Remote Sensing at Montclair State University

Faculty
Remote Sensing at Montclair State University received a boost with the appointments of Dr. Mark Chopping (Earth and Environmental Studies) and Dr. Stefan Robila (Computer Science) in 2002 and 2003, respectively. Mark Chopping received the M.Phil. in Remote Sensing and Geographical Information Systems from the University of Cambridge in 1995 and the Ph.D. in Remote Sensing from the University of Nottingham in 1998. In 1999 he joined the Agricultural Research Service of the United States Department of Agriculture as Physical Scientist, working on remote sensing of arid rangelands. Stefan Robila received the M.Sc. in Computer Science in 2000 and the Ph.D. in Computer and Information Science from Syracuse University in 2002.

Research
Mark Chopping’s research interests focus on the use of multi-angle data and bidirectional reflectance distribution function models with moderate resolution off-nadir data from space-borne sensors to mapping vegetation canopy structure and type, with a special interest in arid and semi-arid environments. Since 2000 he has been an investigator with the European Space Agency’s program for exploitation of multi-angle data from the Compact High Resolution Imaging Spectrometer flown on the PROBA mission. In 2003 he became a principal investigator in a NASA Earth Observing System project using data from MISR and MODIS. He was also appointed to the NASA MISR Science Team and the NASA Land Cover Land Use Change Science Team. Stefan Robila has research interests in independent component analysis, hyperspectral sensors, new remote sensing applications based on off-the-shelf technologies, distributed processing of remotely sensed data, information hiding in images and change detection.

Courses
ENVR / GEOS 455: Fundamentals of Remote Sensing (Chopping)
ENVR 655: Advanced Remote Sensing of the Environment (Chopping)
GEOS/EUGS 270 and 470: GIS I: Digital Mapping; GIS II (Chopping)
Pattern Recognition -- Graduate level (Robila)

Post-doctoral Researchers & Graduate Students
Dr. Lihong Su, Research Associate: NASA EOS project: Mapping C pools using EOS multi-angle data.
Mr. Victor Onwueme (doctoral student): urban heat island, sediment transport and mapping.
Mr. K.P. Naushad (doctoral student):
Ms. Jennifer Haag (NOAA Fellowship): SeaWIFS, algal blooms, nitrogen deposition over coastal areas.
Ms Jamie Lo (doctoral student): Mapping for the MSU Passaic River Institute.
Mrs. Fatoumata Barry (doctoral student): land cover mapping, GIS.

Remote Sensing Laboratories
Earth and Environmental Studies: http://www.csam.montclair.edu/~chopping/rs/RSLAB.html
Computer Science: http://www.csam.montclair.edu/~robila/RSL/
Montclair State University currently maintains two remote sensing laboratories in the Departments of Earth and Environmental Studies (EAES) and Computer Science (CS). EAES’ lab is equipped with seven powerful Sun workstations, several Dell PCs, plotters, and a high resolution drum scanner. Faculty who use the EAES lab include Dr. Mark Chopping, Dr. Gregory Pope, and Dr. Jordan Feng. Ms. Yoko Sato is our Laboratory Specialist, maintaining hardware/software and liaising with the CSAM IT department. CS’ lab hosts an imaging spectrometer (SOC 700 Camera: Spectral Band: 0.43 to 0.9 microns Number of Bands: 120, 240 or 480 (configurable), Dynamic Range: 12-bit, Line Rate: Up to 100 lines/second (120 bands), Pixels per line: 640, Exposure Time: 10-10^7 microsecond). The Center for Computing and Visualization (CSCaV) in the College of Science and Mathematics provides extremely large storage capabilities, with fast network access. Software includes ERDAS Imagine, Arc/INFO, ENVI, IDL, ArcGIS as well as proprietary packages. Access to field equipment is arranged through links with collaborating institutions (e.g., USDA, ARS).

Dr. Mark Chopping
Dr. Stefan Robila
MARK J. CHOPPING
Assistant Professor, Earth and Environmental Studies, Montclair State University
Tel. (973) 655-7384, E-mail: choppingm@mail.montclair.edu,
Web: http://www.csam.montclair.edu/~chopping

Qualifications

Professional Experience
September 1, 2002 - Present: Assistant Professor, Department of Earth and Environmental Studies, Montclair State University, Montclair, New Jersey 07043.


Research: My research interests focus on the use of multi-angle data and bidirectional reflectance distribution function models with moderate resolution off-nadir data from space-borne sensors to mapping vegetation canopy structure and type, with a special interest in arid and semi-arid environments. In 1999 I joined the Agricultural Research Service of the United States Department of Agriculture as Physical Scientist, working on remote sensing of arid rangelands. Since 2000 I have been an investigator with the European Space Agency’s program for exploitation of multi-angle data from the Compact High Resolution Imaging Spectrometer flown on the PROBA mission. In 2003 I became principal investigator in a NASA EOS project to map vegetation communities and carbon pools in arid environments using data from MISR and MODIS; and a member of the MISR Science Team. I have consulted for various institutions including the UK Forestry Commission and the Center for Applied Remote Sensing in Meteorology, Agriculture and the Environment at New Mexico State University (Las Cruces, NM).

Professional Affiliations
Member of The Remote Sensing & Photogrammetry Society, 1994 –
Member of the IEEE Geoscience and Remote Sensing Society, June 2002 -

Awards

Service
Search Cttee Chair. Undergraduate Advisor for Geography Majors 2003-4, Committees: CSAM/SMUG,EAES/IT;EAES/CSAM Search Cttees., CSAM/CScA.

Professional Activities
Peer reviewer for NASA Code Y (Earth System Science and Land Cover Land Use Change program).
Peer reviewer for National Science Foundation.

Publications


Solecki, W.D., Rosenzweig, C., Pope, G., \textbf{Chopping, M.}, Clark, M., Goldberg, R., Lazar, V., Melendez, B., and Onwueme, V. \textit{(2003)}, Analysis of the current and future heat island effect in the Greater Camden, NJ region and potential mitigation strategies, \textit{Final Draft Report} to the New Jersey Department of Environmental Protection, Division of Science, Research and Technology, contract # SR01-096, March 2003, 56 pp + appendices.

\textbf{Chopping, M.} \textit{(2003)}, \textit{Satellites: the Good the Bad and the Ugly.}, College of Science and Mathematics Newsletter, Montclair State University, January 2003 edition, 1, 4.


15 other articles as first author and 10 as co-author. Unique author of 4 peer reviewed articles

**Grants**


- Montclair State University Global Education Center Fall 2002 Competition: \textit{Mapping Community Types in Inner Mongolia Semiarid Grasslands using Multi-Angular Data from EOS MISR} ($1.8k).

- Montclair State University ORSP Grant Writing Proposal 2002 Competition ($4k).

- European Space Agency: Physical structure and composition of desert grasslands and shrublands via hyperspectral multiple view angle reflectance data from the CHRIS sensor on PROBA (data grant, 6/13/2000).

**Other**

- Technical Skills: C, Fortran, ERDAS, IDL, Tcl/Tk, EOSDIS, MISR.

- Numerous Field Campaigns and Workshops, Talks, Lectures, Seminars, Posters and Web Presentations.
EDUCATION:
Ph.D., Computer & Information Science: Syracuse University, Syracuse, NY, (GPA 4.00), August 2002.
Master of Science, Computer Science: Syracuse University, Syracuse, NY, (GPA 4.00), May 2000
Bachelor of Science, Computer Science: University of Iasi, Iasi, Romania, (GPA 3.95), June 1997

EMPLOYMENT HISTORY:
Assistant Professor September 2003 – present Montclair State University, Montclair, NJ,
Assistant Professor August 2002 – August 2003 University of New Orleans, New Orleans, LA
Research Assistant May 2000 – August 2002 Syracuse University, Syracuse, NY
Teaching Assistant August 1998 – May 2000 Syracuse University, Syracuse, NY
Teaching Assistant August 1997 – August 1998 University of Iowa, Iowa City, IA

AWARDS AND GRANTS:
Grants:
2002 “Efficient Processing of Multispectral / Hyperspectral Data”, submitted to Louisiana State Board of Regents – Research Competitiveness Subprogram, (136,000$)
2002 SPIE Student Travel Grant (4908)
2001 Syracuse University Graduate School Travel Grant, Syracuse, NY (200$)
2001 EECS Department Travel Grant, Syracuse University, Syracuse, NY (300$)

Awards:
2002 Wilbur LePage Scholarship for outstanding doctoral candidate in engineering, Syracuse University, Syracuse, NY (3000$)
2000 Syracuse University Graduate Summer Fellowship, Syracuse, NY (550$)
1992-1997 Romanian Ministry of Education National Scholarship and Fellowship, Iasi, Romania
1987 National Romanian Physics Olympiad Mention, Brasov, Romania

TEACHING EXPERIENCE:
Courses Taught:
Montclair State University
CMPT 183 Foundations of Computer Science I
CMPT 285 Discrete Math Structures
Pattern Recognition (Graduate level)
University of New Orleans, New Orleans, LA
Pattern Recognition, (CSCI 6990 – graduate level), Spring 2002
Data Encryption and Cryptography, (CSCI 6130 – graduate level), Fall 2002
Syracuse University, Syracuse, NY
Introduction to C++, (CIS 504 - graduate level), Spring 2000
Intro to programming with C, (CIS 196 - undergraduate / graduate level), Spring 1999
Intro to programming with Pascal, (CIS 197 – undergraduate level), Fall 1998
University of Iowa, Iowa City, IA
Programming with C++, (22C012/112 - undergraduate / graduate level), Summer 1998
Programming with C, (22C010/110 - undergraduate / graduate level), Spring 1998
Teaching Assistant:
Syracuse University, Syracuse, NY
Computer Architecture, (CIS 655 – graduate level), Fall 1999
University of Iowa, Iowa City, IA
Data Structures/ Object Oriented Programming, (22C017/117 – undergraduate level), Fall 1997

Formal Preparation for Teaching:
Enhancing Teaching in Science Courses Workshop A two days (8 hrs/day) program that included
intensive interactive sessions on various aspects on teaching science courses at university level. University of New
Orleans, New Orleans, LA, August 2002
Teaching Assistant Orientation A week long (8 hrs/day) program that included supervised teaching, testing,
debates on classroom issues, informative sessions on academic and teaching issues. Syracuse University, Syracuse,
NY, August 1998
Teaching Assistant Orientation and Preparation Participated in informative and interactive sessions, passed
the language requirement tests, had teaching sessions videotaped and supervised. University of Iowa, Iowa City, IA,
August-December 1997
Pedagogical Attestation Certified to teach Computer Science at High School level in Romania. Completed
courses in Scholar Psychology, Pedagogy as well as designed and taught High School Programming and Operating
RESEARCH EXPERIENCE:

Sensor Fusion Group Studied and designed Independent Component Analysis and higher order statistics based methods and employed them as feature extraction techniques for remote sensed (airborne and satellite) hyperspectral / multispectral images. Successful results were obtained in automated detection of small targets in the images, as well as separation of land cover classes in different image frames. HYDICE and satellite as well as in house multispectral camera data sets were used in experiments. Coordinator: Dr. Pramod K. Varshney, Syracuse University, Syracuse, NY, June 2001 – present

Scalable and Concurrent Computing Laboratory Developed code for hyperspectral / multispectral image processing. Researched new methods for land cover classification, target detection and feature extraction based on higher order statistics (kurtosis, skewness). Maintained and developed software for real-time multispectral camera and distributed computing environment (Intel-based 8 processor machines). Performed collection of data using multispectral camera. Coordinator: Dr. Stephen Taylor, Syracuse University, Syracuse, NY, May 2000-June 2001

Communicating Sequential Processes Studied formal specification of concurrent processes and of computer networks using CSP. Tested validity of a resilient computing model using FDR. Syracuse University, Syracuse, NY, Summer 1999

Algebraic Processing of Programming Languages Investigated algebraic tools for programming language processing, developed and implemented routines for RS6000 processor architecture assembly languages for automated translation to C. University of Iowa, Iowa City, IA, August 1997-August 1998

Petri Nets Modeling Studied Petri Nets theories and investigated their algebraic modeling, University of Iasi, Iasi, Romania, September 1996-May 1997

PUBLICATIONS:


INVITED PRESENTATIONS:

PROFESSIONAL ORGANIZATIONS:
Association for Computing Machinery (ACM)
American Society for Photogrammetry & Remote Sensing (ASPRS)
The International Society for Optical Engineering (SPIE)
Institute of Electrical and Electronics Engineers (IEEE)
IEEE Computer Society