

Stephen Makonin, PhD, PEng, smIEEE

Address: 3738 Kincaid Street
Burnaby BC Canada
V5G 1V5

Mobile: +1 604-725-7838
Email: smakonin@sfu.ca
Twitter: @SMakonin

Citizenship: Canadian

Website: <http://makonin.com>
CompSust Lab: <http://compsust.fas.sfu.ca>

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

- 2019 – now* **Senior Supervisor of Richard Jones — MSc Thesis (on going)**
Simon Fraser University, School of Engineering Science (Burnaby, Canada)
Awarded a Graduate Dean's Entrance Scholarship (GDES) and NSERC CGS-M
Thesis: tbd
- 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 — MSc Thesis (on going)**
Simon Fraser University, School of Engineering Science (Burnaby, Canada)
Awarded a NSERC CGS-M, Thesis: tbd
- 2017 – now* **Co-Supervisor of Md. Zulfiqar 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 (1½ 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 (90% ESL Mandarin), dist. ed. section 225
 TAs/TMs: in-class section 3, dist. ed. section 3

Grants & Funding

- 2019* **Principal Investigator** — Canada-UK Power Forward Challenge (\$100k, 20 months)
 [total award of \$3M, under review, decision expected August 1, 2019]
- 2019* **Principal Investigator** — NSERC Engage Grant (\$25k, 6 months)
 [under review, decision expected March 31, 2019]
- 2019* **Principal Investigator** — NSERC Discovery Launch Supplement Award (\$12.5k)
- 2019* **Investigator** — SENSors and Intelligence in BuLt Environment (SENSIBLE) project
 European Commission Horizon2020 grant (2 years) [*indirect moneys to allow for grad student visits*]
- 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)

Dinesh, C., **Makonin, S.**, and Bajic, I. V. (2019). Residential Power Forecasting Based on Affinity Aggregation
 Spectral Clustering. *IEEE Transactions on Smart Grid*. [in review]

Dinesh, C., **Makonin, S.**, and Bajic, I. V. (2019). Residential Power Forecasting Using Load Identification and
 Graph Spectral Clustering. *IEEE Transactions on Circuits and Systems II: Express Briefs*. [in press]

Gaur, M., **Makonin, S.**, Bajic, I. V., and Majumdar, A. (2019). Performance evaluation of techniques for
 identifying abnormal energy consumption in buildings. *IEEE Access*, 7:62721–62733.

- Makonin, S.** (2019). HUE: The Hourly Usage of Energy Dataset for Buildings in British Columbia. *Data in Brief*, 23(103744):1–4.
- 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)*.
- 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*.
- 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 IEEE 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

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 Coastal 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** — Vvroom.com (Burnaby, Canada)
- 2006* **Software Development Manager** — AbsolutePoker (Vancouver, Canada)

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

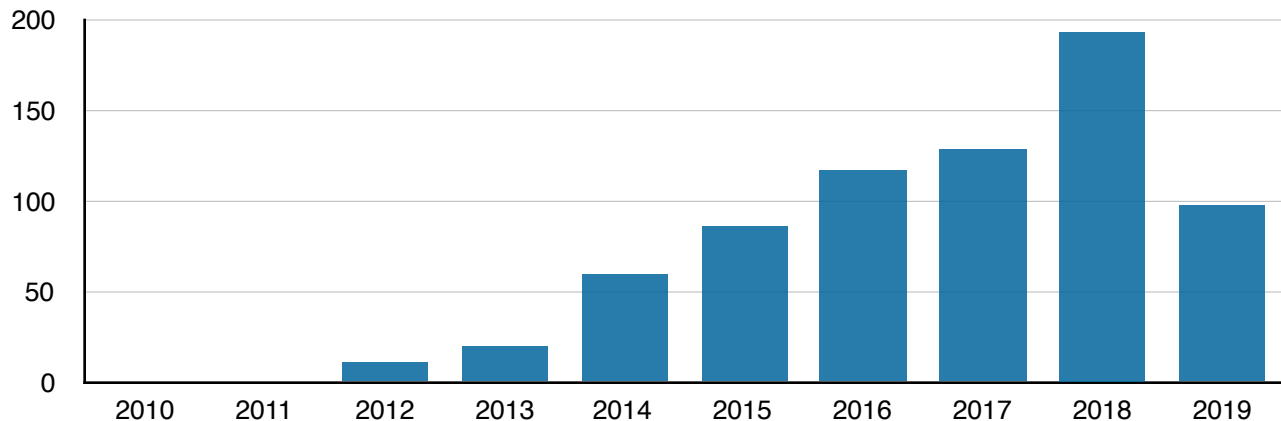
This report was generated by <https://github.com/smakonin/ScholarHacks> and reports [Google Scholar results](#).

Report generated on: 2019-07-11 17:27:48.125122

Citations = 751
h-index = 12
i10-index = 20

Paper Title	Citations	Journal IF
AMPds: A public dataset for load disaggregation and eco-feedback re...	189	
Exploiting HMM Sparsity to Perform Online Real-Time Nonintrusive Lo...	101	10.486
Nonintrusive load monitoring (NILM) performance evaluation	70	1.961
Electricity, water, and natural gas consumption of a residential ho...	65	6.776
A Smarter Smart Home: Case Studies of Ambient Intelligence	52	3.022
Visual C++ 5.0 Developer's Guide	32	
The cognitive power meter: Looking beyond the smart meter	23	
Efficient Sparse Matrix Processing for Nonintrusive Load Monitoring...	21	
The Affect of Lifestyle Factors on Eco-Visualization Design	20	
Real-time embedded low-frequency load disaggregation	19	
Elements of consumption: an abstract visualization of household con...	19	
Load Disaggregation Based on Aided Linear Integer Programming	18	3.250
Investigating the Switch Continuity Principle Assumed in Non-Intrus...	12	
A consumer bill of rights for energy conservation	12	
An intelligent agent for determining home occupancy using power mon...	12	
Mixed-Initiative for Big Data: The Intersection of Human + Visual A...	11	
Home Occupancy Agent: Occupancy and Sleep Detection	11	tbd
RAE: The Rainforest Automation Energy Dataset for Smart Grid Meter ...	10	tbd
Inspiring energy conservation through open source power monitoring ...	10	
Approaches to Non-Intrusive Load Monitoring (NILM) in the Home	10	
Inspiring energy conservation through open source metering hardware...	9	
Appliance Water Disaggregation via Non-Intrusive Load Monitoring (N...	7	
Incorporating Time-Of-Day Usage Patterns Into Non-Intrusive Load Mo...	6	
Start-Up Creation: The Smart Eco-efficient Built Environment	4	
Cognitive Radio Technology: System Evolution	3	
WaveNILM: A Causal Neural Network for Power Disaggregation from the...	2	
HUE: The Hourly Usage of Energy Dataset for Buildings in British Co...	1	1.430
A Recurrent Neural Network for Multisensory Non-Intrusive Load Moni...	1	
Transmitting Patient Vitals Over a Reliable ZigBee Mesh Network	1	
Residential Power Forecasting Using Load Identification and Graph S...	0	3.250
Performance evaluation of techniques for identifying abnormal energ...	0	4.098
Peer-Reviewed Conferences:	21 papers	387
Peer-Reviewed Journals:	10 papers	328
Books Co-authored/Co-edited:	2 books	36
Grand Totals:	33 papers	751
		34.273

Note: Papers without a citation count are not listed above unless they are a journal paper.



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