Giorgos Mountrakis, Ph.D.

Curriculum Vitae

Assistant Professor of GIS/Remote Sensing
Director, Intelligent Geocomputing Laboratory
Department of Environmental Resources Engineering
State University of New York College of Environmental Science and Forestry
419 Baker Hall, 1 Forestry Dr, Syracuse, NY 13210
(315) 470-4824 , gm@esf.edu

CV Highlights

- Ph.D. from the University of Maine in Spatial Information Engineering and Science (2004).
- Founder and Director of the Intelligent Geocomputing Laboratory at SUNY-ESF.
- Expertise include environmental monitoring using remote sensing methods (e.g. impervious surface/forest detection using satellite image analysis), environmental modeling using geographic methods (e.g. national forest consolidation dynamics, urban growth prediction models), and environmental decision systems (e.g. optimal location of animal-vehicle collision structures, population stresses on forests).
- Successful at securing extramural competitive grants from NASA, NSF, USDA Forest Service and Syracuse Center of Excellence. He has been the lead PI for approximately $1.4M in research funds, through individual and collaborative grants ($1.7M including Co-PI status).
- Published in numerous journals and books and has presented his work in various national and international conferences.
- Recipient of several awards in recognition of his academic and research achievements including an award from NASA's prestigious New Investigator Program (2008) and a Postdoctoral Fellowship from the National Academy of Sciences (2004).
- Innovative teaching through student-engaging activities (e.g. incorporating inquiry-based learning); courses include Digital Image Analysis, Spatial Statistics, Remote Sensing and Artificial Intelligence in Geography.
- Notable service activities include his guest editorship in the October 2008 Special Issue on "Artificial Intelligence in Remote Sensing" for the Photogrammetric Eng. & Remote Sensing Journal, his participation on a NASA review panel and his involvement in a United Nations FAO Thematic Study on Trees Outside the Forest.

Curriculum Vitae

Education

PostDoctoral (2004-2005) United States Geological Survey, Fort Collins, CO

Research topic: *Synergetic Use of Satellite Imagery and Ancillary Data for Impervious Surface Estimation in the contiguous US.*

Ph.D. (2004) Department of Spatial Information Science and Engineering, University of Maine, Orono, ME

Dissertation topic: *Similarity Learning in Geospatial Environments using a Neuro-Fuzzy System.*

M.Sc. (2000) Department of Spatial Information Science and Engineering, University of Maine, Orono, ME

Master Thesis topic: *Image-Based Change Detection Using an Integrated Spatiotemporal Gazetteer.*

Dipl. Eng. (1998) Surveying Engineering, National Technical University of Athens, Greece

Diploma Thesis topic: *Determination and Correction of Radial Distortion in Super-wide Angle Lenses of Non-metric Cameras.*

Employment

Assistant Professor (2005-current)

State University of New York College of Environmental Science and Forestry, Syracuse, NY

National Academy of Sciences Postdoctoral Fellow (2004-2005)

U.S. Geological Survey, Fort Collins, CO

National Academies of Science funded project on *"Synergetic Use of Satellite Imagery and Ancillary Data for Impervious Surface Estimation in the contiguous US".*

Research Assistant (1998-2004)

National Center for Geographic Information Analysis (NCGIA), University of Maine, Orono, ME

National Science Foundation funded project on *"Enabling the Creation and Use of GeoGrids for Next Generation Geospatial Information".* NSF Division of Information and Intelligent Systems (2001-2004).

National Imagery and Mapping Agency funded project on *"A Spatio-Temporal Model for Integrated Information Management"* (1998-2001).

Teaching Assistant (2002)

Department of Spatial Information Science and Engineering, University of Maine, Orono, ME

Assisted with an advanced level course on Digital Image Processing.

GIS Database Engineer (1998)

Kotouzas Co., Athens, Greece

Acted as a consultant on database issues focusing on the Greek Cadastre.

Awards

Global Land Project Conference (2010) Tempe, AZ

Travel award to present work (original funding source was NSF and NASA)

NASA New Investigator Program (2008) Syracuse, NY

Prestigious research/education award from NASA's earth science division

National Academies of Science, National Research Council (2004) Fort Collins, CO

Postdoctoral Award based on a national competition to perform research in one of their accredited agencies

Graduate Researcher Award (2004) Orono, ME

University of Maine Graduate Student Award

SPIE Travel Award (2000) Orlando, FL

Travel award by conference organizers to present research paper

University Consortium for GIS Poster Presentation Award (2000) Portland, OR

Poster presentation award by conference organizers

University Consortium for GIS Travel Award (2000) Portland, OR

Travel award by conference organizers to present research paper

Scholarship Award by the Evgenidion Foundation (1998) Athens, Greece

Competitive scholarship to study in the USA

Outstanding Thesis Award by the National Technical Chamber of Greece (1998) Athens, Greece

Diploma thesis received 2nd place award (among approx. 100 candidates) in Thesis of the Year Competition in the Spatial Information field

Teaching Experience

Academic Year → ↓ Course	2005-2006[1]	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	Audience
Principles of Remote Sensing[2] (4cr)		x	x	x	x	x	Mostly UG
Spatial Analysis (3cr)		x	x	x	x	x	UG[3]/ G
Digital Image Analysis (3cr)	x			x	x	x	UG[3]/ G
Artificial Intelligence in Geography (1cr)			x				Only G
Taught a week-long graduate level course in the Mediterranean Agronomic Institute of Chania, Greece					x		Only G
One lecture per semester was also provided in the undergraduate and graduate orientation seminars for all years.							

Notes: UG = Undergraduate, *G* = Graduate, [1]: Joined ESF in Oct/2005, [2]: Also offered at the graduate level as a shared resource course, [3]: Senior undergraduate elective.

Patents

G. Mountrakis (Inventor). A novel multi-scale radial basis function neural network. Full patent (#7,577,626) issued on August 18, 2009 by the United States Patent and Trademark Office.

Research grants

- **"Using LIDAR to assess the roles of climate and land-cover dynamics as drivers of change in biodiversity"**
  National Aeronautics and Space Administration, Biodiversity Program
  Role: Lead PI (Co-PIs: Bill Porter, Colin Beier, Lianjun Zhang, Ben Zuckerberg, and Brian Blair) , Amount: $809,682 , Duration: 2009-2012

- **"Satellite-derived anthropogenic land use/land cover changes: Integrating detection, modeling and educational approaches"**
  National Aeronautics and Space Administration, New Investigator Program
  Role: Sole PI , Amount: $359,341 , Duration: 2008-2012

- **"Establishing a Novel Forest Assessment Method: The Forestless Volume Indicator"**
  USDA – Forest Service, National Urban and Community Forestry Advisory Council
  Role: Sole PI , Amount: $59,954, Duration: 2008-2010

- **"Bridging the temporal mismatch between remotely-sensed land use changes and field-based water quality/quantity observations"**
  Syracuse Center of Excellence, Collaborative Activities for Research and Technology Innovation
  Role: Lead PI (Co-PIs: Karin Limburg , Myrna Hall and Bongghi Hong), Amount: $100,000 , Duration: 2008-2009

- "**Incorporating Spatially-Explicit Uncertainty Metrics in Image-Derived Classification of Impervious Surfaces**"
  National Science Foundation, Geography and Regional Science Program
  Role: Sole PI , Amount: $50,000 , Duration: 2007-2008

- **"An Integrated Monitoring/Modeling Framework for Assessing Human-Nature Interactions in Urbanizing Watersheds: Wappinger and Onondaga Creek Watersheds"**
  Syracuse Center of Excellence, Collaborative Activities for Research and Technology Innovation
  Role: Co-PI with Karin Limburg (Lead PI), Myrna Hall, Bongghi Hong and Peter Groffman
  Amount: $300,000 , Duration: 2006-2008

- **"Monitoring Human-Induced Land Use Changes along the Great Lakes"**
  Great Lakes Research Consortium
  Role: Sole PI , Amount: $10,000 , Duration: 2006-2007

- **"Synergetic Use of Satellite Imagery and Ancillary Data for Impervious Surface Estimation in the contiguous US"**
  National Academy of Sciences and US Geological Survey
  Role: Sole PI , Amount: app. $80,000 , Duration: 2004-2005 [Note: This grant was awarded and completed before joining ESF]

Publications

Note:⁺ identifies current or former advisees.

Book Chapters

G. Mountrakis (2009). Geographic Data Mining: An Introduction. Invited chapter in the ASPRS Manual of Geographic Information Systems. M. Madden (ed.), Chapter 27, pp. 495-508.

R. Watts, **G. Mountrakis** (2009). Transportation Spatial Indicators: Relating the Transportation Network to the Land. Invited chapter in the ASPRS Manual of Geographic Information Systems. M. Madden (ed.), Chapter 34, pp. 659-676.

G. Mountrakis, P. Agouris, A. Stefanidis (2004). Similarity Learning in GIS: An Overview of Definitions, Prerequisites and Challenges. M. Vassilakopoulos, A. Papadopoulos and Y. Manolopoulos (eds.) Spatial Databases: Technologies, Techniques and Trends, Idea Group Co, pp. 294-321.

Journal Papers (fully refereed)

L. Luo⁺, **G. Mountrakis** (in press). Converting local imperviousness information into knowledge through a multi-step partial classification process. ISPRS Journal of Photogrammetry and Remote Sensing.

B. Hong, K.E. Limburg, M.H. Hall, **G. Mountrakis**, P.M. Groffman, K. Hyde, L. Luo⁺, V.R. Kelly, S.J. Myers (accepted, pending minor revisions). An integrated monitoring/modeling framework for assessing human-nature interactions in urbanizing watersheds: Wappinger and Onondaga Creek watersheds, New York, USA. Environmental Modelling and Software.

G. Mountrakis, L. Luo⁺ (in press). Enhancing and replacing spectral information with intermediate structural inputs: A case study on impervious surface detection. Remote Sensing of Environment.

L. Luo⁺, **G. Mountrakis** (in press). A multi-process model of adaptable complexity for impervious surface detection. International Journal of Remote Sensing.

B. Gong, J. Im, **G. Mountrakis** (in press). An artificial immune network approach to multi-sensor land use/land cover classification, Remote Sensing of Environment.

G. Mountrakis, J. Im, C. Ogole⁺, (2011). Support Vector Machines in remote sensing: A review, ISPRS Journal of Photogrammetry and Remote Sensing, 66(3):247-259.

K. Gunson⁺, **G. Mountrakis**, L. Quackenbush (2011). Spatial wildlife-vehicle collision models: A review of current work and their application to transportation mitigation projects. Journal of Environmental Management, 92(4):1074-1082.

J. Wang⁺, **G. Mountrakis** (2011). Developing a multi-network urbanization (MuNU) model: A case study of urban growth in Denver, Colorado. International Journal of Geographical Information Science.

L. Luo⁺, **G. Mountrakis** (2010). Integrating intermediate inputs from partially classified images within a hybrid classification framework: An impervious surface estimation example. Remote Sensing of Environment, 114(6):1220-1229.

G. Mountrakis, K. Gunson⁺ (2009). Multi-scale spatiotemporal analyses of moose-vehicle collisions: A case study in northern Vermont. International Journal of Geographical Information Science, 23(11):1389-1412.

G. Mountrakis, R. Watts, L. Luo⁺, J. Wang⁺ (2009). Developing Collaborative Classifiers using an Expert-based Model. Photogrammetric Engineering and Remote Sensing, 75(7):831-844.

G. Mountrakis, P. Agouris, A. Stefanidis, (2005). Adaptable User Profiles for Intelligent Geospatial Queries. Transactions in GIS, Vol. 9, No. 4, pp. 561-583.

G. Mountrakis, P. Agouris, I. Schlaisich, A. Stefanidis, (2004). Supporting Quality-Based Image Retrieval Through User Preference Learning. Photogrammetric Engineering and Remote Sensing, Vol. 70, No. 8, pp. 973-981.

P. Agouris, K. Beard, **G. Mountrakis**, A. Stefanidis, (2000). Capturing and Modeling Geographic Object Change: A Spatio-Temporal Gazetteer Framework. Photogrammetric Engineering and Remote Sensing, Vol. 66, No. 10, pp. 1224-1250.

Journal Papers (not refereed)

G. Mountrakis, A. Stefanidis (2008). Foreword for Special Issue: Artificial Intelligence in Remote Sensing. Photogrammetric Engineering and Remote Sensing, 74(10):1199.

G. Mountrakis (2008). Next generation classifiers: Focusing on integration frameworks. Highlight article for Photogrammetric Engineering and Remote Sensing, 74(10):1178-1180.

Fully Refereed Conference Papers

A. Stefanidis, C. Georgiadis, P. Agouris, **G. Mountrakis**, (2005). Suitability Assessment of Ground Level Imagery for Geospatial VR Modeling. International Archives of Photogrammetry and Remote Sensing - 3D Virtual Reconstruction and Visualization Conference, Venice, Italy.

G. Mountrakis, P. Agouris, A. Stefanidis, (2003). Multitemporal Geospatial Query Grouping using Correlation Signatures. IEEE International Conference on Image Processing (ICIP) 2003, Vol. 3, pp. 545'548, Barcelona, Spain.

G. Mountrakis, P. Agouris, (2003). Learning Similarity with Fuzzy Functions of Adaptable Complexity. 8th International Symposium on Spatial and Temporal Databases (2003), Lecture Notes in Computer Science, Vol. 2750, pp. 412-429, Santorini, Greece.

G. Mountrakis, P. Agouris, A. Stefanidis, (2002). A Differential Spatiotemporal Model: Primitives and Operators. Advances in Spatial Data Handling, pp. 255-268, Ottawa, Canada.

G. Mountrakis, P. Agouris, A. Stefanidis, (2000). Navigating Through Hierarchical Change Propagation in Spatiotemporal Queries. Time 2000 Workshop, IEEE Press, pp. 123-131, Cape Breton, NS, Canada.

Presentations

Mountrakis, G. (2010, Oral, Invited). Trees Outside Forest Assessment in the U.S., United Nations Food and Agriculture Organization , FRA 2010 Thematic Study on Trees outside Forest, Rome, Italy.

Mountrakis, G. (2010, Oral, Invited). Forest consolidation dynamics in the contiguous United States of the 1990s, Global Land Project Open Science Meeting, Tempe, AZ.

Mountrakis, G. (2010, Oral). ESF goes to Space, Celebration of GIS day on ESF's campus, Syracuse, NY.

Yang+ S. and Mountrakis, G. (2010, Oral). Assessing forest changes in the U.S., Association of American Geographers Conference, Washington, DC.

Luo+ L. and Mountrakis, G. (2010, Oral). Incorporating intermediate results in remote sensing classifiers, Association of American Geographers Conference, Washington, DC.

Zhuang+ W. and Mountrakis, G. (2010, Oral). Evaluation of A Novel Multi-scale Radial Basis Function Networks for Impervious Surface Classification, Association of American Geographers Conference, Washington, DC.

Xi+ B. and Mountrakis, G. (2010, Oral). Developing confidence metrics for remote sensing classification, Association of American Geographers Conference, Washington, DC.

Triantakonstantis+, D. and Mountrakis, G. (2010, Oral). An expert-based urban growth model, capturing the spatial heterogeneity, Association of American Geographers Conference, Washington, DC.

Jin+, H. and Mountrakis, G. (2010, Oral). Super-resolution reconstruction using indicator variograms and local spatial structure, Association of American Geographers Conference, Washington, DC.

Mountrakis, G. and Yang+, S. (2010, Oral). A decadal spatial analysis of nationwide forest change NYS Geographic Information Systems Conference, Lake Placid, NY.

Mountrakis, G. (2010, Poster). Integration of urban growth models in urbanization monitoring, NASA Land Cover Land Use Change Science Meeting, Washington, DC.

Mountrakis, G., Porter, B., Beier, C., Zuckerberg B., Zhang, L., and Blair, B. (2010, Oral). Using LIDAR to assess the roles of climate and land-cover dynamics in biodiversity changes, NASA Biodiversity Science Meeting, Washington, DC.

Gunson+, K., and Mountrakis, G. (2010, Oral). Spatial wildlife-vehicle collision models: A review of current work and recommendation for their application to transportation mitigation projects, 2010 IENE International Conference on Ecology and Transportation: Improving connections in a changing environment, Velence, Hungary.

Jin+, H. and Mountrakis, G. (2010, Poster). Super-resolution reconstruction using indicator variograms and local spatial structure, SUNY ESF Spotlight, Syracuse NY.

Luo+, L. and Mountrakis, G. (2010, Poster). Incorporating intermediate results in remote sensing classifiers, SUNY ESF Spotlight, Syracuse NY.

Yang+, S. and Mountrakis, G. (2010, Poster). Assessing forest changes in the U.S., SUNY ESF spotlight, Syracuse, NY.

Zhuang+, W. and Mountrakis, G. (2010, Poster). Evaluating a novel multi-scale radial basis function network in image classification, SUNY ESF Spotlight, Syracuse, NY.

Xi+ B. and Mountrakis, G. (2010, Poster). Developing confidence metrics for remote sensing classification, SUNY ESF Spotlight, Syracuse, NY.

Mountrakis, G., Porter, B., Beier, C., Zuckerberg B., Zhang, L., and Blair, B.(2009, Poster). Using LIDAR to assess the roles of climate and land-cover dynamics as drivers of change in biodiversity, NASA Biodiversity Meeting, New York, NY.

Mountrakis, G., Porter, B., Beier, C., Zuckerberg B., Zhang, L., and Blair, B. (2009, Poster). Using LIDAR to assess the roles of climate and land-cover dynamics as drivers of change in biodiversity, 8th Annual CNY ASPRS New York State Remote Sensing Symposium, Syracuse, NY.

Luo+, L. and Mountrakis, G. (2009, Poster). Impervious surface area detection in the Onondaga Creek watershed using satellite imagery, SUNY ESF Spotlight, Syracuse NY.

Luo+, L. and Mountrakis, G. (2009, Poster). Impervious surface area detection in the Onondaga creek watershed using satellite imagery, 8th Annual CNY ASPRS New York State Remote Sensing Symposium Syracuse, NY.

Gunson+, K., and Mountrakis, G., (2009, Oral). Tools used to identify spatial and temporal patterns of wildlife-vehicle collisions along roads and their application for mitigation planning, 19th Canadian Multidisciplinary Road Safety Conference, Saskatoon, Saskatchewan, Canada.

Luo+, L. and Mountrakis, G. (2009, Oral). Using an Expert-based system for satellite-derived change detection of impervious surfaces in central New York, Association of American Geographers Conference, Las Vegas, NV.

Luo+, L. and Mountrakis, G. (2009, Poster). Great Lakes goes to Albany. Presentation to legislature on urbanization changes, Albany, NY.

Luo+, L. and Mountrakis, G. (2008, Poster). Impervious surface area detection in the Onondaga creek watershed using satellite imagery, 8th Annual Symposium on Environmental & Energy Systems Syracuse, NY.

Luo+, L. and Mountrakis, G. (2008, Oral). Satellite-derived impervious surface detection with spatially-explicit uncertainty metrics, NYS Geographic Information Systems Conference, Syracuse, NY.

Gunson+, K., and Mountrakis, G. (2008, Oral). Multi-scale spatiotemporal analyses of moose-vehicle collisions: A case study in northern Vermont, Northeastern Transportation and Wildlife Conference, Meredith, NH.

Luo+, L. and Mountrakis, G. (2008, Oral). Satellite-derived impervious surface detection with spatially-explicit uncertainty metrics, Association of American Geographers Conference, Boston, MA.

Mountrakis, G. and Gunson+, K. (2008, Oral). Spatiotemporal analyses of moose-vehicle collisions in Vermont, Association of American Geographers Conference, Boston, MA.

Wang+, J. and Mountrakis, G. (2008, Oral). Modeling land use changes in Colorado over a 60-year period, Association of American Geographers Conference, Boston, MA.

Gunson+, K., and Mountrakis, G. (2007, Oral). Paving the road towards the future: developing valid spatial models to predict wildlife-vehicle collision locations, Toronto Zoo Ecopassages Forum, Toronto, Ontario, Canada.

Luo+, L. and Mountrakis, G. (2007, Oral). A novel approach for impervious surface detection using satellite imagery, Great Lakes Research Consortium, Syracuse NY.

Mountrakis, G. (2007, Oral). Moving Towards Collaborative Remote Sensing Analyses: An Impervious Surface Detection Paradigm, Association of American Geographers Conference, San Francisco, CA.

Limburg, K., Groffman, P., Myrna, H., Hong, G., Mountrakis, G., Hyde, K., Luo+, L., (2006, Poster). An Integrated Monitoring/Modeling Framework for Assessing Human-Nature Interactions in Urbanizing Watersheds: Onondaga and Wappinger Creeks, 6th Annual Symposium on Environmental & Energy Systems Syracuse, NY.

Note: Presenter is listed first, + denotes current or former advisee.

Service

Major activities within ESF

Director, Intelligent Geocomputing Laboratory, (2008-now).

Member, Committee on Research (2009-now).

Member, Council for Geospatial Modeling and Analysis (2005-now).

Member, Empire Search Committee (2010).

Member, Three Departmental Faculty Search Committees (2007-2008).

Assisted with NY State Fair Booth presence (2007-now) and preparation (2010, provided poster).

Assessing annually ABET's learning outcome b (an ability to design and conduct experiments, as well as to analyze and interpret data) in the Principles of Remote Sensing course (2007 - now).

Steering Committee Member for PhD (3 ERE, 3 NRFM) and MSc (2 ERE, 1 EFB).

Major Advisor for two graduated MSc and one graduated PhD student, current advisor for 2 MSc and 2 PhD students.

Chairing PhD Candidacy Exams when requested by Graduate Office (1~2 per year).

ERE Geospatial Area of Study, website development (2008-now).

Major activities outside ESF

Only U.S. academic to participate in the United Nations Food and Agriculture Organization , FRA 2010 Thematic Study on Trees outside Forest (attended Workshop in June 2010 in Rome, Italy and now member of the reviewing committee).

Guest Editor for a Special Issue on "Artificial Intelligence in Remote Sensing" for the Photogrammetric Engineering & Remote Sensing Journal.

Team Leader for Reviewing material for the Association of American Geographers, "Enhancing Departments and Graduate Education (EDGE) in Geography", a project to study the process of professional development in graduate geography.

Reviewer and Panel member for NASA.

Reviewer for NSF.

Reviewer for the following journals: ISPRS Journal of Photogrammetry and Remote Sensing, Landscape and Urban Planning Journal, International Journal of Geographical Information Science, Geocarto, Photogrammetric Engineering & Remote Sensing Journal.

Workshop participant by invitation for the Mellon Interface of Humanities with Science and Technology workshop organized by Syracuse University (2007).

Assistance to the Fayetteville-Manlius High School Science Olympiad Team (2010).