

Charles W. Emerson
Department of Geography
Western Michigan University
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Education

- Ph.D. (1996) Geography, University of Iowa, Iowa City, Iowa
Dissertation Title: Cost-effective spatial characterization of volatile organic compounds in landfill gas.
- M.A. (1993) Geography, University of Iowa, Iowa City, Iowa
Thesis Title: Evaluation of colorimetric detector tubes as screening tools in landfill gas monitoring
- B.S. (1982) Physical Geography, University of Georgia, Athens, Georgia

Academic and Professional Employment

- 9-14 to present Professor, Department of Geography, Western Michigan University
- 6-03 to 9-14 Associate Professor, Department of Geography, Western Michigan University
- 8-99 to 6-03 Assistant Professor, Department of Geography, Western Michigan University
- 8-96 to 8-99 Assistant Professor, Department of Geography, Geology, and Planning Southwest Missouri State University
- 10-88 to 08-91 Air Pollution Specialist, Stationary Source Division, Toxics Program Support Section, California Air Resources Board, Sacramento, CA
- 03-87 to 09-88 Naval Flight Officer, Navigation Instructor, Naval Air Training Unit, Mather AFB, CA
- 07-82 to 02-87 Naval Flight Officer, Senior Electronic Warfare Evaluator, Fleet Air Reconnaissance Squadron Two, Naval Station Rota, Spain

Refereed Publications

- Emerson, C.**, Bommersbach, B., Nachman, B., and Anemone, R., 2015, An object-oriented approach to extracting productive fossil localities from remotely sensed imagery, *Remote Sensing*, 7: 16555-16570.
- Conroy, G.C., **Emerson, C.W.**, Anemone, R.L., and Townsend, K.E., 2012, Let your fingers do the walking: a simple spectral signature model for “remote” fossil prospecting, *Journal of Human Evolution*, 63: 79-84.
- Emerson, C.**, and Anemone, R., 2012, An artificial neural network-based approach to identifying mammalian fossil localities in the Great Divide Basin, Wyoming, *Remote Sensing Letters*, 3(5): 453-460.
- Anemone, R., **Emerson, C.**, and Conroy, G., 2011, Finding fossils in new ways: an artificial neural network approach to predicting the location of productive fossil localities, *Evolutionary Anthropology*, 20: 169-180.

- Anemone, R.L., Conroy, G.C., and **Emerson, C.W.**, 2011, GIS and paleoanthropology: incorporating new approaches from the geospatial sciences in the analysis of primate and human evolution, *Yearbook of Physical Anthropology*, 54: 19-46.
- Emerson, C.**, Veeck, G., Li, Z., Yu, F., and Zhang, H., 2010, Biophysical and agro-economic influences on pasture quality in Da'erhanmaoming'an Union Banner, Inner Mongolian Autonomous Region, China, *Physical Geography*, 31(6): 552-581.
- Reichert, J.D. and **Emerson, C.W.**, 2009, Monitoring bathing beach water quality using composite sampling, *Environmental Monitoring and Assessment*, 168: 33 – 43.
- Emerson, C.W.**, Chinniah, S., Lam, N.S.-N., and Quattrochi, D.A., 2007, Spatial and grayscale metadata for similarity searches of image databases, *GIScience and Remote Sensing*, 44(2); 182-201.
- Veeck, G., **Emerson, C.**, Li, Z., Yu, F., 2006, "Develop the West" assessed: economic and environmental change in the Inner Mongolia Autonomous Region, People's Republic of China 2000 – 2005. *Asian Geographer*, 25(1-2): 61-83.
- Emerson, C.W.**, Lam, N.S.-N., and Quattrochi, D.A., 2005, A comparison of local variance, fractal dimension, and Moran's I as aids to multispectral image classification, *International Journal of Remote Sensing*, 26(8): 1575-1588.
- Emerson, C.W.** and Rajagopal, R., 2004, Measuring toxic emissions from landfills using sequential screening, *Computers, Environment, and Urban Systems*, 28:265-284.
- Kupfer, J.A. and **Emerson, C.W.**, 2004, Remote sensing. In: *Encyclopedia of Social Measurement*. Kempf-Leonard, K. (ed.). Academic Press, San Diego, pp. 377-383.
- Lam, N.S.-N., **Emerson, C.W.**, and Quattrochi, D.A., 2004, Quantitative spatial analysis of remotely sensed imagery. *WorldMinds: Geographical Perspectives on 100 Problems*. Washington, D.C.: Association of American Geographers, pp. 559-564.
- Lam, N.S.-N., Qiu, H.L., Quattrochi, D.A., **Emerson, C.W.**, 2002, An Evaluation of fractal methods for characterizing image complexity, *Cartography and Geographic Information Science*, 29(12): 25-35.
- Quattrochi, D.A., **Emerson, C.W.**, and Lam, N.S.-N., 2001, Fractal characterization of multitemporal remote sensing data, *Scale Issues in Geographical Analysis and GIS*, N. Tate and P. Atkinson, eds., Chichester, U.K: John Wiley and Sons, 13-34.
- Emerson, C.W.**, 1999, Laboratory and field screening strategies for measuring volatile organic compounds in landfill gas. *Journal of Environmental Management*, 57:155-164.
- Emerson, C.W.**, Lam, N.S.N, and Quattrochi, D.A., 1998, Multi-scale fractal analysis of image texture and pattern. *Photogrammetric Engineering and Remote Sensing*, 65:51-61.
- Emerson, C.W.**, 1998, The new mapping paradigm and its application to public affairs. *SMSU Journal of Public Affairs*, 2:131-142.

Magazine Article

Anemone, R.L. and **Emerson, C.W.**, 2014, Fossil GPS. *Scientific American*, 310(5):47-51.

Peer-Reviewed Conference Proceedings

Emerson, C.W., Anemone, R.L., 2014, A multi-scale geospatial model for identifying productive fossil localities in the Great Divide Basin, Wyoming. Annual meeting of the Society for Vertebrate Paleontology, Berlin, Germany. November 2014.

Anemone, R.L., **Emerson, C.W.**, Nachman, B., 2014, Testing predictive models for paleontological site location in the Eocene of Wyoming. 5th International Conference on Remote Sensing in Archaeology: The Age of Sensing, Durham. N.C. October 2014.

Anemone, R.L., **Emerson, C.W.**, Nachman, B., Bommersbach, B., 2014, Testing a predictive model for identifying fossil vertebrate localities in the Eocene of Wyoming. American Association of Physical Anthropologists, Calgary, Alberta, Canada, April 2014.

Anemone, R.L., **Emerson, C.W.**, Nachman, B., 2013, Does predictive modeling work in the search for vertebrate fossils? A case study from the Eocene of Wyoming. *Journal of Vertebrate Paleontology, Programs and Abstracts*, 2013, p. 79.

Bommersbach, B., Anemone, R.L., **Emerson, C.W.**, 2013, Predictive modeling in the search for vertebrate fossils: geographic object based image analysis (GEOBIA) in the Eocene of Wyoming. *Journal of Vertebrate Paleontology, Programs and Abstracts*, 2013, p. 90.

Conroy, G. C., **Emerson, C.W.**, Anemone, R.L., Townsend, K.E.B., 2013, Let your fingers do the walking: A simple spectral signature model for “remote” fossil prospecting. *American Journal of Physical Anthropology Supplement* 56: 101.

Anemone, R.L., **Emerson, C.W.**, Nachman, B., Conroy, G. C., Watkins, R., 2013, Ground-truthing a neural network based predictive model for locating productive fossil localities in the Eocene of Wyoming. *American Journal of Physical Anthropology Supplement* 56: 68.

Anemone, R. L., Conroy, G. C., **Emerson, C.W.**, Watkins, R., 2011, Developing a GIS-based predictive model for the identification of fossil bearing deposits in the Eocene of Wyoming. *Am J Phys Anthropol Supplement* 52: 77.

Emerson, C.W., Chinniah, S., Lam, N.S.-N, Quattrochi, D.A., 2005, A region quadtree-based framework for similarity searches of image databases. *GeoComputation 2005*, Ann Arbor, Michigan.

Emerson, C.W., Quattrochi, D.A., and Lam, N.S.-N., 2002, Spatial metadata for global change investigations using remote sensing. *GIScience 2002 2nd International Conference on Geographic Information Science*, Boulder, Colorado.

Emerson, C.W. and Quattrochi, D.A., 2000, Application of fractal analytical techniques in the estimation of operational scale. *International Archives of Photogrammetry and Remote Sensing*, 33:402-407.

Emerson, C.W., 1998, Screening strategies for measuring toxic compounds in landfill gas. *Proceedings of the International Conference on Modeling Geographical and Environmental Systems with Geographical Information Systems*, Hong Kong.

Poster Presentations

Anemone, R.L. **Emerson, C.W.**, Conroy, G. C., Nachman, B., (2014) Geospatial paleontology: enriching paleontological fieldwork with new approaches from the spatial sciences. Annual meeting of the Society for Vertebrate Paleontology, Berlin, Germany. November 2014.

Emerson, C.W., Quattrochi, D.A., and Lam, N.S.-N., 2002, Image segmentation and classification using local fractal dimension and spatial autocorrelation. *American Geophysical Union Fall Meeting*, San Francisco, California.

Emerson, C.W., Quattrochi, D.A., and Lam, N.S.-N., 2002, Spatial metadata for global change investigations using remote sensing. *GIScience 2002 2nd International Conference on Geographic Information Science*, Boulder, Colorado.

Emerson, C.W. and Quattrochi, D.A., 2000, Application of fractal analytical techniques in the estimation of operational scale. XIXth Congress of the International Society for Photogrammetry and Remote Sensing, Amsterdam.

Grants Received

Anemone, R. (Principal Investigator), **Emerson, C.** (Co-Principal Investigator), Developing and testing new geospatial approaches in paleoanthropology. National Science Foundation BCS 1227329, Project period: September 1, 2012 – 31 August, 2015, Budget \$180,459.

Veck G. and **Emerson, C.**, Integrating local Knowledge into a land-Quality assessment model for reclaimed rice paddy within coastal areas of Kyehwa-ri, Chollabuk-do, Republic of Korea, Milton and Ruth Scherer Endowment Fund, Project period: July 22, 2012 – June 30, 2013, Budget: \$23,582.

Veck, G., (Principal Investigator), **Emerson, C.** (Co-Principal Investigator), Modeling agricultural land use changes in Inner Mongolia. National Science Foundation BCS 0616763. Project period: 1 August 2006 – 31 January 2009; Budget \$49,960.

Veck G. and **Emerson, C.**, An evaluation of the roles of government policy, market mechanisms, and management practices on pasture quality in rural China. Ruth and Milton E. Scherer Endowment Fund, Project period: 1 July, 2009 – 30 June 2011; Budget: \$29,225

Emerson, C.W. (Principal Investigator), Quattrochi, D.A., Lam, N.S.-N. Fractal and geostatistical metadata for monitoring global change using remote sensing imagery. NASA- Research in Intelligent Systems. Project period: 1 June 2001 – 31 August 2004; Budget: \$497,011.

Emerson, C.W., (Principal Investigator). Surveying the transportation infrastructure of Greene County Missouri. Greene County, Missouri Highway Department, Project period: Summer/Fall 1998, Spring 1999, Budget: \$24,000 annually, \$48,000 total.

Emerson, C.W., (Principal Investigator), Baseline environmental investigation of the Fulbright Spring watershed, Missouri. U.S.EPA Environmental Education Grant, Project period: Fall/Spring, 1997, 1998, Budget: \$24,945.

Professional Talks, Colloquia, Papers

Emerson, C.W., Jones, T., Liu, J., and Anemone, R.L., 2016, Developing photogrammetric and LIDAR-based 3D digital outcrop models of an Eocene mammalian fossil locality, 112th National Meeting of the Association of American Geographers, San Francisco, CA.

Emerson, C.W. and Anemone, R.L., 2015, Extracting productive Eocene fossil localities from remotely sensed imagery: a comparison of methodologies, 111th National Meeting of the Association of American Geographers, Chicago, IL.

Emerson, C.W. and Anemone, R.L., 2014, A multi-scale, geospatial model for identifying productive fossil localities in the Great Divide Basin, Wyoming, 74th Annual Meeting of the Society for Vertebrate Paleontology, Berlin, Germany.

Emerson, C.W. and Anemone, R.L., 2014, Applying geospatial analytical techniques to paleontological field studies, 110th National Meeting of the Association of American Geographers, Tampa, FL.

Bommersbach, B., Anemone, R.L., **Emerson, C.W.**, 2013, Predictive modeling in the search for vertebrate fossils: geographic object based image analysis (GEOBIA) in the Eocene of Wyoming. Presented at the East Lakes Division, Association of American Geographers, Toledo, OH. October, 2013.

Emerson, C.W. and Veeck, G. 2013, Agroecologic and biophysical influences on pasture quality, half day seminar, International Workshop on Ecological Civilization and Modern Agriculture Development, Rural Development Institute, Chinese Academy of Social Sciences, Beijing.

Anemone, R.L., Nachman, B., **Emerson, C.W.**, 2013, Ground-truthing a predictive model for locating fossil vertebrate localities in the Eocene of Wyoming, 62nd Annual Meeting of the American Association of Petroleum Geologists, Salt Lake City, UT.

Anemone, R.L., **Emerson, C.W.**, Nachman, B., Conroy, G.C., and Watkins, R., 2013, Ground-truthing a neural-network based predictive model for locating productive fossil localities in the Eocene of Wyoming, American Association of Physical Anthropology Annual Meeting, Knoxville, TN.

- Veeck, G. and **Emerson, C.W.**, 2013, Integrating local knowledge into a land-quality assessment model for reclaimed rice paddy within coastal areas of Kyehwa, Chollabuk-do, Republic of Korea, The Michigan Academy of Sciences, Arts and Letters Annual Meeting, Alma, MI.
- Anemone, R., **Emerson, C.**, 2012, Finding fossils in new ways developing and testing new geospatial approaches in paleoanthropology, Denison University.
- Emerson, C.W.**, 2012, An artificial neural network approach to locating Eocene mammalian fossils, American Society for Photogrammetry and Remote Sensing Annual Meeting, Sacramento, CA.
- Emerson, C.W.**, 2011, A predictive model for locating Eocene mammalian fossils in the Great Divide Basin, Wyoming, 107th National Meeting of the Association of American Geographers, Seattle WA.
- Anemone, R.L., **Emerson, C.W.**, Conroy, G. C. (2011) Finding fossils in new ways: a neural network model for predicting the location of fossil-bearing deposits. Annual Meeting of the Society for Vertebrate Paleontology, Nov. 2-5, 2011, Las Vegas, NV.
- Emerson, C.W.**, 2010, Biophysical and socioeconomic influences on pasture quality in DaMao Banner, Inner Mongolia, American Society for Photogrammetry and Remote Sensing Annual Meeting, San Diego, CA.
- Emerson, C.W.**, 2009, An assessment of the relationships between vegetation changes across Inner Mongolia, agricultural statistics, and rural incomes, 105th National Meeting of the Association of American Geographers, Las Vegas, NV.
- Emerson, C.W.**, 2008, A longitudinal analysis of pastureland management strategies in Inner Mongolia, China, 104th Meeting of the Association of American Geographers, Boston, MA.
- Veeck, G. and **Emerson, C.W.**, 2007, Agro-economic and environmental influences on grassland quality in Daerhanmaomingan Union Banner in Inner Mongolia: 1980 – 2005. 2ND Global Conference on Economic Geography, Beijing.
- Veeck, G., **Emerson, C.**, Li, Z., Yu, F., Zhang, H., 2007 Global trade and local herders: an environmental economic analysis of husbandry in Damao Banner, Inner Mongolia, People's Republic of China. Facing East/Facing West Conference, Kalamazoo, MI.
- Veeck, G., **Emerson, C.**, Biles, J., 2007, The application and analysis of environmental data in multi-scale research, informational seminar at the Rural Development Institute, Chinese Academy of Social Science, Beijing.
- Emerson, C.W.**, 2007, Remote sensing analysis of agricultural land use changes in Inner Mongolia 103rd Meeting of the Association of American Geographers, San Francisco, CA.
- Emerson, C.W.**, 2005, A region quadtree framework for content-based image retrieval. 101st Meeting of the Association of American Geographers, Denver, Colorado.

- Emerson, C.W.**, 2004, Spatial metadata for remote sensing imagery, NASA Earth Science and Technology Conference, Mountain View, California.
- Lam, N.S.-N., **Emerson, C.W.** and Quattrochi, D.A., 2004, From fractals and wavelets to homeland security: use of spatial techniques for change detection. *GIScience 2004*, College Park, Maryland.
- Emerson, C.W.**, 2004, An analysis of texture-based urban land cover classification, 100th Meeting of the Association of American Geographers, Philadelphia, Pennsylvania.
- Arumugam, M., **Emerson, C.W.**, Lam, N.S.-N., and Quattrochi, D.A., 2003, Classifying urban land covers using local indices of spatial complexity. American Society for Photogrammetry and Remote Sensing Annual Conference, Anchorage, Alaska.
- Emerson, C.W.**, 2002, Fractal metadata for urban change investigations, 98th Meeting of the Association of American Geographers, Los Angeles, California.
- Emerson, C.W.** 2001, Fractal simulation of volatile organic compound emissions from landfills, 97th Meeting of the Association of American Geographers, New York, New York.
- Emerson, C.W.**, 2000, Textural measures of urban land covers. 96th Meeting of the Association of American Geographers, Pittsburgh, PA.
- Emerson, C.W.**, 1999, Evaluating field screening methods using stochastic simulation. EcoInnovations Forum, Western Michigan University Environmental Institute.
- Emerson, C.W.**, 1999, Characteristic spatial statistics of urban land cover types. American Society for Photogrammetry and Remote Sensing Annual Conference, Portland, Oregon.
- Emerson, C.W.**, 1998, Screening strategies for measuring toxic compounds in landfill gas. International Conference on Modeling Geographical and Environmental Systems with Geographical Information Systems, Hong Kong.
- Emerson, C.W.**, Quattrochi, D.A., and Luvall, J.C., 1998, Multi-scale fractal analysis of image texture and pattern. 94th Meeting of the Association of American Geographers, Boston, Mass.
- Emerson, C.W.**, 1997, A comparison of nominal and ordinal screening strategies. 93rd Meeting of the Association of American Geographers, Fort Worth, Texas.

Editing, Refereeing, Reviewing Activities

2016 Manuscript review, *Remote Sensing*

2016, 2015 Manuscript review, *Transactions in GIS*

2013 Grant proposal review, American Chemical Society Petroleum Research Fund

2013 Manuscript review, *Scale Issues in Remote Sensing*, Qihao Weng, ed.

2013, 2012, 2008, 2007, 2005 Manuscript review, *International Journal of Remote Sensing*

2011, 2010, 2000 Grant proposal review, National Science Foundation, Geography and Regional Science.

2011 Manuscript review, *IEEE Transactions on Geoscience and Remote Sensing*

2011 Manuscript review, *Environmental Science and Technology*

2011 Manuscript review, *Transactions on Image Processing*

2008 Manuscript review, *Applied Geography*

2004 Manuscript review, *Research in Geographic Education*

2004 Manuscript review, *Photogrammetric Engineering and Remote Sensing*

2004, 2005 Manuscript review, *Remote Sensing of Environment*

2003 Manuscript review, *Journal of Arid Environments*

2001 Guest editor, special issue of *Geocarto International*, on geographical applications of satellite remote sensing, 16:4, December.

2001, 2004 Manuscript review, *Landscape Ecology*.

2001 Grant proposal review, U.S. Civilian Research and Development Foundation.

2000 Grant proposal review, National Science Foundation, International Cooperative Science Activities.

Supervision of Student Research and Thesis Projects

2014 Bommersbach, B. Predictive modeling in the search for vertebrate fossils: geographic object based image analysis (GEOBIA) in the Eocene of Wyoming, M.A. Geography, Western Michigan University

2012, Roush, B. Quantifying urbanization in Grand Traverse County, MI April 2012. Honors Thesis, Lee Honors College, Western Michigan University

2009, Jung, W.R. Vector feature extraction using object-oriented image analysis techniques from scanned maps, M.A. Geography, Western Michigan University

2008, Reicherts, J. Using composite sampling techniques to monitor bathing beach water quality in Kalamazoo County, Michigan, M.A. Geography, Western Michigan University

2008, Delisio, J. A comparative analysis of pixel based and object oriented image analysis methods using Landsat Imagery, M.A. Geography, Western Michigan University

2005, Chinniah, S. Effectiveness of wavelet transforms, fractals, lacunarity, and spatial indices in content-based image retrieval, M.A. Geography, Western Michigan University

2003, Wahid, F.L., Classifying forest composition using fractal dimension as an index of image texture, M.A. Geography, Western Michigan University.

- 2001, Caird, C.P., Development of an Arcviewtm extension to measure local fractal dimension, M.A. Geography, Western Michigan University.
- 2001, Makido, Y.K., A geostatistical screening strategy for assessing contaminated sediment, M.A. Geography, Western Michigan University.
- 1998, Miner, M., Evaluating satellite image classification for bottomland surveys in Ozark National Scenic Riverways, M.A. Geography, Southwest Missouri State University.

Courses Taught

- GEOG 2250 Introduction to Meteorology and Climatology
GEOG 2650 Introduction to Geospatial Technologies
GEOG 3010 Fundamentals of Geographic Information Systems
GEOG 5010 Introduction to Geographic Information Systems
GEOG 5630 Surveying Techniques
GEOG 5670 Spatial Analysis
GEOG 5690 Intermediate GIS
GEOG 5820 Remote Sensing of the Environment
GEOG 6820 Advanced Remote Sensing

Departmental Service Activities

- 2000 - 2002, 2013 Member, Geography Dept. Executive Committee
2013 Member, Geography Dept. Assessment Committee
2007 – 2008 Chair, Lucia Harrison Endowment Committee
2000 Member, Geography Dept. Curriculum Committee
2000 – 2005 Geography Dept. Webmaster

College Service Activities

- 2010 – 2012 Chair, WMU College of Arts and Sciences Curriculum Committee
2002 - 2005, 2009, 2014 Member, WMU College of Arts and Sciences Curriculum Committee
1999, 2000 College of Arts and Sciences Computer Committee

University Service Activities

- 2013 – 2015 Member, WMU Academic Program Review and Planning Committee
2012 – 2015 Chair, WMU Academic and Information Technology Council
2012 – 2015 Member, WMU Office of Information Technology Executive Committee
2012 – 2015 Member, WMU Campus Information Security Committee
2000, 2001 University Class Fees Subcommittee
2000 Medallion Scholarship Program Observer

Discipline Service Activities

2010 – 2014 Membership Committee Chair, University Consortium for Geographic Information Science

2001 – 2002 Director, Remote Sensing Specialty Group, Association of American Geographers

Community Service Activities

2010 – Present Parkwyn Village representative, Asylum Lake Preserve Policy and Management Council

2000-2003 City of Kalamazoo Environmental Concerns Committee

Professional Awards and Recognition

2000 Western Michigan University, Merit Pay, \$500.

1999, 2000 Western Michigan University Research Development Award

1998 National Aeronautics and Space Administration/American Society for Engineering Education Summer Faculty Fellowship—Marshall Space Flight Center, \$12,000.

1997 National Aeronautics and Space Administration/American Society for Engineering Education Summer Faculty Fellowship—Marshall Space Flight Center, \$11,000.