Curriculum Vitae

RAFAEL MORENO-SANCHEZ

as of Summer 2021

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RAFAEL MORENO-SANCHEZ

EDUCATION

1995 - 1996 **Postdoctoral Fellow.** Department of Geography, University of Western Ontario, Canada (Dr. Jacek Malczewski), in collaboration with the Organization of American States (OAE) and the Secretariat for Environment, Natural Resources and Fisheries (SEMARNAP) Mexico.

1987 - 1992 **Ph.D**. Natural Resources Management. Colorado State University. Fort Collins, Colorado. USA. (Advisor: Dr. Al Dyer)

1985 - 1987 **Master of Science.** Natural Resources Planning. Colorado State University. Fort Collins, Colorado. USA.

1978 - 1982 **B.S**. Forestry. Chapingo Autonomous University. Chapingo, Estado de Mexico. Mexico.

AREAS OF INTEREST

- Geographic Information Science and Technology (GISc&T) with emphasis in geospatial Open Source Software and technologies, applications to natural resources conservation and management, and analysis of land use land cover dynamics and environmental impacts.

- Natural resources conservation and sustainable management with emphasis in forest ecosystems.

PROFESSIONAL EXPERIENCE

2011 - to date **Associate Professor.** Department of Geography and Environmental Sciences, University of Colorado Denver.

Jan 2015 - Dec 2015 **Associate Chair.** Department of Geography and Environmental Sciences, University of Colorado Denver.

2003 - to 2011 **Assistant Professor.** Department of Geography and Environmental Sciences, University of Colorado Denver.

2014 - to date **Coordinator, Free and Open Source Software for Geospatial Applications (FOSS4G) Lab.** University of Colorado Denver.

2001 - 2003 **Director Master of Science in Geographic Information Science Program, Senior Research Scientist.** Department of Geography, University of Denver.

2000 - 2001 **Assistant Professor.** Department of Computer Information Systems, Metropolitan State College of Denver. Databases design implementation and management, Programming, Systems Analysis and Design.

1996 - 2000 **Assistant Professor.** Department of Earth and Atmospheric Sciences, Metropolitan State College of Denver. Design, manage and teach the courses for the GIS Planning and Decision Making Program for the Land Use Planning Major. Created a Certificate in GIS.

1995 - 1996 **Postdoctoral Fellow.** University of Western Ontario-Organization of American States-SEMARNAP (Canada). Designed and developed a Multimedia Geographic Information System for social-environmental conflict resolution for the Secretariat of the Environment, Natural Resources and Fisheries (SEMARNAP), Mexico. Also, worked in the application of multicriteria group decision making methods to the solution of environmental conflicts in land use planning.

1993 - 1995 **Director, National Center for Disciplinary Research in Conservation and Improvement of Forest Ecosystems**-INIFAP (Mexico). Established the center, creating its strategic and tactical plans. Obtained external funding for a total of $225,000 USD. Project leader in the revision and expansion of national digital cartography. Designed and established a GIS laboratory for the Center. Participated in intra and inter-institutional GIS planning committees at the national level. Designed and supervised the technical and administrative details of 16 nationwide research projects, carried out by 35 scientists and 60 staff personnel.

1991 - 1992 **Researcher and National Coordinator. National Land Use Planning Special Project-INIFAP** (Mexico). Created national digital cartography (soil, topography, and climate) and analyzed it using GIS to determine best land use strategies at the national level. Supervised 22 scientists nationwide. Development of an Expert System for the identification and issuing of recommendations for the control of bark beetles of the *Dendroctonus* genus in Mexico. This system was acquired, deployed and currently in use nationwide by the Subsecretariat for Forestry, Mexico.

1991 - 1994 **Adjunct Professor.** Colegio de Postgraduados. (Mexico). Taught courses at the Master's Degree level.
Adjunct Professor. Division of Forest Sciences, Chapingo Autonomous University. (Mexico). Taught courses at the Master's Degree and Bachelor's level.

1989 - 1990 **Instructor. College of Forestry and Natural Resources-Colorado State University** (USA). Taught course *Microcomputers in Natural Resources Management* at the Master's degree level. (3 semesters).

1987 - 1988 **Teaching Assistant. College of Forestry and Natural Resources-Colorado State University** (USA). Assisted in lab assignments for course *Microcomputers in Natural Resources Management* at the Master's degree level. (2 semesters).

1983 - 1984 **Acting Head. Logging Department-National Institute for Forest Research** (Mexico). Prepared proposals and reports. Planned, organized, executed and controlled 5 projects and supervised 8 researchers nationwide.

1982 - 1983 **Researcher. Logging Department-National Institute for Forest Research.** Determined optimal spatial strategies for logging operations in large forest areas.
Adjunct Professor. Department of Forestry, Chapingo Autonomous University. (Mexico). Taught courses at the Bachelor's Degree level.

PEER-REVIEWED JOURNAL ARTICLES
(underlined names denote students)

Moreno-Sanchez, R., D. Carver, J.M. Torres-Rojo and P. Anthamatten. 2020. Assessment of the classification accuracy of the GlobeLand30 Forest class for the temperate and tropical forests of Mexico. *Applied Geomatics*, 1-17. https://doi.org/10.1007/s12518-020-00328-1

Moreno-Sanchez, R., J. Raines, J. Diffendorfer, M.A. Drummond, and J. Manko. 2019. Challenges for Monitoring the Extent and Land Use/Cover Changes in Monarch Butterflies' Migratory Habitat across the United States and Mexico. *Land*, 8(10), 156-173. https://doi.org/10.3390/land8100156

Torres-Rojo, J.M., **R. Moreno-Sanchez.** and J. Amador-Callejas. 2019. Effect of capacity building in alleviating poverty and improving forest conservation in the communal forests of Mexico. *World Development*, 121:108-122. https://doi.org/10.1016/j.worlddev.2019.04.016

Cross, M., T. Scambos, F. Pacifici, O. Vargas-Ramirez, **R. Moreno-Sanchez**, and W. Marshall. 2019. Classification of Tropical Forest Tree Species Using Meter-Scale Image Data. *Remote Sensing*, 11(12), 1411. https://doi.org/10.3390/rs11121411

Moreno-Sanchez, R. 2018. Topic FC-35: Openness. *The Geographic Information Science & Technology Body of Knowledge* (4th Quarter 2017 Edition), John P. Wilson (ed.). DOI: 10.22224/gistbok/2018.1.5 https://gistbok.ucgis.org/bok-topics/openness . Digital version of the Geographic Information Science & Technology Body of Knowledge (BoK) from the University Consortium for Geographic Information Science. *(Subject matter experts in each topic are*

invited to contribute an entry to this volume which is a national reference for higher education GIScience curricula).

Moreno-Sanchez, R., J.M. Torres-Rojo, F. Moreno-Sanchez, D. Carver, L. Niknami, and E. Clay. 2017. Exploration of land cover changes 2000-2010 at the national level in Mexico using GlobeLand30 data sets. *Reality, Data and Space International Journal of Statistics and Geography* 8(3): 30-45. https://rde.inegi.org.mx/index.php/2017/12/18/exploration-of-land-cover-changes-2000-2010-at-the-national-level-in-mexico-using-globeland30-data-sets/

Brovelli, M., M. Minghini, **R. Moreno-Sanchez,** and R. Oliveira. 2017. Free and Open Source Software for Geospatial Applications (FOSS4G) to support Future Earth. *International Journal of Digital Earth* 1-19. https://doi.org/10.1080/17538947.2016.1196505

Torres-Rojo, J. M., **R. Moreno-Sánchez,** and M.A. Mendoza-Briseño. 2016. Sustainable Forest Management in Mexico. *Current Forestry Reports*, 2(2): 93-105. https://doi.org/10.1007/s40725-016-0033-0

Clay, E., **R. Moreno-Sanchez**, J.M. Torres-Rojo and F. Moreno-Sanchez. 2016. National assessment of the fragmentation levels and fragmentation-class transitions of the forests in Mexico for 2002, 2008 and 2013. *Forests,* 7(3): 48-79. https://doi.org/10.3390/f7030048

Roth, D. , **R. Moreno-Sanchez**, J.M. Torres-Rojo and F. Moreno-Sanchez. 2016. Estimation of human induced disturbance of the environment associated with 2002, 2008 and 2013 land use/cover patterns in Mexico. *Applied Geography* 66: 22-34. https://doi.org/10.1016/j.apgeog.2015.11.009

Moreno-Sanchez, R., T. Buxton-Torres, K. Silbernagel, F. Moreno-Sanchez. 2014. Fragmentation of the forests in Mexico: National level assessments for 1993, 2002 and 2008. *Reality, Data and Space International Journal of Statistics and Geography*. 5(2): 4-17. https://rde.inegi.org.mx/index.php/2014/05/10/fragmentation-of-the-forests-in-mexico-national-level-assessments-for-1993-2002-and-2008/

Moreno-Sanchez, R., J.M. Torres-Rojo, F. Moreno-Sanchez, S. Hawkins, J. Little, S. MacPartland. 2012. National assessment of the fragmentation, accessibility and anthropogenic pressure on the forests in Mexico. *Journal of Forestry Research* 23(4): 529-541. https://doi.org/10.1007/s11676-012-0293-x

Moreno-Sanchez, R. 2012. Editorial. Free and Open Source Software for Geospatial Applications (FOSS4G): A mature alternative in the geotechnologies arena. *Transactions in GIS* 16(2): 81-88. https://doi.org/10.1111/j.1467-9671.2012.01314.x

Moreno-Sanchez, R. 2012. Editorial. The growing interest in Free and Open Source Software for Geospatial applications (FOSS4G) requires specialized publication venues. *OSGeo Journal* 10: 3-4 https://svn.osgeo.org/osgeo/journal/volume_10/en-us/final_pdfs/OSGeoJournal_FOSS4G2011.pdf

Moreno-Sanchez, R., F. Moreno-Sanchez, J.M. Torres-Rojo. 2011. National assessment of the evolution of forest fragmentation in Mexico. *Journal of Forestry Research* 22(2): 167-174. https://doi.org/10.1007/s11676-011-0145-0

Hayden, M., C.K. Uiejo, K. Walker, F. Ramberg, **R. Moreno-Sanchez**, C. Rosales, M. Gameros, L.O. Mearns, E. Zielinski-Gutierrez and C.R. Janes. 2010. Microclimate and human factors in the divergent ecology of *Aedes aegypti* along the Arizona, U.S./Sonora, MX Border. *EcoHealth*. 7(1): 64-77. https://doi.org/10.1007/s10393-010-0288-z

Moreno-Sanchez, R., G. Anderson, J. Cruz and M. Hayden. 2007. The potential for the use of Open Source Software and Open Specifications in creating web-based cross-border health spatial information systems. *International Journal of Geographical Information Science* 21(10): 1135-1163. https://doi.org/10.1080/13658810701300113

Moreno-Sanchez, R., M. Hayden, C. Janes and G. Anderson. 2006. A web-based multimedia spatial information system to document *Aedes aegypti* breeding sites and dengue fever risk along the US-Mexico border. *Health & Place* 12: 715-727. https://doi.org/10.1016/j.healthplace.2005.10.001

Sayadyan H. and **R. Moreno-Sanchez**. 2006. Forest policies, management and conservation in Soviet (1920-1991) and post-Soviet (1991-2005) Armenia. *Environmental Conservation* 33(1):1-13. https://doi.org/10.1017/s0376892906002852

Moreno-Sanchez, R. and H. Sayadyan. 2005. Evolution of the forest cover in Armenia. *International Forestry Review* 7(2): 113-127. https://doi.org/10.1505/ifor.2005.7.2.113

Anderson, G. and **R. Moreno-Sanchez**. 2003. Building web-based spatial information solutions around Open Specifications and Open Source Software. *Transactions in GIS* 7(4): 447-466. https://doi.org/10.1111/1467-9671.00158

García-N., H., R. García-D., **R. Moreno-Sanchez**. and A. González-R. 2002. Use of remote sensing and GIS to delineate land use change in the agricultural lands in the State of Guanajuato between 1970 and 1997. *Investigaciones Geográficas Boletín* 47: 92-112. (in Spanish). (*This journal is listed in the Roster of Scientific Journals of Excellence by the National Council of Science and Technology in*

Mexico).

García-N., H., R. García-D., **R. Moreno-Sanchez**, J. López-B, and L. Villers-R. 2001. Comparing a fuzzy sets approach and conventional Boolean methodology for the classification of land suitability for agriculture. *Agricultura Técnica en México* 27(2):107-118. (in Spanish). (*This journal is listed in the Roster of Scientific Journals of Excellence by the National Council of Science and Technology in Mexico).*

García-N., H., J. López-B, **R. Moreno-Sanchez**, L. Villers-R. and R. García-D. 2000. Land use change and land suitability classification for agriculture in the Rural Development District 004, Celaya, Guanajuato. *Terra* 18(1): 11-25. (In Spanish).

García-N., H., **R. Moreno-Sanchez**, and R. García-D. 2000. Land use changes and suitability for agriculture in the Rural Development District 004 Celaya, Guanajuato. *In*: Terrones R. y E. Morales T. (Eds.). *Fighting desertification*. INIFAP-CIRCE-Campo Experimental Bajío. Celaya, Guanajuato. pp: 51-61. (In Spanish).

García-N., H., J. López-B, **R. Moreno-Sanchez**, L. Villers-R and R. García-D. 1999. Agricultural potential for the Rural Development District 004 Celaya, Guanajuato: An application of fuzzy set theory**.** *Investigaciones Geográficas Boletín* 38: 69-83. (in Spanish). (*This journal is listed in the Roster of Scientific Journals of Excellence by the National Council of Science and Technology in Mexico***).**

Malczewski, J., **R. Moreno-Sanchez**, L. Bojorquez-T and E. Ongay-Delhaumeau. 1997. A Multicriteria Group Decision Making model for environmental conflict analysis in the Cape Region, Mexico. *Journal of Environmental Planning and Management.* 40(3):349-374.

Moreno-Sanchez, R., J. Malczewski and L. Bojorquez-T. 1996. Design and development strategy for Multimedia GIS to support environmental negotiation, administration and monitoring at the regional level. *Transactions in GIS* 1(3): 161-175.

Moreno-Sanchez, R. and Moreno-Sanchez, F. 1995. GIS in natural resources administration: The INIFAP experiences. *Ciencia Forestal* 20: 93-110. (in Spanish). (*This journal is listed in the Roster of Scientific Journals of Excellence by the National Council of Science and Technology in Mexico).*

Moreno-Sanchez, R. and D. Cibrian-T. 1993. An expert system for the identification of insects of the Dendroctonus genus in Mexico. *Agrociencia: Serie de Recursos Naturales* 4(3): 317-327. (in Spanish). (*This journal is listed in the Roster of Scientific Journals of Excellence by the National*

Council of Science and Technology in Mexico).

Ortíz -V., M., R. Martínez-P., R. Aveldaño-S., **R. Moreno-Sanchez** and F. Moreno-Sanchez. 1992. Determination of production potential of vegetal species in the state of Puebla. Special Publication. National Institute for Forest, Agriculture and Livestock Research. Mexico.

Moreno-Sanchez, R. 1988. Goal programming model for planning a logging system. *Ciencia Forestal* 13(63): 175-190. (in Spanish). (*This journal is listed in the Roster of Scientific Journals of Excellence by the National Council of Science and Technology in Mexico).*

Moreno-Sanchez, R., R. Vargas and P. Rivero. 1985. A linear programming model for planning logging operations. *Ciencia Forestal* 10(53): 28-47. (in Spanish). (*This journal is listed in the Roster of Scientific Journals of Excellence by the National Council of Science and Technology in Mexico).*

Rodríguez-F., C. and **R. Moreno-Sanchez**. 1982. Elaboration of volume tables through stem analysis for Pinus montezumae Lamb. in the "San Juan Tetla" experimental forest, State of Puebla. Technical Bulletin #90. National Institute for Forest Research (INIFAP). Mexico. (in Spanish).

PEER-REVIEWED CHAPTERS IN BOOKS
(underlined names denote students)

Moreno-Sanchez, R. and M. Brovelli. (*Accepted June 2020*). Chapter 11: Free and Open Source Software for Geospatial Applications (FOSS4G) and its relevance to today's challenges In: Kent, A. and D. Specht (Eds.) *Routledge Handbook of Geospatial Technology and Society*. Routledge, Milton Park, U.K.

Torres-Rojo J.M. and **R. Moreno-Sanchez**. (2020) Dinámica de cambio de la cobertura forestal en México. [Forest cover change dynamics in Mexico]. In: El cambio del uso del suelo en Mexico: Un enfoque económico. [Land use change in Mexico: An economic perspective]. Centro Disciplinario de Investigación y Docencia Económicas CIDE. Mexico.

Moreno-Sanchez, R. and J.M. Torres-Rojo. 2010. Decision Support Systems for forest management in Mexico: Their characteristics and context for their creation and evolution. In: Manos, B., K. Paparrizos, N. Matsatsinis and J. Papathanasiou (Eds.): *Decision Support Systems in Agriculture, Food and the Environment: Trends, Applications and Advances*. pp. 74-100. IGI Global, Hershey, PA.

Moreno-Sanchez, R. 2009. The Geospatial Semantic Web: What are its implications for geospatial information users? In: Cunha, M., E. Oliveira, A. Tavares and L. Ferreira (Eds.): *Handbook of Research on Social Dimensions of Semantic Technologies and Web Services*. pp. 588-609. IGI

Global, Hershey, PA.

Moreno-Sanchez, R. 2009. Fragmentation of temperate and tropical forests in Mexico: implications for their conservation and sustainable management. In: Brebbria, C.A., M. Neophyton, E. Beriatos, I. Ioannou, and A.G. Kungolos (Eds) *Sustainable Development and Planning IV,* pp 511-524. WIT Press. Southampton, UK.

Moreno-Sanchez, R., H. Sayadyan, R. Streeter, and J. Rozelle. 2007. The Armenian forests: threats to conservation and needs for sustainable management. In: Tiezzi, E., J.C. Marques, C.A. Brebbria and S.E. Jorgensen (Eds.) *Ecosystems and Sustainable Development VI.* pp 113-122. WIT Press. Southampton, UK.

PRESENTATIONS IN PEER-REVIEWED CONFERENCES
(underlined names denote students)

Truitt, J., **R. Moreno-Sanchez**, C. Speas, and P. Anthamatten. 2021. Stakeholder Engagement in Adaptive Management: Experiences From the SBEADMR Program in Western Colorado. International Association for Landscape Ecology (IALE)-North America. Virtual. April 12-16

Moreno-Sanchez, R., D. Carver, J.M. Torres-Rojo and P. Anthamatten. 2020. Evaluación de la exactitud de la clasificación de la clase Forest en GlobeLand30 2000 y 2010 para los bosques de México. [Assessment of the classification accuracy of the Forest class in GlobleLand30 2000 and 2010 for the forest in Mexico]. *IV Congreso Internacional de Ingenieria Ambiental Forestal y Ecoturismo*. [IV International Congres on Forest Engineering and Ecoturism]. Guayaquil, Ecuador. September 16-19.

Mays, D., T. Roane, **R. Moreno-Sanchez**, Grace RedShirt Tyon and B. Allen. 2019. Extracurricular experiences bring indigenous perspectives to students in Biology, Civil Engineering, and Environmental Science. *American Geophysical Union (AGU)*. Presentation PA44B-04. San Francisco, CA December 9-13.

Moreno-Sanchez, R. J. Raines, J. Diffendorfer, M. Drummond. 2019. Characteristics and limitations of land use/cover digital datasets for monitoring the extent and changes in the monarch butterflies' migratory habitat across the United States and Mexico. *U.S.- International Association of Landscape Ecology annual conference*. Fort Collins, CO April 7-11.

Carver, D., **R. Moreno-Sanchez,** J.M. Torres-Rojo. P. Anthamatten, G. Maclurin. 2019. Using ground-truth sites to assess the capacity of GlobeLand30 2000 and 2010 Forest class to correctly identify the temperate and tropical forests in Mexico. *U.S.- International Association of Landscape Ecology annual conference*. Fort Collins, CO April 7-11.

Moreno-Sanchez, R. 2017. Facilitators and inhibitors for the integration and use of Free and Open Source Software for Geospatial Applications (FOSS4G) in universities and government organizations in the USA. *International Association for the Study of the Commons (IASC) XVI Biannual Conference.* Utrecht, The Netherlands, July 10-14.

Arias-Muñoz, C., M.A. Brovelli, C.E. Kilsedar, **R. Moreno-Sanchez**, D. Oxoli. 2017. Web mapping architectures based on Open Specifications and Free and Open Source Software in the water domain. *5th International Workshop on Web Mapping, Geoprocessing and Services. ISPRS Geospatial Week.* Wuhan, China. September 18-22.

Oliveira R. and **R. Moreno-Sanchez.** 2016. Harvesting, integrating, and distributing large open geospatial datasets using Open Source Software. *International Society for Photogrammetry and Remote Sensing (ISPRS) XXIII Congress*. Prague, Czech Republic. July 12-19.

Clay E., **R. Moreno-Sanchez**, J.M. Torres-Rojo and F. Moreno-Sanchez. 2015. Changes in forest fragmentation in relation to the levels of fragmentation of the temperate and tropical forests in Mexico for 2002, 2008 and 2013. *10th North American Forest Ecology Workshop*. Veracruz, Mexico. June 14-18.

Arias-Muñoz C., M. Brovelli and **R. Moreno-Sanchez.** 2015. Open Data, Open Specifications and Free and Open Source Software: A powerful mix to create distributed Web-based water information systems. *European Geosciences Union General Assembly*. *Geophysical Research Abstracts Vol. 17, EGU2015-8631, 2015*. Vienna, Austria. April 12-15.

Moreno-Sanchez, R. 2012. Free and Open Source Software for Geospatial Applications (FOSS4G): A mature alternative in the geotechnologies arena. *First Latin OSGIS (Open Source Geographic Information Software) Conference*. Guayaquil, Ecuador. November 19-21.

Moreno-Sanchez, R. 2012. Free and Open Source Software for Geospatial Applications (FOSS4G) Education: State of the art and resources. Post conference workshop with Ecuadorian Government delegates. *First Latin OSGIS (Open Source Geographic Information Software) Conference.* Guayaquil, Ecuador. November 22-23.

Moreno-Sanchez, R. 2009. Fragmentation of temperate and tropical forests in Mexico: implications for their conservation and sustainable management. *Third International Conference on Sustainable Development and Planning.* Limassol, Cyprus. May 13-15.

Moreno-Sanchez, R. 2008. Potential contributions of geospatial Open Source Software (OSS) and geospatial Open Specifications to the creation and sustainability of local and global health information systems. *Public Health in the Rockies*. Breckenridge, Colorado September 15-17.

Moreno-Sanchez, R. 2008. The potential contributions of geographical Open Source Software and Open Specifications to natural resources sustainable management. *Third International Symposium on the Environment.* Athens, Greece. May 22-25.

Moreno-Sanchez, R., H. Sayadyan, R. Streeter, and J. Rozelle. 2007. The Armenian forests: threats to conservation and needs for sustainable management. *Ecosystems and Sustainable Development VI*. Coimbra, Portugal. September 5-7.

Moreno-Sanchez, R. 2004. Open specifications, Interoperability, and Distributed GIS systems: How do these concepts relate to natural resources sustainable management. *Symposium: Unifying Knowledge for Sustainability in the Western Hemisphere*. Denver, Colorado September 20-24. Proceedings RMRS-P-42CD. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. (**International conference with published proceedings**).

Hayden, M. and **R. Moreno-Sanchez**. 2004. A web-based model for incorporating environmental factors in *Aedes aegypti* surveillance in the desert southwest. 53rd Annual Meeting of the American Society for Tropical Medicine and Hygiene. Miami, Florida November 7-11.

Moreno-Sanchez, R. and G. Anderson. 2003. Developing web-based spatial solutions based on Open Technologies. *GISRUK The United Kingdom GIS Research Conference*. London, United Kingdom April 9-11.

Moreno-Sanchez, R., J. Fustos, H. García-N. and F. Moreno-Sanchez. 2001. A web based spatial information system to support land use planning at the strategic and tactical levels in central Mexico. *IRMA 2001: Managing Information Technology in a Global Economy*. Toronto, Canada. May 20-23.

Garcia-Nieto, H., **R. Moreno-Sanchez**, J. Lopez-B, L.Villers-R and R. Garcia-D. 2000. A fuzzy set approach to the definition of boundaries for land use planning in Central Mexico. *GIS 2000*. Toronto, Canada, March 13-16.

Moreno-Sanchez, R., C. Aguirre-B., A. Hoover, J. Geddes and F. Couch. 1999. Defining Ecological Accounting Units as part of the North American Framework for Forest Ecosystems Inventorying and Monitoring. *5th World Congress of the International Association for Landscape Ecology*. Snowmass, Colorado, USA. July 29-August 3.

García-Nieto, H., **R. Moreno-Sanchez** and R. Garcia-D. 1999. Land use changes and land suitability for agriculture in the Rural Development District 004 Celaya, Guanajuato. *X Reunión Nacional SELPER*. Guanajuato, Mexico November 11-12.

Moreno-Sanchez, R., C. Aguirre-B., A. Hoover, J. Geddes and F. Couch. 1998. Design and implementation strategy for the creation of a basic GIS infrastructure to support the forests ecosystems inventorying, monitoring and management. *North American Symposium: Towards a Unified Framework for Inventorying and Monitoring of Forest Ecosystems.* Guadalarajara, Jalisco, Mexico, November 1-6.

Moreno-Sanchez, R. 1997. Selecting multimedia authoring tools to facilitate an incremental modular approach to the development of multimedia GIS. *University Consortium for Geographic Information Science: 1997 Annual Assembly and Summer Retreat.* Bar Harbor, Maine. USA. June 15-21.

Moreno Sanchez, R., M. Flores-S. and E. Sánchez-T. 1995. User interface for cartographic visualization and modeling of a nationwide spatial database in Mexico. GIS 95 *Ninth Annual Symposium in Geographic Information Systems.* Vancouver, Canada. March 27-30. Pgs 1007-1010.

Moreno-Sanchez, R. and D. Cibrian-T. 1994. An Expert System for the identification and issuing of recommendations for the control of bark beetles of the *Dendroctonus* genus. *3rd Forest Entomology Symposium.* Monterrey, NL. Mexico. April 3-5.

Moreno Sanchez, R. 1993. GIS in Mexico: current state and future prospects. *The Canadian Conference on GIS.* Ottawa, Canada March 20-23.

Torres-R., J.M., **R. Moreno-Sanchez**, C. Rodríguez-F., O. Magaña, F. Moreno-S., M. Acosta, F. Carrillo. 1993. A Decision Support System for Integrated Forest Management in the "San Juan Tetla" Experimental Forest. *Symposium "Making Sustainability Operational"* Santa Fe, New Mexico. U.S. Department of Agriculture Forest Service, General Technical Report RM-240.

Torres-R., J.M. and **R. Moreno-Sanchez**. 1992. Decision support system for planning the multiple use of the non-urban areas in the Valley of Mexico. *Fourth Latin-American Conference in Operations Research.* Mexico City. Mexico. October 20-23.

Torres-R., J.M., C. Rodríguez-F., and **R. Moreno-Sanchez**. 1991. An area-based approach to the multiple use planning of uneven-aged forests in central Mexico. *ORSA/TIMS joint national meeting.* Anaheim, California. November 3-6.

Rodríguez F., C.; J.M., Torres-R., **R. Moreno-Sanchez** and O. Magaña. 1991. Advanced computer systems for forest planning. *First National Forum on Integrated Forest*

Management. Chapingo, Estado de Mexico. Mexico. October 10-11.

Torres R., J.M. and **R. Moreno-Sanchez**. 1991. Economic aspects of integrated forest management. *First National Forum on Integrated Forest Management*. Chapingo, Estado de Mexico. Mexico. October 10-11.

Moreno-Sanchez, R. and J.M., Torres-R. 1991. Multicriteria decision making: methods and prospectus for natural resources management in Mexico. *First National Forum on Integrated Forest Management.* Chapingo, Estado de Mexico. Mexico. October 10-11.

Moreno-Sanchez, R. and R. Valenzuela R. 1989. Does the woman have a role in agroforestry? *Agroforestry Symposium in Mexico.* Linares, Nuevo Leon. Mexico. November 14-16.

Valenzuela-R., R. and **R. Moreno-Sanchez**. 1989. The use of traditional plants and the effects of agroforestry systems on soil productivity. *Agroforestry Symposium in Mexico.* Linares, Nuevo Leon. Mexico. November 14-16.

NON-PEER REVIEWED PUBLICATIONS
(<u>underlined names denote students</u>)

Moreno-Sanchez, R., J. Ruttenber, D. Thomas, M. Egbert, and M. Hayden. 2002. Check up! GIS supports diverse human health applications. *GeoWorld* 15(11): 28-30. (*GeoWorld, previously GISWORLD, is the premier GIS industry magazine in the US).*

Moreno-Sanchez, R. 1993. Mexico supports diverse GIS efforts. *GISWORLD* May issue pp. 58-60.

Moreno-Sanchez, R. 1992. An integer programming-queuing theory approach for the deployment of forest crews in Mexico. Doctoral Dissertation. Colorado State University. Fort Collins, Colorado. USA.

Moreno-Sanchez, R. 1987. A goal programming model for planning logging operations in Atenquique Jalisco, Mexico. Master's Degree Thesis. Colorado State University. Fort Collins, Colorado. USA.

Moreno-Sanchez, R. and F., Moreno-Sanchez. 1992. Geographic Information Systems in the administration of natural resources Reunion of Science and Technology in the State of Mexico. Toluca, Estado de Mexico. Mexico.

Moreno-Sanchez, R., C. Rodríguez, F. Carrillo and F. Moreno-Sanchez. 1992. Determination of production potential of forestry species in the state of Puebla. Special Publication. National Institute for Forest, Agriculture and Livestock Research. Mexico.

Moreno-Sanchez, R. 1984. A linear programming model for planning logging operations. Bachelor Degree Thesis. Forestry Department. Chapingo Autonomous University. Chapingo, Estado de Mexico. Mexico.

PRESENTATIONS IN NON-PEER REVIEWED CONFERENCES
(underlined names denote students)

Moreno-Sanchez, R., T. Roane, D. Mays, G. Tyon, and B. Allen. 2021. Lessons learned in the design and operation of the Certificate in Environmental Stewardship of Indigenous Lands (ESIL)**.** American Associate of Geographers annual meeting. Virtual. April 7-11.

Manko, J., D. Muresan, **R. Moreno-Sanchez**, J. Coolidge, A. Duff, H. Smith. 2020. Professional development and research opportunities: A cooperative agreement between the National Park Service (NPS) and the University of Colorado Denver. Poster. Virtual presentation due to COVID-19. *ESRI User Conference*. July 13-16.

Manko, J., D. Muresan, S. Das, M. Redmon, **R. Moreno-Sanchez**, J. Carlino, A. Duff, H. Smith. 2020. National Park Service (NPS) – University of Colorado Denver internships cooperative agreement enhances education and advances geospatial projects at the NPS. Poster. Virtual presentation due to COVID-19. *American Association of Geographers (AAG)*. Denver, CO. April 6-10.

Manzanares, B., **R. Moreno-Sanchez**, K. Christensen, A. Weaver, and J. Campbell. 2020. University of Colorado Denver: A multi-criteria assessment of guided efficiency on campus. Undergraduate student poster. Virtual presentation due to COVID-19. *American Association of Geographers (AAG)*. Denver, CO. April 6-10.

Boudreaux, N., **R. Moreno-Sanchez**, A. Weaver, and K. Christensen. 2020. Korean Natural Farming (KNF): Process and applications. Undergraduate student poster. Virtual presentation due to COVID-19. *American Association of Geographers (AAG)*. Denver, CO. April 6-10.

Dennis, R., **R. Moreno-Sanchez,** and K. Christensen. 2020. Analysis of the urban heat island effect in Denver county. Undergraduate student poster. *CU Denver Research and Creative Activities Symposium (RaCAS).* Denver, CO. May 1-8. **Winner: Technology, Engineering and Math People's Choice Award.**

Truitt, J. **R. Moreno-Sanchez,** P. Anthamatten and C. Speas. 2020. Critical review of linking science with Adaptive Management: Case study of Spruce Beetle epidemic and aspen decline management response program (SBEADMR) in the Gran Mesa, Uncompahgre, and Gunnison (GMUG) National Forest in southern Colorado. Undergraduate student poster. *CU Denver Research and Creative Activities Symposium (RaCAS).* Denver, CO. May 1-8.

Moreno-Sanchez, R. 2019. Keynote speaker as first director of the National Center for Forest Ecosystems Conservation and Management (CENID-COMEF), National Institute for Forest, Agriculture and Livestock Research (INIFAP). *CENID-COMEF 25th anniversary celebration symposium.* Mexico City. November 19. *(Remote Skype presentation).*

Moreno-Sanchez, R. 2019. Discussion panel Data Science education. Panelist. *University of Colorado Denver Data Science Symposium*. Denver, CO. August 30th.

Roane, T., B. Allen, D. Mays, **R. Moreno-Sanchez**, and G. Tyon. 2019. Network for Education and Employment in Environmental Stewardship of Indigenous Lands. *National Science Foundation INCLUDES National Convening.* Alexandria, VA. May 29-30.

Hildebrand C. A., D. Smith, M. Cameron, M., Redmon, R., and **R. Moreno-Sanchez**. 2019. Geospatial Applications at the National Park Service. Poster. *CU Denver Research and Creative Activities Symposium (RaCAS).* Denver, CO. April 26.

Moreno-Sanchez R., J. Raines, J. Diffendorfer, M. Drummond. 2018. Characteristics and limitations of land use/cover digital data sets for monitoring the extent and changes in the monarch butterflies' migratory habitat across the United States and Mexico. *Tri-national Commission for Environmental Cooperation; Meeting of U.S. and Mexico members of the tri-national commission on the Monarch Butterfly*. Universidad Nacional Autónoma de México (UNAM). Mexico City, Mexico. March 19-21

Stevenson, R., **R. Moreno-Sanchez**, and D. Thomas. 2018. FOSS4G (Free and Open Source Software for Geospatial Applications) at the University of Colorado Denver. *FOSS4G North America*. St Louis, Missouri. May 14-17.

Raines, J. **R. Moreno-Sanchez**, J.M. Torres-Rojo, and P. Anthamatten. 2018. Assessing effectiveness of Natural Protected Areas in Mexico to prevent forest cover loss and forest fragmentation. *American Association of Geographers (AAG)*. New Orleans, LA. April 10-14.

Raines, J. **R. Moreno-Sanchez**, J.M. Torres-Rojo, and P. Anthamatten. 2018. Effectiveness of Natural Protected Areas in Mexico to prevent forest cover loss and degradation. Poster. *CU Denver Research and Creative Activities Symposium (RaCAS).* Denver, CO. April 27.

Carver, D., **R. Moreno-Sanchez,** J.M. Torres-Rojo and G. McLaurin. 2017. Assessing accuracy of the Forest class in GlobeLand30 2000 and 2010 data sets in Mexico. *American Association of Geographers (AAG)*. Boston MA. April 5-9.

Carver, D., **R. Moreno-Sanchez,** G. McLaurin, J.M. Torres-Rojo. 2017. Assessing accuracy of GlobeLand30 2000 and 2010 data sets for the forest in Mexico. Poster. *Research and Creative Activities Symposium, University of Colorado Denver*. April 28.

Stevenson R., D. Thomas, and **R. Moreno-Sanchez**. 2017. Free and Open Source Software for Geospatial Applications (FOSS4G) at the University of Colorado Denver. *State of the Map U.S., OpenStreetMap-US National Conference*. Boulder, CO. October 20-22.

Moreno-Sanchez, R. 2016. Ciencia y tecnología de la información geográfica y software libre y abierto para aplicaciones geoespaciales (FOSS4G) [Geographic information science and technology and Free and Open Source Software for Geospatial Applications (FOSS4G)]. *2016 México Campus Party*. Guadalajara, Jalisco, Mexico. Junio 29-Julio 3.

Moreno-Sanchez, R. 2016. FOSS4G (Free and Open Source Software for Geospatial Applications) in the USA and around the World. **Track Chair**. *GIS in the Rockies*. Denver, Colorado. September 21-22.

Moreno-Sanchez, R. 2016. Why Free and Open Source Software for Geospatial Applications (FOSS4G) in the education and training of geospatial professionals. *GIS in the Rockies*. Denver, Colorado. September 21-22.

Moreno-Sanchez, R. and D. Murray. 2016. Facilitators and inhibitors for the integration and use of FOSS4G in the geospatial science and technology arena. *GIS in the Rockies 2016*. Denver, Colorado. September 21-22.

Moreno-Sanchez, R. 2016. Geographic information science and technology and Free and Open Source Software for Geospatial Applications (FOSS4G) in the University of Colorado Denver. *Colorado GIS in Higher Education Summit*. Broomfield, Colorado. April 22.

Moreno-Sanchez, R. 2016. Why Free and Open Source Software for Geospatial Applications (FOSS4G) in higher education? *Colorado GIS in Higher Education Summit.* Broomfield, Colorado. April 22.

Moreno-Sanchez, R. 2016. **Keynote Speaker**: Geographic information science and technology and sustainable development. *GIS Day, Denver, Colorado*. November 16.

Stevenson, R. and **R. Moreno-Sanchez**. 2016. Maptime: Bridging the gap between students and professionals. Poster. *Research and Creative Activities Symposium, University of Colorado Denver*. April 18.

Moreno-Sanchez, R. 2015. Open Geospatial Consortium (OGC) Open Standards. *GIS in the Rockies.* Denver, CO. September 23-24.

Moreno-Sanchez, R. 2015. Free and Open Source Software for Geospatial Applications (FOSS4G): What is it? Why should you consider it? *GIS in the Rockies*. Denver, CO. September 23-24.

Moreno-Sanchez, R. 2015. Free and Open Source Software for Geospatial Applications (FOSS4G) **Track Chair**. *GIS in the Rockies*. Denver, CO. September 23-24.

Moreno-Sanchez, R. 2015. Free and Open Source Software for Geospatial Applications (FOSS4G): What is it? Why should you consider it? *GIS in the Rockies*. Denver, CO September 23-24.

Moreno-Sanchez, R. 2015. Open Geospatial Consortium: Open Standards. *GIS in the Rockies.* Denver, CO September 23-24.

Clay, E., **R. Moreno-Sanchez,** and P. Anthamatten. 2015. Assessment of the fragmentation of the forests in Mexico at the national level in Mexico for 2002, 2008, and 2013. Poster. *Research and Creative Activities Symposium, University of Colorado Denver*. April 17.

Moreno-Sanchez, R. 2014. The future of the geospatial profession. Discussion panel. *GIS in the Rockies*. Grand Junction, CO. September 22-26.

Moreno-Sanchez, R (panel member). 2014. Technology Panel: Future directions in GIS science and technology. *GIS in the Rockies*. Grand Junction, Colorado. September 22-26.

Brovelli, M. and **R. Moreno-Sanchez**. 2014. Free and Open Source Software and Web Services specializing in the water resources domain. Webminar Series (by invitation only), *International Society for Photogrammetry and Remote Sensing*. September 26, 2014.

Moreno-Sanchez, R. (Panel Member and Lead Discussion Group). 2014. National Science Foundation, *EarthCube IT/Free and Open Source Software Workshop*. Boulder, CO. March 4-7.

Collier, K., **R. Moreno-Sanchez,** P. Anthamatten and M. Wunder. 2014. Analysis of spawning habitat site selection by Chinook Salmon. Poster. *University of Colorado Denver 2014 Research and Creative Activities Symposium*. Auraria Campus, Denver. April 25.

Anderson, S. and **R. Moreno-Sanchez**. 2014. Characterization of the population

and land cover patterns of Mexico. Poster. *University of Colorado Denver 2014 Research and Creative Activities Symposium.* Auraria Campus, Denver. April 25.

Moreno-Sanchez, R. 2013. **Keynote Speaker**: Free and Open Source Software applications in natural resources management. *30 years Celebration, Forestry School. Universidad Juarez del Estado de Durango,* Mexico. March 21.

Moreno-Sanchez, R. and M. Brovelli 2013. Free and Open Source Software for Geospatial Applications (FOSS4G): A mature alternative in the geotechnologies arena. *Webinar. GeoTech Center*. Jan 16. (Invited). Available at: http://youtu.be/uIaPfbLEgak

Moreno-Sanchez, R. 2011. OpenStreetMap: Mapping the world through volunteers. *9th Expo Forestal*, Mexico City, Mexico. September 22-25.

Moreno-Sanchez, R. , and F. Moreno-Sanchez. 2011. Example of the use of OpeStreetMap around the world and their relevance for the forest areas in Mexico. *9th Expo Forestal*, Mexico City, Mexico. September 22-25

Moreno-Sanchez, R. 2008. Building a Web-based spatial information system using Open Source Software for the forests in Armenia. *VI Geography Colloquium, Department of Geography, University of Coimbra, Coimbra, Portugal*. December 10-12. (Invited remote online presentation).

Moreno-Sanchez, R. 2008. Use of Geographic Information Systems for the Sustainable Management of Forests. *Academic Commemorative Events for the XXV Anniversary of the establishment of the School of Forestry. Universidad Juarez del Estado de Durango, Mexico*. November 3-7. (Invited remote online presentation).

Moreno-Sanchez, R., R. Streeter, and H. Sadyadyan 2007. Determining the forest extent in Armenia. *Association of American Geographers Annual Meeting*. San Francisco, California April 17-21.

Rozelle, J., **R. Moreno-Sanchez**, and A. L. Rowan. 2007. Building a Web-based Spatial Information System for the forests in Armenia using Open Source Software. *Association of American Geographers Annual Meeting.* San Francisco, California April 17-21.

Streeter, R., **R. Moreno-Sanchez**, and H. Sadyadyan 2007. Determining the forest cover of Armenia with Landsat imagery. *Association of American Geographers Annual Meeting.* San Francisco, California April 17-21.

Streeter, R. and **R. Moreno-Sanchez**. 2006. Estimation of the forest cover in Armenia using Landsat Enhanced Thematic Mapper (ETM+) imagery. *GIS*

in the Rockies. Denver, Colorado. September 13-15.

Everhart, C.. **R. Moreno-Sanchez** and S. Hawkins. 2006. Facilitating the access to GIS in K-12 systems through web-based GIS applications using Open Source Software. *GIS in the Rockies*. Denver, Colorado. September 13-15.

Moreno-Sanchez, R. 2005. Teaching Internet GIS: Challenges and Opportunities. *Association of American Geographers Annual Meeting*. Denver, Colorado April 5-9.

Moreno-Sanchez, R. and M. Hayden. 2004. Web-based spatial information system for studying the potential of emergence of dengue fever along the U.S./Mexico border. *100th Annual Meeting of the Association of American Geographers.* Philadelphia, PA. April 7-14.

Moreno-Sanchez, R. , M. Hayden and C. Janes. 2004. Web-based spatial information system for documenting *Aedes aegypti* breeding sites along the U.S./Mexico border. *V Conference Information for Action.* Rio Rico, Arizona April 29-30.

Moreno-Sanchez, R., C. Aguirre-B., A. Hoover, J. Geddes and F. Couch. 1999. Supporting the North American Framework for Forest Ecosystems Inventorying and Monitoring. *1999 International ESRI Users Conference*. San Diego, California, USA. July 26-30.

Moreno-Sanchez, R. and A. Hoover. 1999. Bringing real-world projects to the classroom: The Metropolitan State College of Denver Experiences. *1999 ESRI SouthWest User Group Regional Conference*. Breckenridge, Colorado, USA. October 12-14.

Moreno-Sanchez, R., A. Hoover, J. Geddes, F. Couch and C. Sunchild. 1998. Poster: 3-D Terrain visualization to support forest ecosystems inventorying and monitoring efforts. *GIS in the Rockies*. Denver, Colorado. USA. September 14-16.

Moreno-Sanchez, R., J. K. Berry and L. Johnson. 1998. Round table on GIS Higher education. *GIS in the Rockies*. Denver, Colorado. USA. September 14-16.

Moreno-Sanchez, R., R., Smilnak, J. Cronoble and J. Kilcoyne. 1997. Creating a program of excellence for Geographic Information Systems (GIS) education and training at The Metropolitan State College of Denver. *1997 Trustee/FACT Conference*. Glenwood Springs, Colorado. April 17-19.

Moreno-Sanchez, R., J. K., Berry and L. Johnson. 1997. Round table on higher

education. *GIS in theRockies.* Denver, Colorado. USA. September 15-17.

Moreno-Sanchez, R., J. Malczewski and L. Bojorquez. 1996. Multicriteria-Spatial Decision Support System for Land Use Analysis in Nayarit, Mexico. *92nd Annual Meeting of the Association of American Geographers.* Charlotte, North Carolina. April 9-13.

FUNDED GRANTS AND CONTRACTS

*Total **external funding** since 2003 arrival to CU Denver up to June 2020 (PI and Co-PI**): $2,015,024;** Since tenure in 2011 up to June 2020 (PI and Co-PI): **$1,796,975***

2018-2023. Environmental Stewardship of Indigenous Lands Scholarships Program.
Funded by: NSF (National Science Foundation DUE-1742603) Period: 2018-2023
Role: Co-PI.
Amount: $1,000,000
Summary: Scholarships to support students joining the Certificate in Environmental Stewardship of Indigenous Lands (ESIL https://clas.ucdenver.edu/esil/) at CU Denver.

2017-2020. Building a Network for Education and Employment in Environmental Stewardship of Indigenous Lands.
Funded by: NSF (National Science Foundation DBI-1744524) Period: 2018-2020
Role: Co-PI.
Amount: $298,484
Summary: Create a Certificate in Environmental Stewardship of Indigenous Lands (ESIL https://clas.ucdenver.edu/esil/) at CU Denver involving partners from indigenous tribes, government, private sector, and non-profit organizations to prepare a new generation of professionals with cross-cultural knowledge and skills to be effective liaisons between dominant-culture organizations and tribes for the stewardship of indigenous lands.

2017-To date. Land cover change in monarch butterfly migratory habitat across southeast US and Mexico.
Funded by: USGS (United States Geological Survey)-CESU (Cooperative Ecosystems Studies Unit).
Role: Principal Investigator.
Amount: $29,653.
Summary: Analyze land use/cover changes in the monarch butterflies' migration corridor from Texas to central Mexico.

2018-To date. Cooperative agreement National Park Service, Abandoned Mineral Lands (AML)**.**
Funded by: National Park Service, Abandoned Mineral Lands.
Role: Principal Investigator.
Amount: August 2018 $25,000; Extension Summer 2019 $35,955; Extension June 2020 $5,896 Total amount as of June 2020: $66,851
Summary: Cooperative agreement to support the AML geospatial science and technology activities through student internships and joint faculty, student, and NPS staff research.

2017-To date. Cooperative agreement National Park Service, National Resource Information Services**.**
Funded by: National Park Service, National Resource Information Services Division (RISD).
Role: Principal Investigator.

Amount: $90,000. Extension September 2018: $55,000. Extension July 2019 $85,955; Extension June 2020 $50,000.
Total amount as of June 2020: $280,955
Summary: Cooperative agreement to support the RISD geospatial science and technology activities through student internships and joint faculty, student, and NPS staff research.

2016-To date. Cooperative agreement National Park Service, Intermountain Region (NPS-IMR), Geographic Resources Division**.**
Funded by: National Park Service, Intermountain Region (NPS-IMR)
Role: Principal Investigator.
Amount: $42,722. Extension summer 2017: $15,281. Extension fall 2017: $23,102. Extension May 2018 $7,500; Extension May 2019 $14,927; Extension November 2019 $17,500; Extension March 2020 $5,423.
Total amount as of Dec 2019: $121,032
Summary: Cooperative agreement to support the NPS-IMR geospatial science and technology activities through student internships and joint faculty, student, and NPS staff research.

2016. CLAS Dissemination grant.
Funded by: College of Liberal Arts and Sciences (CLAS), CU Denver.
Role: Principal Investigator.
Amount: $1,500
Summary: Support to attend ISPRS 2016 Congress in Prague, Czech Republic.

2014. Enhancement of CU Denver international presence, research and teaching in the area of Geospatial Open Source Software (FOSS4G)
Funded by: CU Denver Center for Faculty Development.
Role: Principal Investigator.
Amount: $2,000
Summary: Funding to attend international FOSS4G workshop and complement other sources of funding for establishment of the CU DENVER FOSS4G Lab.

2014. Seed funding for establishment of University of Colorado Denver FOSS4G Lab.
Funded by: Dean's Office, College of Liberal Arts and Sciences.
Role: Principal Investigator.
Amount: $3,800
Summary: Funding to cover student assistant in developing CU DENVER FOSS4G Lab website and purchase of computer equipment.

2010. "The future outside" video podcasting project.
Funded by: CU Denver Center for Faculty Development.
Role: Co-PI with Jessica Lance College of Arts and Media.
Amount: $1,993
Summary: Production of short videos highlighting the importance of outdoor experiences for children and families in their health and understanding of their relation to the environment and the natural resources in Colorado and the U.S.

2009. China: An emerged economic powerhouse in the global economy. Faculty professional development program.
Funded by: CIBER (Center for International Business Education and Research), School of

Business, University of Colorado Denver.
Role: Participant.
Amount: $3,500
Summary: 10-day program with presentations by business, government, and education leaders, as well as international trade experts with on-site tours of businesses, universities, and government agencies.

2008-2009. ELIXIR project: Documenting use of rubrics by faculty.
Funded by: FIPSE (Fund for the Improvement of Postsecondary Education). Department of Education.
Role: Participant
Amount: $1,500
Summary: Summer salary to participate as one of the study cases on how the use of rubrics can enhance education in universities.

2008. Enhancement of international and interdisciplinary aspects of sustainability courses outside of business schools.
Funded by: CIBER (Center for International Business Education and Research), School of Business, University of Colorado Denver.
Role: Principal Investigator
Amount: $2,500
Summary: Summer salary to study how businesses' sustainability perspectives, considerations, concerns, and case studies can be better incorporated into sustainability courses outside of business schools (with a case study for the course GEOG4265: Sustainability in Resources Management).

2007. Research and long-term internships program for CU DENVER-HSC students and faculty with the National Park Service, National Office of the Geological Resources Division, Soil Resources Inventory Project.
Funded by: National Park Service, National Office of the Geological Resources Division.
Role: Principal Investigator.
Amount: $87,814 for year one (summer 2007-summer 2008). Future annual budgets to be negotiated based on future needs for research, interns and contract work.
Summary: Students and faculty will collaborate with the NPS staff to address GIS&T research, educational, and spatial analysis needs that emerge from the network of national parks in the country.

2007. Funding to present two papers with students at the Association of American Geographers (AAG) annual meeting.
Funded by: YUMPS program, University of Colorado at Denver-Health Sciences Center.
Amount: $500
Summary: Complement departmental funding to present paper at this conference.

2007. Funding to present a paper at the Sixth International Conference on Ecosystems and Sustainable Development ECOSUD 07.
Funded by: Center for Faculty Development, University of Colorado at Denver-Health Sciences Center. Mentoring Pilot Project.

Amount: $1,000
Summary: Prepare paper and present at this conference. The paper has been selected to become a chapter in a book that will be published after the conference.

2006. Field work to advance strategic research agenda to move toward the sustainable management of the forests ecosystems in Armenia.
Funded by: Center for Faculty Development, University of Colorado at Denver-Health Sciences Center.
Amount: $2,000
Summary: Carry out field work to complete research on supervised classification of Landsat satellite images to identify the current extent of the forest cover in Armenia.

2005. The unique confidentiality requirements of spatially enabled public health data.
Funded by: Colorado Department of Public Health and the Environment.
Amount: $4,960 **Summary:** Create educational materials and a four-hour workshop that was presented several times to health and Information Technology professionals from different health organizations in the state of Colorado on the topic of the grant and the basics of GISc&T and its applications in the area of public health.

2005. Funding to present a paper at the Association of American Geographers (AAG) annual meeting.
Funded by: YUMPS program, University of Colorado at Denver-Health Sciences Center.
Amount: $400
Summary: Complement departmental funding to present paper at this conference.

2004. Improving disease surveillance with Geographic Information Systems.
Funded by: Colorado Department of Public Health and the Environment.
Amount: Total: $324,863 **My subcontract:** $21,000 to pay a student and equipment.
Role: Provide technical expertise and guidance for student to develop a Web-GIS system.
Summary: Create a web-based spatial information system to analyze the distribution of West Nile cases in animals in Colorado.

2004. Dr. Hovik Sadjayan (National Academy of Agricultural and Forestry Science, Armenia) postdoctoral research stay Feb-May, 2004.
Funded by: U.S. Department of State International Research and Exchanges Board (IREX)
Amount: $7, 775
Role: Sponsor and host of postdoctoral fellow.
Summary: This grant allowed Dr. Sadjayan to travel to the USA and work with me on research regarding forest management and conservation in Armenia.

2003. The potential for the emergence of Dengue Fever along the U.S./Mexico border in the southwestern United States.
Funded by: National Oceanic & Atmospheric Administration (NOAA)
Amount: Total of $426,990 over three years. **My subcontract :** $95,000.00
Role: Co-PI. Dr. Duane Gubler was the PI; Co-PI: Mary Hayden (team leader), Craig Janes
Summary: A total of 80 sampling points will be established to monitor microclimate conditions and the presence of the disease vector (the *Aedes egyptae* mosquito) on both sides of the border. A custom-made bilingual cross-border web-based multimedia GIS was created to manage and analyze the information collected during the study. Spatial analyzes were carried out to study the relationship of social, economic and environmental factors.

2002. Creation of a joint track between Computer Science and Geography.
Funded by: Center for Teaching and Learning, University of Denver.
Amount: $22,390
Role: Principal Investigator. Co-PI Dr. Joseph K. Berry and Dr. Mario Lopez.
Summary: This grant will fund the creation of the first course of a proposed joint track that will emphasize aspects of systems analysis and design, database management, design and integration of Spatial Decision Support Systems and other advanced topics in the creation of custom-made GIS systems. Interdisciplinary teams of computer science and geography students will work on the creation of these systems.

2002. Design and Development of a Technical Library in Support of Teaching and Learning.
Funded by: Center for Teaching and Learning, University of Denver.
Amount: $21,964
Role: Principal Investigator. Co-PI Dr. Joseph K. Berry
Summary: A system will be created for archiving and accessing technical notes, technical projects and white papers that deal with detailed instruction to perform various GIS operations and analyzes.

2001. Rapid mapping for clean air in Commerce City, Colorado.
Funded by: Environmental Protection Agency.
Amount: Total of $500,000.00 over two years**. My subcontract:** $57,600.00
Role: Co-PI. Dr. Jim Ruttenber (CU DENVER-HSC) was the PI.
Summary: Real time atmospheric data will be downloaded over the Web and fed into an atmospheric dispersion model that will generate predictions of the dispersion of pollutants. The modeling results will be posted in real time in a GIS application over the WWW.

2001. Development of cooperation agreements with the University of Colima and University of Guadalajara, Mexico.
Funded by: Office of Internationalization. University of Denver.
Amount: $1,000.00 to complement other sources of funding.
Summary: We established cooperation agreements with these universities to develop research projects of mutual interest and exchange of students and faculty.

1998. Definition of Ecological Accounting Units in support of the North American Framework for Forest Ecosystems Inventorying and Monitoring.
Funded by: Rocky Mountain Forest and Range Experimental Station, US Forest Service. National Institute for Forest and Agriculture Research, Mexico.
Amount: $ 7,000
Summary: The Digital Elevation Model for the study's pilot area was processed to generate information that is fundamental for the definition of Ecological Accounting Units and to serve as basis for other studies being carried out in the area. The expenses for four students and two professors were paid for a field trip to NW Mexico in August 1998. The expenses of three students and one professor for one week were paid to present a paper at the North American Symposium: Toward a unified framework for inventorying and monitoring forest ecosystem resources. Guadalajara, Jalisco, Mexico, November 1-6, 1998. The Forest Service gave a donation of $1000.00 for the MSCD Foundation for part the work done. The students involved and Dr. Rafael Moreno received a diploma of appreciation from the Director of the Rocky Mountain Station in recognition of the high quality and value of the results created during this research.

1997. Contributing to the dissemination of Geographic Information Systems (GIS) technology at The Metropolitan State College of Denver.
Funded by: The Metropolitan State College of Denver Academy for Teaching Excellence.
Amount: $2,780 USD
Summary: One short course was organized with a leading GIS scholar to explain to faculty what GIS is and how it is applied to their particular areas of expertise.

1996. Design and development strategy for Multimedia GIS to support environmental negotiation, administration and monitoring at the regional level. Mexico-Canada.
Funded by: Organization of American States through the National Autonomous University of Mexico, Center for Ecology.
Amount: $10,000 USD
Summary: Designed and developed a Multimedia Geographic Information System to support land use planning and social-environmental conflict resolution for the Secretariat of the Environment, Natural Resources and Fisheries (SEMARNAP), Mexico. It applies mathematical programming techniques to land use conflict resolution.

1994. DENDROCTONUS EXSYS II: A visual Expert Systems for the identification and issuing of recommendations for the control of bark beetles of the *Dendroctonus* genus in Mexico. Mexico.
Funded by: Contracted by the Subsecretariat for Forestry and Wildlife Mexican Federal Government.
Amount: $50,000 USD.
Role: Principal Investigator. Dr. David Cibrian was Co-PI.
Summary: The insects of the *Dendoctonus* genus are the main forest pest in Mexico. There are only a handful of specialists capable of precisely identifying each species. The proper identification of the species is key to deciding whether or not to implement a combat and control campaign. Through a series of questions posed using images, the system guides the non-expert user to the identification of the species.

1993-1994. Revision and expansion of national digital cartography. Mexico.
Funded by: National Institute for Forest, Agriculture and Livestock Research and National Commission for the Knowledge and Conservation of the Biodiversity. Mexico.
Amount: $175,000 USD.
Role: Co-PI together with two other researchers.
Summary: The three layers of digital cartographic (soils, climate, topography) created in the previous project were reviewed. Digital cartography for forest vegetation and LANDSAT TM 1991 imagery were integrated to the other layers. The working group was integrated by scientists from 3 different institutions.

1991-1993. National land use planning project. Mexico.
Funded by: Secretariat for Agriculture and Water Resources, Mexican Federal Government.
Amount: $236,000 USD.
Role: One of three national coordinators.
Summary: Climate information from 1800 weather stations was interpolated, 125 soil maps scale 1:250,000, were digitized, Mexico's Digital Elevation Model was processed at 3' of degree resolution. This information was analyzed to determined areas with the best natural physiographic-climatic potential for the development of vegetal species of interest

(crops, grasses and/or trees). The core working group was composed of 15 researchers. The extended working group involved 4 researchers from each of the 32 states of Mexico. Results were requested by and delivered to the Mexican Federal Government.

GRANTS AND CONTRACTS SUBMITTED PENDING DECISION

None as of April 2020

GRANTS AND CONTRACTS SUBMITTED BUT NOT FUNDED

2019. NRT-HDR: Creating a Data-Smart Cities Workforce: MS and PhD Traineeship and Research Programs in Transportation Data Science (Submitted: 02/06/2019)
Funded by: Not funded. National Science Foundation (NSF)
Role: Co-PI
Amount: $2,989,408

2019. Linking Environmental Stewardship of Indigenous Lands to a National Network (Submitted: 05/06/2019)
Funded by: Not funded. National Science Foundation (NSF)
Role: Co-PI
Amount: $23,325

2018. NSF INCLUDES Alliance: Indigenous STEM Recruitment Through Education and Mentoring (I-STREAM).
Funded by: Not funded. National Science Foundation (NSF)
Role: Co-PI.
Amount: $1,915,526

2015. Development and Deployment of a CubeSat for Tropical Missions (CTropSat).
Funding: Not funded. NASA Education Opportunities in NASA STEM (EONS), FY14 NASA Research Announcement (NRA) NNH14ZHA001N-MIRO MUREP Institutional Research Opportunity (MIRO)
Role: Co-PI
Amount of Subcontract requested: $188,664 over 5 years.
Summary: The University of Colorado Denver will be the primary facility responsible for the processing and analysis of the imagery collected from the CubeSat.

2012-2013. Mapping the Industrial Forests of the Western Hemisphere.
Funded by: Not funded. NASA. Rejected at 2nd level of reviews. NASA-ROSES 2012, A.2 Land Cover/Land Use Change.
Role: Principal Investigator CU DENVER. In collaboration with PI's CU Boulder.
Amount: $210,441 over 3 years, CU DENVER portion of project.
Summary: Develop spectral, textural, and time-domain-based methods for identifying industrial forest areas in North and South America using the advanced capabilities of Landsat-8.

2009. ULTRA-Ex: Assessing the Interoperability and Integration of Data, Models, and Policy Development Within and Between Urban and Natural Environments.

Funding: Not funded. NSF National Science Foundation. Proposal Number: 0948915
Role: PI
Amount requested: $299,971 over 2 years.
Summary: Research concentrates on how urban data and land use planning models are used in forest land-use planning processes, and how forest data and models are used in urban land-use planning processes regarding wildfire risks.

PRESENTATIONS AT MEETINGS, SEMINARS AND COLLOQUIA OUTSIDE OF THE UNIVERSITY OF COLORADO DENVER
(underlined names denote students)

Every year I do at least one invited presentation at organizations such as National Park Service, U.S. Geological Survey, Forest Service, and environmental non-profit organizations. Most of them are focused on GISc&T. Some are about forest conservation and management in Mexico.

Moreno-Sanchez, R. 2008. Open Source Software to create web-based GIS solutions: Challenges and opportunities. Graduate Seminar, Department of Geography, University of Denver. January 31. (Invited).

Moreno-Sanchez, R. 2007. Ethanol: Can it free us from foreign oil? Participation in *Global Agenda* program, Public Broadcast Station (PBS) KBDI Channel 12, Denver.

Moreno-Sanchez, R. 2007. One-day workshop: GIS applications. Universidad de Colima, Colima, Mexico. July 27, 2007. (Invited).

Sadyadyan, H., **R. Moreno-Sanchez** and R. Streeter. 2007. Estimation of the forest cover in Armenia circa 1988 and 2000 using Landsat images. Lore Eco Club, Non-Governmental Organization. Stepanavan, Armenia. April 18. (Invited).

Moreno-Sanchez, R. 2007. GIS and participatory planning in natural resources conservation and management. Department of Earth and Atmospheric Sciences. Metropolitan State College of Denver. April 2. (Invited).

Sadyadyan, H., **R. Moreno-Sanchez** and R. Streeter. 2007. Estimation of the forest cover in Armenia circa 1988 and 2000 using Landsat images. Armenian Forests, Non-Governmental Organization. Yerevan, Armenia. March 5. (Invited).

Sadyadyan, H., and **R. Moreno-Sanchez**. 2007. The forests of Armenia: Historical evolution and current state. Landscape and Plant Ecology Department, Hohenhein University. Stuttgart, Germany. January, 23. (Invited).

Sadyadyan, H., and **R. Moreno-Sanchez**. 2007. The forests of Armenia: Historical evolution and current state. Association of French Geographers. Paris, France. January, 16. (Invited).

Moreno-Sanchez, R. 2006. Auraria Campus Sustainable Campus Fair "An Inconvenient Truth" movie panel discussion with former Senator Gary Hart. November 13th, 2006. (Invited).

Moreno-Sanchez, R. 2006. GIS and web-GIS Open Source Software, Distributed GIS Systems, and the future of geotechnologies. Graduate Seminar Series. Department of Geography, University of Denver. April 10. (Invited).

Moreno-Sanchez, R. 2006. The use of Remote Sensing and Geographic Information Systems technologies to support the sustainable management of the forests in Armenia. The Armenian State Agricultural University. Yerevan, Armenia. July 10. (Invited)

Moreno-Sanchez, R. 2006. The unique confidentiality requirements of spatially enabled public health data. Colorado Department of Public Health and the Environment. Site visit by participants in the ESRI Health Conference. Denver, Colorado. October 26, 2006. (Invited).

Moreno-Sanchez, R. 2006. Open Source Software tools to create web-based GIS solutions. U.S. Geological Survey Six Biennial Geographic Information Science Workshop. Denver, Colorado, April 24-28. (Invited).

Moreno-Sanchez, R. 2005. Colorado Alliance for Minority Participation (CO-AMP) Annual Awards Banquet Keynote Speaker. "The role of geosciences and technologies in diverse professional areas". November 10, 2005. (Invited).

Moreno-Sanchez, R. 2005. The unique confidentiality requirements of spatially enabled public health data. Colorado Department of Public Health and the Environment. Three different presentations: April, June, and October, 2005.

Sadyadyan, H. and **R. Moreno-Sanchez**. 2005. Historical evolution of the forest cover in Armenia. Armenia Tree Project Non-Governmental Organization. Yerevan, Armenia. June 10. (Invited)

Moreno-Sanchez, R. 2005. Web-based Open Source Software technologies. Computer Terrain Mapping (CTM). Boulder, Colorado. May 2005. (Invited).

Sadyadyan, H. and **R. Moreno-Sanchez**. 2005. Historical evolution of the forest cover in Armenia. Lore Eco Club Non-Governmental Organization. Stepanavan, Armenia. April 21. (Invited).

Sadyadyan, H. and **R. Moreno-Sanchez**. 2004. Historical evolution of the forest cover in Armenia. Armenia Tree Project Non-Governmental Organization. Yerevan, Armenia. November 19. (Invited)

Moreno-Sanchez, R. and Hayden, M. 2004. Workshop for the use of the web-based

spatial information to track the presence of *Aedes aegypti* in the Tucson-Ambos Nogales corridor. V Conference Border Health Information for Action. Rico Rico, Arizona. April 29-30, 2004. (Invited).

Moreno-Sanchez, R. 2004. Panel discussion on Open Source Software, Open Specifications, Interoperability, Web Services and Distributed Information Services: What is each of these technologies and what is their relevance to GIS students, professionals, and educators. Urban and Regional Information Systems Association (URISA). Denver, Colorado. November 18, 2004. (Invited).

Moreno-Sanchez, R. 2004. Workshop on the use of Open Source Software and Open Specifications for the creation of web-based spatial information solutions. Urban and Regional Information Systems Association (URISA). Denver, Colorado. April 8, 2004. (Invited).

PEER-REVIEWED PUBLICATIONS IN PREPARATION (underlined names denote students)

Raines, J., **R. Moreno-Sanchez,** J.M. Torres-Rojo, and P. Anthamatten. Assessing the effectiveness of the National System of Protect Areas in Mexico in reducing deforestation and forest degradation.

Moreno-Sanchez, R., J.M. Torres-Rojo, F. Moreno-Sanchez, and Mendoza-Briseño. Proposal for a socio-economic-environmental hierarchical organization of forest management units in Mexico.

RECOGNITIONS AND HONORS

- 2018. Inducted as Charter Member Open Source Geospatial (OSGeo) Foundation https://www.osgeo.org/ *This organization provides guidance and oversees the process to certify Free and Open Source Software for Geospatial Applications (FOSS4G). Its mission is to foster global adoption of open geospatial technologies.*

- 2018. Invitation to contribute Topic FC-35: Openness. *The Geographic Information Science & Technology Body of Knowledge* (4th Quarter 2017 Edition), John P. Wilson (ed.). DOI: 10.22224/gistbok/2018.1.5 https://gistbok.ucgis.org/bok-topics/openness . Digital version of the Geographic Information Science & Technology Body of Knowledge (BoK) from the University Consortium for Geographic Information Science. *Subject matter experts in each topic are invited to contribute an entry to this volume which is a national reference for higher education GIScience curricula.*

- 2018. Featured as GeoAmbassador in the International Cartographic Association (ICA) Commission on Open Source Geospatial Technologies Newsletter. https://opensourcegeospatial.icaci.org/2017/02/geoambassador-dr-rafael-moreno-

sanchez/

- 2012-To date. Member International Advisory Board to the GeoForAll International network of FOSS4G Labs https://www.osgeo.org/initiatives/geo-for-all/ . *"Geo for All" is the Open Source Geospatial (OSGeo) Foundation's Committee for Educational outreach and works in close collaboration with International Cartographic Association (ICA), International Society for Photogrammetry and Remote Sensing (ISPRS), United Nations Geospatial Information Section (UN-GIS), Association of Geographic Information Laboratories in Europe (AGILE), University Consortium for Geographic Information Science (UCGIS), International Geographical Union (IGU) and other partners worldwide in our mission for making geospatial education and opportunities accessible to all.*

- 2009-2010. Excellence in Teaching Award, College of Liberal Arts and Sciences, University of Colorado Denver.

- 2008-2014. Science and Technical Team for the Consortium for Advancing Monitoring of Ecosystem Sustainability in the Americas (CAMESA) web site. U.S. Forest Service.

- 2007. Letter of recognition and appreciation State Agrarian University of Armenia for contributions to the study, conservation, and management of the forests in Armenia.

- 2004-To date. Member External Advisory Committee Department of Forestry, State Agrarian University of Armenia, Armenia.

- 2003-To date. Member External Advisory Committee Department of Computer Information Systems, Metropolitan State College of Denver.

- 2000-To date. Member External Advisory Committee National Center of Excellence for Economics Research and Teaching (CIDE). Division of Economics of Natural Resources. National Council of Science and Technology (CONACYT). Mexico.

- 1999-To date. Member External Advisory Committee Master of Science in Geomatics, Department of Civil Engineering, University of Colima. Mexico.

- 1998-2014. Advisor, North American Framework for Forest Ecosystems Inventorying and Monitoring Program. USDA, Forest Service, Rocky Mountain Forest and Range Experimental Station.

- 1998. Diploma of appreciation USDA, Forest Service, Rocky Mountain Forest and Range Experimental Station for contributions to the North American

Framework for Forest Ecosystems Inventorying and Monitoring Program.

- 1992-2014. Member Senior Advisory Committee. Consortium for Advancing Monitoring of Ecosystem Sustainability in the Americas (CAMESA). U.S. Forest Service.

- 1996-To date. Member External Advisory Committee, National Center for Disciplinary Research in Forest Ecosystems Conservation and Management. (CENID-COMEF), National Institute for Forest, Livestock, and Agriculture Research (INIFAP). Mexico.

- 1991-1996. Member National System of Researchers, Mexico.

- 1992. Inducted into National Academy of Forest Sciences, Mexico.

- 1979-1982. Four "Cuadros de Honor" (equivalent to Dean's list). Division of Forest Sciences, Universidad Autonoma Chapingo, México.

EDITORSHIP OF JOURNALS

- ***Applied Geomatics***. Springer. **Associate Editor.** 2013-To date.

- ***Ciencia Forestal en México.*** National Institute for Forest, Agriculture, and Livestock Research (INIFAP). Mexico. **Member editorial board.** 1996 -To date.

- ***Agricultura Técnica en México***. National Institute for Forest, Agriculture, and Livestock Research (INIFAP). Mexico. **Member editorial review board.** 1996-2000

DEVELOPMENT OF NEW EDUCATIONAL PROGRAMS AT CU DENVER

- 2016. Graduate/Undergraduate Certificate in Free and Open Source Software for Geospatial Applications (FOSS4G). (PI) Lead developer and coordinator.

- 2018. Certificate in Environmental Stewardship of Indigenous Lands (ESIL). (Co-PI). Dr. Timberley Roane lead developer and coordinator.

COURSES TAUGHT

University of Colorado Denver *(2003-To date)*
Department of Geography and Environmental Sciences
GEOG6750: Research Design.
ENVS6100: Research Topics in Environmental Management.
SUST 3011: SUSTII: Toward our sustainable future. Team taught.
GEOG4095/5095: Deploying GIS functionality on the Web.

GEOG4090/5090: Environmental modeling with GIS.
GEOG 4080/5080: Introduction to Geographic Information Systems.
GEOG4265/5265: Sustainability in Resources Management.
ENVS1042: Introduction to Environmental Science.
GEOG4995/5995: Sustainable development and resources Adaptive Management in Costa Rica. (Field course).

University of Denver *(2001-2003)*
Department of Geography
GEOG 4100: GIS Applications and Design I.
GEOG 4105 GIS Applications and Design II.
GIS 4990: GIS on the web.

Metropolitan State College of Denver *(2000-2001)*
Department of Computer Information Systems
CIS 2110: Systems analysis and design.
CIS 3850: Databases design, implementation and management.
CIS 3600: Visual Basic Programming.

Metropolitan State College of Denver *(1996-2000)*
Department of Earth and Atmospheric Sciences.
GEG 1100: Introduction to Environmental Science.
GEG 2250: Introduction to GIS.
GEG 4850: Advanced GIS.
GEG 4860: GIS Databases design implementation and management.
GEG 4870: ARC/INFO applications to natural resources management.
GEG 4900: Advanced GIS lab.
GEG 4950: GIS on the web.

Colorado State University *(1987-1990)*
Department of Forestry
TA for Microcomputers in natural resources management.

Colegio de Postgraduados, Mexico *(1991-1994)*
Quantitative methods in natural resources management.

Universidad Autonoma Chapingo, Division of Forest Sciences, Mexico *(1991-1994)*
Microcomputers in natural resources management.
Quantitative methods in natural resources management.
Forest Planning.
Introduction to forestry.

SERVICE
(Since joining CU Denver in 2003)

***The following list includes only on-going and major activities and committees**. A detailed list of yearly service activities is contained in the annual evaluation reports and are available upon request.*

DEPARTMENT/PRIMARY UNIT

Ongoing or long-term activities

2003 - 2015	Member Master of Science in Environmental Sciences Academic Committee.
Fall 2003 - to date	Advisor Geospatial Analysis concentration in the Master of Science in Environmental Sciences.
Since Fall 2003 – To date several revisions	Subcommittee for revisions to the Geography Major, Environmental Studies option; Environmental Science option.
Fall 2004 - to date	Advisor to the Environmental Science concentration in the B.A. in Geography.
Spring 2005 - 2012	Coordinator and advisor to the Certificate in Geospatial Science and Technology (GISc&T) in the GES.
Fall 2003 – To date several revisions	Revisions to the structure and curriculum of the Certificate in Geospatial Science and Technology (GISc&T) in the GES.
2016-2019	GES Geospatial Group Committee. Review GISc&T curriculum; GIS Certificates; New GES GISc&T research lab activities.
Fall 2016 - Summer 2017	GES Graduate Committee.
Fall 2017	GES Undergraduate Committee
Fall 2019-To date	GES Student and Faculty Affairs Committee: Chair

Short-term activities

Fall 2004 - Several years	Review of GES student applications to the Rodger's Scholarship program.
Fall 2004	Obtained external funding from US Forest Service to fund presentation of student Chris Helm at the *Monitoring Science and Technology Symposium: Unifying Knowledge for Sustainability in the Western Hemisphere*. Consortium for the Advancing the monitoring of ecosystem sustainability in the Americas (CAMESA). September 20-24 2004, Denver, Colorado
Fall 2006	Prepare documentation for gtPathways approval for the course ENVS1042: Introduction to Environmental Science.
Spring 2006	Member of the GES Faculty Annual Evaluation committee.

Fall 2007-Spring 2008	Chair Search Committee GES Faculty: Water resources, environmental policy (Gregory Simon).
Fall 2007-Spring 2008.	Member Search Committee for Physical Geography Faculty: Physical Geography (Casey Allen).
Spring 2007.	Member search committee for GES faculty position: GIS, Health, Human Geographer (Peter Anthamatten).
Spring 2008	Member Search Committee for GES faculty position: Geology instructor (Ryan Sicavage).
Spring 2009	Member of the GES Department's Faculty Annual Report evaluation committee.
Fall 2011	Peter Anthamatten 4th Year Teaching and Research Comprehensive Review
Fall 2011	Casey Allen 4th Year Teaching Comprehensive Review Committee
Spring 2011	Member of the Teaching and Research review committees for Rudy Hartmann's application to the Clinical Teaching Track
Spring 2012	Gregory Simon 4th Year Comprehensive Review Teaching (Chair), Research (Member) and Service (Member) Committees
Jan 2015 - Dec 2015	Associate Chair GES
Spring-Fall 2015	Prepared documentation and address reviewers comments for the application for the Professional Science Master's (PSM) certification for our MA in Applied Geography and Geospatial Science. We finally got the certification in the Spring of 2016.
Spring 2016	Hiring committee for MSES Associate Director position. 2nd search for position Dan Liptzin hire.
Spring and Fall 2016	Committee member, comprehensive test for MS Environmental Science non-thesis track.
Spring 2016	Chair GES Merit Committee for 2015 annual evaluations.
Fall 2016	Participated in Fall 2016 new graduate students' orientation with presentation: Difference between thesis and non-thesis tracks.
Spring 2017	Member Merit Committee for 2016 GES annual evaluation.
Spring 2017	Chair Rudi Hartmann promotion to CT professor.
Fall 2017	Participated in Fall 2017 new graduate students' orientation with presentation: Difference between thesis and non-thesis tracks.
Fall 2019	Tenure Review committee. Service Chair: Christy Briles.
Fall 2019	Hiring committee GAM Lab manager.

COLLEGE/SCHOOL

Long-term activities

Fall 2003-Spring 2016 and Spring 2020- To date	Member Advisory Board for FAST GIS Lab.

Fall 2007-Spring 2010	Member CLAS Scholarships Committee
Fall 2006 to 2009	GES representative to the CLAS Strategic Planning Committee.
Fall 2007-2009	Member core group working on the creation of the CLAS Minor in Sustainability
2007	Member of the hiring committee for the Director of CLAS Signature Areas
Fall 2005-2007	Member core faculty group developing proposal for Sustainability, Society and the Environment Ph.D. proposal.
Fall 2006-Spring 2007	Member of committee to create Geospatial Signature Area in CLAS.
Fall 2006-Spring 2007	Member of committee to create Sustainability Signature Area in CLAS.
Fall 2012-Spring 2015	Member Dean's Advisory Committee (DAC)
Fall 2016-Spring 2017	Ad hoc Information Technology CLAS committee. Review and discuss CLAS IT related issues such as security and Web Content Management System.

Short-term activities

Spring 2003	Acquired dedicated server for Web-GIS education and research for the FAST lab through external funding.
Fall 2005-2007	Member core group developing proposal for Sustainability Ph.D. proposal.
Fall 2006-Spring 2007	Member of committee to create Geospatial Signature Area in CLAS.
Fall 2006-Spring 2007	Member of committee to create Sustainability Signature Area in CLAS.
2007	Participated in the creation of the CLAS Signature Area: Sustainability.
2007	Participated in the creation of the CLAS Signature Area: Geotechnologies.
2007	Edited Goal #3: Creation of Interdisciplinary Programs part of the CLAS Strategic Plan.
2007	Review Faculty Development Office grant proposals for 2007-2008.
2007	Member of the hiring committee for the Director of CLAS Signature Areas
2010	Member of the search committee for CLAS Assistant Dean (Jeff Franklin position).
Fall 2010	Participated in meetings to review the criteria for the CLAS Excellence in Teaching Award.
Spring 2014 – To Date	Creation of the CU Denver FOSS4G Lab and FOSS4G Certificate.
Fall 2018-To date	Program advisor for Environmental Science area in the *Certificate in Environmental Stewardship of Indigenous Lands (ESIL)* CU Denver https://clas.ucdenver.edu/esil/
Spring 2019	Adhoc CLAS Salary Grievance Committee.

DENVER CAMPUS

2003-2020	Presentations on Geographic Information Science and Technology (GISc&T) and forest conservation and management in courses and meetings at the University of Colorado Denver, CU Health Sciences Center, and CU Boulder campuses. At least one every year. Detailed list in annual evaluation reports.
Spring 2004-To date	Attend Spring and Fall presentations of professional projects and thesis projects for the Master of Science in Geographic Information Systems, Department of Civil Engineering, CU Denver College of Engineering.
Spring 2005-2007	Member of the core group of faculty working on the development of a Ph.D. Program (initial proposal) on Sustainability, Society, and the Environment. End result: CLAS Minor in Sustainability.
Fall 2008-Spring 2009	Member of the Search Committee for Faculty Position in the Department of Civil Engineering: Transportation-GIS (Wesley Marshall).
2004-2007	Attend graduation commencements Spring 2004, Spring 2005, Spring 2006, Spring 2007.
Spring-Summer 2007	Member of committee that reviewed proposals submitted for funding to the Grants for Professional Development program sponsored by the CU DENVER Center for Faculty Development for the fiscal year 2007-2008
November 17, 2006	Participation in CU DENVER-HSC Academic Master Plan campus-wide meeting.
2005-To date	Member the group to put together a proposal to create a Ph.D. program in Sustainability.
Spring 2004	Member search committee for the Director of the Center for Faculty Development.
Fall 2010	Participated in Center for Faculty Development workshop: Tips and best practices for teaching.
Spring 2011	Participated in the review process for candidates to the 2011 Non-Tenure Excellence in Teaching Award.
2011	Participated in meetings to the review the criteria for the 2011 Excellence in Teaching Awards.
Spring 2011	Judge for the Research and Creative Activities Symposium Spring 2011
Fall 2012	I participated in the external review of the Center for Faculty Development carried out by Dr. James Groccia.

TO THE PROFESSION AND THE SCIENTIFIC COMMUNITY

Long-term activities

2015-To date	Coordinator of webinar series for the GeoForAll international network of FOSS4G labs. https://www.osgeo.org/initiatives/geo-for-all/webinars/
2013-To date	Associate Editor journal *Applied Geomatics* Springer
Spring 2000 - To date	External Advisor to the Centro de Investigaciones y Docencia en Economía (CIDE). National Council for Science and Technology. Mexico City, Mexico.

	• Advisor to the National Program of Economic Incentives for the Conservation of Natural Resources. • Advisor to the Division of Natural Resources Economics.
Fall 2003-To date	Member External Advisory Committee, Department of Computer Information Systems, Metropolitan State University of Denver
2015-To date	Member International Advisory Board for the International Network of FOSS4G Labs (Free and Open Source Software for Geospatial Applications).
2016-To date	Coordinator: International series of webinars for the International Network of FOSS4G Labs.
2016-To date	Advisor to Rocky Mountain Petroleum User Group ROCKYPUG. Alina Shemetova President.
Two three-year appointments starting Spring 2012	Reviewer for: Ministero dell'Istruzione, dell'Universtá e della Recerca (MUIR), Agenzia Nazionale di Valutazione del Sistema Universitario e della Ricerca. Italy. Review of research grant applications in the area of Geographic Information Science and Technology.
1992-2012	Member Senior Advisory Committee. Consortium for Advancing Monitoring of Ecosystems Sustainability in the Americas (CAMESA). U.S. Forest Service; INIFAP Mexico; Canadian Forest Service.

Short-term activities

Spring 2003-Summer 2004	Member of the organizing committee for the *Monitoring Science and Technology Symposium: Unifying Knowledge for Sustainability in the Western Hemisphere*. Consortium for the Advancing the monitoring of ecosystem sustainability in the Americas (CAMESA). September 20-24 2004, Denver, Colorado
Spring-Fall 2004	Member of the local support committee for the *Association of American Geographers 2005 Annual Meeting*.
Spring- Fall 2004	Chair session: "The role of web-based Geographic Information Systems (GIS) in supporting sustainable management". *Symposium: Unifying Knowledge for Sustainability in the Western Hemisphere*. Denver, Colorado September 20-24, 2004.
Fall 2006	External reviewer contribution for application for promotion to full professor Dr. Jacek Malczewski, Department of Geography, University of Western Ontario, Canada.
2009-2010	Member organizing and planning committee. 2010 U.S. meeting The State of the Map. WhereCamp5280. August 14-15, Denver, CO.
2010-2011	Member of the organizing and planning committee for the *FOSS4G 2011 International Conference* (Free and Open Source Software for Geospatial applications) September 12-16. Denver, Colorado.
2010-2011	Chair of the Academic Track. *FOSS4G 2011 International Conference* (Free and Open Source Software for Geospatial applications) September 12-16. Denver, Colorado.
2010-2011	Member of the organizing committee and planning committee

	international conference *The State of the Map (SOM).* September 9-11. Denver, CO.
Fall 2012	Review of submissions for presentation at the *First Latin OSGIS (Geospatial Open Source Software) Conference*. Guayaquil, Ecuador. November 22-23, 2012.
Spring 2012	I helped organize the team that lead the Academic Track of the *2013 FOSS4G (International Free and Open Source Software for Geospatial Applications) conference*. September 17-21, Nottingham, England.
Spring 2012	Finished the edition of special issues for two peer-reviewed scientific journals (*Transactions in GIS; OSGeo Journal*). The edited articles were selections from the Academic Track of the FOSS4G 2011 international conference. I served as chair of this track.
May 2015	External Review of the Department of Geography at Salem State University, MA.
Fall 2016	**Moreno-Sanchez, R.** 2016. **Session Chair**: FOSS4G (Free and Open Source Software for Geospatial Applications) in the USA and around the World. *2016 GIS in the Rockies conference*. Denver, Colorado. September 21-22
Spring 2017	Member review committee Academic Track national conference *FOSS4G-North America*. August 14-19. Boston, MA.
2018	Member Scientific Committee for the Academic Track. *2018 FOSS4G International Conference*. August 27-31. Dar Es Salaam, Tanzania.
2018	Member Program Committee. *2018 FOSS4G International Conference*. August 27-31. Dar Es Salaam, Tanzania.
2019	Reviewer Academic Track. *FOSS4G 2019 International Conference*. August 26-30. Bucharest, Romania.

Articles reviewed for scientific journals

November 2019. Relevance of the cell neighborhood size in landscape metrics evaluation and FOSS implementations. *ISPRS International Journal of Geo-Information.*

July 2019. Urbanization forecasts across the U.S. southern Atlantic States reveal varying losses in ecosystem services under different scenarios of landscape change. *Land.*

April 2019. Enabling fine-grained scientific citation for GRASS GIS software modules. *ISPRS International Journal of Geo-Information.*

March 2019. Analysis of Municipal Solid Waste Collection using GIS and Multi-Criteria Decision Aid. *Applied Geomatics.*

December 2018. An Adapted Technology Acceptance Model to Test GIS Software Users' Perceptions about FOSSGIS Open Geospatial Data, Software and Standards. *Open Geospatial Data, Software and Standards.*

December 2018. Optimización de la producción forestal maderable y conservación del

ecosistema en bosques comunitarios en el sur de México. [Optimization of timber production and conservation of the ecosystem in community forests in southern Mexico]. *Bosques.*

September 2018. Spatio-temporal analysis of urban expansion using GIS and Remote Sensing in Jigjiga Town of Ethiopia. *Applied Geomatics.*

April 2018. Geospatial Algorithms within Academia: A Survey About User Practices. *Open Geospatial Data, Software and Standards.*

March 2018. Evaluating the multi-functionality of forest ecosystems in northern Mexico. *Forests.*

May 2017. FOSS Tools and Applications for Education in Geospatial Sciences. *ISPRS International Journal of Geo-Information.*
March 2017. Cloud Based Spatial Visualization with Statistical Approach for Road Accidents. *Applied Geomatics.*

November 2016. A Simplified Geographical Information Systems (GIS)-Based Methodology for Modeling the Topography of Bedrock. *Applied Geomatics*

February 2016. Diseño de las políticas públicas de corte forestal en México: implicaciones para la gestión de la vulnerabilidad social y el territorio [Design of forestry public policies in Mexico: Implications for the assessment of the social vulnerability and the landscape]. *Investigaciones Geográficas.* Mexico.

September 2015. Toward an integrated understanding of social values for cultural ecosystem services and environmental conditions in a national park. *Environmental Conservation.*

March 2014. Evaluation of Free/Open Source Software Using OSMM Model, Case Study: WebGIS and Spatial Database. *IET Software.*

February 2013. From geoportals to geographic information knowledge. *ISPRS International Journal of Geo-Information.*

January 2013. GIS-based hazard and risks maps of the Douro river basin. *Geomatics, Natural Hazards and Risk.*

March 2012. Spatial inference with an interchangeable rule format. *International Journal of Geographic Information Science.*

August 2011. Mapping collaboration in Open Source Geospatial ecosystem. *Transactions in GIS.*

March 2011. Analysis of fragmentation in part of western Himalayan ecoregion using

geospatial techniques. *Journal of Forestry Research.*

Fall 2011. Who is watching your food? A flexible framework for public health monitoring. *Transactions in GIS.*

Fall 2011. The WISERD Geoportal: A tool for the discovery, analysis and visualization of socio-economic metadata for Wales. *Transactions in GIS.*

Fall 2011. Web geoservices and ancient cadastral maps: the Web C.A.R.T.E. project. *Transactions in GIS.*

Fall 2011. Supporting accessibility for blind and vision-impaired people with a localized gazetteer and Open Source geotechnology. *Transactions in GIS.*

Fall 2011. Advancing global marine biogeography research with open-source GIS software and cloud computing. *Transactions in GIS.*

Fall 2011. Using GRASS GIS to Model Solar Irradiation on North Carolina Aquatic Habitats with Canopy Data. *Transactions in GIS.*

Fall 2011. Modelling of landslide-generated tsunamis with GRASS. *Transactions in GIS.*

Fall 2011. GIS-based calibration of MassMov2D. *Transactions in GIS.*

Fall 2011. Earth Observation Scientific Workflows in a Distributed Computing Environment. *Transactions in GIS.*

Fall 2011. A comparison between WCS and OPeNDAP for making model results and data products available through the internet. *Transactions in GIS.*

Fall 2011. Open source based online map sharing to support real-time collaboration. *OSGeo Journal.*

Fall 2011. An innovative Web Processing Services based GIS architecture. *OSGeo Journal.*

Fall 2011. Using GRASS and R for Landscape Regionalization through PAM Cluster Analysis. *OSGeo Journal.*

Fall 2011. Functional Coverages. *OSGeo Journal.*

Fall 2011. Opticks Open Source Remote Sensing and Image Processing Software. *OSGeo Journal.*

Fall 2011. Implementation, challenges and future directions of integrating services from the GIS and decision science domains. *OSGeo Journal.*

Fall 2011. A Vivid Relic Under Rapid Transformation. *OSGeo Journal.*

January and resubmission in April 2010. Study on the construction of a lightweight Web-GIS based on Flash technology and its application in monitoring and evaluation of China regional development. *International Journal of Geographic Information Science.*

June 2009. On the boundaries of integration in large work chains in health care. *European Journal of Information Systems*

May 2009. Spatial prediction of land use changes in Texcoco, Estado de Mexico. *Ciencia Forestal*.

September 2008. An analytical solution for maintaining access speeds to arbitrarily large vector spatial datasets from invasive species surveys. *International Journal of Geographic Information Science.*

May 2008. Decision support system for wildfire protection in the Euro-Mediterranean. *Environmental Modeling and Software*.

February 2008. Facilitating stakeholder dialogue by politicizing systems design in the interest of sustainable development. *Journal of Environmental Management*. (Two rounds of reviews. June 2007 first submission).

January 2008. System for delineating the potential for forest fires in Baja California, Mexico. *Ciencia Forestal.*

October 2007. Identification of malaria Hot Spots for Focused Intervention in Tribal State of India: a GIS based Approach. *International Journal of Geographic Information Science.*

July 2007. Identifying potential areas for forest commercial plantations of *Pinus pseudostrobus* Lindl. and *Pinus greggii* Engelm. in Michoacan, Mexico. *Ciencia Forestal*.

April 2007. GinisWeb: Application framework and underlying methodology for rapid development of Web-based GIS. *International Journal of Geographic Information Science.*

April 2007. New approach for modeling climatic data with applications in modeling tree species distributions in the states of Jalisco and Colima, Mexico. *Journal of Arid Environments.*

February 2007. Geospatial analysis of soil and climatic properties as a new tool to predict

the risk of selenium-related diseases. *The Lancet.*

February 2007. Environmental indicators in the evaluation of natural resources. *Ciencia Forestal.*

May 2006. Evaluation of the regeneration of a pine forest through the "zero parcel" method. *Ciencia Forestal*

February 2005. Exploratory map animation of post-event analysis of wildfire protective action recommendations. *Natural Hazards Review.*

October 2005. Land use change and its consequences for the agricultural potential for the upper Balsas river. *Agricultura Técnica en México.*

June 2005. Comparing statistical distributions of climatic information for land use potential analysis. *Ciencia Forestal.*

March 2005. Spatial simulation of fire dispersion based on fuel loads and slope. *Ciencia Forestal.*

July 2003. Identification of corn (*Zea mays* L.) from other crops and estimation of the total area planted using LANDSAT 7 ETM+ images. *Agricultura Técnica en México*.

April 2001. Integrating multi-criteria evaluation and Landsat TM landuse map to identify suitability areas for crops: A case study in Central Mexico. *Photogrammetric Engineering & Remote Sensing*

Reviews of grant applications

I am in the board of reviewers of the Ministerio dell'Istruzione, dell'Università e della Ricerca (MUIR), Italy. I have reviewed grant applications in the area of Geographic Information Science and Technology, natural resources management, and Sustainable Development.

- 2012 review of 2 grant applications.
- 2014 review of 1 grant application.
- 2016 review of 1 grant application.

March 2006. NSF 0616957. A Geospatial Semantic Web Framework for Feature-Level Data Search, Access, Retrieval, Integration and Visualization: A Case of Transportation Network Data. *National Science Foundation. Geography and Regional Science.*

September 2005. NSF 0552278. A Geospatial Semantic Web Framework for Feature-Level Data Search, Access, Retrieval, Integration and Visualization: A Case of Transportation Network Data. *National Science Foundation. Geography and Regional Science.*

Book reviews

Book review "Sustainability Science: Managing risk and resilience for sustainable development". P. Becker. Elsevier, 1st Edition. (2014) (302 pp.) *Anthropocene* Nov 2015.

Book review "Discovering GIS and ArcGIS" by Bradley A. Shellito for MacMillan Education.

Book review "Exploring Geographical Information Systems" by Nicholas Chrisman for John Wiley & Sons, Inc.

TO THE COMMUNITY

- All consulting activities to local, regional, national, and international organizations have been done free of charge. Please see list of recent activities in the section "**Consulting**" in this document.
- All presentations at seminars and meetings for local, regional, national, and international events have been done free of charge. Please see list of recent activities in the section "**Presentations at meetings, seminars, and colloquia outside of CU DENVER**" in this document

2009-To date	I initiated and coordinate a collaboration between diverse outdoors industry companies, government agencies, interest groups and education organizations with several professors at CU Dnever to work on the creation of short film documentaries to highlight the importance and value of outdoor experiences for children and their families. I have obtained jointly with instructor Jessica Lance from the College of Arts and Media a grant from the Center for Faculty Development to continue this work. See examples of short films at: http://www.youtube.com/watch?v=XRw4vkEM2xc . These mini documentaries are been used to encourage government agencies, cities and counties, politicians, and K-12 systems to support and sponsor outdoor activities for children.
2006 - To date.	Block coordinator for the Boulder Regional Transportation District (RTD) EcoPass Program. I encourage and coordinate the participation of my neighbors in this program. I collect and submit annual fees for the program in my block.

CONSULTING

2010-2016 **Colorado Department of Public Health and the Environment.** External

	Advisor to the Colorado Environmental Public Health Tracking (COEPHT) program. Attend quarterly meetings to design and review program developments.
August 2012	**National Forestry Commission (CONAFOR), Mexico.** Review of: Pilot Spatial Decision Support System for the Management of the Forests in Mexico. Three-day meeting in Guadalajara, Jalisco, Mexico.
July 24-25, 2007	**University of Colima, Mexico,** "Workshop: Advanced spatial modeling techniques using GIS proprietary and Open Source Software".
February 9, 2005	**Denver Regional Council of Governments (DRCOG)**, "Metro Vision Resource Center" Review Committee Meeting.
2004 - to date	**Colorado Department of Public Health and the Environment.** Workshops to train health professionals on the unique confidentiality requirements of spatially enabled public health data. (Paid, see listing in Grants and Projects).
2003 - to date	**State Agrarian University of Armenia** (formerly Armenian Academy of Agricultural Sciences), Yerevan, Armenia. Advisor in the creation of an infrastructure for GIS education. Several interactions and on-site visit summer 2006.
Spring 2000	**City of Nederland.** Support the Design and implementation of its city-wide GIS System.
Summer 1999	**Support to the Upper Arkansas Conservation Interest Group.** Creation of maps and 3D perspectives to show the spatial relationships between roadless and wilderness areas in the Upper Arkansas and Platte River watersheds. Provided help to prove the hypothesis that biodiversity is under represented in these areas.
Spring 1999	**Mapping the trials system for the City of Boulder Parks and Open Space.** Creation of maps and 3D perspectives of the City of Boulder trail system.
Fall 1998 - Spring 1999	**Support to the Auraria Higher Education Campus (AHEC) for the creation of a GIS system for the Campus Master Plan**. Create a GIS system to support the Campus Master Plan, and later to serve as a planning tool for AHEC.
Fall 1998	**Modeling wildfire hazard levels for City of Boulder Mountain Parks.** With data from the City of Boulder (Digital Elevation Model, vegetation types, roads, land use, and urban developments) we created a model that generates wildfire risk indexes in the open space west of the city.

Fall 1998	**Mapping the trails infrastructure for the Cherry Creek Reservoir Park**. We used GPS to create a layer of the trails in the Cherry Creek Reservoir State Park. Maps were produced to assist in the management of existing trails and planning of new ones.
Spring 1998	**Mapping gamma rays in Downtown Denver for the Colorado Department of Public Health and the Environment.** Digitize historical records of gamma rays in Denver maps and create cartographic products for the Colorado Department of Health and the Environment.
Spring 1998	Presentation and discussion of issues surrounding the creation of GIS Department in Prowers County, Colorado.
October 1997	**GIS Workshop for K-12 teachers.** One-day workshop on GIS theory and applications to a group of K-12 teachers from Jefferson and Adams counties.
Summer 1997	**Support to the Dillon/Breckenridge Rotary Club for the development of the Dillon Reservoir Scenic By-Way Project.** Create maps and 3D perspectives of the current and proposed bike and hike paths for this project.
Spring-Summer 1997	**Support to the Enterprise Foundation for the development of poor neighborhoods in downtown Denver.** Creation of property boundaries layer in a GIS for the Denver Five-Points area in downtown and linking it to a large database of attributes for each lot.
Spring 1997	**Support to the State Office of the Natural Resources Conservation Service.** Creation of map templates in the ARC/INFO and ArcView GIS software. Creation of customized interfaces for non-expert users to facilitate the production of cartographic products using the mentioned GIS systems.
1997	**Participation in state-wide coordinating committee.** I participated in the monthly meetings (starting in January 1997) of the Colorado Geographic Information Coordinating Committee (CGICC).