LAURA G. TATEOSIAN

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RESEARCH INTERESTS AND PROJECTS

- Eye-tracking for map and visualization design
- Visualization of terrain geomorphology
- Geospatial visualization
- Human visual perception and aesthetics

EDUCATION

Ph.D. in Computer Science, North Carolina State University, 2006, GPA: 4.0
Thesis: Investigating aesthetic visualizations: Propose new visualization techniques to engage viewer attention. Employ nonphotorealistic rendering techniques to visualize large multi-variariate datasets. Approaches are based on psychophysical models of perception and aesthetics.

M.S. in Computer Science, North Carolina State University, 2002, GPA: 4.0
M.S. in Mathematics, University of Oklahoma, 1997, GPA: 4.0
B.A. in Mathematics, Towson University, 1992, GPA: 3.5

SPONSORED RESEARCH GRANTS

Tateosian, L., Mitasova, H., and Overton, M., 2011. Renaissance Computing Institute (RENCI) at NC State. "Visualization of Terrain Evolution: from Animations to Space-Time Cube" ($12,000)

Devine, H., **Tateosian, L.**, and Mitasova, H., 2010-2011. NC Department of Environment and Natural Resources, Division of Forestry Resources. "Virtual Forest Management Plan - Landowner Boundary Collection Application" ($38,700).

Devine, H., **Tateosian, L.**, and Mitasova, H., 2010-2011. NC Department of Environment and Natural Resources, Division of Environmental Health. "FDA Innovative Food Defense Project - Environmental Health Web-Based GIS Mapping System" ($56,566).

PUBLICATIONS

Peer Reviewed Journal Articles

1. **Tateosian, L.**, Mitasova, H., Thakur, S., Hardin, E., Russ, E., and Blundell, B. (2013) "Visualizations of Coastal Terrain Time-series." *Information Visualization*. To appear.
2. Thakur, S., **Tateosian, L.**, Mitasova, H., Hardin, E., and Overton, M. (2013)."Summary Visualizations for Coastal Spatial-Temporal Dynamics." *International Journal for Uncertainty Quantification*, Vol. 3, No. 3, pp.241-253, 2013.
3. **Tateosian, L.**, Supak, S., Luo, H., Fang, K., Harrell, J., Harrelson, C., Bailey, A., and Devine, H. (2012). "Who's Watching Your Food? A Flexible Framework for Public Health Monitoring." *Transactions in GIS*, Vol. 16, No. 2, pp. 89-104, 2012.
4. **Tateosian, L.**, Mitasova, H., Harmon, B. A., Fogleman, B., Weaver, K. and Harmon, R.S. (2010). "TanGeoMS: A Tangible Geospatial Modeling system." *IEEE Transactions on Visualization and*

Computer Graphics (Proceedings IEEE Visualization 2010, Salt Lake City, Utah, Oct. 24-29, 2010) Vol. 16, No. 6, pp. 1605-1612, Nov.-Dec. 2010.

5. Healey, C. G., Enns, J. T., **Tateosian, L.**, and Remple, M. (2004). "Perceptually-Based Brush Strokes for Nonphotorealistic Visualization." *ACM Transactions on Graphics* Vol. 23, No. 1, 6496, 2004.

Peer Reviewed Conference Articles

1. **Tateosian, L.**, Healey, C. G., and Enns, J. T. (2007). "Engaging Viewers Through Nonphotorealistic Visualizations." *In Proceedings of the 5th international Symposium on Non-Photorealistic Animation and Rendering* (San Diego, California, Aug. 04-05, 2007). NPAR '07. ACM, New York, NY, 93-102.
2. **Tateosian, L.**, Dennis, B. M., and Healey, C.G. (2006). "Stevens Dot Patterns for 2D Flow Visualization." *In Third International Symposium on Applied Perception in Graphics and Visualization*, (Boston, Massachusetts, Jul. 28-29, 2006). APGV '06, vol. 153. ACM Press, New York, NY, 93-100.
3. Dennis, B. M., Kocherlakota, S. M., Sawant, A. P., **Tateosian, L.**, and Healey, C. G. (2005). "Designing a Visualization Framework for Multidimensional Data." *IEEE Computer Graphics & Applications (Visualization Viewpoints)*, 25, 6, 10-15, 2005.

Peer Reviewed Posters

1. Kanters, M., Bocarro, J., Edwards, M., **Tateosian, L.**, Hodge, C., McKenzie, T., and Floyd, M. (2013) "Neighborhood Income and Shared Use of School Physical Activity Facilities: Place Disparities Limit Participation in Afterschool Programs." Poster, presented at *Active Living Research Conference*, Feb. 26-28 2013.
2. **Tateosian, L.**, Thakur, S., Hardin, E., Mitasova, H., and Overton, M. (2011). "Visualizing Coastal Spatial-Temporal Dynamics." Poster, presented at *IEEE Information Visualization Conference*, Oct. 23-28, 2011.
3. Hagh-Shenas, H., Kim, S., **Tateosian, L.**, and Healey, C. G. (2009). "Multivariate Visualization of Continuous Datasets, a User Study." Poster, presented at *IEEE Information Visualization Conference*, Oct. 11-15, 2009.

Other non-peer Reviewed Publications

1. Rouse, S., Bhosle, R., and **Tateosian, L.**, "Eye Tracking & ArcGIS: We can read your mind." Poster and digital application, presented at *North Carolina Geograph Information Science Conference*, Raleigh, NC, Feb. 7-8, 2013.
2. Thakur, S., **Tateosian, L.**, Mitasova, H. and Hardin, E., "Visualizing Coastal Tourism and Landscape Change.", workshop on *Visualization Technologies to Support Research on Human-Environment Interactions*, organized by National Socio-Environmental Synthesis Center (SESYNC) Annapolis, Maryland, Jul. 23-24, 2012.
3. Weaver, K., di Leo, M., Mitasova, H., and **Tateosian, L.**, "Exploring Topographic Change Impacts with a Tangible Geospatial Modeling System." Poster, presented at *41st Annual Binghamton Geomorphology Symposium*, Columbia, SC, Oct. 15-17, 2010.

Technical and Professional Reports

1. **Tateosian, L.**, Luo, H., Supak S., and Fang H. "NCDENR Open Source Web Map: A database management, analysis, and mapping application." (2011, August). North Carolina Department of Natural Resources, Raleigh Office.
2. **Tateosian, L.** and Healey, C. G. "NPR: Art Enhancing Computer Graphics." Technical Report TR-2004-17, Department of Computer Science, North Carolina State University, 2004.

Dissertation

Tateosian, L., "Investigating Aesthetic Visualizations." Doctoral Dissertation, Department of Computer Science, North Carolina State University, 2006.

Master's Thesis

Tateosian, L. "Non-photorealistic visualization of multidimensional datasets." Master's Thesis, Department of Computer Science, North Carolina State University, 2002.

Professional Meeting Presentations

1. Thakur, S., **Tateosian, L.**, Hardin, E., Mitasova, H., and Overton, M. "Summary Visualizations for Coastal Spatial-Temporal Dynamics." Short paper presented at IEEE Working with Uncertainty Workshop at the IEEE 2011 Visualization Conference, Providence, Rhode Island, October 24, 2011.
2. **Tateosian, L.**, Mitasova, H., Harmon, B. A., Fogleman, B., Weaver, K. and Harmon, R.S. "TanGeoMS: A Tangible geospatial modeling system." Paper presented at the IEEE 2010 Visualization Conference, Salt Lake City, Utah, October 2010.
3. **Tateosian, L.**, Healey, C. G., and Enns, J. T. "Engaging Viewers Through Nonphotorealistic Visualizations." Paper presented at the 5th International Symposium on Non-Photorealistic Animation and Rendering co-located with SIGGRAPH, San Diego, California, August 2007.

Honors and Awards

Best Digital Application Award for "Eye Tracking & ArcGIS: We can read your mind.", *North Carolina Geograph Information Science Conference*, Feb. 2013. Dean's Fellowship, Department of Computer Science, North Carolina State University, Fall 2000 - Spring 2001.

Awarded out of state fee waivers for outstanding academic conduct, University of Oklahoma, Fall 1996 - Spring 1997.

Joyce C. Neubert Award for Excellence in Mathematics, Mathematics Department, Towson University, Spring 1992.

PROFESSIONAL APPOINTMENTS

Research Assistant Professor

December 2010 - present — Center for Earth Observation, North Carolina State University, NC

The Center for Earth Observation is a research and teaching group that explores geospatial data management and visualization issues. My role includes:

- Developing and teaching GIS Programming Fundamentals and Principles of Geospatial Information Science courses.
- Guiding student research in the NCSU Geospatial Visualization Laboratory on tracking eye movements for cognitive map design.
- Visualizing terrain evolution with a space-time cube technique.
- Investigating the use of interactive open-source web mapping for applications in natural resources management.
- Academic advising for over 35 students.
- Serving on masters and Ph.D. research committees.

Research Associate

June 2008 - December 2010 — Center for Earth Observation, North Carolina State University, NC

Investigating GIS visualization and data management problems in collaboration with subject experts in applications such as geomorphology, forestry, fire management, national heritage site inventory, and natural resources monitoring:

- Modeling and visualizing terrain data with a tangible user interface. Testing the system by modeling storm surge in the Outer Banks, NC and erosion control at Ft. Bragg for the US Army Research Office.
- Developing and teaching a new core course, Principles of Geographic Information Science, covering mathematical and algorithmic underpinnings of GIS.
- Implementing a system for enhancing consistency across metadata files for remote sensing data collected by U.S. National Park Service departments.
- Designing a system to process and visualize fuels data (e.g., woody debris) for the Shenandoah National Park Fire Management Office to analyze wildfire risks.
- Building an application to convert kmz files to a GIS compatible format to enable geospatial analysis of the National Register of Historic Places for the U.S. National Park Service.

Postdoctoral Research Associate

January 2007 - June 2008 — Center for Earth Observation, North Carolina State University, NC

Teaching and development projects for GIS related topics:

- Designing and implementing custom interactive mapping applications for conducting geospatial processing on United States North East Regional Parks map data.
- Developing and teaching a new course for NCSU's Master's in GIST degree - GIS Programming Fundamentals, using Python and VBA.

Mathematics Instructor

Spring 1999 - Summer 2000 — Department of Math and Computer Science, Shippensburg University, PA

MAT 108 College Algebra
MAT 100 Introductory Algebra
MAT 60 Algebra

Full-time faculty member for three semesters. Taught four sections (˜120 students) each semester and summer mathematics courses for at risk students. Participated in conferences and faculty meetings.

TEACHING AND MENTORING EXPERIENCE

Courses developed

GIS Programming Fundamentals (NCSU, GIS 540)

This course explains principles, syntax, and language elements associated with creating and running computer programming scripts. Python scripting is used to efficiently run ArcGIS tools, read text files of data and ArcGIS attribute tables, interact with map elements, manipulate batches of GIS data, and create basic user interfaces. Assignments are preformed in Python, ArcGIS, and PythonWin. Teaching techniques incorporate hands-on learning in a stimulating, interactive classroom environment. Students completing this course will be armed to streamline GIS work-flow and build reusable applications.

Principles of Geographic Information Science (NCSU, GIS 530)
This course focuses on geospatial information systems from a mathematical and information science perspective. We discuss theoretical frameworks for conceptualizing geographic data, including levels of measurement, data control, and the vector data and raster data paradigms. Then we discuss the geometric underpinnings of geospatial systems: representing data with geographic elements, spatial referencing systems, projections. Next, we explore map-related topology and computational geometry concepts. Finally, we survey the algorithms for core spatial manipulations, such as interpolation and polygon operations.

Courses Taught

GIS 540 GIS Programming Fundamentals
GIS 530 Principles of Geographic Information Science
NR 536 Introduction to Visual Basic for GIS
NR 533 Application Issues In Geographic Information Systems
MATH 1473 Math for Critical Thinking
MAT 108 College Algebra
MAT 100 Introductory Algebra
MAT 60 Algebra
MAT 60 Essential Mathematics
MAT 90 Intermediate Algebra
CSC 554 Human Computer Interaction (teaching assistant)
CSC 431 File Processing and Organization (teaching assistant)
CSC 462/562 Computer Graphics (teaching assistant)
CSC/MA 565 Graph Theory (teaching assistant)
MATH 1823 Calculus and Analytic Geometry I (teaching assistant)

Mentoring Activities

Informally advising two Masters students at NC State on eye-tracking analysis for cognitive map design. The advising has resulted in an North Carolina Geospatial Information & Technology Association Student Scholarship Award for $1000 and the 2013 NC GIS Best Electronic Submission Award.

Supervised two Ph.D. student and a Postdoc at NC State in developing open-source web mapping applications for the North Carolina Department of Natural Resources.

GRADUATE COURSE WORK

Computer Science

Operating Systems, Design and Analysis of Algorithms, Advanced Data Structures, Computer Graphics, Computer Networks, Human Computer Interaction, Database Management Systems, Special Topics in Computer Graphics, E-commerce, Automata, Languages, and Computability Theory

Mathematics

Foundations of Analysis, Topics in Probability, Mathematical Models, Statistical Decision Making, Applied Statistical Methods, Mathematical Models in Biology, Introduction to Analysis I, Graph Theory I & II, Psychological Statistics I, Computational Complexity, Higher Algebra I

PROFESSIONAL DEVELOPMENT

NC State Preparing Future Leaders Seminars, Spring 2008
NC State New Faculty Orientation Workshop on Teaching and Research, August 2007

PROFESSIONAL SERVICE AND AFFILIATION

Reviewer, IEEE Transactions on Graphics and Visualization, 2013
Open Source Geospatial Research and Education Laboratory Faculty since November 2012
NCSU Associate Member, Graduate Faculty since May, 2011
Reviewer, IEEE Visualization Conference, 2010
Reviewer, Eurographics/IEEE Symposium on Visualization, 2008, 2009, 2010
Reviewer, Computer/Human Interaction, 2007
Computer Science Graduate Student Library Representative, 2004 - 2007
ACM Siggraph Member, 2007
IEEE Member, 2005, 2010 NC GIS Conference Session 'VBA - Dead on Arrival' Moderator, 2013

COMMUNITY ACTIVITIES

Kramden Institute Geek-A-Thon volunteer, 2007 and 2008
Service Raleigh, 2006
Founding Member of NCSU's Women in Computer Science, Feb. 8, 2003

REFERENCES

Available upon request.