

Thomas Oommen, Ph.D.

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Education

- **Tufts University** Medford, MA
Ph.D. (Geotechnical and Geoenvironmental Engineering) January 2007 - December 2009
 - Dissertation: “Pattern Recognition and Satellite Remote Sensing for Liquefaction Characterization.”
 - Advisor: Dr. Laurie G. Baise, Associate Professor
- **University of Alaska Fairbanks** Fairbanks, AK
M.S. (Systems Engineering) January 2005 - December 2006
 - Thesis: “Geodatabase Development and Resource Assessment of Platinum Placer Deposits in the Offshore Region of Goodnews Bay, Southwest Alaska.”
 - Advisors: Drs. Debasmitta Misra, Associate Professor & Anupma Prakash, Professor
- **Bangalore University** Bangalore, India
B.E. (Civil Engineering) September 1995 - September 1999
 - First class with distinction

Work Experience

- **Tufts University** Medford, MA
Post-Doctoral Associate January 2010 -
 - Developing strategies for using satellite remote sensing for post-liquefaction characterization
- **Tufts University** Medford, MA
Graduate Student Researcher/Teacher January 2007 - December 2009
 - Assisted in teaching, developed research in the application of pattern recognition and remote sensing for liquefaction studies, written journal articles and research proposals, and presented the work in conferences
- **University of Alaska Fairbanks** Fairbanks, AK
Graduate Student Researcher/Teacher January 2005 - December 2006
 - Assisted in teaching, done research in integrating and interpreting geophysical data for geo-resource estimation of an offshore placer platinum reserve, written journal articles and research proposals, and presented the work in conferences
- **Bharat Susamachar Samiti** Dehradun, India
Director of Infrastructure Development October 2004 - January 2005
 - Directed the university campus planning and construction, coordinated with architects and local government authorities for developing new projects, and executed and supervised building construction projects
- **USAID projects, Shelter for Life International** Kabul, Afghanistan
Project Manager/ Technical Consultant January 2004 - September 2004

- Coordinated the retrofitting of schools and clinics in Kabul damaged from the 2002 earthquake, and developed seismic design codes with locally available construction materials

- **Bharat Susamachar Samiti**

Dehradun, India

- *Project Engineer*

October 1999 - January 2004

- Executed and supervised building construction projects, and developed QA/QC program

Honor Societies

Sigma Xi Scientific Research Society

Awards and Honors

Publication Awards

Northeast Geotechnical Graduate Research Symposium, Second prize in the abstract competition	2009
Association of Environmental & Engineering Geologists Annual Meeting, Platinum corporate sponsor award for outstanding abstract	2008
Northeast Geotechnical Graduate Research Symposium, First prize in the abstract competition	2007
American Geophysical Union Annual meeting, Outstanding student paper award	2005

General Recognition

Marquis Whos Who in America	2009
Littleton Award, Civil and Environmental Engineering, Tufts University	2009
Dean's fellow, College of Engineering, Tufts University	2006 - 2007
Best student award for academics, M.S. Ramaiah Institute of Technology	1999

Invited Lectures

- Invited talk at the 2009 Space Day at Boston Museum of Science, Massachusetts Space Grant Consortium "Post-Liquefaction Characterization from Space" (November, 2009)
- Invited talk at the IEEE Geoscience and Remote Sensing Society, Boston Section "Multisensor and Multispectral Approach in Documenting and Analyzing Liquefaction Hazard using Remote Sensing and Support Vector Data Description" (February, 2009)
- Invited talk at the Machine Learning Group, Department of Computer Science, Tufts University "Application of Remote Sensing & Machine Learning for Liquefaction Susceptibility Mapping" (April 23, 2007)
- Invited talk at the Institute of Marine Science Seminar, University of Alaska Fairbanks Goodnews Bay Platinum Reserve" (November 15, 2006)

Scientific Publications

Journal Articles

1. Misra D., Oommen T., Agarwal A., Mishra S.K., and Thompson A. (2009) Application and analysis of support vector machine based simulation for runoff and sediment yield. *Biosystems Engineering* 103(4): 527-535.
2. Oommen T., Prakash A., Misra D., Kelley J.J., Naidu S., and Bandopadhyay S. (2008). GIS based marine platinum exploration, Goodnews Bay, Southwest Alaska. *Marine Georesources & Geotechnology* 26(1): 1-18.
3. Oommen T., Misra D., Twarakavi N.K.C., Prakash A., Sahoo B., and Bandopadhyay S. (2008). An objective analysis of support vector machine based classification for remote sensing. *Mathematical Geoscience* 40(4): 409-424.
4. Sahoo B., Oommen T., Misra D., and Newby G. (2007). S-Transform as a discrimination tool in classification of hyperspectral images. *Canadian Journal of Remote Sensing* 33(6): 551-560.
5. Misra D., Schatzinger A.R., and Oommen T. (2005). Use of modal and geostatistical analysis of outcrop analog to assess the lateral variability of geohydrological parameters. *World Journal of Engineering* 2(3): 89-103.

Journal Articles In Review

1. Oommen T., Baise L.G., and Vogel R.M. (2009). Objective validation and application of empirical liquefaction models. *Journal of Geotechnical and Geoenvironmental Engineering* (In second round review).
2. Oommen T., and Baise L.G. (2009). Model development and validation for intelligent data collection for lateral spread displacements. *Journal of Computing in Civil Engineering* (In second round review).
3. Oommen T., Baise L.G., and Vogel R.M. (2009). Sampling bias and class imbalance in maximum likelihood logistic regression. *Mathematical Geosciences* (In review).

Journal Articles In Preparation

1. Oommen T., Baise L.G., Gens R., Prakash A., and Gupta R.P. (2010). Multisensor and multispectral approach in documenting and analyzing liquefaction hazard using satellite remote sensing. *Earthquake Spectra*
2. Oommen T., Misra D., and Prakash A. (2010). Multiple regressive pattern recognition technique: An adapted approach for improved georesource estimation. *Computers and Geosciences*

Conference Papers

1. Oommen T., and Baise L.G. (2010). A practical approach for implementing the probability of liquefaction in performance based design. *Fifth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics*.
2. Oommen T., and Baise L.G. (2008). A new approach to liquefaction potential mapping using remote sensing and machine learning. *IEEE International Geoscience & Remote Sensing Symposium* 1(III): 51-54.
3. Oommen T., Misra D., Agarwal A., and Mishra S.K. (2007). Analysis and application of support vector machine based simulation for runoff and sediment yield. *American Society of Agricultural and Biological Engineers*.

Reports

1. Misra D., Heinrichs T.A., Bandopadhyay S., Naidu S. A., and Oommen T., (2008). Web server mapping, reserve definition, and resource assessment of platinum placers in Goodnews Bay region, Alaska, *Technical Report Submitted to Mineral Management Services, U.S. Department of Interior through the Marine Mining Technology Center Arctic Seas Division, University of Alaska Fairbanks, MMS Cooperative Agreement #1435-02-01-CA-85124.*
2. Bandopadhyay S., Misra D., Prakash A., Naidu S.A., Kelley J.J., and Oommen T., (2008). GIS based assessment of platinum placers in Goodnews Bay Region, Alaska, *Technical Report Submitted to Mineral Management Services, U.S. Department of Interior through the Marine Mining Technology Center Arctic Seas Division, University of Alaska Fairbanks, Fairbanks, Alaska, MMS Cooperative Agreement #1435-01-02-CA-85124.*

Abstracts and Conference Presentations

1. Oommen T., and Baise L.G. (2010). A practical approach for implementing the probability of liquefaction in performance based design. *Fifth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics* May 24-29, 2010, San Diego, California.
2. Oommen T., Baise L.G., Gens R., Prakash A., and Gupta R.P. (2009). Documenting liquefaction failures using satellite remote sensing and artificial intelligence algorithms. *Eos Trans. AGU, Fall Meet. Suppl.* Dec 14-18, 2009. San Francisco, California.
3. Misra D., Oommen T., Radatz T., and Thompson A. (2008). Using support vector machines to characterize runoff-triggering in small watersheds. *Eos Trans. AGU, Fall Meet. Suppl.* Dec 14-18, 2009. San Francisco, California.
4. Oommen T., Baise L.G., Gens R., Prakash A., and Gupta R.P. (2008). Multisensor and multispectral approach in documenting and analyzing liquefaction hazard using remote sensing. *Eos Trans. AGU, Fall Meet. Suppl.* Abstract INI13A-1054.
5. Misra D., Oommen T., Prasanna H.G., Bajwa S.G., and Howell T.A. (2008). Estimation of Leaf Area Index from Landsat Imagery for Texas High Plains using Support Vector Machines. *Eos Trans. AGU, Fall Meet. Suppl.* Abstract H31C-0879.
6. Oommen T., Radatz T., Thompson A., and Misra D. (2008). Probability of Triggering Runoff in Small Watersheds Using Support Vector Machines. *Association of Environmental & Engineering Geologists 51st Annual Meeting* September 15-20, New Orleans, LA, USA.
7. Oommen T., and Baise L.G. (2008). A new approach to liquefaction potential mapping using remote sensing and machine learning. *IEEE International Geoscience & Remote Sensing Symposium* 1(III): 51-54.
8. Oommen T., and Baise L.G. (2008). Critical Evaluation of Lateral Spread Displacement Using Support Vector Regression and Stack Generalization. *Seismological Research Letters* 79(2):277.
9. Oommen T., Radatz T., Thompson A., and Misra D. (2008). Developing Runoff-Triggering Characteristics in Small Watersheds Using Artificial Intelligence Models. *American Society of Agricultural and Biological Engineers* June 29- July 2, Providence, RI, USA.
10. Oommen T., and Misra D. (2008). Spatial & Temporal Modeling Using Artificial Intelligence/Pattern Recognition Technique. *Annual Alaska-American Water Resources Association Conference* Jan 28-31, Juneau, AK, USA.

11. Oommen T., and Baise L.G., (2007). A New Approach to Liquefaction Potential Mapping Using Remote Sensing and Machine Learning. *Eos Trans. AGU, Fall Meet. Suppl.* Abstract H41G-0845.
12. Oommen T., and Baise L.G. (2007). A New Approach to Liquefaction Potential Mapping Using Remote Sensing and Machine Learning. *Northeast Geotechnical Graduate Research Symposium* UMass Amherst, MA, USA.
13. Sahoo B., Oommen T., and Misra D. (2007). Using 1D S-Transform as a Discrimination Tool in Classification of Hyperspectral Images. *Association of Environmental & Engineering Geologists 50th Annual Meeting* September 24-29, Los Angeles, CA, USA.
14. Oommen T., and Misra D. (2007). Comparative Analysis of Artificial Neural Networks and Support Vector Machines for Simulation of Runoff and Sediment Yield. *Annual Alaska-American Water Resources Association Conference* April 3-5, Fairbanks, AK, USA.
15. Oommen T., Misra D., Agarwal A., and Mishra S.K. (2007). Analysis and Application of Support Vector Machine Based Simulation for Runoff and Sediment Yield. *American Society of Agricultural and Biological Engineers, Annual Meeting* Minneapolis, MN, USA.
16. Oommen T., Misra D., Prakash A., Bandopadhyay S., Naidu S., and Kelley J.J. (2006) Marine Geodatabase and Multiple Regressive Pattern Recognition Technique: A New Approach to Marine Placer Resource Assessment. *Eos Trans. AGU Fall Meet. Suppl.* Abstract IN14A-05.
17. Sahoo B., Oommen T., Misra D., and Newby G. (2006). Application of 1D S-Transform in Discrimination Problems in Remote Sensing. *Eos Trans. AGU, Fall Meet. Suppl.* Abstract IN11A-1152.
18. Misra D., Oommen T., Agarwal A., and Mishra S.K. (2006). Simulation of Runoff and Sediment Yield Using Support Vector Machines: A Preliminary Analysis. *Eos Trans. Fall Meet. Suppl.* Abstract H31E-1470.
19. Oommen T., Kelley J.J., Naidu S., Prakash A., Misra D., and Bandopadhyay S. (2005). A Preliminary GIS Analysis of Marine Geophysical Signatures to Decipher Distribution Patterns of Platinum Placer in Offshore Goodnews Bay Region, Alaska. *Eos Trans. AGU, Fall Meet. Suppl.* Abstract IN23B-1214.
20. Oommen T., Prakash A., Misra D., Gens R., Bandopadhyay S., Naidu S., and Kelley J.J. (2005). Marine Placer Platinum Prospects Near Goodnews Bay, Alaska: GIS database design and preliminary analysis. *Alaska Geological Society, Geology Symposium* Fairbanks, AK, USA.

Professional Activities

Committee Service

- Program Committee Member, International Symposium on Soil Erosion and Landscape Evolution (ISELE-ASABE), September 18-21st , 20011, Anchorage, Alaska
- Program Committee Member, 11th IEEE International Conference on Information Technology (ICIT), December 17-20th , 2008, India
- Graduate Representative, Emil Usibelli Distinguished Teaching, Research and Service Award committee- 2006, University of Alaska, Fairbanks

Journal Reviews

- International Journal of Remote Sensing
- Water Resources Management
- Journal of Geology and Mining Research
- IEEE Geoscience and Remote Sensing Letters
- Transactions of the ASABE

Conference Reviews

- 9th IEEE International Conference on Information Technology (CIT 2006) December 18th-21st 2006, India

Professional Training

- Completed a workshop in Pedagogy, by the Graduate Institute for Teaching (GIFT) and the Center for the Enhancement of Teaching and Learning (CELT), at Tufts University May 8 - June 11, 2009, Medford, Massachusetts, USA
- Completed a course in Multi-Interdisciplinary Subsurface Integration in Exploration and Production from “Plates to Pores...”, at ExxonMobil March 18-21, 2009, Woodlands, Texas, USA
- Completed a course in Feedforward Neural Networks: Theory & Applications by the IEEE Geoscience & Remote Sensing Society, at the IGARSS July 6-11, 2008, Boston, Massachusetts, USA
- Completed a course in SAR Polarimetry: Basics, Processing Techniques & Applications by the IEEE Geoscience & Remote Sensing Society, at the IGARSS July 6-11, 2008, Boston, Massachusetts, USA
- Completed a course in Introduction to ArcGIS Geostatistical Analyst by the Environmental Systems Research Institute at the Virtual Campus, June 23rd, 2006
- Completed a workshop on Basics of the Geodatabase Data Model by the Environmental Systems Research Institute at the Virtual Campus, October 15th, 2005
- Completed a course in ArcGIS Spatial Analyst by the Environmental Systems Research Institute at the Virtual Campus, October 10th, 2005

<h3>Teaching Experience</h3>

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| • Environmental Statistics
<i>Tufts University</i> | Graduate level
<i>Two invited lectures</i> |
| • Computer Applications in Geotechnical Engineering
<i>Tufts University</i> | Graduate level
<i>Teaching assistant</i> |
| • Foundations Engineering
<i>Tufts University</i> | Graduate level
<i>Teaching assistant</i> |
| • Geohazards Engineering
<i>Tufts University</i> | Undergraduate level
<i>Teaching assistant</i> |
| • Dynamics
<i>University of Alaska Fairbanks</i> | Undergraduate level
<i>Teaching assistant</i> |

Computational Skills

Highlights

- In coordination with the Geographic Information Network of Alaska (GINA) developed an internet map service. This service provides the near shore placer potential for Bering Sea to the public. My role in this included the integration and development of the geodatabase and analysis of the available data layers for resource estimation. Available at:
<http://mms-goodnewsbay.gina.alaska.edu/index.phtml>

Languages

- Proficient in R and Matlab, and experience with C, Perl, VBA, and Fortran

Applications

- ArcGIS, ENVI, Erdas Imagine, AutoCAD, Plaxis, GeoStudio, Winsaf, Winstress, Lpile, Weka, L^AT_EX, and MS Office

Research/Travel Grants Awarded

<i>Agency</i>	U. S. Geological Survey, National Earthquake Hazards Reduction Program (NEHRP)
<i>Title</i>	Application of Satellite Data for Post-Liquefaction Reconnaissance
<i>Amount</i>	\$75,000
<i>Role</i>	Participant, co-author of the proposal with Principle Investigator and established national and international collaborators (University of Alaska Fairbanks, Alaska Satellite Facility, Indian Institute of Technology Roorkee)
<i>Dates</i>	January 2010 – December 2010
<i>Agency</i>	NASA & Massachusetts Space Grant Consortium
<i>Title</i>	Post-Liquefaction Characterization from Space
<i>Amount</i>	\$5,800
<i>Role</i>	Investigator, author of the proposal
<i>Dates</i>	June 2009 – December 2010
<i>Agency</i>	Clarence Berry Fellowship, College of Engineering and Mines, University of Alaska Fairbanks
<i>Title</i>	Modeling the distribution of marine platinum at Goodnews Bay, Alaska by pattern recognition using Synthetic Aperture Radar (SAR) spectral inversion and geochemical data analysis
<i>Amount</i>	\$15,000
<i>Role</i>	Investigator, author of the proposal
<i>Dates</i>	September 2006 – May 2007
<i>Agency</i>	Experimental Program to Stimulate Competitive Research (EPSCoR) Travel grant
<i>Title</i>	Marine Geodatabase and Multiple Regressive Pattern Recognition Technique: A New Approach to Marine Placer Resource Assessment
<i>Amount</i>	\$1,500
<i>Purpose</i>	Present the research at the American Geophysical Union, Annual Meeting
<i>Dates</i>	December 2006

Professional Society Affiliations

- American Society of Civil Engineers (ASCE)
- American Geophysical Union (AGU)
- Seismological Society of America (SSA)
- IEEE Geoscience and Remote Sensing Society
- Association of Environmental & Engineering Geologist (AEG)
- American Society of Agricultural and Biological Engineers (ASABE)