Beta Kappa, 2009.

Alpha Sigma Nu (Jesuit Honors Society), 2009.

Honorable Mention in AASHE, 2007: Association for the Advancement for Sustainability in Higher Education), for initiating food justice work on campus

Donovan Fellowship, Santa Clara University, 2007. $1,500 to fund an internship with Catholic Relief Services, El Salvador

Research Grants

Future Investigators in NASA Earth and Space Science and Technology. 2022-2025. Proposal number 21-EARTH21-0129. PI. Future Investigator Hannah Friedrich, graduate student. Beyond Surface Water Mapping: Satellite-Based Estimates of Coastal Storm and Flood Exposure for the United States Gulf Coast. $150,000.

Arizona Institutes for Resilience Working Group Grant: 2022-2023. International Working Group to Assess Flood Recovery, Adaptation, and Resilience from Space. Co-lead with Hannah Friedrich and Adriana Zuniga-Teran. $15,000

Pima County Flood Control District. 2022**.** PI. validation and machine learning approaches for surface water mapping. $28,000.

NASA Hydrology Lab. 80NSSC22K0744. 2022-24**.** PI. validation and machine learning approaches for surface water mapping. $120,000.

NASA Commercial SmallSat Data Analysis Augmentation. 2022-23**.** PI with collaborators Iskha Gurung, Andrew Molthan (NASA) and Jonathan Giezendanner and Rohit Mukherjee (University of Arizona). Assessing BlackSky data for surface water detection. $100,000.

NASA Commercial SmallSat Data Analysis. 20-CSDA20-0121. 2021-22**.** PI with collaborators Iskha Gurung, Andrew Molthan (NASA) and Upmanu Lall. High resolution imagery to train and validate deep learning models of inundation extent for multiple satellite sensors. $200,000.

NASA New Early Career Investigators Program Earth Sciences. 20-NIP20-0224. 2021-2024. PI with Collaborators Upmanu Lall, Saiful Islam, Mohammed Bhuyan, Mehadi Hasan, and Sarder Raihan. Understanding flood risk in human altered landscapes from cities to farms: inferences from satellites and machine learning**.** $377,733.

NASA Terrestrial Hydrology. 19-THP19-0042. 2021-2024. PI with Co-Is Upmanu Lall, Pierre Gentine, and Venkat Lakshmi. Mapping flood impacts using multi-sensor satellite data fusion in urban areas**.** $630,000.

NASA Land Cover Land Use Change. 20-LCLUC2020-0048. 2021-2024. Co-PI with Nick Magliocca and Matt Fagan. Making the Hidden Visible: Accelerated Land-Use Change and Degradation Caused by Narco-Trafficking In and Around Central America's Protected Areas. $696,112.

NASA Flood Risk Workshop, 2018. Co-PI with Guy Schumann and Albert Kettner. $49,006. https://csdms.colorado.edu/wiki/FloodRiskWorkshop

Lincoln Land Institute Commissioned Study, 2017-2018. Co-PI: Informality, Poverty, Clientelism, and Corruption: The governance of land change and ecosystem services in Mexico City's Conservation Zone. $36,000.

Human Dimensions of Global Change (HDGC) specialty group from American Association of Geography, 2017.Field expenses for third chapter of dissertation: Mapping and Modeling Cocaine Driving Deforestation in the Mesoamerican Biological Corridor. $500

NSF DDRI (Doctoral Dissertation Research Improvement) Award, 2017. Mapping and Modeling Clandestine Drivers of Urban Expansion in Mexico City for $ 15,638

National Science Foundation Graduate Student Research Fellow, 2012- 2017. Tuition plus stipend to obtain Masters in Environmental Science at Yale University, and for one year of doctoral studies at Arizona State University.

Foster Latin American Research Fellowship, 2017**.** To cover field expenses for dissertation in Mexico City. $1500

Google Earth Engine Research Award, 2016. *Co-PI:* Development of a Global Database for Historical Flood Events – A Comprehensive Mapping of the Dartmouth Flood Observatory in Google Earth Engine*. $100,000 (With Cloud to Street)*

Conference of Latin American Geographers Field Award, 2016. Clandestine transactions and land use change: The consequences of clientelism in Mexico City and cocaine transit in Central America. $*1500*

Melvin G. Marcus Award (ASU), 2016. Biophysical Signatures of Clientelism: The Role of Legalizing Irregular Settlements in Flood Vulnerability in Mexico City $1,500 for summer research from ASU geography department. *$1500*

Research Assistantship, 2015-2016. *Conduct fieldwork in Mexico City and analyze the data to characterize the actors, mental models, perceived risks and adaptation strategies of the water*

system for the NSF project "Dynamics of Multi-scalar Adaptation in the Megalopolis: Autonomous action, institutional change and social-hydrological risk in Mexico City."

Google Earth Engine Research Award, 2015*. Co-PI: Dynamic Flood Vulnerability Mapping for Climate Affected Areas in the US. $100,000 (With Cloud to Street)*

Yale Institute for Biospheric Studies Small Grants Program, 2013. *$2,700 for Master's thesis in El Salvador "Ecosystem Services for Disaster Risk Reduction"*

Yale Latin American and Iberian Studies Travel Grant, 2013. *$750 for El Salvador research*

Hackworth Applied Ethics Research Grant, 2008. *$2,500 to fund Undergraduate Thesis field work in El Salvador: "Not So Fair: Alternative Coffee Economies in El Salvador"*

Teaching and Mentoring

Current Phd primary advisees: Hannah Friedrich, Lucas Belury, Elise Thompson, Ariful Islam, Prashanti Sharma.

Current Postdoc mentor to: Rohit Mukherjee, Zhijie Zhang, Jonathan Giezendanner

2021
Committee Member, Sakiko Rivera, Master's Thesis "Capacidad adaptativa de la forma urbana: hacia la mitigación del riesgo por inundaciones y deslaves en el Cerro del Peñón del Marqués, Iztapalapa." Posgrado en Ciencias de la Sostenibilidad, National Autonomous University of México (UNAM).

Professional Positions and Consulting

Co-Founder and Chief Scientist at Cloud to Street, 2015-pres. start up- tech company that sells flood maps from satellite data. Contracts and support from Google, The World Bank, The Data Pop Alliance, The French Development Bank, NYRISE (New York State Resiliency Institute for Storms and Emergencies), German Development Agency, and the World Flood Programme to test, develop, or apply model in Senegal, Uttarakhand India, New York State, Rio Salado Argentina, Tamil Nadu, India, and other locations. *http:/www.cloudtostreet.info/*

Coordinator, Rain Water Capture Potential Across Mexico City, 2017-2018. An analysis of spatial inequality coordinating a team of scientist together with Dr. Felipe de Alba to estimate potential for rainwater capture in Mexico City at the city block level using large datasets for the NGO Isla Urbana, Funded by Oxfam ($800,000 MXN, ~$45,000 USD)

Project Manager, SNAP (Science for Nature and People), 2014-2016**.** Coordinated a $450,000 project of 30 people organized in working groups to prioritize investment in green infrastructure in Latin America for future urban water security based on hydrologic, ecologic, economic, and land use change sciences

Teaching Assistant (Yale Forestry), 2014**.** Geographic Information Systems (for Yale Undergrads)

Co-Founder and Director of CEIBA, 2009-2014. *Coordinated and funded projects including disaster risk reduction, violence prevention, political participation, and agriculture in Santiago Texcuangos, El Salvador http://friendsofsantamaria.blogspot.com/.*

Scientist at The Nature Conservancy, 2009. *Wrote ecosystem service case studies for CCICED (China Council on International Cooperation for Environment and Development)*

Community Agroecology Network Intern, 2008. *research assistant to Tacuba, El Salvador to Masters´ and PhD students on food security and biodiversity for coffee farmers*

Catholic Relief Services Intern, 2007: *Evaluated economic success of agricultural programs in El Salvador funded by Donovan Fellowship*

Invited Talks

Latin American Studies weekly colloquium, University of Arizona: Narcotrafficking, Forest Loss, and Land Control on the Central American Frontier", April 1, 2022.

Hydrology and Atmospheric Sciences weekly colloquium, University of Arizona: " Understanding flood risk from space: opportunities to adapt to changing risk with improved monitoring and index-based insurance", Thursday, Nov 18, 2021.

Geography Department weekly colloquium, University of Maryland: " Understanding flood risk from space: opportunities to adapt to changing risk with improved monitoring and index-based insurance", Thursday, Nov 18, 2021.

Women in Data Science Conference, University of Arizona: "Mapping flood from space" Friday April 22, 2022.

Sustain What? Podcast by Andy Revkin. Paths to Sustaining Forests and Communities in Guatemala's Maya Reserve. August 7, 2020. https://www.earth.columbia.edu/videos/view/paths-to-sustaining-forests-and-communities-in-guatemalas-maya-reserve-1

University of Colorado, Boulder Geography Department Colloquium Speaker. Understanding flood risk from space: opportunities to adapt to changing risk with improved monitoring and index-based insurance. February 12, 2020.

University of Illinois Engineering Department Colloquium Speaker: The consequences of adaptation: mitigating and producing vulnerability in Mexico City. 5 February, 2021.

NASA Frontier Development Labs Machine Learning for Climate Change Keynote Speaker: Leveraging machine learning to improve satellite flood detection. January 18, 2021.

NASA SERVIR Technical Advisory Group "Integrating Earth observations and geospatial technology into risk financing sectors." September 3, 2020.

University of Massachusetts Engineering Department Colloquium Speaker: The consequences of adaptation: mitigating and producing vulnerability in Mexico City. 17 April, 2020.

Google Geo For Good User Summit 2020: More than maps: enabling flood resilient decisions with Google Earth Engine. October 20, 2020. Virtual. https://earthoutreachonair.withgoogle.com/events/geoforgood20/register?after-register=%2Fevents%2Fgeoforgood20%2Fwatch%3Ftalk%3Dtalk-37

Google Machine Learning Workshop 2020: Towards filling gaps in near real-time multi-satellite sensor flood monitoring with machine learning. February 10, 2020. Tel Aviv, Israel.

Simposio sobre la Selva Maya 2020: Narcotráfico y la pérdida de bosque en Centroamérica 2000-2016. January 5 2020. PRISMA, Antigua, Guatemala. desde la correlación hacia la causalidad.

UNAM LANCIS 2018: Deforestación, urbanización, y vulnerabilidad: incidencia de la ciencia de la sostenibilidad en la generación de propuestas para enfrentar cambios. March 15 2018. Invited by the National Laboratory of Sustainability Science, UNAM.

20 years since People and Pixels 2018: Clandestine political economic activity in landscape dynamics-linking pattern to process. March 15 2018. PERN (Population Environment Research Network). https://populationenvironmentresearch.org/cyberseminars

People and Ecosystems (PECS II) 2018: Clientelism, Corruption, Poverty, and Informality: the governance of land and ecosystem services in Mexico City's conservation zone. November 7-10. Oaxaca, Mexico. In the Panel "Equity and Environmental Change in an Urbanizing World".

Paradojas de la Megalopolis 2018: Nuevas formas de medir el crecimiento y la expansion and La captación de lluvia como opurtunidad del futuro. Centro de Estudios Sociales y de Opinión Pública, CESOP, LXIII Legislatura, Cámara de Diputados, Palacio Legislativo de San Lázaro. August 9 and 10, Mexico City.

Crisis Preparedness & Management in the Network Age 2017: Socio-physical Vulnerability to Flooding in Senegal. French Development Bank. February 24, Paris, France.

American Geophysics Union 2016: Developing a Global Database of Historic Flood Events to Support Machine Learning Flood Prediction in Google Earth Engine. December 12 2016. Covered by Nasa Media: http://landsat.gsfc.nasa.gov/mapping-historic-floods-around-the-world/

Google Earth Engine User Summit 2016: Invited Keynote. *Flood Vulnerability from the Cloud to the Street and back! Powered by Google Earth Engine.* *https://www.youtube.com/watch?v=W7Ogja4ukSI* June 2016: Mountain view,CA

COP 21 side event 2015: Building a socio-physical vulnerability index for Senegal. For Side event: Climate Change Resilience in the Age of Data. December 4 2015. Paris, France. Sponsored by the Data Pop Alliance and the French Development Bank.

Conference Presentations

American Association of Geographers, 2022. Identifying, projecting, and evaluating informal urban expansion spatial patterns in Mexico City. 28 February, 2022, Virtual.

American Geophysics Union, 2021. High resolution imagery to train and validate deep learning models of inundation extent for multiple satellite sensors. Oral Session: IN017 - Commercial Earth Observation Data: Research and Applications. 14 December, 2021, Virtual.

Gobeshona, 2021. Co-organized panel on Building Flood resilience in the Bangladesh Context. Presented: Flood Index Insurance Trigger Development with Radar Satellites and News Media in Northern Bangladesh. Tuesday January 19, 2021.

American Geophysics Union, 2020. Flood Index Insurance Trigger Development with Radar Satellites and News Media in Northern Bangladesh. Oral Session: Innovations in Risk Transfer Solutions using Earth Observations, Weather Data, Physical Models, and Short to Long Term Forecasts. 15 December, 2020, Virtual.

American Geophysics Union, 2020. Machine learning and computer vision for improved satellite flood detection: seeing through (thin) clouds and identifying objects. Oral Session: Global Floods: Forecasting, Monitoring, Risk Assessment, and Socioeconomic Response. 16, December, 2020, Virtual.

Global Flood Partnership, 2020. Making flood maps better and making them matter! Machine learning, SmallSats, and iterative stakeholder design at Cloud to Street. November 20, 2020. Virtual.

The IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops: Earth Vision 2020. Sen1Floods11: a georeferenced dataset to train and test deep learning flood algorithms for Sentinel-1. June 14, 2020.

American Association of Geographers, 2020. Co-organized panel: *Sustainability and Informal Urbanization.* Presented The Role of Institutional Entrepreneurs, Electoral Politics, and Clientelism in Informal Titling and Urban Expansion in Mexico City. April 5, 2020, Virtual.

Global Flood Partnership, 2019: What flood event map accuracy is required to enable governments, aid agencies, and insurance companies to protect vulnerable lives and livelihoods? June 11-13,Guangzhou, China.

American Geophysics Union, 2019: From publishable to operational: new metrics to more honestly measure the ability of remote sensing algorithms to consistently monitor flooded assets and populations in near real time. In: Global Floods: Forecasting, Monitoring, Risk Assessment, and Socioeconomic Response I. Oral Talk. December 9, San Francisco.

American Geophysics Union, 2019: Monitoring inundated infrastructure and assets with high resolution satellite imagery to enable financial protection. Advances in Remote Sensing, Machine Learning, and Economics to Improve Risk Management and Evaluate Impacts in Socioenvironmental Systems II Posters. December 11, San Francisco.

UNAM LANCIS, 2019: Mapeando motores ilícitos de cambio de uso de suelo expansión urbana en la Ciudad de México. May 2019. Mexico City. Seminar. National Laboratory of Sustainability Science

Global Land Programme Open Science Meeting, 2019: Illicit-clandestine land transactions - linking pattern to process in narcodeforestation. April 2019. Bern, Switzerland.

Council of Latin Americanist Geographers, 2018: An empirical approach to quantify the effects of narcotrafficking on deforestation in Central America. May 22 2018. Part of the Drug War Conservation Panel. San Jose, Costa Rica.

American Geophysics Union, 2017: A Global Geospatial Database of 5000+ Historic Flood Event Extents. December 11 2017. In: Global Floods: Forecasting, Monitoring, Risk Assessment, and Socioeconomic Response II.

Resilience, 2017: Institutional Entrepreneurs and Informal Urban Land Transactions in Mexico City and co-organized session: Informal, clandestine dynamics and sustainability transformations in cities. August 21-April 23,Stockholm, Sweden.

American Association of Geographers, 2017: Institutional Entrepreneurs and Informal Urban Land Transactions in Mexico City and co-organized panel via 2 sessions- Clandestine dynamics I: the cocaine commodity chain and land change in Latin America and chaired Clandestine dynamics II: informal and illicit transactions, markets and rent-seeking activities as drivers of land change. April 3-April 7, Boston MA.

Paradojas de la Megalopolis, 2016: "Las fugas a debate. Incide en el estrés hídrico? Un análisis preliminar de datos 2000-2004 y 2009-2015.". Centro de Estudios Sociales y de Opinión Pública, CESOP, LXIII Legislatura, Cámara de Diputados, Palacio Legislativo de San Lázaro. July 25 and 26, Mexico City.

American Association of Geographers, 2016: Socio-hydrological risk transfer and emergent vulnerability in the Basin of Mexico on panel New insights, approaches, and challenges in the field of socio-hydrology. March 29-April 3, San Francisco, CA.

American Geophysics Union, 2015: Poster: Dynamic Flood Vulnerability Mapping with Google Earth Engine.

Google Earth Engine User Summit, 2015: Sociobiophysical Flood Vulnerability in Earth Engine. https://www.youtube.com/watch?v=eUbZZoJtnaA&feature=youtu.be

FOSS4gNA 2015:(Free and Open Source for Geospatial, North America) Bring developers+ scientists together to unlock (Big, Open?) Geospatial Data to Build Climate and Disaster Resilience. San Francisco, March 9-12 2015.

American Geophysics Union, 2014: Assessing Coupled Social Ecological Flood Vulnerability from Uttarakhand, India, to the State of New York with Google Earth Engine. December 15 2015. San Francisco, CA.

Early Career Researchers Conference "Integrating the Social and Natural Dimensions of Sustainability", 2014: Participatory Watershed Modeling: precision and people in Urbanizing

Salvadoran catchments. *LUCID* Lund University Centre of Excellence for Integration of the Social and Natural Dimensions of Sustainability, Oct 8-10, Lund, Sweden.

American Association of Geographers, 2014: Quantifying the impacts of land use change on flooding in data-poor watersheds in El Salvador with community-based model calibration. April 8-12, Tampa, Florida.

International Conference for Crisis Mappers, 2013: Modeling social-ecological vulnerability to disasters on the fly and in the cloud. https://www.youtube.com/watch?v=0lcDsgOFSJc. Nairobi, Kenya, November 18-22 2013.

United States Society for Ecological Economics, 2013: poster: Ecosystem Services for Flood and Landslide Mitigation in El Salvador. University of Vermont, June 9-12th 2013,

Dimensions of Political Ecology, 2013: Community Resilience and Hurricane Ida: How Marginalized Salvadorans Lacking NGO and Governmental Support Cope with Climate Shock. University of Kentucky, February 28-March 3.

National Council on Science and The Environment ,2013: Disasters and Environment: Science, Preparedness and Resilience. Poster: Community Resilience in El Salvador. D.C., January 15-17.

International Society of Tropical Foresters, 2013: 19th annual conference, Food and Forests: Cultivating Resilient Landscapes. Poster: Barriers to Fair Trade Certification in El Salvador. January 24-26, Yale University.

International Collaboration, Research, and Study

Serves on Master's student external committees at UNAM Sustainability PhD program

UNU-Munich Re-ICCCAD Resilience Academy 2013 and 2014: *workshop with 30 scientists to discuss resilience science context of livelihoods and climate change, September 15-21 2013, Dhaka, Bangladesh and August 15-20 Munich, Germany.*

Economia Solidaria The Solidarity Economy 2012: *short course at La Universidad Luterana Salvadoreña, San Salvador, March-June 2012.*

UN Summer Academy on Social Vulnerability 2010: *Protecting Environmental Migrants: Creating New Policy and Institutional Frameworks, United Nations University Institute for Environment and Human Security, Hokenhammer Germany July 25-31 2010.*

Disasters, Development and Gender 2010: *Short master's level course put on by UNDP (United Nations Development Program) with the UCA (University of Central America), San Salvador, March-June 2010.*

ABC's of Climate Change Adaptation 2009: *short course at La Universidad Luterana con Unidad Ecologica Salvadoreña, San Salvador Oct.-Nov. 2009.*

Study Abroad Thailand 2008: *organized a Farmer's Market in Northeastern Thailand in collaboration with Alternative Agriculture Network of Thailand.*

Study Abroad El Salvador 2007: *focus on community development and poverty, taught English and Yoga in marginalized communities.*

Media

Invited participant on REDDIT Science "Ask Me Anything." 2017. Live chat with 6,000 views to answer questions about our paper regarding narcotrafficking published in Environmental Research Letters.https://www.reddit.com/r/science/comments/6c3864/science_ama_series_were_steve_sesnie_us_fish_and/

Social Entrepreneurs Predict Flooding Risk In Vulnerable Communities. September 21 2016. *Forbes.* [https://www.forbes.com/sites/annefield/2016/09/21/social-enterpreneurs-predict-flooding-risk-in-vulnerable-communities/ - d4352b91d8de](https://www.forbes.com/sites/annefield/2016/09/21/social-enterpreneurs-predict-flooding-risk-in-vulnerable-communities/)

Mapping Historic Floods Around the World. *NASA* December 12 2016. *NASA.* http://landsat.gsfc.nasa.gov/mapping-historic-floods-around-the-world/

Professional Affiliations

American Association of Geographers
American Geophysical Union
Research Affiliate, Data Pop Alliance
Affiliate, Center for Biodiversity Outcomes, Arizona State University

Service

Reviewer for Nature, Regional Environmental Change, People and Nature, Journal of Photogrammetry and Remote Sensing, Nature Sustainability, Conference on Computer Vision and Pattern Recognition, Geographical Analysis, Latin American Geography, Sustainability Science, Food Policy, PNAS, Water, The Social Science Journal, Frontiers in Sustainable Cities, International Journal for Disaster Risk Reduction, Hydrology and Earth System Sciences, City and Environment Interactions, World Development, Geoforum, Science of the Total Environment, Water Resources Research, Journal of Land Use Science, Sustainability, Bulletin of the American Meteorological Society, Nature Scientific Reports

Center for Climate Adaptation Science and Solutions, Scientific Advisory
Population Environment Research Network, Scientific Advisory
Global Flood Partnership, Steering Committee
Umbela Transformaciones Sostenibles (Mexican NGO), Scientific Advisor and co-founder
Volunteer with No More Deaths, Phoenix, putting water in the desert on migrant trails (2015-2017)
Travel Grants Reviewer, ASU GPSA (Graduate and Professional Student Association) (2014-2015)
Program Committee, FOSS4gNA 2015:(Free and Open Source for Geospatial, North America). *Read abstracts and voted on talks, participated in conference calls*
Panel Organizer with Dr. Leah Gerber: *Expanding Diversity in the Next Generation of Ecology: What Works to Recruit, Matriculate, and Retain Disadvantaged Youth in Undergraduate Degrees in Ecological Degree Programs?* At ESA (Ecological Society of America), Aug 11 2015.
Volunteer, Green Careers, Women Leaders. Professional Development and mentorship program for highschool girls in New Haven. 2014-2016.
Conference Organizer with Bessie Schwarz, *Yale Urban Ecosystem Services Symposium*. January 24 2015.

Skills

Fluent in Spanish, conversational Swahili
Intermediate programming in Python, Javascript, MatLab, Octave, XPPAUT, NetLogo, Xpress
Advanced programming skills in R- regression (econometrics, multi-level) and spatial analysis techniques
Advanced in GIS and Remote Sensing Analysis in ArcMap, QGIS, ENVI, Google Earth Engine
Intermediate skills in website design, mobile data collection
Hydrologic and Hydraulic Modeling in ArcHydro, Hec-HMS, Hec-RAS
Qualitative Analysis in Dedoose