# 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

**under review** **Professional Engineer (PEng)**
Association of Professional Engineers and Geoscientists of BC (APEGBC)
1. Status of Academic Assessment is *completed*.
2. Status of Experience Assessment is *in progress*.
3. Status of Law and Ethics Seminars is *completed*.
4. Status of Professional Practice Examination (PPE) is *completed* and *passed*.

**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

*2017 – now*  **Adjunct Professor**
Simon Fraser University, School of Engineering Science (Burnaby, Canada)

*2014 – now*  **Postdoctoral Fellow & Research Associate**
Simon Fraser University, School of Engineering Science (Burnaby, Canada)
Advisor: Ivan V. Bajic

*2016 – 2017*  **Postdoctoral Fellow**
University of British Columbia, Electrical and Computer Engineering (Burnaby, Canada)
Advisor: Z. Jane Wang

*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)

# Graduate Student Co-/Supervision

*2014 – 2015*  **Co-Supervised Bradley Ellert — MSc Thesis (defended Aug 17, 2015)**
Simon Fraser University, School of Computing Science (Burnaby, Canada)
Thesis: Leveraging Submetered Electricity Loads to Disaggregate Household Water-Use

# 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 section 200, dist. ed. section 225
TAs/TMs: in-class section 3, dist. ed. section 3

# Industry Experience (Software Engineering)

*2017 – now*  **Senior Software Engineer** — Knowledge Network (Burnaby, Canada)

*2014 – now*  **Co-Founder & Senior Research Scientist** — SweetLightning (Calgary, Canada)

*1996 – now*  **Principal & Senior Software Developer**
Oponix Systems Inc. formerly Makonin Consulting Corp. (Burnaby, Canada)
Clients incl. Telus Mobility, Vancouver Costal Health, Sierra Wireless, Safeway Canada,
Quartech Systems, Engineering Central, ApexMail, OAN Services, Green Running (UK),
Electric Power Research Institute (EPRI, USA)

*2006 – 2008*  **Co-Founder & CTO** — Vvvroom.com (Burnaby, Canada)

*2006*  **Vancouver Office Software Development Manager**
AbsolutePoker.com: ePrado Management, Inc. (Vancouver, Canada)

# Grants & Funding

*2016* IC-IMPACTS NCE Project Grant  ($133k each, 2 years, 11.2% success rate)

*2011, 15, 16* NSERC Engage Grants ($25k each, 6 months each)

*2012, 14* SFU GSS Professional Development Grant ($500 each)

*2013* BCIT School of Energy Research Seed Funding Grant ($10k, 4 months)

*2012* Mitacs Accelerate Grant ($15k, 4 months)

# Publications (see citation report at end of CV)

## BOOKS & THESES

Pacheco-Torgal, F., Rasmussen, E., Granqvist, C.-G., Ivanov, V., Kaklauskas, H. A., and **Makonin, S.**, editors (2016). *Start-Up Creation: The Smart Eco-Efficient Built Environment*. Woodhead Publishing/Elsevier, ISBN: 978-0-08-100546-0.

Authored: **Makonin, S.** (2015) Chapter 18: App programming and its use in smart buildings.

**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: 978-0-672-31031-7.

## JOURNAL ARTICLES (PEER REVIEWED)

Dinesh, C., **Makonin, S.**, and Bajic, I. V. (2017). Residential Power Forecasting Using Load Identification and Graph Spectral Clustering. *IEEE Transactions on Smart Grid*. [in submission]

Guzman, L., **Makonin, S.**, and Clapp, R. A. (2016). CarbonKit: a technological platform for personal carbon tracking. *Computers, Environment and Urban Systems.* [in submission]

Bhotto, Md. Z. A., **Makonin, S.**, and Bajic, I. V. (2016). Load Disaggregation Based on Aided Linear Integer Programming. *IEEE Transactions on Circuits and Systems II: Express Briefs*, 64(7):792–796.

**Makonin, S.**, Ellert, B., Bajic, I. V., and Popowich, F. (2016). Electricity, water, and natural gas consumption of a residential house in Canada from 2012 to 2014. *Scientific Data*, 3(160037):1–12.

**Makonin, S.**, Popowich, F., Bajic, I. V., Gill, B., and Bartram, L. (2015). Exploiting HMM Sparsity to Perform Online Real-Time Nonintrusive Load Monitoring. *IEEE Transactions on Smart Grid*, 7(6):2575–2585.

**Makonin, S.** and Popowich, F. (2014). Nonintrusive Load Monitoring (NILM) Performance Evaluation. *Energy Efficiency*, 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.** (2016). Investigating the Switch Continuity Principle Assumed in Non-Intrusive Load Monitoring (NILM). In *Proceedings of the 29th Annual IEEE Canadian Conference on Electrical and Computer Engineering (CCECE)*.

**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 49th Hawaii International Conference on System Sciences (HICSS)*, pp. 1427-1436.

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)*.

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.

**POSTER SESSIONS**

Dinesh, C., **Makonin, S.**, and Bajic, I. V. (2017). Understanding Appliance Power Consumption Without Sensors. In *Poster Session at the 3rd Annual IC-IMPACTS Research Conference.*

**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.*

**PUBLISHED PUBLICLY AVAILABLE DATASETS**

**Makonin, S.** (2017). *RAE: The Rainforest Automation Energy Dataset*, doi:10.7910/DVN/ZJW4LC, Harvard Dataverse, V1.

**Makonin, S.** (2016). *AMPds2: Almanac of Minutely Power dataset (Version 2)*, doi:10.7910/DVN/FIE0S4, Harvard Dataverse, V1.

**Makonin, S.** (2013). *AMPds: Almanac of Minutely Power dataset (R2013)*, doi:10.7910/DVN/MXB7VO, Harvard Dataverse, V1.

**Makonin, S.** (2010). *ODDs: Occupancy Detection Dataset*, doi:10.7910/DVN/2K9FFE, Harvard Dataverse, V1.

**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.

**SFU TALK INVITATIONS (A SELECTED FEW)**

*2013* **Lightning Talks: Sustainability**
SFU Research Commons, July 18.
Radio broadcast: CJSF on July 25th at 2:30pm, Sustainable Futures Program.

*2010* **An Introduction to the Smart Grid**
SFU COGS 300 / CMPT 417 "Intelligent Systems" 2-hour Course Lecture, April 8.

# Service To Profession

**GENERAL CHAIR & ORGANIZER**

*2016*   3rd International Workshop on Non-Intrusive Load Monitoring (NILM)
Vancouver, Canada. May 14 – 15

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

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

**WEBSITE & SOCIAL MEDIA CHAIR**

*2016*   14th IEEE International NEW Circuits And Systems (NEWCAS) Conference
Vancouver, Canada. June 26 – 29

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

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

**LOCAL ARRANGEMENTS CHAIR**

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

**TECHNICAL PROGRAM COMMITTEE (TPC) MEMBER**

*2017*   5th IFIP Conference on Sustainable Internet and ICT for Sustainability (SustainIT)

*2015 – 2017*   IEEE Workshop on Pervasive Energy Services (PerEnergy)

*2016*   Int. Workshop on Computational Energy Management in Smart Grids (CEMiSG)

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

*2011 – 2015*   Int. Conf. on Ubiquitous Computing and Ambient Intelligence (UCAmI)

*2012*   IEEE Int. Conf. on Power and Energy (PECON)

**MISCELLANEOUS ACTIVITIES**

*2011, 13, 15, 17*   **External Paper Reviewer**, Canadian Conference on Artificial Intelligence (AI)

*2014, 17*   **External Grant Reviewer**, Mitacs Accelerate Grant Proposal

# Scholarships & Awards

*2015*   IEEE Vancouver Section Leadership and Contribution Award — Initiative

*2015*   NSERC Postdoctoral Fellowship (PDF) — Application Deemed Meritorious

*2014*   SFU Faculty of Applied Science (FAS) Graduate Fellowship (PhD)

*2012, 14*   Ebco/Eppich Graduate Scholarships in Intelligent Systems

*2013*   SFU Travel & Minor Research Award (2 awards won that year)

*2013*   SFU President's PhD Scholarship

*2012, 13*   SFU Graduate Fellowship (PhD)

*2010*   BCIT Vancouver 2010 Olympic Winter Games Legacy Fund Scholarship

# Philanthropic Work

*2017 – now*   **Donor**, Simon Fraser University

*2015 – now*   **Leadership Circle Ambassador**, Knowledge Network Corporation
BC's Public Broadcaster

*2014 – now*   **Campaign Backer**, Kickstarter [10 project backed]

*2014 – now*   **Campaign Backer**, Indiegogo [2 project backed]

# Volunteer Work

*2016 – now*   **Vice-Chair**, IEEE Vancouver Signal Processing Chapter

*2014 – now*   **Treasurer**, Westside Montessori Academy PAC (incl. Co-Chair for 2014/15 school year)

*2014 – 2016*   **Chair**, IEEE Vancouver Joint Computing Chapter

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

# Citation Counts Report

**This report was generated by** https://github.com/smakonin/ScholarHacks **and reports** Google Scholar results**.**

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Report generated on: 2017-06-15 12:23:00.477774

Citations =     374
h-index   =      11
i10-index =      13
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| Paper Title | Citations | Journal IF |
|-------------|-----------|------------|
| AMPds: A public dataset for load disaggregation and eco-feedback re... | 115 | |
| A Smarter Smart Home: Case Studies of Ambient Intelligence | 38 | 1.836 |
| Visual C++ 5.0 Developer's Guide | 34 | |
| Nonintrusive load monitoring (NILM) performance evaluation | 24 | 1.183 |
| The cognitive power meter: Looking beyond the smart meter | 19 | |
| Exploiting HMM Sparsity to Perform Online Real-Time Nonintrusive Lo... | 18 | 3.190 |
| The Affect of Lifestyle Factors on Eco-Visualization Design | 16 | |
| Elements of consumption: an abstract visualization of household con... | 16 | |
| Efficient Sparse Matrix Processing for Nonintrusive Load Monitoring... | 14 | |
| Home Occupancy Agent: Occupancy and Sleep Detection | 12 | tbd |
| An intelligent agent for determining home occupancy using power mon... | 12 | |
| Electricity, water, and natural gas consumption of a residential ho... | 11 | 4.836 |
| Real-time embedded low-frequency load disaggregation | 11 | |
| A consumer bill of rights for energy conservation | 9 | |
| Inspiring energy conservation through open source power monitoring ... | 6 | |
| Cognitive Radio Technology: System Evolution | 4 | |
| Inspiring energy conservation through open source metering hardware... | 4 | |
| Appliance Water Disaggregation via Non-Intrusive Load Monitoring (N... | 3 | |
| Start-Up Creation: The Smart Eco-efficient Built Environment | 2 | |
| Investigating the Switch Continuity Principle Assumed in Non-Intrus... | 2 | |
| Mixed-Initiative for Big Data: The Intersection of Human + Visual A... | 2 | |
| Approaches to Non-Intrusive Load Monitoring (NILM) in the Home | 2 | |
| Total Number of Papers = 30 | 374 | 11.045 |

**Also see Semantic Scholar and Research Gate for other read/citation statistics.**