VINEET KUMAR

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- **8 years** of relevant work experience | **M.Sc Computer Science**, McGill University
- Languages - C++, Python, Java | Skills and interests - Compilers, Program Analysis, Computer Architecture, System Software

WORK EXPERIENCE

Huawei Canada Research Center - Heterogeneous Compiler Research Lab September 2017 - May 2018
Senior Software Engineer *Toronto, ON, Canada*

- Developed a new way to dynamically resize available heap size in the JVM (with Serial GC). Patent filed.
  - Solution based on memory ballooning technique used by hypervisors.
- Contributed to the compiler framework being developed for Huawei's new AI accelarator.
  - My research mostly focused on loop transformations and vectorization for tensor operations.
- Designed a DSL to describe IoT devices and their network.

INRO December 2014 - September 2017
Senior Developer *Montreal, QC, Canada*

- Designed and developed a **new compiler and memory management system** for Emme's matrix calculator language. Emme is a travel demand modelling system for transportation forecasting, used by some of the world's most populous cities.
  - Achieved **up to 30x faster** performance. Efficient even for computations on **large matrices (over 1 GB)**. (C++ and Python)
- Built **analytics tools for public transit data** to visually analyze and query loads, delays, stop activities, etc. (Python)
- Designed and developed the **data import library** for CityPhi, an analytics platform for spatial and mobility data at scale.
  - Support for parsing various geographical and transit data formats like shapefile, OSM and GTFS.
  - Optimized to handle large datasets by importing data only in specified spatial and/or time windows. (C++ and Python)

ISENCORE Technologies September 2013 - December 2014
CTO and co-founder *Montreal, QC, Canada*

- Won **first prize with $10,000 in funding** in the **Mcgill Dobson cup** (SME category) 2014 startup competition.
- Delivered the **winning pitch** to get selected as **one of the 20 startups worldwide** to present at SLUSH 2014.
- Developed the **3D object discretization** module for Quirdity, ISENCORE's 3D simulation engine.
  - It generates a voxel tree and the associated data for a 3D model. (C++)(bit.ly/discretizer)

McGill University - Sable Compilers Research Lab January 2012 - April 2014
Research and Teaching *Montreal, QC, Canada*

- **Research Assistant, Sable Lab** - My research included program analysis and static compilation of dynamic languages.
  - Wrote MiX10 **: a** Matlab **to** X10 **(programming language) compiler for high-performance**. (Java)(*bit.ly/getmix10*)
  - Achieved **7 times (mean) faster** performance compared to the standard Matlab implementation.
  - Designed a new algorithm to identify and safely typecast floating point values to integers at compile time for improved performance.
  - Discovered a **severe performance bottleneck** in the X10 compiler and helped improve the X10 compiler.
  - Developed an analysis to identify complex numerical values in the McLAB compiler framework for Matlab .(*bit.ly/iscomplex*)
- **Teaching Assistant** - Program Analysis and Transformations, Compiler Design, and Introduction to Computer Systems.

AT&T September 2008 - August 2011
Systems Engineer *Pune, India*

- **Led** a team of 4 for **deployment performance management** for AT&T's online and mobility frontend and backend applications.
  - My team's job was to design and develop performance test scripts, analyze results, and troubleshoot performance issues.

Sun Microsystems January 2007 - May 2008
Intern - Student Tech Lead, APAC region/Campus Ambassador *Bangalore, India*

- As one of the **only 5 Tech Leads worldwide** I taught a course on OpenSolaris and developed tutorials for ambassadors worldwide.
- Wrote a simple decompiler for x86 assembly to C for undergraduate project.

PUBLICATIONS

- Vineet Kumar and Laurie Hendren. MiX10 : Compiling Matlab to X10 for High Performance. In Proceedings of the 2014 ACM International Conference on **Object Oriented Programming Systems Languages & Applications (OOPSLA '14)**.(*bit.ly/1papr1*)
- Vineet Kumar and Laurie Hendren. First steps to compiling Matlab to X10 . In Proceedings of the 2013 ACM SIGPLAN X10 Workshop, **X10 '13** co-located with **PLDI 2013**.(*bit.ly/2papr2*)

EDUCATION

McGill University April 2014
M.Sc. in Computer Science *Montreal, QC, Canada*

- Won the DFW scholarship awarded to **exceptional international Research Master's** students.

SASTRA University June 2008
B.Tech. in Computer Science & Engineering *Thanjavur, India*

- Won the Dean's list scholarship for being among the **top 10%** students in the University.