

Julien Gascon-Samson, Ph.D.

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PROFESSIONAL APPOINTMENTS

Assistant Professor (2019-) – *ÉTS Montreal / University of Quebec*

- Department of Software and IT Engineering.

NSERC Post-Doctoral Fellow (2017-2018) – *University of British Columbia, Canada*

- Department of Electrical and Computer Engineering (Dependable System Lab). Advisor: Dr Karthik Pattabiraman. Field of research: engineering of large-scale IoT systems.

EDUCATION

Ph.D. in Computer Science (2017) – *McGill University, Canada* – GPA 3.86/4

- *Thesis: Adaptive Cloud Publish-Subscribe Services for Latency-Constrained Applications.*
Supervisors: Dr Bettina Kemme and Dr Jörg Kienzle.

M.Sc.A. in Computer Engineering (2011) – *École Polytechnique de Montréal (University of Montréal), Canada* – GPA 3.77/4

- Collaboration with an industrial partner (Geninov inc.)
- Thesis nominated for the best thesis for the university year 2010-2011

B.Eng. in Software Engineering (2009) – *École Polytechnique de Montréal (University of Montréal), Canada* – GPA 3.52/4

- Award of Excellence.

RESEARCH INTERESTS

- Edge & Cloud Computing
- Internet of Things (IoT)
- Software & Systems Engineering
- Software Reliability, Security and Fault Tolerance
- Code Migration
- Publish/Subscribe Systems
- Large-Scale Distributed-Systems
- Multiplayer & Large-Scale Online Games

RESEARCH EXPERIENCE

NSERC Post-Doctoral Research – *University of British Columbia*, Jan 2017-Dec 2018

In my post-doctoral fellowship within the Dependable Systems Lab, I led the design and development of ThingsJS, a comprehensive high-level framework for building and conducting research on highly distributed, flexible, dependable and error-resilient IoT applications. ThingsJS is a multidisciplinary project in that has links to several research disciplines such as software and systems engineering, networking, dependability, security, cloud/edge computing and programming languages. The project was in partnership with Intel, our industrial and funding partner. Several graduate and undergraduate students have been involved in ThingsJS. Several research contributions were made in key systems, software engineering and dependability venues.

Doctoral Research – *McGill University*, 2011-2016

In the context of my PhD, I designed a set of scalable topic-based publish/subscribe cloud services, to handle data delivery in latency-constrained applications. Experiments have been done over multiplayer game prototypes.

- A publish-subscribe platform has been built over Redis (Dynamoth) that has been used to conduct various kinds of experiments.
- A prototype large-scale game has been built and has been used to run many experiments.
- A framework for running distributed experiments over many machines has been built.
- Papers have been published to ICDCS, IPDPS and NetGames.

RESEARCH FUNDING AND AWARDS

For each award, the total amount awarded is listed.

- **Collaborative Research and Development (CRD) Grant (co-applicant)**, 488,400\$ (shared between the 3 co-Pis), NSERC (Canada), 2019-2021. In partnership with Intel.
Applicant: Karthik Pattabiraman; Co-applicant: Ali Mesbah
- **Post-Doctoral Fellowship (PDF)**, 90,000\$, NSERC (Canada), 2017-2018
- **Post-Doctoral Research Scholarship (B3)**, 70,000\$, FQRNT (Canada), valid for 2017-2018 (declined).
- **Graduate University Scholarship - 3rd cycle**. 10,000\$, Desjardins Foundation (Canada), 2015
- **Google Lime Connect Scholarship** (including a 4-days Google Scholar's retreat at the Google Campus), 5000 US\$, Google and Lime Connect (USA), 2014
- **Doctoral Scholarship (B2)**, 60,000\$, FQRNT (Canada), 2012-2015
- **McGill SOCS Funding Supplement**, 15,000\$, McGill School of Computer Science (2013-2015)
- **University Student Scholarships**, 3250\$, Caisse Desjardins Ahuntsic and Caisse Desjardins

Sault-au-Récollet (2012, 2013 and 2014)

- **BMP-Innovation Masters Scholarship**, 28,000\$, FQRNT, NSERC and Geninov, 2009-2010

TEACHING EXPERIENCE

Instructor, Electrical and Computer Engineering Dept., UBC (2017-2018)

- **CPEN400A** Modern Web Apps.: Fall 2017, Summer 2017/2018 (stripped-down version)
Topics include: JavaScript Language, DOM, AJAX, Node.js, Defensive Programming, Web Security, MVC Frameworks.

Instructor, Computer and Software Engineering Department, École Polytechnique de Montréal (2010-2016)

- **LOG1000** Software Engineering: (F)all 2010, (W)inter 2011, F2012, W2013, W2015, W2016.
Topics include: Software life cycle, development processes, analysis & requirements, design, implementation, testing, version control, build systems, continuous integration. Integration of the principle of “flipped classrooms” and new technologies.

Teacher's Assistant (TA), Computer and Software Engineering Department, École Polytechnique de Montréal (2009-2012)

- LOG3900 Evolution of a Software Project (3 times) – Integrative Project
- INF2990 Interactive Graphical Software Project (3 times) – Integrative Project
- INF4402 : Distributed Systems over Internet (1 time)
- LOG4420 : Dynamic and Transactional Web Sites (1 time)
Integrative project teaching assistantships involved supervising and assisting teams of students working on specific projects for the duration of the semester.

STUDENT SUPERVISION EXPERIENCE

Co-supervision of a Master's student, Zeineb Baba Cheikh, ÉTS Montreal / University of Quebec (Feb 2019-) (co-supervision with Ghizlane ElBoussaidi)

Co-supervision of a Master's of Engineering student, Adrien Gasté, ÉTS Montreal / University of Quebec (Jan 2019-) (co-supervision with Kaiwen Zhang)

Involvement in the supervision of a PhD student, Rafiuzzaman Mohammad, University of British Columbia (Jan 2017-Dec 2018)

- Thesis topic: scheduling and predicting IoT application failures.

Involvement in the supervision of a PhD student, Kumseok Jung, University of British

Columbia (Sept 2017-)

- Thesis topic: migrating IoT JavaScript applications.

Involvement in the supervision of a Master's of Engineering student, Jose Thomas, University of British Columbia (January 2018-May 2018)

- Implementation work on research project: adaptive IoT topic-based publish/subscribe service

Co-supervision of Computer Engineering Undergraduate Interns, Selina Suen and Atif Mahmud, University of British Columbia (Winter 2018)

- Implementation work on the base ThingsJS system and the web dashboard

Co-supervision of Computer Engineering Undergraduate Interns, Shivanshu Goyal and Armin Rezaiean-Asel, University of British Columbia (Summer 2017)

- Implementation work on the base ThingsJS system and on ThingsMigrate.

Co-supervision of a Computer Engineering MITACS Intern, Wiem Badreddine, University of British Columbia (Summer 2017)

- Preliminary implementation of a web dashboard for ThingsJS.

Co-supervision of Computer Science students for a research project, Aaron Uthayagumaran and Tristano Tenaglia, McGill University (Fall 2016)

- Integration of new contributions to the Cachewise project.

Co-supervision of an Computer Science student for a research project, Michael Coppinger, McGill University (Summer 2016)

- Implementation work on CacheDOCS.

Co-supervision of an Honours Computer Science student for a research project, Fan Jin, McGill University (Fall 2015)

- Preliminary work on CacheDOCS.

Co-supervision of an Honours Computer Science student for a project course, Franz-Philippe Garcia, McGill University (Summer 2014)

- Development of features that have been used as part of the Dynamoth project.

Co-supervision of an exchange student for an internship (Germany), Joscha Lausch, McGill University (Summer 2013)

- Implementation of features over Dynamoth.

Supervision of Graduating Students for a Software Engineering project, École Polytechnique de Montréal (Winter 2013)

- The team built a website and a mobile crowdsourcing application to gather data on the accessibility of public places in Montreal. Volunteer work included giving the students an overview (vision) of the project and a set of basic requirements as well as supervising them throughout the semester.

Mentoring of a CEGEP student for a Computer Science Project, École Polytechnique de Montréal (2009-2010)

- Helped the student prepare for local, regional and international competitions. Prizes: 2nd place (regional), 1st place (North America), 3rd place (international / England).

RELEVANT WORK AND INDUSTRIAL COLLABORATION EXPERIENCES

Industrial Post-Doctoral Research Partnership, Intel (2017-2018)

- The research project that I'm leading at the University of British Columbia – ThingsJS – is developed in partnership with Intel, our industrial and funding partner.

Software Developer (on an occasional basis and full time at some occasions), Jsm Micro inc. (2005-2017)

- Participate in all phases of the Software Development Cycle, including writing of technical manuals, user guides and specifications. Development of GUI-based, web-based, client-server and embedded applications.
- Developed a set of data collection and reporting applications for nursing homes and hospitals, which have been used successfully over dozens of sites, for several years.

Industrial Partnership for Master's in Computer Engineering, Geninov, inc. (2009-2010)

THESES

Gascon-Samson, J. (2016) Adaptive Cloud Publish-Subscribe Services for Latency-Constrained Applications, McGill University

Gascon-Samson, J. (2010) Architecture de rebalancement dynamique pour jeux massivement multijoueurs en ligne fonctionnant sur réseaux pair-à-pair, École Polytechnique de Montréal

REFEREED PUBLICATIONS

Rafiuzzaman M., **Gascon-Samson J.**, Pattabiraman K., Gopalakrishnan S. (2019) Failure

Prediction in the Internet of Things due to Memory Exhaustion. *To appear at the 34th ACM Symposium on Applied Computing (SAC 2019)*, Limassol, Cyprus

Khare, S., Sun, H., Zhang, K., **Gascon-Samson, J.**, Gokhale, A., Koutsoukos, K., Abdelaziz H. (2018) Scalable Edge Computing for Low Latency Data Dissemination in Topic-Based Publish/Subscribe, *2018 IEEE/ACM Symposium on Edge Computing (SEC 2018)*, Seattle, WA, USA

Jung K., **Gascon-Samson, J.**, Pattabiraman K. (2018) Demo: ThingsMigrate – Platform-Independent Live-Migration of JavaScript Processes, *2018 IEEE/ACM Symposium on Edge Computing (SEC 2018)*, Seattle, WA, USA

Gascon-Samson, J., Jung K., Pattabiraman K. (2018) Poster: Towards a Distributed and Self-Adaptable Cloud-Edge Middleware, *2018 IEEE/ACM Symposium on Edge Computing (SEC 2018)*, Seattle, WA, USA

Khare, S., Sun, H., Zhang, K., **Gascon-Samson, J.**, Gokhale, A., Koutsoukos, K. (2018) Poster Abstract: Ensuring Low-Latency and Scalable Data Dissemination for Smart-City Applications, *IoTDI 2018*, Orlando, USA

Gascon-Samson, J., Jung, K., Goyal, S., Rezaiean-Asel, A., Pattabiraman, K. (2018) ThingsMigrate: Platform-Independent Migration of Stateful JavaScript IoT Applications, *ECOOP 2018*, Amsterdam, Netherlands

Khare, S., Sun, H., Zhang, K., **Gascon-Samson, J.**, Gokhale, A., Pattabiraman, K. (2018) Ensuring Low-Latency and Scalable Data Dissemination for Smart-City Applications (Poster), *to appear at ACM/IEEE International Conference on Internet of Things Design and Implementation (IoTDI 2018)*, Orlando, USA

Gascon-Samson, J., Rafiuzzaman M., Pattabiraman K. (2017) ThingsJS: Towards a Flexible and Self-Adaptable Middleware for Dynamic and Heterogeneous IoT Environments, *Middleware for IoT (m4iot)@Middleware 2017*, Las Vegas, USA

Gascon-Samson, J., Rafiuzzaman M., Pattabiraman K. (2017) SmartJS: Dynamic and Self-Adaptable Runtime Middleware for Next-Generation IoT Systems (Poster), *SPLASH 2017*, Vancouver, Canada

Aliabadi, M.R., Kamath, A.A., **Gascon-Samson, J.**, Pattabiraman, K. (2017) ARTINALI: dynamic invariant detection for cyber-physical system security, *ESEC/SIGSOFT FSE 2017*, Paderborn,

Germany [**Acceptance ratio: 24%**]

Gascon-Samson, J., Coppinger, M., Jin, F., Kienzle, J., Kemme, B. (2017) CacheDOCS: A Dynamic Key-Value Object Caching Service, *ICDCS-PED 2017*, Atlanta, USA

Gascon-Samson, J., Kemme, B., Kienzle, J. (2017) MultiPub: Latency and Cost-Aware Global-Scale Cloud Publish/Subscribe, *ICDCS 2017*, Atlanta, USA

Gascon-Samson, J., Kienzle, J., Kemme, B. (2015) DynFilter: Limiting Bandwidth of Online Games using Adaptive Pub/Sub Message Filtering, *NetGames 2015*, Zagreb, Croatia

Gascon-Samson, J., Garcia, F.-P., Kemme, B., Kienzle, J. (2015) Dynamoth: A Scalable Pub/Sub Middleware for Latency-Constrained Applications in the Cloud, *ICDCS 2015*, Columbus, USA [**Acceptance ratio: 12.8%**]

Khan, H., **Gascon-Samson, J.**, Kienzle, J., Kemme, B. (2015) Monitoring Large-Scale Location-Based Information Systems, *IPDPS 2015*, Hyderabad, India [**Acceptance ratio: 22%**]

Gascon-Samson, J., Kemme, B., Kienzle, J. (2013) Lamoth: A Message Dissemination Middleware for MMOGs in the Cloud (Poster), *NetGames 2013*, Denver, USA

Yahyavi, A., Huguenin, K., **Gascon-Samson, J.**, Kienzle, J., Kemme, B. (2013) Watchmen: Scalable Cheat-Resistant Support for Distributed Multi-player Online Games, *ICDCS 2013*, Philadelphia, USA [**Acceptance ratio: 13%**]

PROFESSIONAL MEMBERSHIPS

- **Ordre des Ingénieurs du Québec** (Quebec Board of Engineers) (since 2009)
- **IEEE**
- **ACM**

UNIVERSITY SERVICE

- **IEEE TPDS**: Reviewer for a journal paper (2019)
- **Elsevier JSS**: Reviewer for a journal paper (2019)
- **REBLS'17**: Program Chair member (2017)
- **Edutainment Conference 2016-2018**: Program Chair member
- **SRDS 2015**: Registration chair (2015)

VOLUNTEERING AND SOCIAL IMPLICATION

Translink Access Transit Users' Advisory Committee (Vancouver, Canada). User committee working in collaboration with Translink on improving public transit accessibility in Metro-Vancouver.

Canadian Undergraduate Software Engineering Conference (CUSEC) (Montreal, Canada). Head Delegate for École Polytechnique in 2009.

RUTA Montreal, Member and Vice-President of the Board of Administrators (2010-2011, 2012-2013). Non-profit organization promoting the right of disabled public transit users in Montreal.

RAPLIQ, Member of the Board of Administrators (2011-2014). Non-profit organization defending the rights of persons with disabilities in Montreal.

PARTICIPATION IN CONFERENCES, SEMINARS AND VISITS

m4iot@Middleware 2017 (Las Vegas, USA). Presentation of a paper. (December 2017)

SPLASH 2017 (Vancouver, Canada). Presentation of a poster. (October 2017)

ICDCS 2017 (Atlanta, USA). Presentation of two papers. (June 2017)

ICICS-ECE-IEEE Workshop 2017 (Vancouver, Canada). Presentation of a poster. (May 2017)

University of British Columbia (British Columbia, Canada). Invited to give a talk. (November 2016)

University of Toronto (Toronto, Canada). Invited to give a talk. (May 2016)

NetGames 2015 (Zagreb, Croatia). Presentation of a paper. (December 2015)

ICDCS 2015 (Columbus, USA). Presentation of a paper. (June/July 2015)

Google Scholar's Retreat (Mountain View, USA). Attended the 2014 Google Scholar's Retreat. (June 2014)

NetGames 2013 (Denver, USA). Presentation of a poster. (December 2013)

ICDCS 2013 (Philadelphia, USA). Co-author of a paper. (July 2013)

Middleware 2012 (Montreal, Canada). (December 2012)

MISCELLANEOUS

Nationality : Canadian Citizen

Languages: French (native) and English (bilingual)