

# Dr. Stephen Makonin

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## Education

*2010– 2014* **Doctor of Philosophy**

Simon Fraser University, School of Computing Science (Burnaby, Canada)

Thesis: Real-Time Embedded Low-Frequency Load Disaggregation

Advisor: Fred Popowich

*2007 – 2009* **Bachelor of Technology**

British Columbia Institute of Technology

School of Computing and Academic Studies (Burnaby, Canada)

Major: Computer Systems with a Data Communications Specialization

*1993 – 1996* **Diploma in Computer Technology**

Selkirk College (Castlegar, Canada)

*2009* **Certificate, Electronics Technician**

George Brown College (Toronto, Canada)

## Professional Affiliation

*submitted &* **Professional Engineer (PEng)**

*under review* Association of Professional Engineers and Geoscientists of British Columbia

*2013 – now* **Senior Member (smIEEE)**

Institute of Electrical and Electronics Engineers (IEEE)

Student Member and Member since 2008

*2010 – now* **Information Systems Professional (ISP)**

Canadian Information Processing Society (CIPS)

## Research Experience

*2014 – now* **Postdoctoral Fellow & Research Associate**

Simon Fraser University, School of Engineering Science (Burnaby, Canada)

Advisor: Ivan V. Bajic

*2014 – 2015* **Postdoctoral Fellow & Sessional Instructor**

Simon Fraser University, School of Computing Science (Burnaby, Canada)

Advisors: Wolfgang Stuerzlinger (postdoc) & Anthony Dixon (instructor)

*2008 – 2015* **Research Associate**

British Columbia Institute of Technology, Applied Research (Burnaby, Canada)

## Teaching Experience

*Fall 2014,* **Introduction to the Internet and the World Wide Web (CMPT 165)**

*Spring 2015* Simon Fraser University, School of Computing Science

Students each semester: in-class 200, dist ed 225. TAs: 6.

Instructor rating by students: A/71%, B/26%, C/3%, D/0%, F/0%.

## Industry Experience (Software Engineering)

*2012* **Mitacs Accelerate Intern** (4 months)

Awesense Wireless Inc. (Vancouver, Canada)

*2011 – 2012* **NSERC Engage Research Assistant** (8 months)

Embedded Automation, Inc. (Surrey, Canada)

*2006 – 2008* **Co-Founder & CTO**

Vvvroom.com (Burnaby, Canada)

*2006* **Vancouver Office Software Development Manager**

AbsolutePoker.com: ePrado Management, Inc. (Vancouver, Canada)

*1996 – 2008* **Principal & Senior Software Developer**

Oponix Systems Inc. formerly Makonin Consulting Corp. (Burnaby, Canada)

Clients incl. Telus Mobility, Vancouver Coastal Health, Sierra Wireless, Safeway

Canada, Quartech Systems, Engineering Central, ApexMail, OAN Services

## Scholarships, Awards & Grants

- 2015 IEEE Vancouver Section Leadership and Contribution Award — Initiative
- 2012, 2014 SFU GSS Professional Development Grant
- 2014 SFU Faculty of Applied Science (FAS) Graduate Fellowship (PhD)
- 2012, 2014 Ebco/Eppich Graduate Scholarships in Intelligent Systems
- 2013, 2013 SFU Travel & Minor Research Award
- 2013 BCIT School of Energy Research Seed Funding Grant
- 2013 SFU President's PhD Scholarship
- 2012, 2013 SFU Graduate Fellowship (PhD)
- 2010 BCIT Vancouver 2010 Olympic Winter Games Legacy Fund Scholarship

## Publications

### BOOKS & THESES

- Pacheco-Torgal, F., Rasmussen, E., Granqvist, C.-G., Ivanov, V., Kaklauskas, H. A., and **Makonin, S.**, editors (in draft). *Start-Up Creation: The Smart Eco-Efficient Built Environment*. Elsevier, ISBN: tbd.
- Makonin, S.** (2014). *Real-Time Embedded Low-Frequency Load Disaggregation*. PhD thesis, Simon Fraser University, School of Computing Science.
- Bennett, D., **Makonin, S.**, Mayfield, V. W., Neustaedter, T., and Wrenn, M. R. (1996). *Visual C++ 5.0 Developer's Guide*. Sams Publishing, ISBN: 0672310317.

### JOURNAL ARTICLES (PEER REVIEWED)

- Makonin, S.**, Ellert, B., Popowich, F., Bajic, I. V., and Gill, B. (2015). AMPds: 2 years (2012-2014) of electricity, water, and natural gas consumption of a residential house in Canada. *Scientific Data*, NPG, [in submission].
- Makonin, S.**, Popowich, F., Bajic, I. V., Gill, B., and Bartram, L. (2015). Exploiting HMM Sparsity to Perform Online Real-Time Nonintrusive Load Monitoring (NILM). *IEEE Transactions on Smart Grid*, [in revised submission].
- Makonin, S.** and Popowich, F. (2014). Nonintrusive Load Monitoring (NILM) Performance Evaluation. *Energy Efficiency*, Springer, 8(4):809–814.

**Makonin, S.**, Bartram, L., and Popowich, F. (2013). A Smarter Smart Home: Case Studies of Ambient Intelligence. *IEEE Pervasive Computing*, 12(1):58–66.

**Makonin, S.** and Popowich, F. (2012). Home Occupancy Agent: Occupancy and Sleep Detection. *GSTF Journal on Computing*, 2(1):182–186.

#### CONFERENCE PROCEEDINGS (PEER REVIEWED)

**Makonin, S.**, McVeigh, D., Stuerzlinger, W., Tran, K., and Popowich, F. (2016). Mixed-Initiative for Big Data: The Intersection of Human + Visual Analytics + Prediction. In *Proceedings of the Hawaii International Conference on System Sciences (HICSS-49)*. [to appear]

Ellert, B., **Makonin, S.**, and Popowich, F. (2015). Appliance Water Disaggregation via Non-Intrusive Load Monitoring (NILM). In *Proceedings of the EAI International Conference on Big Data and Analytics for Smart Cities (BigDASC)*. [to appear]

Wallace, J., Richardson, K., Gill, B., and **Makonin, S.** (2015). Cognitive Radio Technology: System Evolution. In *Proceedings of the 4th International Conference On Wireless Networks and Embedded Systems (WECON)*.

**Makonin, S.**, Bajic, I. V., and Popowich, F. (2014). Efficient Sparse Matrix Processing for Nonintrusive Load Monitoring (NILM). In *Proceedings of the 2nd International Workshop on Non-Intrusive Load Monitoring*.

**Makonin, S.**, Guzman Flores, L., Gill, R., Clapp, R. A., Bartram, L., and Gill, B. (2014). A Consumer Bill of Rights for Energy Conservation. In *Proceedings of the 2014 IEEE Canada International Humanitarian Technology Conference (IHTC)*.

Filsoof, R., Bodine, A., Gill, B., **Makonin, S.**, and Nicholson, R. (2014). Transmitting Patient Vitals Over a Reliable ZigBee Mesh Network. In *Proceedings of the 2014 IEEE Canada International Humanitarian Technology Conference (IHTC)*.

**Makonin, S.**, Sung, W., Dela Cruz, R., Yarrow, B., Gill, B., Popowich, F., and Bajic, I. V. (2013). Inspiring Energy Conservation Through Open Source Metering Hardware and Embedded Real-Time Load Disaggregation. In *Proceedings of the 5th IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC)*.

**Makonin, S.**, Popowich, F., Bartram, L., Gill, B., and Bajic, I. V. (2013). AMPds: A Public Dataset for Load Disaggregation and Eco-Feedback Research. In *Proceedings of the 2013 IEEE Electrical Power and Energy Conference (EPEC)*.

- Makonin, S.**, Popowich, F., Moon, T., and Gill, B. (2013). Inspiring Energy Conservation Through Open Source Power Monitoring and In-Home Display. In *Proceedings of the 2013 IEEE Power and Energy Society General Meeting*.
- Makonin, S.**, Popowich, F., and Gill, B. (2013). The Cognitive Power Meter: Looking Beyond the Smart Meter. In *Proceedings of the 2013 26th Annual IEEE Canadian Conference on Electrical and Computer Engineering (CCECE)*.
- Makonin, S.**, Kashani, M., and Bartram, L. (2012). The Affect of Lifestyle Factors on Eco-Visualization Design. In *Proceedings of Computer Graphics International (CGI)*.
- Makonin, S.**, Pasquier, P., and Bartram, L. (2011). Elements of Consumption: An abstract visualization of household consumption. In *Smart Graphics*, LNCS, 6815:194–198. Springer Berlin Heidelberg.
- Makonin, S.** and Popowich, F. (2011). An intelligent agent for determining home occupancy using power monitors and light sensors. In *Toward Useful Services for Elderly and People with Disabilities*, LNCS, 6719:236–240. Springer Berlin Heidelberg.

#### PUBLISHED PUBLICLY AVAILABLE DATASETS

- Makonin, S.** (2015). Almanac of Minutely Power dataset (AMPds). Harvard Dataverse, V2. DOI: <http://dx.doi.org/10.7910/DVN/FIE0S4>. [to be released, previous releases 2013 and 2014 found at <http://ampds.org>].
- Makonin, S.** (2015). 2010 ZigBee Sensor Data Collected From a House (in Vancouver, Canada) Dataset. Harvard Dataverse, V1. DOI: <http://dx.doi.org/10.7910/DVN/2K9FFE>.

#### POSTER SESSIONS

- Makonin, S.** (2014). Nonintrusive Load Monitoring (NILM): What an algorithm can tell you about your energy consumption. In *Poster Session at IEEE Vancouver Section Annual General Meeting*.

#### TECHNICAL REPORTS

- Makonin, S.** (2012). A Visualization Prototype for Detecting Energy Losses on a Power Grid. Awesense Wireless Inc. Mitacs-Accelerate Internship.
- Makonin, S.** (2012). Approaches to Non-Intrusive Load Monitoring (NILM) in the Home. PhD Depth Report, Simon Fraser University, School of Computing Science.
- Makonin, S.** (2008). Map with Wheels. BTech Major Project Final Report. British Columbia Institute of Technology, School of Computing and Academic Studies.

## Invited Talks

### INTERNATIONAL INVITATIONS

- 2015 **From Socioeconomic Concerns to Standardizing Accuracy to Water NILM**  
The 2nd EU Nonintrusive Load Monitoring Workshop (London, UK), July 8.

### BCIT TALK INVITATIONS

- 2014 **Why There Is Nothing Smart about the Current Smart Home & Smart Meter**  
BCIT, School of Construction and the Environment, Building Sciences Masters Program (Burnaby, Canada), Feb 18.
- 2014 **Using Computing and Engineering to Tackle Sustainability Problems with Energy Consumption**  
BCIT, School of Energy (Burnaby, Canada), Feb 21.

### SFU TALK INVITATIONS

- 2013 **Load Disaggregation For Energy Conservation**  
Our Own CMPT 120 Mini-Conference: Research in Computing Science, Sep 27.
- 2013 **Lightning Talks: Sustainability**  
SFU Research Commons, July 18.  
Radio broadcast: CJSF on July 25th at 2:30pm, Sustainable Futures Program.
- 2013 **The Cognitive Power Meter, Not The Smart Meter**  
SFU Computing Science GSA Scientific Colloquium, June 19.
- 2010 **An Introduction to the Smart Grid**  
SFU COGS 300 / CMPT 417 "Intelligent Systems" Course Lecture, April 8.

## Service To Profession

### CONFERENCE/WORKSHOP ORGANIZING, CHAIRING & HOSTING

*2014 – now* **Local Arrangements Chair**

2016 IEEE World Congress on Computational Intelligence (WCCI)  
Vancouver, Canada. July 25 – 29, 2016

*2015 – now* **Website and Social Media Chair**

The 29th Annual IEEE Canadian Conference on Electrical and Computer Engineering (CCECE 2016)  
Vancouver, Canada. May 15 – 18, 2016

*2015* **Organizer and Host**

IEEE Vancouver Windows 10 Hackathon  
Burnaby, Canada. May 16 – 17, 2015, 28-hours

*2014* **Organizer and Host**

IEEE Vancouver Kinect and Structure Sensor Hackathon  
Burnaby, Canada. November 8 – 9, 2014, 28-hours

*2014* **Web Co-Chair**

IEEE 15th Int. Conf. on High Performance Switching and Routing (HPSR)  
Vancouver, Canada. July 1 – 4, 2014

### INVITED JOURNAL REVIEWER

*2015* IEEE Transactions on Smart Grid [regular reviewer, 1—2 manuscript/month]

*2014 – 2015* IEEE Transactions on Mobile Computing [periodic reviewer]

*2013* Springer's Energy Efficiency Journal [periodic reviewer]

### TECHNICAL PROGRAM COMMITTEE MEMBER

*2016, 2015* First IEEE Workshop on Pervasive Energy Services (PerEnergy)

*2015* Int. Conf. on Big Data and Analytics for Smart Cities (BigDASC)

*2011 – 2015* Int. Conf. on Ubiquitous Computing and Ambient Intelligence (UCAmI)  
[regular, yearly TPC member]

*2012* 2012 IEEE International Conference on Power and Energy (PECON).

## GRADUATE STUDENT MENTORING

2015 Bradley Ellert — MSc Thesis (defended Aug 17, 2015)

Thesis: Leveraging Submetered Electricity Loads to Disaggregate Household Water-Use

## EXTERNAL CONFERENCE REVIEWER

2011, 2013, Canadian Conference on Artificial Intelligence (Canadian AI)

2015

## GRANTING AGENCY REVIEWER

2014 Mitacs Accelerate Grant Proposal External Reviewer

## Volunteer Work

2014 – now **Chair**, IEEE Vancouver Joint Computing Chapter

2014 – now **Leader & Organizer**, IEEE/SFU Internet of Things (IoT) Club

2013 – now **Co-Chair & Treasurer**, Westside Montessori Academy PAC

2012 – 2014 **Membership Development Chair**, IEEE Vancouver Section