

13:30 Alberta Biodiversity Monitoring Institute (ABMI)

ABMI (Alberta Biodiversity Monitoring Institute) is an arm's-length, not-for-profit scientific organization. The business of the ABMI is to monitor and report on the status and trends of Alberta's species, habitat, and human footprint. The Geospatial Centre is the newest business unit within the ABMI where a number of core GIS products are produced. Satellite (SPOT) and aerial photo imagery is used as a data source for three main projects; Photo-plot Interpretation, Human Footprint interpretation and Base Feature updates. Along with these core products, the Geospatial Centre supports the other Centres within the ABMI, responds to committee and report requests and has begun venturing into new research areas and filling data voids within Alberta.

Ms. Gray is the northern GIS Coordinator at the ABMI Geospatial Centre. She received her B.Sc. in Biology from the University of Victoria. After working in the field of wildlife research in Alberta for 13 years, she returned to higher education and completed an Advanced Diploma in GIS at Selkirk College.

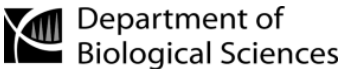
13:50 Applying least cost path analysis to maritime contexts multi-criteria weighting in Paleo-Indian migration models

Here I present a new methodology which uses predictive multi-criteria weighting in a least cost path (LCP) analysis to model possible routes of maritime migration by Paleo-Indian peoples during the peopling of the New World. By quantitatively analyzing environmental, physiological, and cultural maritime movement costs with GIS software, it is possible to predict movement corridors across the Northwest Coast land and seascapes that existed ~16,000 to 10,000 years ago. I introduce a technique which can help to identify areas that contain early archaeological sites, the excavation of which could help clarify to what extent and at what scale these coastal migrations may have happened. This methodology is the first to apply predictive LCP analysis to maritime travel. Additionally Greater accuracy is achieved by accounting for human agency and reducing environmental determinism by conducting this analysis at different data resolutions and at various temporal windows. Lastly the use of spatial autocorrelation statics is considered as a means of assessing model accuracy.

Mr. Robert Gustas is a graduate student at the University of Alberta in the anthropology department studying with Dr. Kisha Supernant. His research focuses on the application of Geographic Information System (GIS) technology to the archaeology of the Pacific Northwest. Specifically his work looks at using least cost analysis to predict possible coastal Paleo-Indian migration routes into the New World along the coast of British Columbia during the Late Pleistocene and Early Holocene. Outside of geospatial archaeology he is also interested in survey techniques and methods, mapping technology, cartography, history, and the anthropology of the Preclassic Maya of Northwestern Belize.

Thank you to:

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Urban and Regional Information Systems (URISA) Alberta Chapter

Geospatial Information and Technology Association (GITA) Pacific NorthWest Chapter

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UofA GIS Day

Friday, November 21, 2014



A Showcase of GIS Applications  
at the  
University of Alberta



Agenda

10:00	Welcome	Room 2-926 Enterprise Square
10:10	Changing Your World with GIS and what the Esri campus site license means to you	David Parry Esri Canada
10:40	Do food deserts exist in Calgary?	Wes Lu REES
11:00	Predicting patterns of regeneration on seismic lines to inform restoration planning in Boreal Forest habitats	Cassidy Van Rensen Renewable Resources
11:20	A new remotely-sensed topographic index to predict water-related soil attributes in the Boreal Forest of Alberta	Gabriel Oltean Renewable Resources
11:40	Digital monoplotting to extract vector and raster data from oblique angle terrestrial photographs	Chris Stockdale Renewable Resources
12:00	Lunch	
13:00	Early Childhood Development Mapping Project (ECMap)	Susan Lynch & Cindy Post ECMap
13:30	Alberta Biodiversity Monitoring Institute (ABMI)	Cris Grey ABMI
13:50	Applying least cost path analysis to maritime contexts multi-criteria weighting in Paleo-Indian migration models	Robert Gustas Anthropology
14:10	Closing	

www.ualberta.ca/~gis

### 10:10 Changing Your World with GIS and what the Esri campus site license means to you

This presentation will look at GIS software, training and cloud services available for University of Alberta Students, Faculty and Staff as well as touching on some upcoming Esri programs, including GeoMentors. **Mr. Parry** is an alumnus of the University of Alberta graduating in 1989, BSc with Specialization in Geology, furthering his Studies at NAIT in GIS. Mr. Parry has been working in Mineral Geology and IT Professional Services for 23 years with clients across Canada. His focus in the past 15 years has been in applying Geographical Sciences especially Remote Sensing, GPS, and Information Technology to many facets of Natural Resources, Energy, Transportation, Public Safety, and Commercial & Government Policy Analysis and Decision Support.

### 10:40 Do food deserts exist in Calgary?

A significant amount of research has examined supermarket accessibility, and food deserts have been identified among high-need residents. However, little research has explored the changes that occur in the access to healthy food when taking farmers' markets into consideration. Furthermore, few researchers have emphasized communities with large populations of children and seniors. This study investigated the accessibility of supermarkets and farmers' markets in the city of Calgary, Canada. Two communities with high populations of children and seniors, but low-income levels and limited access to healthy food sources, were identified as food deserts. The results also suggested that farmers' markets provide the surrounding neighborhoods with significant benefits, even though their overall alleviating effects on the lack of access to healthy food are limited.

**Mr. Lu** is a MSc student in Agricultural and Resource Economics with the Department of Resource Economics and Environmental sociology at the University of Alberta. He received a B.Sc. in Agricultural Economics from Dalhousie University with the Dean's Medal. He enjoys doing research on various topics. His research has been focusing on consumer behaviour, healthy food accessibility and current and future water use in Alberta.

### 11:00 Predicting patterns of regeneration on seismic lines to inform restoration planning in Boreal Forest habitats

Mapping of oil sand reserves involves the use of seismic lines (linear disturbances), which fragment forests and often fail to regenerate trees even decades following their use. With the continued increase in human footprint, regeneration of these disturbances is necessary for biodiversity conservation in the boreal forest. Little is known, however, about how local and landscape factors affect patterns of forest recovery on seismic lines. We investigated factors affecting forest regeneration using LiDAR, forest stand databases and a disturbance inventory of 4350 km of seismic lines in northeast Alberta, Canada. Recovery to a height of at least 3 m were inversely related to terrain wetness, line width, distance from roads as a proxy for human use of lines, and the presence of lowland habitat. Overall, terrain wetness had the strongest effect on recovery patterns with the wettest sites failing to recover even after 40 years post-disturbance. We used the conservation planning software MARXAN to prioritize restoration of seismic lines in our study area based on probability of regeneration, economic considerations and priority areas for threatened woodland caribou.

**Ms. Van Rensen** recently completed her MSc in Conservation Biology in the Department of Renewable Resources at the University of Alberta. She also completed her BSc in Ecology at the University of Alberta in 2010. Currently, she has a position with Environment and Sustainable Resource Development in the Government of Alberta as a Land and Biodiversity Modeller.

### 11:20 A new remotely-sensed topographic index to predict water-related soil attributes in the boreal forest of Alberta

Soil moisture and other site properties control the growth and development of woody plants and are consistently related to forest productivity. The complex interactions between climate, parent material, topography and biota through time control soil formation processes and allow us to predict soil attributes using topographic information without the expensive field surveys required to gather soil descriptions. Accurate digital elevation models based on LiDAR were used to calculate the depth-to-water (DTW) index defined as the sum of slopes along the least-cost path from any cell in the landscape to the nearest flow channel. We collected field estimates of site and soil properties from 125 plots across 5 locations representative of the Central Mixedwood natural subregion of northern Alberta, Canada. Our objectives were (1) to explore the relationships between DTW and soil properties, (2) to evaluate the effect of flow initiation

area on these relationships, and (3) to develop a model for predicting soil properties. Soil moisture regime, drainage class and depth to mottles were strongly related to DTW ( $p < .0001$ ). A flow initiation threshold area of 2 ha was found to provide the strongest relationships, while gradually weaker regressions were found with larger (4, 8, 12, 16 ha) or smaller (0.5, 1 ha) areas. We propose a linear model that uses DTW (2ha), Flow Accumulation and Slope to predict soil moisture regime in the rolling landscape of the boreal forest. **Mr. Oltean** graduated with a BSc in Forest Sciences from "Transilvania" University of Brasov, Romania and is currently working on my MSc in Forest Biology and Management with Dr. Phil Comeau in the Department of Renewable Resources. I am interested in remote sensing applications to forest management, with a particular focus on airborne and terrestrial LiDAR.

### 11:40 Digital monoplplotting to extract vector and raster data from oblique angle terrestrial photographs

Remote sensing is the best tool available to study ecological change over time over large landscapes but is limited to the era of aerial photography. The Mountain Legacy Project permits us to see the landscape at the turn of the 20th century, and is the world's largest land-based oblique repeat photograph collection (1890-2010). Previous studies of these photographs have been limited to qualitative description, or detailed analysis of only very small areas (10's of km<sup>2</sup>). Recent advancements in computing power have enabled the development of techniques to georeference oblique angle photographs. This collection of images can now be analyzed to measure landscape vegetation change since European settlement of the southern Rocky Mountains. The WSL Monoplplotting Tool is a new piece of software that extracts spatially referenced vector data from photographs. This presentation will demonstrate how the tool works, and provide an assessment of the accuracy and utility of using the WSL Monoplplotting Tool to georeference and measure change in the Mountain Legacy Project photographic collection. This paper also demonstrates a method by which raster data can be rapidly extracted from an image pair to measure changes in vegetation cover over time.

**Mr. Stockdale** is a PhD candidate in the department of Renewable Resources at the University of Alberta. His main areas of interest are in disturbance ecology and ecosystem dynamics at the landscape scale. Prior to his PhD studies, he worked with Alberta Sustainable Resource Development as the provincial coordinator of the prescribed fire program, and with the Canadian Forest Service as a forest health officer researching the relationships between fire and mountain pine beetle disturbance on the landscape. His Masters degree is from Oregon State University in forest ecology, and his Bachelor degree is from the University of Victoria in biology.

### 13:00 Early Childhood Development Mapping Project (ECMap)

The Early Childhood Development Mapping Project (ECMAP) was a five year initiative at the University of Alberta, Faculty of Extension, Community University Partnership that aims to strengthen Alberta's ability to make positive early childhood development a reality for every child in the province. Using the Early Development Instrument (EDI) combined with socio-economic and community data, analyzed information provided insights into how young children are developing in different geographic areas in Alberta and across the province, and possibly into the factors and circumstances that may affect development. As the popular context for GIS typically supports the natural resource sector, this project uses GIS in support of social mapping or human geography. This presentation will discuss the current provincial picture and the strategies that were put in place to make this project successful.

**Dr. Susan Lynch** is an adjunct professor in the Faculty of Extension at the University of Alberta. She received her PhD and master's degree in early childhood education at the U of A and has worked in public education for 45 years. Dr. Lynch has coordinated many development and research projects, including the Edmonton Early Childhood Development Community Mapping Pilot Project. Dr. Lynch directed the Child Study Centre at the U of A for six years and is a member of several boards and councils, including Success By 6 Edmonton and the Community-University Partnership for the Study of Children, Youth and Families (CUP) in the Faculty of Extension. In 2009, she accepted the position of ECMap director.

**Ms. Post** has been involved in the GIS field since 1996. She has worked in the public (municipal, provincial and federal government) and private sectors on GIS mapping, data compilation, data/business analysis, system design, project design, management and integration projects. She has also developed and taught GIS courses to corporate and academic clients. Post is past president of URISA Alberta and was an elected director of URISA International, an association for international GIS professionals. She has been on the steering committee for the GeoAlberta conference since 2005 and is active on many GIS sounding boards in Canada and the US. Post received her BA from the UofA.