

CURRICULUM VITAE
Garfield Giff

Western Arctic Research Centre,
Aurora Research Institute,
PO Box 1450, 191 Mackenzie Rd,
Inuvik, NT, Canada X0E 0T0

Office #
Tel: 1-867-777-3298
Fax: 1-867-777-4264
Email: Garfield.Giff@auroracollege.nt.ca

EDUCATION AND EMPLOYMENT HISTORY

Education

Ph.D. in Geodesy and Geomatics Engineering, University of New Brunswick, Fredericton, New Brunswick, Canada, 2005. Thesis Title: Conceptual Funding Models for Spatial Data Infrastructure Implementation. Supervisor: Dr. David Coleman

Dip. Ed. in University Teaching, University of New Brunswick, Fredericton, New Brunswick, Canada, 2005.

MSc (Honours) in Geographic Information Systems for Cadastral Application, University of Twente, Enschede, The Netherlands, 1997. Thesis Title: Property Information System Modeling and its Application in Urban Property Markets. Supervisor: Dr. Arbind Tuladhar

BSc (Honours) in Surveying and Mapping Sciences, University of East London, London, UK, 1990. Thesis Title: Assessment of the Precision of Nearshore Positioning Systems.

Certificates in: Asset Management, GIS Strategic Planning, How to Financially Justify Geospatial Projects, SDI: Planning, Policy, Strategy and Implementation, Managing GIS Implementation, Business and Technical Writing and Professional Development, and Project Writing

Professional Experience

2017-Present Manager, GIS Programs, Western Arctic Research Centre, Aurora Research Institute, Inuvik, Northwest Territories, Canada

2016-2017 Lecturer, GIS, Lakehead University, Orillia, Ontario, Canada

2016-2017 Civilian Consultant, Peel Regional Police, Ontario, Canada

2014- 2017 Independent Geospatial Information Management Consultant, Ontario, Canada

2013- 2014 Project Manager, (Enterprise GIS Roadmap), GPC GIS/Department of Municipal Affairs, Abu Dhabi, United Arab Emirates

| | |
|-----------|---|
| 2012-2013 | Geospatial Information Management Consultant, Geo-Information Management Consortium, Canada |
| 2010-2012 | Senior Performance Management Consultant (Geospatial Programs), GPC GIS /Abu Dhabi Systems and Information Centre, United Arab Emirates |
| 2008-2010 | Geospatial Information Management Consultant, Geo-Information Management Consortium, Canada |
| 2006-2008 | Research Fellow/Consultant, OTB Research Institute for Housing, Urban and Mobility Studies, Delft University of Technology, The Netherlands |
| 2006-2007 | Visiting Geo-Information Management Lecturer, Wageningen University, Wageningen, The Netherlands |
| 2000-2005 | Researcher and Instructor, Department of Geodesy and Geomatics Engineering, University of New Brunswick, Canada |
| 1985-2000 | Lecturer and GIS Coordinator, University of Technology, Kingston, Jamaica |

CURRENT ACTIVITIES

Research Interests

Over the last twenty years, I have done extensive research and consulting work on the socio-political, socio-economic, and technical issues associated with the implementation and maintenance of Geographic Information systems (GISs) and Spatial Data Infrastructures (SDIs). My work has contributed significantly to the GIS/SDI body of knowledge in the following areas:

- Economic justification of GISs and SDIs (e.g. cost benefit and cost avoidance analysis);
- Funding models for the implementation and maintenance of GISs and SDIs;
- Access and pricing policies for geospatial information;
- Business models, strategic plans, program designs, and implementation plans to support GIS and SDI implementation and maintenance;
- Quantification of the social and qualitative benefits of GISs and SDIs;
- Frameworks for assessing the performance of GISs and SDIs; and
- Data models to support interoperability.

My current research focuses on the application of GIS and remote sensing in facilitating climate change adaptation strategies for the Western Arctic. That is, the role of GIS and remote sensing in facilitating the design, development, and implementation of more efficient and effective climate change adaptation strategies. In keeping with the concept of making current and reliable spatial information more readily accessible, my research will investigate the capabilities of UAVs in collecting high volumes of data in a cost effective, timely, and reliable manner under Arctic conditions.

Although UAVs are currently used successfully in the South to collect high volumes of reliable large-scale data, their application in Northern environments has yet to be tested extensively. Questions still need to be answered on whether UAVs can produce consistent, reliable, affordable and timely data when operating in extreme Arctic conditions. That is, what are the effects on the UAV technology and mapping methodology when the operations or surveys are carried out in Arctic conditions (e.g., sub-zero temperatures, ice fogs, clouds, varying light conditions, and frequent loss of signal)? The research will attempt to add to the body of knowledge on UAV operations in Arctic regions (e.g., a manual on UAV operations in the Arctic), as well as making data readily available to support climate change adaptation strategies through advance testing of UAV technology and methodologies in Arctic conditions. Some key areas that will be investigated are as follows:

- The difference in accuracy and cost between UAV mapping with Ground Controls and UAV mapping using Real Time Kinematic (RTK).
- The operational efficiency of UAVs and their payloads in sub-arctic temperatures and the image quality produced in sub-arctic temperatures.
- The effectiveness of UAVs fitted with Optical and LIDAR sensors to measure snow depth.
- The economies of scale associated with using UAVs with Optical and LIDAR sensors to measure snow depth.
- The effects of the different Arctic light conditions and, in particular, snow reflection on UAV mapping results.
- The feasibility of using UAVs fitted with Optical and LIDAR cameras to survey waterways in the Arctic.
- The feasibility of using UAVs and satellite imagery to identify slumps in the Western Arctic in an effective and efficient manner.
- The use of UAV photogrammetry methodology to support effective and efficient monitoring and management of slumping and landslides in the Western Arctic.

Current Projects

Western Arctic Indigenous Mapping Workshops: The aim of this project is to deliver a series of geospatial workshops to communities across the Western Arctic. The goals of the workshops are to increase GIS and remote sensing capacity in the Western Arctic and to promote the application of GIS and remote sensing in the decision-making processes in the Western Arctic. This will be achieved through the delivery of technical training on GIS and remote sensing mapping tools that is specifically designed for the region.

Designing and Implementing a GIS to Support the Management of Mineral Strategies in the Western Arctic: The goal of this project is to design and implement a GIS capable of capturing, accessing, displaying, integrating, manipulating, analyzing, modelling, and managing geospatial information to support the management (planning, development, implementation, and review) of mineral strategy activities in the Western Arctic. The GIS will provide Western Arctic communities and researchers with easy and reliable access to current geospatial information and tools specifically designed to support mineral strategy activities in the Western Arctic.

Developing Online Digital Hazard Maps of Landslides Along the Caribou Hills, Inuvik,

NWT: This project aims to map and monitor the landslides and slumps along the Caribou Hills within the vicinity of Reindeer Station north of Inuvik. The initial phase will use UAV photogrammetry techniques to map the landslides and slumps. Within this phase additional information will be collected, for example, the vegetation type, soil type, and where possible, soil moisture content. In the second phase, selected areas will be remapped to identify growth in the slumps and landslides, as well as additional earth movement. The third phase of the project will investigate the effects of slope, soil type, soil moisture, permafrost condition, vegetation, and rainfall on the development of slumps and landslides along the Caribou Hills.

GIS and Remote Sensing Capacity Building in Indigenous Communities: The goal of this project is to grow the GIS and remote sensing capacity within indigenous communities across the Western Arctic through student engagement. That is, the project will deliver different levels of GIS and remote sensing training to high school and college students across the Western Arctic. It is expected that this project will grow GIS and remote sensing awareness amongst Western Arctic students and encourage them to pursue geomatics careers.

Professional Memberships

Urban and Regional Information Systems Association (URISA).

PUBLICATIONS

Journal Articles

- Giff, G, et al. 2008. GI Policies in Norway and England; Are they within the spirit of recent EU directives? In *The International Journal of Spatial Data Infrastructure Research* Vol. 3, pp 118-145.
- Giff, G, et al. 2008. Designing Performance Indicators to Support Spatial Data Infrastructure Assessment. In *The Journal of Computers, Environment and Urban Systems* Vol. 32, No. 5, pp 365-376.
- Giff, G, Coleman D, and Labonte J. 2005. A Comparison of SDI Funding Arrangements in Europe and Canada. In *Geomatica*, Vol. 60, No. 1, pp 59-78.
- Giff, G, and Coleman D. 2005. Selecting Funding Models for SDI Implementation: Using Simulation Models. In *GIS Development*, Vol.1, No.2.
- Giff, G. 2002. A Critical Review of the GSDI Cookbook from the Viewpoint of SDI Implementation in Emerging Nations. In *Geomatica*, Vol. 56, No. 3, pp. 246-250.

Papers in Conference Proceedings

- Giff, G. 2008. In Search of Policies to Support the Implementation of SDIs in the Caribbean. *Proceedings of URISA 2008 Caribbean GIS Conference*, Grand Cayman, Cayman, August 2008.
- Giff, G. 2008. The Application of Performance Indicators to Assist in SDI/GIS Assessment. *Proceedings of the Geospatial Infrastructure Solutions Conference on Infrastructure Solution*, Seattle, Washington USA, March 9-12, 2008.
- Giff, G and Lunn R. 2008. Designing Performance Indicators for Local SDI Assessment: A City of Fredericton Case Study. *Proceedings of GSDI10 Conference on Small Island Perspectives on Global Challenges*, Port of Spain, Trinidad and Tobago, February 2008.
- Giff, G. 2008. Geoportals in Selected European States: A comparative analysis. *Proceedings of GSDI10 Conference on Small Island Perspectives on Global Challenges*, Port of Spain, Trinidad and Tobago, February 2008.
- Giff, G. 2007. Key Socio-Political Issues Associated with National Geoportals. Paper presented at the EUROGI Members meeting. Brussels, Belgium. Published on the EUROGI website.
- Giff, G, van Loenen B, and Zevenbergen J. 2007. Policies Supporting Sharing and Reuse of GI in Norway and the UK: Are They Within the Spirit of Recent EU Directives? *Proceedings of the 13th EC GI & GIS Workshop*, Porto, Portugal, 4-6 July 2007.
- Giff, G. 2006. Performance Indicators: An Essential tool for The Recapitalisation of GISs. *Proceedings of URISA 2006 Caribbean GIS Conference*, Nassau, Bahamas, November 2006.
- Giff, G. 2006. The Value of Performance Indicators to Spatial Data Infrastructure Development. *Proceedings of GSDI9 Conference on Spatial Information: Tool for Reducing Poverty*, Santiago, Chile, November 2006.
- Giff, G and Coleman D. 2005. Using Simulation to Evaluate Funding Models for SDI Implementation. *Proceedings of FIG Working Week 5 and GSDI8 Conference on the role of SDIs in an Information Society*, Cairo, Egypt, April 2005.
- Giff, G and Coleman D. 2004. Evaluating Funding Models for SDI Implementation in Emerging Nations Through Simulation. *Proceedings of URISA 2004 Caribbean GIS Conference*, Barbados, September 2004.
- Giff, G and Coleman D. 2003. Financing Models For SDIs: Are They Applicable In Emerging Nations. *Proceedings of the Cambridge Conference on National Mapping*, Cambridge, UK, July 2003. *Invited Paper and Presentation*.

- Giff, G and Coleman D. 2003. Financing Models for SDIs: Are they Applicable in Emerging Nations? *Proceedings of the 9th European Community GI & GIS Workshop – ESDI: Serving the User*, A Coruña, Spain, 25-27 June 2003.
- Giff, G and Coleman D. 2002. Funding Models for SDI Implementation: from Local to Global. *Proceedings of GSDI6 Conference on SDI*, Budapest, Hungary, September 2002.
- Giff, G and Coleman D. 2002. Spatial Data Infrastructure Funding Models: A necessity for the success of SDIs in Emerging Countries. *Proceedings of the 2002 Congress of the Federation Internationale des Geometres (FIG)*, Washington, D.C., USA, April 2002.
- Giff, G. 2001. Financing Spatial Data Infrastructure Development: Towards A Framework of Alternative Funding Models. *Proceedings of the International Symposium on Spatial Data Infrastructure*, University of Melbourne, Australia, 19-20 November 2001.

Book Chapters

- Giff, G. 2013. Measuring and Monitoring Spatial Data Infrastructures. *In SDI Implementation Manual of the Americas*. Chapter 10, (Eds.) GeoConnections; Hickling Arthurs Low Corporation; Giff, G. A. Permanent Committee for Geospatial Data Infrastructure for the Americas publication, UN, New York, pp 129-149.
https://unstats.un.org/unsd/geoinfo/RCC/docs/rcca10/E_Conf_103_14_PCIDEA_SDI%20Manual_ING_Final.pdf
- Giff, G and Jackson J. 2013. Towards An Online Self-Assessment Methodology for SDIs. *In Spatial Enablement in Support of Economic Development and Poverty Reduction*. Chapter (Eds.) H Onsrud and A Rajabifard. GSDI Association Press, Needham, MA, USA, pp 99-120.
- Giff, G. 2008. A Framework for Designing Performance Indicators for Spatial Data Infrastructure Assessment. *In A Multi-View Framework to Assess Spatial Data Infrastructures*. Chapter 11, (Eds.) J Crompvoets, A Rajabifard, B van Loenen, and T Delgado Fernández. Space for Geo-Information (RGI), Wageningen University, Wageningen, The Netherlands, pp 211-228.
- Giff, G. 2008. Using Performance Indicators to Assess SDIs/GISs. *In Assessment and Socio-economic Aspects of Geographic Information Infrastructures*. Chapter 2, (Ed.) B van Loenen. The Netherlands Geodetic Commission, Delft, The Netherlands, pp 13-22.
- Giff, G and Coleman D. 2004. Funding Mechanisms for SDI Implementation in Developing Countries. *In SDI Africa: An Implementation Guide*. Chapter 7. (Eds.) ECA, an online document available at: <http://geoinfo.uneca.org/sdiafrica/>
- Giff, G and Coleman D. 2003. Financing Spatial Data Infrastructure Development: Examining Alternative Funding Models. *In Developing Spatial Data Infrastructures: from concept*

to reality. (Eds.) I Williamson, ME Feeney, and A Rajabifard. Taylor & Francis, London, UK, pp 211-233.

Reports

Prepared a number of reports during my career which are too numerous to list here. Please see below for some examples:

Giff, G. 2011. Abu Dhabi's GeoMaturity Assessment Results: Summary Report. A Report for Abu Dhabi Systems and Information Centre, Abu Dhabi, United Arab Emirates.

Giff, G. 2011. Abu Dhabi Spatial Data Infrastructure Stakeholder Entities GeoMaturity Assessment Report. A Report for Abu Dhabi Systems and Information Centre, Abu Dhabi, United Arab Emirates.

Giff, G. 2009. Gap Analysis Study: Barriers to Accessing Public Sector Data in Jamaica. A Public Sector Modernisation Report, Office of the Prime Minister, Government of Jamaica, Kingston, Jamaica.

van Loenen, B, Zevenbergen J, Giff G, and Crompvoets J. 2006. *Opentoeegankelijkheidsbeleid voor geo-informatie vergeleken: het gras leek groener dan het was*, onderzoek in opdracht van het Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 120 pagina's (Executive summary & country reports in English).

Giff, G and Coleman D. 2004. Financing Future Generations of Spatial Data Infrastructure: The Application of Innovative Funding Models. A GeoConnections Report, GeoConnections, Ottawa, Canada

Giff, G and Coleman D. 2003. Spatial Data Infrastructure Developments in Europe A Comparative Analysis with Canada. A GeoConnections Report, GeoConnections, Ottawa, Canada.

Unpublished Reports and Other Contributions

Prepared a number of reports and teaching materials during my career which are too numerous to list here.

PRESENTATIONS

Invited, Plenary, and Keynote Presentations

Giff, G. 2007. Key Socio-Political Issues Associated with National Geoportals. Paper presented at the EUROGI Members meeting. Brussels. Published on the EUROGI website. *Invited Paper and Presentation*

Giff, G and Coleman D. 2003. Financing Models For SDIs: Are They Applicable In Emerging Nations. *Proceedings of the Cambridge Conference on National Mapping*, Cambridge, UK, July 2003. ***Invited Paper and Presentation***

Giff, G. 2001. Financing Spatial Data Infrastructure Development: Towards A Framework of Alternative Funding Models. *Proceedings of the International Symposium on Spatial Data Infrastructure*, University of Melbourne, Australia, 19 - 20 November 2001. ***Invited Paper and Presentation***

Contributed Oral Presentations

Too many to list.

RESEARCH FUNDING

Pending Applications

The Canada Foundation for Innovation's College-Industry Innovation Fund. To test the capabilities of Unmanned Aerial Vehicles to perform reliable, accurate, efficient, and timely data collection in the Western Arctic using photogrammetric techniques. \$670,000

Awarded – Current

Natural Resources Canada Geo-mapping for Energy and Minerals Program, Phase 2, 2018-20. Organizing, facilitating and delivering Indigenous Mapping Workshops to Western Arctic Communities. \$75,000

Natural Resources Canada Geo-mapping for Energy and Minerals Program, Phase 2, 2018-20. Design and implement a GIS capable of capturing, accessing, displaying, integrating, manipulating, analyzing, modelling and managing geospatial information to support the management (planning, development, implementation and review) of mineral strategy activities in the Western Arctic. \$75,000

Indigenous and Northern Affairs Canada Climate Change Preparedness in the North Program. Map and monitor landslides and slumps along the Caribou Hills within the vicinity of Reindeer Station in Inuvik using UAV photogrammetry technique. \$295,000

Awarded - Completed

The Netherlands Ruimte voor Geo-Informatie or Space for Geo-information Project. 2006-2008. Developed an Assessment Framework for National Spatial Data Infrastructures.

The Netherlands Ministry of Interior Affairs. 2006-2007. Performed a comparative study and analysis of access policies to public sector information (PSI) across Europe.

University of New Brunswick's Centre for Property Studies. 2004. Investigated key socio-political and technical issues that should be addressed when implementing a Spatial Data Infrastructure in the Chilean environment.

Natural Resources Canada GeoConnections Program 2003-2004. Designed funding models for the implementation of the next generation of SDIs across Canada.

Natural Resources Canada GeoConnections Program 2003-2004. Reviewed SDI implementation throughout major European countries and compared the findings to the level of SDI implementation in Canada. The report analysed access policies, data standards, data models, data content, data quality, Geoportals and organisational issues.

University of New Brunswick. 2000-2005. Developed funding models for the implementation of SDIs across different implementation environments.

AWARDS AND HONOURS

Awards

- 2007 ePSIplus Network Grants
- 2003 GEOIDE Network Grant
- 2002 GeoConnections Skills Network Scholarship
- 2001 Department of Geodesy and Geomatics Engineering Scholarship, University of New Brunswick, New Brunswick, Canada.
- 1995 Netherlands Fellowship Program Scholarship, The Netherlands.
- 1994 Lecturer of the year, Department of the Built Environment, University of Technology, Kingston, Jamaica
- 1989 British Council Scholarship

TEACHING ACTIVITIES

Courses Taught

At Aurora College

- 120-116 Geographic Information Systems.
Second-year course for the Environment and Natural Resources Technology Program that provides a general introduction to Geographic Information Systems and their application to environmental management. 2018-present.

Lakehead University

GEOG 3251 Geographic Information Systems.
An introduction to the fundamental principles and techniques of Geographic Information Systems (GIS). Topics include the collection and visualization of digital data, database construction and manipulation, and the production of cartographically-sound maps using industry-standard GIS software. 2016.

Wageningen University

Geospatial Information Management. 2007

Thesis supervision. 2006-2007

University of New Brunswick (2000-2004)

GGE1001 Introduction to Geodesy and Geomatics, year I

GGE2012 Advanced Surveying, year II

GGE2013 Advanced Surveying Practicum, year II

GGE3111 Introduction to Adjustment Calculus, year III

GGE3023 Surveying Design Practicum, year III

University of Technology

Geographic Information Systems, year II-III

Introduction to Surveying, year I

Surveying Practicum, year I

Advanced Surveying, year II

Advanced Surveying Practicum, year II

Cadastral Surveying, year III

Engineer Surveying, year II-III

Introduction to Adjustment Calculus, year III

Geodesy, year III

Thesis supervision, year IV

Student Supervision

1985-2008 Supervised and mentored undergraduate and graduate students on geomatics projects, thesis, and conference presentations.

PROFESSIONAL SERVICE ACTIVITIES

Review Panels and Advisory Boards

Member, the Global Spatial Data Infrastructure Editorial Board. 2009-Present.

Member, the Journal of Computers, Environment and Urban Systems Editorial Committee.
2009-Present.

Peer Reviewer, the International Journal of Spatial Data Infrastructure Research. 2009-Present.

Member, the GSDI Legal and Economic Working Group. 2006-2010.

Rapporteur, the ePSIplus Thematic Meetings on Monitoring the Financial Impact of the
Implementation of the European Public Sector Information Directive. 2006-2008.

Member, the URISA Workshop Development Committee.

Conference, Conference Session, and Workshop Organization

Conference and Workshop Organizer

Organized, hosted, and facilitated several conferences, workshops, and think tanks, in many different countries and organizations, at the academic, professional development and professional levels.

Other Professional Service Activities

Manuscript Reviews

Reviewed a number of manuscripts for journals and conferences. Also reviewed and marked graduate theses for universities.