Stephen Makonin, PhD, PEng, smIEEE

Address: 307 - 8850 University Crescent *Mobile*: +1 604-725-7838

Burnaby, BC, Canada *Email:* smakonin@sfu.ca V5A oC8 *Twitter:* @SMakonin

Citizenship: Canadian Website: http://www.sfu.ca/~smakonin/

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

TBD Senior Supervisor of Lior Bragilevsky — PhD Thesis (starting Summer 2020)

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

2019 - now Senior Supervisor of Richard Jones — MASc 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 — MASc 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. 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, University of Strathclyde, UK (2 months)
- 2019 Bundit Buddhahai PhD, KMUTT, Thailand (6 months)
- 2019, 2020 Christoph Klemenjak PhD, University of Klagenfurt, Austria (6 months)
 - 2018 Shikha Singh PhD, IIIT-Delhi, India (½ month)
- 2017 2018 Megha Gaur PhD, IIIT-Delhi, India (6 months)

External Examiner (Viva)

2019 Georgia Elafoudi (PhD Electronic and Electrical Engineering)

University of Strathclyde, Glasgow, UK

Thesis: Meaningful Information Extraction from IoT Measurements using Signal Information Processing

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 (PI = Principal Investigator)

- 2020 **Co-PI** SSHRC Knowledge Synthesis Grant (in review) [total award of \$50,000 for 1 year, under review, decision expected Apr. 1, 2020]
- 2019 PI NSERC Engage Grant (\$25,000, 6 months)
 Title: Inferring power grid transformer to meter association using inconsistent geospatial data
- 2019 **Investigator** SENSors and Intelligence in BuLt Environment (SENSIBLE) project European Commission Horizon2020 grant (2 years) [indirect moneys to allow for grad student visits]
- ²⁰¹⁹ **PI** NSERC Discovery Launch Supplement Award (\$12,500)
- 2018 **PI** NSERC Discovery Grant (\$140,000, 5 years) Title: Non-Intrusive Load Monitoring (NILM)
- 2016 **Postdoc** IC-IMPACTS NCE Project Grant (\$133,000, 2 years, 11.2% success rate) **★** Title: Energy and Water Disaggregation for Non-Intrusive Load Monitoring in Buildings
- 2012, 14 PhD Candidate SFU GSS Professional Development Grant (2 at \$500 each)
 - 2013 PI BCIT School of Energy Research Seed Funding (\$10,000, 4 months)

❖ Note: was a main author and organizer of grant but could not be co-Pl.

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 Using Load Identification and Graph Spectral Clustering. *IEEE Transactions on Circuits and Systems II: Express Briefs*, 66(11):1900–1904.
- 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)

- Jones, R., Rodriguez-Silva, A., and **Makonin, S.** (2020). Increasing the Accuracy and Speed of Universal Non-Intrusive Load Monitoring (UNILM) Using a Novel Real-Time Steady-State Block Filter. In *Proceedings of the 11th Conference on Innovative Smart Grid Technologies (ISGT)*.
- Klemenjak, C., **Makonin, S.**, and Elmenreich, W. (2020). Towards Comparability in Non-Intrusive Load Monitoring: On Data and Performance Evaluation. In *Proceedings of the 11th Conference on Innovative Smart Grid Technologies (ISGT)*.

- Rodriguez-Silva, A., and **Makonin, S.** (2019). Universal Non-Intrusive Load Monitoring (UNILM) Using Filter Pipelines, Probabilistic Knapsack, and Labelled Partition Maps. In *Proceedings of the 11th IEEE PES Asia-Pacific Power and Energy Engineering Conference 2019 (APPEEC)*.
- Klemenjak, C., Reinhardt, A., Pereira, L., **Makonin, S.**, Bergés, M., and Elmenreich, W. (2019). Electricity Consumption Data Sets: Pitfalls and Opportunities. In *Proceedings of the 6th ACM International Conference on Systems for Energy-Efficient Built Environments, Cities, and Transportation (BuildSys*).
- 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 EEE 20th International Workshop on Multimedia Signal Processing (MMSP)*.

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

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

- 2020 eSim 2020, International Building Performance Simulation Association (IBPSA-Canada)
- 2019 11th IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC)
- 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 (UCAml)
 - 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 (Al)

Keynotes, Invited Talks & News/Media Interviews

- News Talk Show Interview/Discussion on CarbonKit and Personal Carbon Tracking The Danielle Smith Show (Calgary, AB, Canada), 22 min, October 2.
- 2018 Data, Datasets, and Data Engineering
 The 5th EU Nonintrusive Load Monitoring Workshop (Duisburg, Germany), October 1.
- NILM Real-World Testing: An Emulator for NILM and Smart Home Research 4th International Workshop on Non-Intrusive Load Monitoring (Austin, USA), March 8.
- 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.
- 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
- 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 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 **Director of Software Development, Vancouver** AbsolutePoker (Vancouver, Canada) Reporting staff: 3 Software Developers, 1 QA Manager, 3 QA Testers Department budget: \$600,000/year

Volunteer Work

- 2017 now Yearly Scholarship for Aboriginal Undergraduates (Donor of), Simon Fraser University
- 2016 now Executive Member, IEEE Vancouver Section

Vice-Chair, Signal Processing Chapter: 2016 - now

Chair, IEEE Vancouver Joint Computing Chapter: 2014 – 2016

Membership Development Chair, IEEE Vancouver Section: 2012 - 2014

- 2018 2020 Director of Communication, Burnaby Mountain Mantas Swim Club
- 2012 2019 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

Citation Counts Report

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

Report generated on: 2020-03-10 09:42:52.108483

Citations = 944h-index = 15i10-index = 22

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Paper Title		Citations	Journal IF
AMPds: A public dataset for load disaggregation and eco-feedb	ack re	227	
Exploiting HMM Sparsity to Perform Online Real-Time Nonintrus		136	10.486
Nonintrusive load monitoring (NILM) performance evaluation		92	1.961
Electricity, water, and natural gas consumption of a resident	ial ho	87	6.776
A Smarter Smart Home: Case Studies of Ambient Intelligence		56	3.022
Visual C++ 5.0 Developer's Guide		32	
The cognitive power meter: Looking beyond the smart meter		30	
Real-time embedded low-frequency load disaggregation		28	
Load Disaggregation Based on Aided Linear Integer Programming	ſ	27	3.250
Efficient Sparse Matrix Processing for Nonintrusive Load Moni	toring	26	
RAE: The Rainforest Automation Energy Dataset for Smart Grid	Meter	19	tbd
The Affect of Lifestyle Factors on Eco-Visualization Design		19	
Elements of consumption: an abstract visualization of househo	old con	16	
Investigating the Switch Continuity Principle Assumed in Non-Intrus		15	
Mixed-Initiative for Big Data: The Intersection of Human + Visual A		15	
An intelligent agent for determining home occupancy using power mon		14	
Approaches to Non-Intrusive Load Monitoring (NILM) in the Home		13	
A consumer bill of rights for energy conservation		12	
Inspiring energy conservation through open source metering ha		11	
Inspiring energy conservation through open source power monitoring		11	
Home Occupancy Agent: Occupancy and Sleep Detection		11	tbd
Appliance Water Disaggregation via Non-Intrusive Load Monitoring (N		10	
Incorporating Time-Of-Day Usage Patterns Into Non-Intrusive Load Mo		7	
Start-Up Creation: The Smart Eco-efficient Built Environment		6	
WaveNILM: A Causal Neural Network for Power Disaggregation from the		5	
Cognitive Radio Technology: System Evolution		5	
Electricity consumption data sets: Pitfalls and opportunities		4	1 420
HUE: The Hourly Usage of Energy Dataset for Buildings in British Co Towards Comparability in Non-Intrusive Load Monitoring: On Data and			1.430
Transmitting Patient Vitals Over a Reliable ZigBee Mesh Network		2	
Increasing the Accuracy and Speed of Universal Non-Intrusive Load M		1	
Residential Power Forecasting Using Load Identification and Graph S		1	
A Recurrent Neural Network for Multisensory Non-Intrusive Load Moni		_	
Performance evaluation of techniques for identifying abnormal			
Peer-Reviewed Conferences:	26 papers	474	
		432	
Books Co-authored/Co-edited:	2 books	38	
Grand Totals:			34.273
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Note: Papers without a citation count are not listed above unless they are a journal paper.