Stephen Makonin, PhD, PEng, smIEEE

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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)

2018 **Certificate, Software Carpentry Instructor**
Software Carpentry Foundation (Vancouver, BC)

2009 **Certificate, Electronics Technician**
George Brown College (Toronto, Canada)

Professional Affiliation

2018 – now **Professional Engineer (PEng)**
Engineers and Geoscientists BC (EGBC)
a.k.a. Association of Professional Engineers and Geoscientists of BC (APEGBC)

2014 – now **Member**
Society for Industrial and Applied Mathematics (SIAM)

2013 – now **Senior Member (smIEEE)**
Institute of Electrical and Electronics Engineers (IEEE)
Student Member and Member since 2008.

2010 – 2016 **Information Systems Professional (ISP)**
Canadian Information Processing Society (CIPS)

Research Experience

2017 – now **Adjunct Professor**
Simon Fraser University, School of Engineering Science (Burnaby, Canada)
PI of the Computational Sustainability Lab: http://compsust.fas.sfu.ca

2018 **Visiting Professor**
Indraprastha Institute of Information Technology, Delhi (IIIT-Delhi, India)

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

2014 – 2017 **Postdoctoral Fellow & Sessional Instructor**
Simon Fraser University, Engineering Science & Computing Science (Burnaby, Canada)
2015 – 2017 Advisor: Ivan V. Bajic (postdoc)
2014 – 2015 Advisors: Wolfgang Stuerzlinger (postdoc) & Anthony Dixon (instructor)

2008 – 2015 **Research Associate**
British Columbia Institute of Technology, Applied Research (Burnaby, Canada)

Graduate Student Co-/Supervision

2018 – now **Senior Supervisor of Alejandro Rodriguez-Silva — PhD Thesis (on going)**
Simon Fraser University, School of Engineering Science (Burnaby, Canada)
Thesis: tbd

2018 – now **Co-Supervisor of Alon Harell — MASc Thesis (on going)**
Simon Fraser University, School of Engineering Science (Burnaby, Canada)
Thesis: tbd

2017 – now **Co-Supervisor of Md. Zulfiquar Ali Bhotto — Postdoctoral Fellow**
Simon Fraser University, School of Engineering Science (Burnaby, Canada)
Research Areas: NILM, smart grid optimization

2014 – 2015 **Co-Supervisor of 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

Visiting Scholars

2019 **David Murray — PhD Scholar, University of Strathclyde, UK (2 months)**

2019 **Bundit Buddhahai — PhD Scholar, KMUTT, Thailand (6 months)**

2019 **Christoph Klemenjak — PhD Scholar, University of Klagenfurt, Austria (2 months)**

2018 **Shikha Singh — PhD Scholar, IIIT-Delhi, India (½ month)**

2017 – 2018 **Megha Gaur — PhD Scholar, IIIT-Delhi, India (6 months)**

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)

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

1996 – now **Senior Software Developer Consultant**
Oponix Systems Inc. formerly Makonin Consulting Corp. (1996-2010, Burnaby, Canada)
Clients incl. Telus Mobility, Vancouver Costal Health, Sierra Wireless, Safeway Canada, and Quartech Systems. Recent clients incl. Green Running (UK), and Itron (USA)

2017 – 2018 **Senior Software Engineer** — Knowledge Network (Burnaby, Canada)

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

2006 **Software Development Manager** — AbsolutePoker (Vancouver, Canada)

Grants & Funding

2019 **Principal Investigator** — NSERC Engage Grant ($25k, 6 months)
[under review, decision expected March 31, 2019]

2019 **Investigator** — SENSors and Intelligence in BuLt Environment (SENSIBLE) project
European Commission Horizon2020 grant (2 years)

2018 **Principal Investigator** — NSERC Discovery Grant ($140k, 5 years)
Title: Non-Intrusive Load Monitoring (NILM)

2016 **Postdoc** — IC-IMPACTS NCE Project Grant ($133k, 2 years, 11.2% success rate) ✽
Title: Energy and Water Disaggregation for Non-Intrusive Load Monitoring in Buildings

2012, 14 **Recipient** — SFU GSS Professional Development Grant (2 at $500 each)

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

✽ *Note: was a main author and organizer of grant but could not be co-PI.*

Publications (see citation report at end of CV)

BOOKS

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.

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)

Makonin, S. (2019). HUE: The Hourly Usage of Energy Dataset for Buildings in British Columbia. *Data in Brief*. [in press]

Dinesh, C., **Makonin, S.,** and Bajic, I. V. (2018). Residential Power Forecasting Based on Affinity Aggregation Spectral Clustering. *IEEE Transactions on Smart Grid*. [in review]

Gaur, M., **Makonin, S.,** Bajic, I. V., and Majumdar, A. (2018). Performance evaluation of techniques for identifying abnormal energy consumption in buildings. *IEEE Access*. [in review]

Dinesh, C., **Makonin, S.,** and Bajic, I. V. (2018). Residential Power Forecasting Using Load Identification and Graph Spectral Clustering. *IEEE Transactions on Circuits and Systems II: Express Briefs*. [in press]

Makonin, S., Wang, Z. J., and Tumpach, C. (2018). RAE: The Rainforest Automation Energy Dataset for Smart Grid Meter Data Analysis. *Data*, 3(1):1-9.

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. (2016). 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. (2015). 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)

Harell, A., **Makonin, S.,** and Bajic, I. V. (2019). WaveNILM: A Causal Neural Network for Power Disaggregation from the Complex Power Signal. In *Proceedings of the 44th International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*. [to be presented May/2019]

Guzman, L., **Makonin, S.,** and Clapp, R. A. (2019). CarbonKit: Designing A Personal Carbon Tracking Platform. In *Proceedings of SocialSense '19: Fourth International Workshop on Social Sensing*. [to be presented April/2019]

Dinesh, C., **Makonin, S.,** and Bajic, I. V. (2017). Incorporating Time-Of-Day Usage Patterns Into Non-Intrusive Load Monitoring. In *Proceedings of the 5th IEEE Global Conference on Signal and Information Processing (GlobalSIP)*.

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 & DEMO SESSIONS

Harell, A., **Makonin, S.**, and Bajic, I. V. (2018). A Recurrent Neural Network for Multisensory Non-Intrusive Load Monitoring on a Raspberry Pi. In *Proceedings of the EEE 20th International Workshop on Multimedia Signal Processing (MMSP)*.

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). *Approaches to Non-Intrusive Load Monitoring (NILM) in the Home*. PhD Depth Report, Simon Fraser University, School of Computing Science.

Service To Profession

GENERAL CHAIR & ORGANIZER

2019 Advanced Signal Processing for Non-intrusive Load Monitoring Special Session
44th International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
Brighton, UK. May 12 [to be held]

2018 4th International Workshop on Non-Intrusive Load Monitoring (NILM)
Auston, TX, USA. March 7 – 8

2017 The Plenty of Fish (POF) 24hr Hackathon
Burnaby, Canada. October 13 – 14, 24-hours

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

JOURNAL EDITORSHIP

2019 – now Editorial Board Member, *Scientific Data*, Nature

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

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

2014, 17, 19 **External Grant Reviewer**, Mitacs Accelerate Grant Proposal, Canada

2018 **External Grant Reviewer**, EPSRC Grant Proposal, UK

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

Keynotes & Invited Talks

2018 **Data, Datasets, and Data Engineering**
The 5th EU Nonintrusive Load Monitoring Workshop (Duisburg, Germany), October 1.

2018 **NILM Real-World Testing: An Emulator for NILM and Smart Home Research**
4th International Workshop on Non-Intrusive Load Monitoring (Austin, USA), March 8.

2017 **The Expectations of Non-Intrusive Load Monitoring (NILM)**
The International Conference on Application of Demand-Side Management (DSM) and Data Driven Technology in Energy Saving (Taipei, Taiwan), November 22.

2017 **NILM Real-World Testing: The Case for an Emulator**
The 4th EU Nonintrusive Load Monitoring Workshop (London, UK), November 7.

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

Scholarships & Awards

2017 IEEE Signal Processing Society Appreciation Certificate — Leadership & Support

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

Volunteer Work

2018 – now **Director of Communication**, Burnaby Mountain Mantas Swim Club

2017 – now **Yearly Scholarship for Aboriginal Undergraduates in Engineering** (Donor of), Simon Fraser University

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

2012 – now **Executive Member**, Westside Montessori Academy PAC
Co-Chair: 2014/15 school year
Treasurer: 2014/15, 2015/16, 2016/17, and 2017/18 school years
Executive-at-Large: 2012/13 and 2018/19 school years

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

2012 – 2014 **Membership Development Chair**, IEEE Vancouver Section
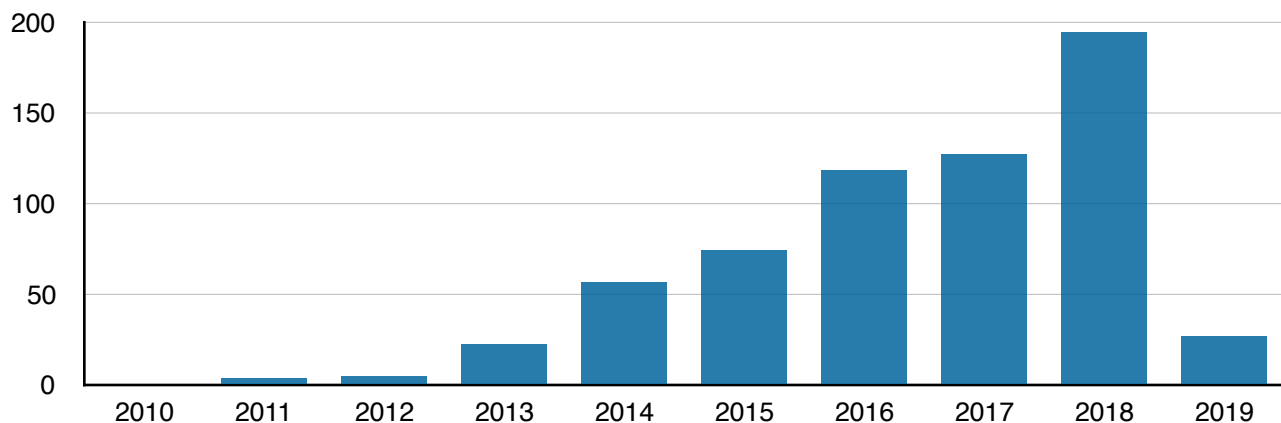
Citation Counts Report

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

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Report generated on: 2019-02-20 15:57:44.314589

Citations =      669
h-index   =       13
i10-index =       18

Paper Title                                                        Citations Journal IF
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AMPds: A public dataset for load disaggregation and eco-feedback re...   165
Exploiting HMM Sparsity to Perform Online Real-Time Nonintrusive Lo...    83     7.364
Nonintrusive load monitoring (NILM) performance evaluation               64     1.634
A Smarter Smart Home: Case Studies of Ambient Intelligence               52     3.022
Electricity, water, and natural gas consumption of a residential ho...    51     4.836
Visual C++ 5.0 Developer's Guide                                         32
The cognitive power meter: Looking beyond the smart meter                22
Efficient Sparse Matrix Processing for Nonintrusive Load Monitoring...    19
The Affect of Lifestyle Factors on Eco-Visualization Design              19
Real-time embedded low-frequency load disaggregation                     18
Elements of consumption: an abstract visualization of household con...    18
Load Disaggregation Based on Aided Linear Integer Programming            15     2.450
A consumer bill of rights for energy conservation                        13
An intelligent agent for determining home occupancy using power mon...    12
Inspiring energy conservation through open source power monitoring ...    11
Home Occupancy Agent: Occupancy and Sleep Detection                      11       tbd
Mixed-Initiative for Big Data: The Intersection of Human + Visual A...    10
Approaches to Non-Intrusive Load Monitoring (NILM) in the Home           10
Investigating the Switch Continuity Principle Assumed in Non-Intrus...     9
Inspiring energy conservation through open source metering hardware...     9
RAE: The Rainforest Automation Energy Dataset for Smart Grid Meter ...     8       tbd
Appliance Water Disaggregation via Non-Intrusive Load Monitoring (N...     6
Start-Up Creation: The Smart Eco-efficient Built Environment              4
Cognitive Radio Technology: System Evolution                             4
Incorporating Time-Of-Day Usage Patterns Into Non-Intrusive Load Mo...     3
Transmitting Patient Vitals Over a Reliable ZigBee Mesh Network           1
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Total Number of Papers = 34                                             669    19.306
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Note: Papers without a citation count are not listed above.

Note: Citation counts earlier than 2010 are from: Visual C++ 5.0 Developer's Guide.