

THE INTERNATIONAL ARCHIVES OF THE PHOTOGRAMMETRY, REMOTE SENSING AND SPATIAL INFORMATION SCIENCES
ARCHIVES INTERNATIONALES DE PHOTOGRAMMÉTRIE, DE TÉLÉDÉTECTION ET DE SCIENCES DE L'INFORMATION SPATIALE
INTERNATIONALES ARCHIV FÜR PHOTOGRAMMETRIE, FERNERKUNDUNG UND RAUMBEZOGENE INFORMATIONSWISSENSCHAFTEN

VOLUME
VOLUME
BAND

XXXVIII

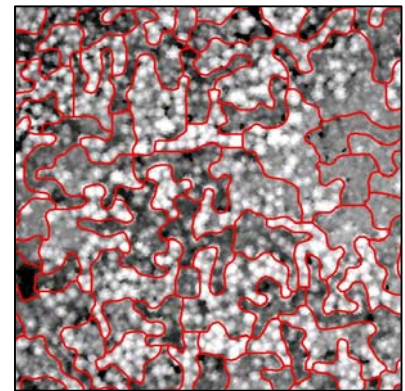
PART
TOME
TEIL

4 / C1

GEOBIA

GEOBIA 2008 - Pixels, Objects, Intelligence
GEOgraphic Object Based Image Analysis for the 21st Century

Calgary, Alberta, Canada



Editors

Geoffrey J. Hay, Thomas Blaschke and Danielle Marceau

Co-organizing Partners

Canadian Space Agency
American Society for Photogrammetry and Remote Sensing
ISPRS WG IV/4 "Landscape Modeling and Visualization"

The International Society for Photogrammetry and Remote Sensing (ISPRS), the co-organizing and sponsoring bodies of this conference and the editors of this publication accept no responsibility for errors and omissions in the abstracts and shall not be held liable for any damage caused by these errors or omissions.

This compilation © 2008 is available in electronic form only and should be referenced as:

2008, G.J. Hay, T. Blaschke and D. Marceau (Eds). GEOBIA 2008 – Pixels, Objects, Intelligence. GEOgraphic Object Based Image Analysis for the 21st Century. University of Calgary, Calgary Alberta, Canada, August 05-08. ISPRS Vol. No. XXXVIII-4/C1. Archives ISSN No.: 1682-1777. 373p.

Published by

University of Calgary, Calgary, Alberta, Canada
ISPRS WG IV/4 Landscape Modeling and Visualization

ISPRS Headquarters 2008-2012

c/o CHEN JUN, ISPRS Secretary General
National Geomatics Centre of China
No. 1 Baishengcun
Zizhuyuan
Beijing 100044
PR CHINA
Tel: +86 10 6842 4072
Fax: +86 10 6842 4101
Email: chenjun@nsdi.gov.cn
Email: chenjun_isprs@263.net

ISPRS WEB Homepage: <http://www.isprs.org>

Available from

GEOBIA 2008 Web site
<http://www.ucalgary.ca/geobia>

Acknowledgements:

We thank Mr Ryan Powers and Mr Shawn Mueller for compiling this document.

Front Images (provided by G.J. Hay: <http://www.ucalgary.ca/f3gisci/profs>)

These images (from left to right) are intended to represent the evolution from pixels to objects to intelligence. (L) A fused (1.0 m) QuickBird forest scene in Campbell River British Columbia, Canada. (M) A 3D perspective of the same QuickBird scene draped over the corresponding lidar digital canopy model (DCM). (R) Size Constrained Region Merging (SCRM) segmentation results automatically derived from the DCM.

Table of Contents:

Introduction and Welcome	p.4
Committees and Organization	p.5
Keynote Abstracts	p.6
Proceedings Papers: (by session)	
Session 1: <i>Comparison of object-based vs. pixel-based methods</i>	p.7
Session 2: <i>Comparison of segmentation methods; 3D applications (a)</i>	p.7
Session 3: <i>Automated feature detection (a)</i>	p.8
Session 4: <i>Monitoring (a)</i>	p.8
Session 5: <i>New classification and segmentation methods (a)</i>	p.9
Session 6: <i>New classification and segmentation methods (b)</i>	p.9
Session 7: <i>Government session presentations:</i>	p.10
Session 8: <i>Monitoring (b)</i>	p.10
Session 9: <i>Delineation of man-made features</i>	p.10
Session 10: <i>Ontology</i>	p.11
Session 11: <i>New classification and segmentation methods (c)</i>	p.11
Session 12: <i>Map updating and tree crown delineation</i>	p.12
Co-organization and Partnerships	p.13
Conference Presenter E-mail Listings	p.14

Introduction and Welcome

Dear Colleagues,

On behalf of the Conference Planning Committee, we invite you to peruse this proceeding of the international conference: ***GEOBIA 2008 - Pixels, Objects, Intelligence: GEOgraphic Object-Based Image Analysis for the 21st Century***. Please note that only full proceedings papers have been included in this document. GEOBIA, 2008 was held at the [University of Calgary](#), Alberta, Canada August, 5-8, 2008. A total of 137 participants from 19 different countries attended the conference and 8 workshops over the 4-day period that featured 3 keynote addresses, more than 63 regular oral presentations in three concurrent sessions, poster sessions and a student prize award for best paper. A special joint session titled '*GEOBIA in Support of Government of Canada Needs*' was also held. GEOBIA, 2008 was co-organized in partnership with the [Canadian Space Agency](#), the [ASPRS](#) and the [ISPRS](#). A GEOBIA special issue of Photogrammetric Engineering and Remote Sensing ([PE&RS](#)) will be published in 2009.

GEOBIA (pronounced *ge-o-be-uh*) is a recent sub-discipline of [Geographic Information Science](#) devoted to developing automated methods to partition remote sensing (RS) images into meaningful image-objects, and assessing their characteristics through spatial, spectral and temporal scales. Its applications range from agriculture and natural resource management, to national defense and global climate change. Its economic impact spans from data collection, hardware and software vendors, developers and users, to recipients of sound sustainable environmental policy.

GEOBIA 2008 builds upon the success of the 1st International Conference on Object Based Image Analysis ([OBIA 2006](#)), held in Salzburg Austria, where over 120 participants from 24 different countries attended to discuss the latest advances in this developing field. An edited book¹ has been published from extended peer-reviewed conference papers. A [GEOBIA Wiki](#)² has also been established to facilitate community interaction related to this conference.

A key objective of this event was to facilitate a forum for this growing international community of practice from which we can better share in the latest developments of GEOBIA theory, methods, and applications so as to more intelligently exploit remote sensing imagery. Our theme - '***Pixels, Image-objects, Intelligence: GEOgraphic Object-Based Image Analysis for the 21st Century***' - is intended to highlight this objective, and the evolution of this discipline.

We invite you to help build this discipline by contributing your comments, expertise and experience at GEOBIA, 2010, to the [GEOBIA Wiki](#) and to the newly proposed GEOBIA.org website.



Dr. Geoffrey J. Hay
Conference Chair



Dr. Thomas Blaschke
Conference Co-Chair



Dr. Danielle Marceau
Conference Co-Chair

¹ Object-Based Image Analysis - Spatial concepts for knowledge-driven remote sensing applications. Eds: Thomas Blaschke, Stefan Lang, Geoffrey J. Hay. Springer Lecture Notes in Geoinformation and Cartography, 2008

² <http://wiki.ucalgary.ca/page/GEOBIA>

Committees and Organization:



The Organization committee was lead by Dr Geoffrey J. Hay ([Geography](#), University of Calgary) with Co-Chairs Dr Thomas Blaschke ([Z_GIS](#): Austria), and Dr Danielle Marceau ([Geomatics Engineering](#), University of Calgary). The scientific committee included ten Remote Sensing and GIScience experts from academia, government and industry working throughout North-America and Europe.



Conference Chair & Co-Chairs:

- [Geoffrey J. Hay](#) (U.Calgary, AB, Canada)
- [Thomas Blaschke](#) (Z_GIS, Salzburg, Austria)
- [Danielle Marceau](#) (U.Calgary, AB, Canada)



Scientific Committee (alphabetical order):

- [Thomas Blaschke](#) (Z_GIS, Salzburg, Austria)
- [Guillermo Castilla](#) (U.Calgary, AB, Canada)
- [Manfred Ehlers](#) (U.Osnabrück, Germany)
- [Geoffrey Hay](#) (U.Calgary, AB, Canada)
- [Maggi Kelly](#) (U.C.Berkeley, USA)
- [Stefan Lang](#) (Z_GIS, Salzburg, Austria)
- [Marguerite Madden](#) (U.Georgia, USA)
- [Danielle Marceau](#) (U.Calgary, AB, Canada)
- [Greg McDermid](#) (U.Calgary, AB, Canada)
- [Mike Wulder](#) (Canadian Forest Service, BC, Canada)



Executive Committee (alphabetical order):

- [Yves Crevier](#) (GRIP, Canadian Space Agency)
- [Marcelle Grenier](#) (Environment Canada, QC, Canada)
- [Mryka Hall-Beyer](#) (U.Calgary, AB, Canada)
- [Erica Borgstrom](#) (Conference & Special Events, U.Calgary)
- [Tim Fukami](#) (Conference & Special Events, U.Calgary)



Keynote Abstracts:

GEOGRAPHIC OBJECT-BASED IMAGE ANALYSIS (GEOBIA) IN CONTEXT: PAST, PRESENT AND FUTURE.

Geoffrey J. Hay, University of Calgary

What is Geographic Object-Based Image Analysis (GEOBIA)? To answer this we provide a historical, geographical and contextual overview leading up to this conference. We then propose a formal definition of GEOBIA along with a brief account of its coining and recommend a key objective for this new discipline. We then, propose GEOBIA's main tenets and discuss its plausible future. Much remains to be accomplished.

10 YEARS OF OBJECT-ORIENTED IMAGE ANALYSIS FOR GEOSPATIAL APPLICATIONS: EVOLUTION AND OUTLOOK.

Martin Baatz, Gregor Willhauck, Christian Hoffmann. Definiens

Automated feature extraction from earth observation data is a key requirement in numerous application fields. Increased availability of remote sensing data and increasing market request generate a demand for high-throughput information extraction. Spectral variation, level of detail and the multitude of forms of appearance of specific types of landcover features however are only some aspects that set significant challenges for fully automated analysis. Object-based and object-oriented image analyses have proven in recent years to be a new paradigm for automated feature extraction. At the same time, a shift in focus from desktop based interactive workflows to industrial production workflows can be observed. This contribution discusses requirements and challenges within this context. In order to support fully automated processing, semantic segmentation approaches are needed that are knowledge-based as well as context-driven and support modelling at the same time. Fast adaptation to new tasks, scalability and integratability are further key requirements. An overview about the evolution of Definiens object-oriented Cognition Network Technology is combined with an outlook on future trends and developments.

AUTOMATED FEATURE EXTRACTION FROM TERRESTRIAL AND AIRBORNE LIDAR.

Stuart Blundell, David W. Opitz, Raj Rao Visual Learning Systems, Inc.

The U.S. Army and other Department of Defense (DoD) combat and combat support agencies requires automated feature extraction (AFE) software for collecting very high-resolution 3D urban features from terrestrial LIDAR data to support the ground-based Warfighter operating in the urban battlespace. Advanced vehicle-mounted and man-portable terrestrial Light Imaging and Range Detection (LIDAR) systems capture accurate 3D measurements of the urban environment with spatial resolutions on the order of 5 centimeters or less [Blais, 2004]. The 3D imaging capability of these systems is negated, however, by a lack of commercial software tools capable of exploiting terrestrial LIDAR datasets [Shiode 2001]. Current approaches for creating high-resolution 3D urban models are expensive requiring thousands of man-hours to digitize feature geometries, assign textures to features and attribute features. The lack of robust AFE software tools for collecting geospecific urban features from terrestrial LIDAR systems directly impacts applications for facility reconnaissance, special operations planning and urban warfare decision-making. Visual Learning Systems, Inc. (VLS) has developed a LIDAR AFE system capable of extracting over 1,000 buildings per minute as 3D Shapefiles from airborne LIDAR. In this presentation we provide an overview of the VLS solution for 3D AFE from advanced terrestrial LIDAR systems operating in urban environments.

Proceedings Papers:

Session 1: *Comparison of object-based vs. pixel-based methods*

A COMPARISON OF THE PERFORMANCE OF PIXEL-BASED AND OBJECT-BASED CLASSIFICATIONS OVER IMAGES WITH VARIOUS SPATIAL RESOLUTIONS.

(KEY WORDS: Pixel-based image analysis, Object-based image analysis, Accuracy assessment, Simulated images)
Y. Gao, J.F. Mas

CORRELATION OF OBJECT-BASED TEXTURE MEASURES AT MULTIPLE SCALES IN SUB-DECIMETER RESOLUTION AERIAL PHOTOGRAPHY.

(KEY WORDS: texture, segmentation, correlation, multiresolution, aerial photography, object, vegetation)
A. S. Laliberte, A. Rango

A COMPARISON OF OBJECT-BASED AND PIXEL-BASED APPROACHES TO ESTIMATE LIDAR-DERIVED FOREST CANOPY HEIGHT USING QUICKBIRD IMAGERY.

(KEY WORDS: Canopy height, Geographic object-based image analysis (GEOBIA), Geographic object-based texture (GEOTEX), Tree-ray-shadow geometry (TG), Quickbird, Lidar)
G. Chen, G. J. Hay, G. Castilla, B. St-Onge, R. Powers

COMPARISON OF PIXEL- AND OBJECT-BASED SAMPLING STRATEGIES FOR THEMATIC ACCURACY ASSESSMENT.

(KEY WORDS: Quality, object-based, pixel-based, confusion matrix, samples)
Julien Radoux, Pierre Defourny and Patrick Bogaert

CLASS MODELLING OF BIOTOPE COMPLEXES – SUCCESS AND REMAINING CHALLENGES.

(KEY WORDS: Object-based image analysis, aggregated functional units, CNL, hybrid approach)
D. Tiede, S. Lang, F. Albrecht and D. Hölbling

THE ROLE OF EDGE OBJECTS IN FULL AUTONOMOUS IMAGE INTERPRETATION.

(KEY WORDS: Autonomous classification, crucial features, anchor objects, transferability)
R. de Kok, P. Wezyk, M. Weidenbach

EVALUATION OF ASTER SPECTRAL BANDS FOR AGRICULTURAL LAND COVER MAPPING USING PIXEL-BASED AND OBJECT-BASED CLASSIFICATION APPROACHES.

(KEY WORDS: Agriculture, Land cover, Object, Segmentation, Spectral, Mapping, ASTER, Remote Sensing)
Mst. Farida Perveen, Ryota Nagasawa, Md. Shawkat Ali and Husnain

OBJECT-ORIENTED HIERARCHICAL IMAGE VECTORIZATION.

(KEY WORDS: Segmentation, scale, image vectorization, Delaunay triangulation, Minimum Spanning Tree, Scalable Vector Graphics, visual perception)
A. N. Skurikhin, P. L. Volegov

ACCURACY ASSESSMENT METHOD FOR WETLAND OBJECT-BASED CLASSIFICATION.

(KEY WORDS: Accuracy assessment, object-based classification, error matrix, fuzzy logic, wetland mapping)
M. Grenier, S. Labrecque, M. Benoit and M. Allard

Session 2: *Comparison of segmentation methods; 3D applications (a)*

OBJECTIVE IMAGE SEGMENTATION EVALUATION FRAMEWORK.

(KEY WORDS: Automation, comparison, image, information content, nearness, objective evaluation indices, segmentation)
Christopher Henry and James F. Peters

QUANTITATIVE SEGMENTATION EVALUATION FOR LARGE SCALE MAPPING PURPOSES.

Frieke Van Coillie, Ghent University
(KEY WORDS: Image Sharpening, Segmentation, IKONOS, SPRING 4.3, eCognition 5.0)
T. Novack, L. M. G. Fonseca, H. J. R. Kux

LIBRARY CONCEPT AND DESIGN FOR LIDAR DATA PROCESSING.

(KEY WORDS: lidar data, Point Cloud, Design, Data Management System, Processing)
Nicolas David, Clément Mallet, Fr'ed'eric Bretar

ASSESSMENT OF REMOTE SENSING IMAGE SEGMENTATION QUALITY.

(KEY WORDS: Comparison, evaluation methods, software, remote sensing, IKONOS, high resolution)

M. Neubert, H. Herold

Session 3: Automated feature detection (a)

MAPPING ROAD TRAFFIC CONDITIONS USING HIGH RESOLUTIONS SATELLITE IMAGES.

(KEY WORDS: Remote Sensing, Vehicle Detection, Pattern Recognition, Traffic Statistics, High-Resolution Satellite Images, Object-Based Segmentation, QuickBird)

S. Ø. Larsen, J. Amlie, H. Koren, R. Solberg

RECOGNIZING MEANDERS TO RECONSTRUCT RIVER DYNAMICS OF THE GANGES.

(KEY WORDS: river metrics, Landsat, Ganges delta, Bangladesh)

E. A. Addink, M. G. Kleinans

MULTI IMAGE MATCHING OF STRAIGHT LINES WITH GEOMETRIC CONSTRAINTS.

(KEY WORDS: Matching, Straight Lines, Correlation, Plane Intersection)

A. F. Elaksher

AUTOMATIC CLASSIFICATION OF CENTRAL ITALY LAND COVER: COMPARATIVE ANALYSIS OF ALGORITHMS.

(KEY WORDS: Land cover, comparative analysis, pixel-based algorithms, IKONOS, multispectral images)

P. Zingaretti, E. Frontoni, A. Bernardini, E. S. Malinverni

COMPARATIVE ANALYSIS OF AUTOMATIC APPROACHES TO BUILDING DETECTION FROM MULTI-SOURCE AERIAL DATA.

(KEY WORDS: Building detection, comparative analysis, pixel-based and object-based algorithms, LIDAR, multispectral images)

E. Frontoni, K. Khoshelham, C. Nardinocchi, S. Nedkov, P. Zingaretti

Session 4: Monitoring (a)

INCORPORATION OF TEXTURE, INTENSITY, HUE, AND SATURATION FOR RANGELAND MONITORING WITH UNMANNED AIRCRAFT IMAGERY.

(KEY WORDS: segmentation, texture, scale, aerial photography, accuracy, vegetation, object, classification)

A. S. Laliberte, A. Rango

OBJECT-BASED CHANGE DETECTION OF HISTORICAL AERIAL PHOTOGRAPHS REVEALS ALTITUDINAL FOREST EXPANSION.

(KEY WORDS: High Resolution, Forest, Temporal, Change Detection, Soil)

M. Middleton, P. Närhi, M-L. Sutinen, R. Sutinen

OBJECT-BASED LAND-USE AND LAND-COVER MAPPING USING SPECTRAL, SPATIAL AND TOPOGRAPHIC INFORMATION FROM IKONOS IMAGERY.

(KEY WORDS: Vegetation Types, Multispectral IKONOS Image, Segmentation Quality, Object-based Classifications, Topographic Variable, Stream, Euclidean Distance Image)

Minho Kim, Bo Xu, and Marguerite Madden

AN INVERSE ANALYSIS OF UNOBSERVED TRIGGER FACTOR ACCORDING TO SLOPE FAILURE TYPES.

(KEY WORDS: Slope failure types, Trigger factors, Inverse analysis, Structural equation modeling, Spatial data integration)

Hirohito KOJIMA and Shigeyuki OBAYASHI

OBJECT BASED CLASSIFICATION TECHNIQUES IN URBAN CHANGE PLANNING.

(KEY WORDS: Change Detection, Digital Map, Object Based Analysis, Segmentation, Urban Growth, Very High Resolution Imagery)

Mana Nikfal, Farhad Samadzadegan

Session 5: New classification and segmentation methods (a)

A FRAMEWORK FOR THE EVALUATION OF MULTI-SPECTRAL IMAGE SEGEMENTATION.

(KEY WORDS: Image segmentation, synthetic images, similarity indices, segmentation metrics, segmentation evaluation)

André R. S. Marçal, Arlete S. Rodrigues

UNIVERSAL OBJECT SEGMENTATION IN FUSED RANGE-COLOR DATA.

(KEY WORDS: Expectation Maximization, Data Fusion, SICK LMS, CCD camera, Segmentation)

Jeff Finley and Chris Lewis

A METHOD FOR ADAPTING GLOBAL IMAGE SEGMENTATION METHODS TO IMAGES OF DIFFERENT RESOLUTIONS.

(KEY WORDS: Object based image analysis, image segmentation, transferability of rule bases)

P. Hofmann, Josef Strobl, Thomas Blaschke

MODIS EVI AS AN ANCILLARY DATA FOR AN OBJECT-BASED IMAGE ANALYSIS WITH MULTI-SPECTRAL MODIS DATA.

(KEY WORDS: Enhanced Vegetation Index (EVI), Moderate Resolution Imaging Spectral-radiometer (MODIS), Phenology, Object-based image analysis)

Y. Gao, J.F. Mas

MULTI SCALE OBJECT BASED DETECTION AND CLASSIFICATION OF ROADS AND VEHICLES IN HIGH RESOLUTION OPTICAL SATELLITE IMAGERY.

(KEY WORDS: Object based, Detection, Classification, Vehicles, Roads, High resolution, Satellite imagery)

A. Oostdijk, M. van Persie, H.H.S. Noorbergen, J.W. van Rijn

Session 6: New classification and segmentation methods (b)

FUZZY IMAGE SEGMENTATION FOR URBAN LAND-COVER CLASSIFICATION.

(KEY WORDS: Segmentation, classification, land-cover, image-regions, image-objects, fuzzy)

I. Lizarazo, J. Barros

AUTOMATIC ADAPTATION OF SEGMENTATION PARAMETERS APPLIED TO NON-HOMOGENEOUS OBJECTS DETECTION.

(KEY WORDS: Parameter Adaptation, Parameter Tuning, Object Detection, Segmentation, Genetic Algorithms, Hough Transform)

C. M. B. Fredrich, R. Q. Feitosa

IMAGE-TO-MAP CONFLICT DETECTION USING ITERATIVE TRIMMING: APPLICATION TO FOREST CHANGE.

(KEY WORDS: trimming, change, vector, kernel density estimate, Quickbird)

Radoux, J. and Defourny, P.

AN OBJECT-BASED LAND-USE CELLULAR AUTOMATA MODEL TO OVERCOME SCALE SENSITIVITY.

(KEY WORDS: Scale dependency, raster-based cellular automata model, object-based cellular automata model, dynamic neighborhood, land-use change, simulation)

Niandry Moreno, Fang Wang, and Danielle J. Marceau

USE OF STATISTICAL DISTRIBUTION FOR SEGMENTATION OF SAR IMAGES OF OCEANIC AREAS.

(KEY WORDS: SAR, Statistics, Ship Detection, Processing, Image, Algorithms, Oceans, Remote Sensing)

R.F.Rocha

VEGETATION FIRE FUELS MAPPING IN THE SAN DIEGO CITY CANYONS – A METHOD COMPARISON.

(KEY WORDS: Mapping, hazards, high resolution, comparison, segmentation)

M. Neubert, S. Kropp, S. Wagenknecht, D. Stow, L. Coulter

CHANGE DETECTION FOR UPDATES OF VECTOR DATABASE THROUGH REGION-BASED CLASSIFICATION OF VHR SATELLITE DATA.

(KEY WORDS: Change detection, Database updating, Very high spatial resolution satellite images, Object based classification, PLEIADES-HR data)

Carleer Alexandre, Wolff Eléonore

GEO-OBJECT BASED VHR IMAGE CLASSIFICATION SUPPORTED BY GIS LAYERS AND EXPERT KNOWLEDGE.

(KEY WORDS: object classification, digital analysis, land cover, VHR satellite images)

J. Chmiel, A. Fijałkowska

Session 7: Government session presentations:

FOREST MONITORING INFORMATION NEEDS IN CANADA.

Mike Wulder, Natural Resources Canada, Canadian Forest Service – presented by Joanne White

THE USE OF EARTH OBSERVATION TO ASSESS GROUND WATER RESOURCES.

Stéphane Chalifoux, NRC, Earth Sciences – Ground water

WETLAND MAPPING USING OBJECT BASED CLASSIFICATION OF RADARSAT AND LANDSAT-ETM IMAGES FOR PROTECTED AREAS.

Marcelle Grenier, Environment Canada – Ecosystem Conservation

SPACE-BASED MONITORING TO SUPPORT WILDLIFE RESEARCH, MANAGEMENT AND ENFORCEMENT TO DELIVER ON ENVIRONMENT CANADA'S MANDATE.

Jason Duffe, Environment Canada – Pesticides Evaluation

OBJECT-BASED RESOURCE INFORMATION EXTRACTION: RELEVANCE TO ECOLOGICAL INVENTORY AND MONITORING.

Rajeev Sharma, National Parks Directorate EI Branch – Ecosystem Monitoring

Session 8: Monitoring (b)

HAVE FORESTS REALLY BECOME DENSER? AN OBJECT-ORIENTED ASSESSMENT OF A KEY PREMISE IN WILDFIRE POLICY.

(KEY WORDS: forest fire, object, management, ecosystem, hazards, land cover, vegetation, orthorectification)

R.V. Platt, T. Schoennagel

DEVELOPMENT OF PROCESS TREES FOR OBJECT-ORIENTED CHANGE DETECTION IN RIPARIAN ENVIRONMENTS FROM HIGH SPATIAL RESOLUTION MULTI-SPECTRAL IMAGES.

(KEY WORDS: Object-Oriented Change Detection, Definiens Developer, Rule Sets, Riparian Zones, QuickBird)

K. Johansen, L.A. Arroyo, S. Phinn, C. Witte

STUDYING THE EARTHQUAKE EFFECT ON LINEAMENT DENSITY CHANGES BY REMOTE SENSING TECHNOLOGY.

(KEY WORDS: Earthquake, Lineament Density, Remote Sensing, Feature-Based Methods)

A.Sharifi, M.A.Rajabi, N.Fuladi Moghaddam

QUANTITATIVE COMPARISON OF SEGMENTATION RESULTS FROM IKONOS IMAGES SHARPENED BY DIFFERENT FUSION AND INTERPOLATION TECHNIQUES.

(KEY WORDS: Image Sharpening, Segmentation, IKONOS, SPRING 4.3, eCognition 5.0)

T. Novack, L. M. G. Fonseca, H. J. R. Kux

INNOVATIVE WOODY BIOMASS RESOURCE ASSESSMENT USING MULTIPLE RESOLUTION SATELLITE IMAGERY AND GEOBIA TECHNOLOGY.

(KEY WORDS: Renewable Energy, Biomass, Satellite Imagery, GEOBIA, QuickBird, Landsat, Feature Analyst)

J. W. San Souci

MONITORING VEGETATION STRUCTURE IN FLOODPLAINS FOR FLOOD RISK ESTIMATION.

(KEY WORDS: flood risk, floodplain, natural vegetation, De Blauwe Kamer, the Netherlands)

E. A. Addink, M. E. ten Haaf, S. M. de Jong

Session 9: Delineation of man-made features

DETECTION OF RING SHAPED STRUCTURES IN AGRICULTURAL LAND USING HIGH RESOLUTION SATELLITE IMAGES.

(KEY WORDS: Ring graves, Quickbird, template matching, contrast enhancement, archaeology, remote sensing)

S. Ø. Larsen, Ø. D. Trier, R. Solberg

BUILDING DETECTION FROM HIGH-RESOLUTION SATELLITE IMAGERY USING ADAPTIVE FUZZY-GENETIC APPROACH.

(KEY WORDS: Building Extraction, Image Processing, Genetic Algorithms, Fisher Linear Discriminant, High Resolution Satellite Imagery)

E. Sumer, M. Turker

HIDDEN MARKOV MODELS APPLIED IN AGRICULTURAL CROPS CLASSIFICATION.

(KEY WORDS: Crop Identification, Hidden Markov Models, Multitemporal Analysis, Object-based Image Analysis)

P. B. C. Leite, R.Q. Feitosa, A.R. Formaggio, G. A. O. P. Costa, K.Pakzad, , I. D. A. Sanche

EXTRACTION OF RAILROAD OBJECTS FROM VERY HIGH RESOLUTION HELICOPTER-BORNE LIDAR AND ORTHO-IMAGE DATA.

(KEY WORDS: LIDAR, object extraction, three-dimensional, GIS integration)

M. Neubert, R. Hecht, C. Gedrange, M. Trommler, H. Herold, T. Krüger, F. Brimmer

ROBUST DETECTION OF BUILDINGS FROM A SINGLE COLOR AERIAL IMAGE.

(KEY WORDS: Color Aerial Imagery, Building Detection, Segmentation, Mean-shift, Photometric Quasi-invariants)

Ali Özgün Ok

Session 10: Ontology

FROM PIXELS TO GRIXELS: A UNIFIED FUNCTIONAL MODEL FOR GEOGRAPHIC OBJECT-BASED IMAGE ANALYSIS.

(KEYWORDS: GEOBIA, Remote Sensing, Image Analysis, Knowledge, Ontology)

I. Lizarazo, P. Elsner

SEGMENTATION: THE ACHILLES HEEL OF OBJECT-BASED IMAGE ANALYSIS?

(KEY WORDS: digital cartography, spatial framework, segmentation, land cover)

Geoffrey Smith and Daniel Morton

Session 11: New classification and segmentation methods (c)

IMALYS - AN AUTOMATED AND DATABASE-INTEGRATED OBJECT-ORIENTED CLASSIFICATION SYSTEM.

(KEY WORDS: Segmentation, Classification, Database, Automation, Method, Software)

E. Matejka, M. Reinhold, P. Selsam

MULTILEVEL OBJECT BASED IMAGE CLASSIFICATION OVER URBAN AREA BASED HIERARCHICAL IMAGE SEGMENTATION AND INVARIANT MOMENTS.

(KEY WORDS: hierarchical segmentation, shape, object-based classification, invariant moments, high resolution imagery, watershed transformation)

Peijun Li, Jiancong Guo, Haiqing Xu and Xiaobai Xiao

QUANTUM-INSPIRED EVOLUTIONARY ALGORITHM AND DIFFERENTIAL EVOLUTION FOR THE AUTOMATIC ADAPTATION OF SEGMENTATION PARAMETERS.

(KEY WORDS: Image Segmentation, Genetic Algorithm, Optimization, Quantum-Inspired, Differential Evolution)

L. M. Melo, G. A. O. P. Costa, R. Q. Feitosa, A. V. Abs da Cruz

INTERIMAGE: AN OPEN SOURCE KNOWLEDGE BASED FRAMEWORK FOR AUTOMATIC INTERPRETATION OF REMOTE SENSING DATA.

(KEY WORDS: Interpretation, Classification, Knowledge Base, Open Systems, Inter-Operability)

D. A. B. Oliveira, G. A. O. P. Costa, R. Q. Feitosa, E. F. Castejon, L. M. G. Fonseca

DEVELOPING AN AGENT BASED SYSTEM FOR CUSTOMIZING DISTRIBUTED GIS SERVICES.

(KEY WORDS: GIServices, GIS Meta Data, Mobile Agent, Information Technology)

Aliaa Youssif, Atef Gabwash and Marwa Shahin

RANGE IMAGE SEGMENTATION USING THE NUMERICAL DESCRIPTION OF MEAN CURVATURE VALUES.

(KEY WORDS: Laser Scanner, Range Image Segmentation, Mean Curvature values, Crease-step edge)

Yahya Alshawabkeh, Norbert Haala, Dieter Fritsch

Session 12: Map updating and tree crown delineation

INDIVIDUAL TREE DETECTION BASED ON DENSITIES OF HIGH POINTS FROM HIGH RESOLUTION AIRBORNE LIDAR.

(KEY WORDS: Airborne LiDAR, densities of high points, tree detection, Inverse Watershed segmentation, Canopy Height Model (CHM), Digital Terrain Model (DTM))

M.Z.A. Rahman, B. Gorte

AUTOMATIC DELINEATION OF FOREST STANDS FROM LIDAR DATA.

(KEY WORDS: LiDAR segmentation, automatic stand delineation, stand definition, stand quality, forest stand delineation, automatic feature extraction, region growing)

V. J. Leppänen, T. Tokola, M. Maltamo, L. Mehtätalo, T. Pusa, J. Mustonen

APPLIED 3D TEXTURE FEATURES IN ALS BASED TREE SPECIES SEGMENTATION.

(KEY WORDS: lidar, Segmentation, Tree species classification, Alpha shape, 3D texture)

T. Tokola, J. Vauhkonen, V. Leppänen, T. Pusa, L. Mehtätalo, & J. Pitkänen

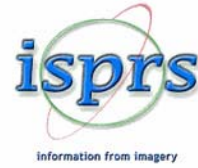
ESTIMATING CANOPY COVER FROM EUCALYPT DOMINANT TROPICAL SAVANNA USING THE EXTRACTION OF TREE CROWNS FROM VERY HIGH RESOLUTION IMAGERY.

(KEY WORDS: canopy cover, object-based, image segmentation, tree crowns, northern Australia, tropical savanna)

Tim Whiteside and Waqar Ahmad

Co-organization & Partnership

Co-organization Partners:



Gold Partners:



Silver Partners:



Bronze Partners:



In-Kind Partners:



Email List of Participants:

Title	First Name	Last Name	Company	Country	Email
Mr	Muhammad	Abd Rahman	Delft University Of Technology	Netherlands	M.Z.AbdRahman@tudelft.nl
Ms.	Lauren	Abell	Naval Postgraduate School	Usa	llabell@nps.edu
Mr	Fausto	Acerbi Júnior	Federal University Of Lavras	Brazil	fausto@ufla.br
Dr	Elisabeth	Addink	Utrecht University	The Netherlands	e.addink@geo.uu.nl
Dr	Rami	Al-Ruzouq	Al-balqa' Applied University	Jordan	alruzouq@bau.edu.jo
Mr	Robert	Albricht	Silvatech Group	Canada	r.albricht@silvatech.ca
Dr.	Martin	Baatz	Definiens Ag	Germany	mbaatz@definiens.com
Dr	Peter	Barnett	Ontario Geological Survey	Canada	peter.barnett@ontario.ca
Prof.	Thomas	Blaschke	University of Salzburg	Austria	thomas.blaschke@sbg.ac.at
Mr.	James	Blundell	Overwatch Geospatial - VLS	USA	sblundell@overwatch.textron.com
Dr	Christoph	Borel	Ball Aerospace	United States	cborel@ball.com
Mr	Bill	Braunsch	Dynagra Corp	Canada	wbraunsch@mac.com
Ing.	Friedrich	Brimmer	Oebb-infrastruktur Bau Ag	Austria	friedrich.brimmer@bau.oebb.at
Mrs.	Dawn	Browning	University of Arizona	Usa	dbrownin@ag.arizona.edu
Mr.	Mark	Bruhn	RTI International	United States	mbruhn@rti.org
Ms	Gwen	Byard	Trimble Navigation	USA	gwen_byard@trimble.com
Dr.	Alexandre	Carleer	Université Libre De Bruxelles	Belgium	acarleer@ulb.ac.be
Dr	Luis	Carvalho	Federal University of Lavras	Brazil	passarinho@ufla.br
Dr.	Guillermo	Castilla	University of Calgary	Canada	gcastill@ucalgary.ca
Mr.	Stephane	Chalifoux	Natural Resources Canada	Canada	stephane.chalifoux@nrcan.gc.ca
Mr.	Gang	Chen	University of Calgary	Canada	gangchen@ucalgary.ca
Mr.	Freeman	Chikomo	University of Newcastle	UK	freeman.augustine@gmail.com
Dr.	Jerzy	Chmiel	Warsaw University of Technology	Poland	j.chmiel@gik.pw.edu.pl
Mr.	Mike	Chubey	Silvatech Group	Canada	m.chubey@silvatech.ca
Msc	Gilson	Costa	Catholic University Of Rio De Janeiro (puc-rio)	Brasil	gilson@ele.puc-rio.br
Mr.	Chris	Curlis	US Bureau Of Reclamation	USA	ccurlis@mp.usbr.gov
Mr.	Michael	Diller	MDA Federal	USA	jennifer.dickson@mdafederal.com
Mr	John	Dodge	Ontario Geological Survey	Canada	john.dodge@ontario.ca
Ms	Patricia	Donovan	Virginia Tech University	USA	padonova@vt.edu
Mr	Jason	Duffe	Environment Canada	Canada	jason.duffe@ec.gc.ca
Dr	Laurent	Durieux	Institut de Recherche Pour le Développement	Brasil	laurent.durieux@ird.fr
Dr.	Ahmed	Elaksher	Cairo University	Egypt	Ahmedelaksher@yahoo.com
Dr	Raul	Feitosa	Catholic University Rio De Janeiro	Brazil	raul@ele.puc-rio.br
Ms.	Negin	Fouladi Moghaddam	Shahid Beheshti University- Remote Sensing And Gis Group	Iran	fuladi_negin@yahoo.com
Msc	Yan	Gao	UNAM	Mexico	gaoyan@pmip.unam.mx
Miss	Erin	Grass	Alberta Government	Canada	erin.grass@gov.ab.ca
Mrs.	Marcelle	Grenier	Environment Canada	Canada	marcelle.grenier@ec.gc.ca
Dr.	Geoffrey J.	Hay	University of Calgary	Canada	gjhay@ucalgary.ca
Mrs.	Virginia	Herrera-cruz	Infoterra Gmbh	Germany	virginia.Herrera-Cruz@astrium.eads.net
	Roger	Huckle	Forschungszentrum Karlsruhe	Germany	roger.huckle@imk.fzk.de
	Dave	Hulslander	ITT Visual Information Solutions	USA	daveh@ittvis.com
Mr	Ross	Jenkins	University of New England	Australia	rjenkin3@une.edu.au
Dr	Kasper	Johansen	The University Of Queensland	Australia	k.johansen@uq.edu.au
	Shafraaz	Kaba	Manasc Isaac Architects	Canada	shafraaz@miarch.com
Ast.prof	Leif	Kastdalen	Hedmark University College	Norway	leif.kastdalen@hihm.no
Dr.	Maggi	Kelly	U.C. Berkeley	USA	mkelly@nature.berkeley.edu
Dr	Kourosh	Khoshelham	Delft University Of Technology, Delft	The Netherlands	k.khoshelham@tudelft.nl
Dr.	Hirohito	Kojima	Tokyo University Of Science	Japan	kojima_h@rs.noda.tus.ac.jp
Dr.	Andrea	Laliberte	New Mexico State University	USA	alaliber@nmsu.edu
Prof.	Stefan	Lang	Technical University of Berlin	Germany	stafan.lang@sbg.ac.at
Ms	Siri Oyen	Larsen	Norwegian Computing Centre	Norway	siri.larsen@nr.no

Email List of Participants:

Title	First Name	Last Name	Company	Country	Email
Mr	Vesa	Leppänen	University of Joensuu	Finland	wleppanen@gmail.com
Dr.	Chris	Lewis	Kansas State University	United States	clewis@ksu.edu
Dr.	Peijun	Li	Peking University	P R China	pjli@pku.edu.cn
Dr.	Ron	Li	The Ohio State University	United States	li.282@osu.edu
Ms	Julia	Linke	University of Calgary	Canada	Jlinke@ucalgary.ca
Mrs	Patti	Lippe	Weyerhaeuser	Canada	patti.lippe@weyerhaeuser.com
Dr	Zhigang	Liu	Beijing Normal University	China	zhigangliu@bnu.edu.cn
Mr	Ivan	Lizarazo	Birkbeck, University Of London	United Kingdom	i.lizarazo@geog.bbk.ac.uk
Dr.	Thomas	Loecherbach	Hjw Geospatial	Usa	loecherbach@hjw.com
Dr.	Marguerite	Madden	University of Georgia	USA	mmadden@uga.edu
Dr	Andre	Marcal	University Of Porto - FCUP	Portugal	andre.marcal@fc.up.pt
Dr	Danielle	Marceau	University of Calgary	Canada	marceau@geomatics.ucalgary.ca
Mr	Prashanth	Marpu	Freiberg University Of Mining And Technology	Germany	prashanthmarpu@ieee.org
Mrs.	Evelin	Matejka	Friedrich Schiller University, Jena, Germany	Germany	evelin.matejka@uni-jena.de
Dr.	Greg	McDermid	University of Calgary	Canada	mcdermid@ucalgary.ca
Dr.	Alex	Melnitchouck	Dynagra Crop	Canada	alexm@dynagra.com
Ms.	Maarit	Middleton	Geological Survey Of Finland	Finland	maarit.middleton@gtk.fi
Ms	Ann	Morrison	Ministry Of Forests And Range	Canada	ann.morrison@gov.bc.ca
Dr.	Marco	Neubert	Leibniz Institute Of Ecological And Regional Development	Germany	m.neubert@ioer.de
	David	Nicolas	IGN (Institut Geographique National)	France	nicolas.david@ign.fr
Mr	Dirk	Nielsen	Dendron Resource Surveys	Canada	dnielsen@dendron.com
Mr.	Tessio	Novack	National Institute For Space Research - Inpe	Brazil	tessio@dsr.inpe.br
Mr.	Adam	O'Connor	ITT Visual Information Solutions	USA	aoconnor@ittvis.com
Dr.	Martin	Oczipka	German Aerospace Centre (DLR)	Germany	martin.oczipka@dlr.de
Mr	Ali	Ok	Middle East Technical University	Turkey	oozgun@metu.edu.tr
Mrs	Ajuka	Oluchi	Ajuko & Co	Nigeria	info_fmww@yahoo.com
Mr.	Arjen	Oostdijk	National Aerospace Laboratory NLR	Netherlands	arjen@nlr.nl
Mr	Chris	Padwick	ITT Vis	USA	cpadwick@ittvis.com
Mrs	Mst. Farida	Perveen	Tottori University	Japan	perveen_28@yahoo.com
Dr.	James	Peters	University of Manitoba	Canada	jfpeters@ee.umanitoba.ca
Dr.	Rutherford	Platt	Gettysburg College	USA	rplatt@gettysburg.edu
Mr.	Julien	Radoux	Universite Catholique de Louvain	Belgium	julien.radoux@uclouvain.be
Mr.	Waylon	Rank	SAIT Polytechnic	Canada	werank@gmail.com
Mr.	Renato	Rocha	Brazilian Navy Hydrographic Center	Brazil	renatofrocha@hotmail.com
Mrs.	Sumbal Bahar	Saba	ITC	the Netherlands	saba@itc.nl, sumbal_saba@hotmail.com
Visitor	Amir	Samaditabrizi	Dolphin Khakestari Vala Ltd	Iran	hgh495@yahoo.com
Mr.	Jason	San Souci	Ncdc Imaging	U.s.a	rwright@ncdcimaging.com
Ms	Karen	Schleeweis	University Of Maryland, College Park	Usa	ska1@umd.edu
Mr	Tasha	Schmaltz	Dynagra Corp	Canada	tschmaltz@dynagra.com
	Marwa	Shahin	National Authority for Remote Sensing and Space Science	Egypt	marwasayed@hotmail.com
Dr.	Rajeev	Sharma	Parks Canada Agency	Canada	rajeev.sharma@pc.gc.ca
Dr.	Tara	Sharma	Parks Canada	Canada	tara.sharma@pc.gc.ca
Mr	Ian	Sinclair	Ontario Ministry Of Natural Resources	Canada	ian.sinclair@ontario.ca
Dr	Alexei	Skurikhin	Los Alamos National Laboratory	Usa	alexei@lanl.gov
Mr	Aaron	Smith	Ducks Unlimited Inc	USA	asmith@ducks.org
Dr	Geoff	Smith	Centre For Ecology And Hydrology	United Kingdom	gesm@ceh.ac.uk
Mr.	Stephen	Sporik	Spatial Systems Associates, Inc.	USA	ssporik@spatialsys.com
	Bogoljub	Stankovic	ASRD	Canada	bob.stankovic@gov.ab.ca
Dr.	Stefan	Steiniger	Univ. Of Calgary	Canada	ssteinig@ucalgary.ca

Email List of Participants:

Title	First Name	Last Name	Company	Country	Email
Mr	Laurence	Strong	U.S. Geological Survey	Usa	lstrong@usgs.gov
Mr.	Emre	Sumer	Baskent University	Turkey	esumer@baskent.edu.tr
Ms	Leona	Svancara	University of Idaho	USA	leonab@uidaho.edu
Mr.	Bill	Tedford	Ducks Unlimited Canada	Canada	b_tedford@ducks.ca
Mr.	Bob	Ternes	ITT Visual Information Solutions	USA	tjones@ittvis.com
Ms.	Robin	Thompson	SAIT Polytechnic	Canada	robin.thompson@sait.ca
Dr,	James	Tilton	NASA GSFC	USA	James.C.Tilton@nasa.gov
Dr	Timo	Tokola	University of Joensuu	Finland	timo.tokola@joensuu.fi
Mr	Aaron	Trowbridge	Bulkley Valley Research Centre	Canada	aaron.trowbridge@bvcentre.ca
Ms.	Nancy	Van Camp	AGIV	Belgium	nancy.vancamp@agiv.be
Dr.	Frieke	Van Coillie	Ghent University	Belgium	frieke.vancoillie@ugent.be
Mrs	Joan	Vlasschaert	Nexen Inc.	Canada	joan_vlasschaert@hotmail.com
Ms.	Joanne	White	Natural Resources Canada	Canada	joanne.white@nrca.gc.ca
Mr	Tim	Whiteside	Batchelor Institute Of Indigenous Tertiary Education	Australia	tim.whiteside@batchelor.edu.au
Dr	Youssif	Aliyaa	Faculty of computers and information Helwan University, Cairo	Egypt	aliaay@yahoo.com
Dr	Weiqi	Zhou	University of Vermont	Usa	wzhou1@uvm.edu
Prof	Primo	Zingaretti	Polytechnic University Of Marche	Italy	zinga@diiga.univpm.it

NOTES:

UofC • This Is Now

- [Skip to Headline](#)
- [Skip to Navigation](#)
- [Skip to Content](#)
- [Skip to Sidebar](#)

UofC Navigation

- [Prospective Students](#)
- [Current Students](#)
- [Alumni](#)
- [Community](#)

Search UofC:

- [IT](#)
- [MY U OF C](#)
- [Contacts](#)



Team



Team2

Site Navigation

Primary links

- [Home](#)
- [Team](#)
- [Research](#)
- [Publications](#)
- [Graduate Opportunities](#)
- [Contact Us](#)

Team Members

- [Professors](#)
- [Post Doctoral Fellows](#)
- [Research Staff \(RS\)](#)

- [PHD](#)
- [M.Sc](#)
- [MGIS](#)
- [Alumni](#)

Professors

The Lab is co-directed by [Dr Geoff Hay](#) and [Dr Greg McDermid](#).

Geoffrey J. Hay



Assistant Professor - Geography

PhD Biology, Montreal
MSc Geography, Victoria
BSc (Hons) Geography, Calgary

Phone: (403) 220-4768

Email: gjhay@ucalgary.ca

Web: <http://homepages.ucalgary.ca/~gjhay>

Bio Summary

Geoff is a GIScientist and Landscape Ecologist specializing in multiscale geo-object based image analysis. He is an Alberta Ingenuity New Faculty Scholar and grant recipient ([AI](#): 2006-8), and his research program is supported by [NSERC](#) (2006-2011). Geoff is the conference chair for [GEOBIA, 2008](#) - *Pixels, Objects, Intelligence: Geo-Object Based Image Analysis for the 21st Century*, which will be held at the University of Calgary, Alberta Canada, Aug 6-7, 2008.

Additional information can be found in his [Department Profile](#).

Greg McDermid



Assistant Professor - Geography

PhD University of Waterloo
MSc University of Calgary
BSc (Hons) University of Calgary

Phone: (403) 220-4780

Email: mcdermid@ucalgary.ca

Bio Summary

Greg is a remote sensing scientist who joined the department in January, 2005. His research activities revolve around environmental modeling and monitoring using remote sensing and geographic information systems. He is a principal investigator in the Foothills Model Forest Grizzly Bear Research Program, where he works on the application of remote sensing and other geospatial tools for large-area, multi-jurisdictional resource management.

Additional information can be found in his [Department Profile](#).

Quick Links

- [GEOBIA](#)
- [GEOBIA - Wiki](#)
- [Geography - UofC](#)
- [UofC Library](#)

- [Staff & Faculty](#)
- [A to Z Index](#)