# Community Wireless Infrastructure Research Project
## "Exploring Models & Best Practices in Community/Public Wireless Networking in Canada"

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Project Objectives:

- To deepen, extend and share knowledge and research in the emerging field of community/public wireless networking, by identifying, profiling and analyzing case studies, models and best practices in Canada and around the world;
- To enhance community/public wireless practices and empower community/public wireless networking practitioners and organizations, by documenting and validating achievements and best practices, and by analyzing case studies in order to reinforce their decision making and problem-solving capacity;
- To promote networking and the sharing of knowledge, resources and expertise between university researchers, community organizations, and government personnel with an interest in wireless infrastructure; and,
- To influence the development of government policies, programs and funding priorities with regards to community/public wireless infrastructure.

Key questions for policymakers, economic development professionals, and community networking researchers and practitioners:

- What is the current state of wireless broadband deployment in Canada? How accessible is wireless broadband service to the majority of Canadians?
- What role do or can community-based organizations, municipalities and other public entities play in the development and accessibility of wireless broadband infrastructure in Canada?
- What are the benefits/advantages of community-based, public models of wireless broadband provision, particularly in relation to commercial alternatives (where these exist)?
- What models and best practices in community/public wireless networking maximize these benefits?
- What obstacles to the development of community/public wireless networking initiatives exist in Canada – legislative, regulatory, competitive, technical, etc. – and what steps need to be taken to overcome them?

**Community Wireless Infrastructure Research Project (CWIRP)**

"Exploring Models & Best Practices in Community/Public
Wireless Networking in Canada"

## Project Details

### Background

Access to advanced information and communications technology (ICT) infrastructure, such as broadband internet and wireless networks, is vital to the socio-economic well-being of communities in the global knowledge-based economy. The provision of 'smart' or 'intelligent' infrastructure, such as municipal wireless (WiFi) systems, is being used increasingly by communities to compete for investment and skilled workers. Firms, investors, skilled workers, researchers and governments rely on such infrastructure to share data and information, transact business, innovate, communicate, and work more efficiently. Citizens, meanwhile, are becoming increasingly reliant upon wireless networks and mobile devices to carry out their daily lives, from accessing news and information and communicating with friends and relatives, to mobile working and accessing location-based services. Indeed, wireless broadband infrastructure is becoming as important to the new economy as the great public infrastructures and utilities of the industrial era were in the 19th and 20th centuries, including electricity, wired telephony, transportation grids, and water and sewage facilities.

In recognition of the importance of wireless broadband as an essential amenity for the 21st century, hundreds of communities and municipalities in the United States are developing community/public WiFi systems. Major U.S. cities like Philadelphia and San Francisco are in the process of rolling-out municipal WiFi systems in partnership with the private sector. While, for its part, Canada is one of the most 'connected' nations in the world, other jurisdictions have begun to pull ahead of us in broadband and wireless deployment, including South Korea, the Netherlands and Denmark. Meanwhile, persistent gaps in ICT infrastructure development and service delivery continue to exclude many Canadians from the benefits of new ICTs, including inhabitants of rural and remote communities, Aboriginals, the disabled, and low income Canadians. While Canada has been an acknowledged leader among nations in the global race to "wire" itself, its place among nations in the wireless future is uncertain.

The current situation raises a number of questions for policymakers, economic development professionals, and community networking researchers and practitioners:

- What is the current state of wireless broadband deployment in Canada? How accessible is wireless broadband service to the majority of Canadians?

- What role do or can community-based organizations, municipalities and other public entities play in the development and accessibility of wireless broadband infrastructure in Canada?

- What are the benefits/advantages of community-based, public models of wireless broadband provision, particularly in relation to commercial alternatives (where these exist)?

- What models and best practices in community/public wireless networking maximize these benefits?
- What obstacles to the development of community/public wireless networking initiatives exist in Canada – legislative, regulatory, competitive, technical, etc. – and what steps need to be taken to overcome them?

To explore answers to these and other questions, the Community Wireless Infrastructure Research Project (CWIRP) brings together a multidisciplinary and collaborative research team of academics, community practitioners and government partners that will investigate the development, benefits and challenges of community/public wireless networks in Canada. The work of CWIRP is supported through the Peer Reviewed Research Program of Infrastructure Canada and is administered by the Social Sciences and Humanities Research Council.

## Objectives

Among the research and practical goals of the CWIRP project are the following:

- To deepen, extend and share knowledge and research in the emerging field of community/public wireless networking, by identifying, profiling and analyzing case studies, models and best practices in Canada and around the world;

- To enhance community/public wireless practices and empower community/public wireless networking practitioners and organizations, by documenting and validating achievements and best practices, and by analyzing case studies in order to reinforce their decision making and problem-solving capacity;

- To promote networking and the sharing of knowledge, resources and expertise between university researchers, community organizations, and government personnel with an interest in wireless infrastructure; and,

- To influence the development of government policies, programs and funding priorities with regards to community/public wireless infrastructure.

## Program of Research

The project will include a number of research elements, including:

- in-depth, site-specific case studies focusing on community/public wireless infrastructure initiatives in Canada; and,

- broader thematic studies addressing cross-cutting, conceptual and policy issues.

**Case Studies:**

The foundation of CWIRP's research program will be a coordinated series of in-depth case studies at the sites of 4 community partners. The following lists each of our case studies, with the assigned CWIRP investigator indicated in parenthesis:

- **Keewaytinook Okimakanak / K-Net,** (Clement)
- **Wireless Nomad,** (Clement)
- **Île Sans Fil (ISF),** (Crow)
- **Fred e-Zone**, (Middleton)

Additional case studies of other community/public wireless initiatives may also be carried out, including Toronto Hydro Telecom and Wireless Toronto.

Each case site will be examined and compared in terms of the following areas of concern:

- Project rationale/mission;
- access infrastructure and technology choices;
- ownership, business model and/or funding mechanism;
- governance;
- network policies;
- applications;
- adoption and use;
- community impacts; and
- government policies and programs.

**Thematic Studies:**

In conjunction with the case studies, CWIRP investigators will pursue a number of thematic studies that address themes and issues cutting across the case studies (e.g. partnerships, governance, funding) or that make a broader conceptual, theoretical, or policy-related contribution to the study of community/public wireless infrastructure. Among the broad-based studies to be undertaken by the project are (Investigative lead in brackets):

- a theoretical and conceptual interrogation of community/public wireless networks as public infrastructure (All);

- a study of risks associated with commercial wireless broadband infrastructure deployment (Middleton);

- a cross-case study comparison and exploration of various models of governance for public/community wireless infrastructure (Longford); and,

- a comparative study and analysis of public policies related to community/public wireless infrastructure in Canada, the U.S. and selected other international jurisdictions (Longford).

Additional research materials and resources will be created in support of both the case and broad-based studies, including literature reviews, an inventory of community/public wireless infrastructure in Canada and abroad, and an "environmental scan" of relevant public policies, thus contributing to the development of a repository of knowledge and research

resources for use beyond the academic community, including community organizations, municipalities and policy makers.


## What Community Partners Can Expect to Gain

- Voice in Research
- Validation
- Access to Research Resources
- Knowledge Sharing
- Reflection
- Training & Networking Opportunities


## Profiles of CWIRP Academic Investigators

**Andrew Clement** is a Professor in the Faculty of Information Studies at the University of Toronto, where he coordinates the Information Policy Research Program. He is the Director of the Collaborative Graduate Program in Knowledge Media Design and holds a cross-appointment (status-only) in the Department of Computer Science, from where he received his PhD in 1986. Dr. Clement is the principal investigator for the Canadian Research Alliance for Community Innovation and Networking (CRACIN), a SSHRC-funded collaborative research project exploring the status and benefits of community networks in Canada.

**Barbara Crow** is an Associate Professor of Communication Studies at York University. Her research interests include digital technologies, social movements, feminist theory, women's studies, and the political economy of communication. Dr. Crow is a Co-Investigator with the Heritage Canada-funded Mobile Digital Commons Network, which connects researchers, the arts and industries focused on mobile, wireless, digital technologies in Canada. Dr. Crow holds a PhD in Sociology from York University.

**Catherine Middleton (Principal investigator)** is an Associate Professor in the School of Information Technology Management, in the Faculty of Business at Ryerson University. Dr. Middleton recently held a SSHRC Initiative on the New Economy (INE) grant studying broadband adoption and policy in Canada (www.broadbandresearch.ca). She received her PhD in Management Information Systems and Organization Theory from the Schulich School of Business at York University in 2002.

**Graham Longford** is a Postdoctoral Research Fellow in Community Informatics in the Faculty of Information Studies at the University of Toronto, where he is affiliated with CRACIN. Dr. Longford's research focuses on the social and political implications of new information and communication technologies. Dr. Longford received a Ph.D. in Political Science from York University in 2000.


## Profiles of CWIRP Community Partners

### Keewaytinook Okimakanak - K-Net
An initiative of Keewaytinook Okimakanak (KO), a non-profit tribal council in northwestern Ontario, K-Net is an aboriginally-owned and managed community network established in 1994 to provide broadband services and ICT applications (telehealth, education, economic development, and community e-centres) to communities of the Nishnawbe Aski First Nations. K-Net uses satellite broadband, video conferencing, IP telephony, online forums, e-

mail, and other web-based communication tools to link First Nations communities and their service organisations. KO was named as Industry Canada's Aboriginal Smart Communities demonstration project in 2000. K-Net also serves as the Regional Management Organization for First Nations School-Net programs across Ontario, and operates telemedicine services in 24 communities. K-Net servers host over 20,000 web pages and 30,000 e-mail accounts, and receive over 100 million hits per month.

### Île Sans Fil (ISF)
Île Sans Fil is an all-volunteer bilingual non-profit organization dedicated to the development of a free communication infrastructure to strengthen local communities in the greater Montreal region. Île Sans Fil is both a technical development project and a grass roots community group, involving professionals and students from diverse fields. Île Sans Fil has deployed 70+ free internet hotspots in public spaces and local businesses (cafes, parks, etc.) in downtown Montreal, which currently have over 12,000 registered users. Open source captive portal software developed by ISF (WiFi-DOG) enables members to disseminate local content (e.g. arts, community news, local events) at its various hotspots.

### Fredericton eZone
Wi-Fi in Fredericton, NB is the result of an extension to the fiber network that the City developed in 1999. Addressing issues such as high cost of internet, necessity of communicating across a dispersed organization, and effectively sharing information and files led to the formation of a City-owned company known as e-Novations to build and manage a fiber network. Fred-eZone is now a free, community-wide Wi-Fi network providing residents, visitors and businesses with mobile broadband access in many zones within the city.

### Wireless Nomad (WN)
Wireless Nomad is a Toronto-based co-operative ISP established in 2005 to develop a community-based and cooperatively managed residential and commercial broadband network using WiFi "mesh" networking technology. The network is financed through fees paid by subscribers, who automatically become members of the WN co-operative, with full membership rights to participate in developing and managing the network. In addition, Wireless Nomad has developed captive portal technology which enables members to post locally-specific content to neighbourhood "splash" pages.


### Profile of CWIRP Government Partner

**Industry Canada** is the main federal government department with both program and regulatory involvement in the deployment, adoption and use of advanced ICTs in Canada, and has been a long-standing funder of public/community based ICT initiatives in Canada, including SchoolNet and the Community Access Program. More recently, Industry Canada has managed the Broadband for Rural and Northern Development Pilot Program and, along with Infrastructure Canada, the National Satellite Initiative. In addition, radio-frequency spectrum allocation and management, including WiFi, are mandated responsibilities of the Department.