

Sameer Deshmukh

Curriculum Vitae

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Objectives

- Gain a deeper understanding of the challenges of developing distributed linear algebra libraries for future supercomputers.
- Work with the leaders in this field and better understand future research trends.
- Understand the role of low rank approximation and low precision arithmetic.
- Understand the role of distributed linear algebra within the wider scope of actual applications like machine learning and simulation.

Education

October 2019–present **Ph.D. Computer Science (High Performance Computing),**
Tokyo Institute of Technology, Japan.
Advisor: Dr. Rio Yokota.

2017–2019 **M.S. Computer Science (High Performance Computing),**
Tokyo Institute of Technology, Japan,
GPA: 3.7/4.5.
Thesis: Distributed Factorization of Hierarchical Matrices using Runtime Based Systems.
Advisor: Dr. Rio Yokota.

Projects

May 2018 – present **HiCMA: Hierarchical approximation and factorization of large dense matrices,**
Tokyo Institute of Technology, Japan.

Writing a library from the ground up using MPI+X programming paradigms with C++ for highly efficient and scalable low rank approximation and factorization of dense matrices. Currently conducting research on gaining a deep analytical and empirical understanding of distributed memory LU factorization of Block Low Rank matrices arising out of dense linear equation systems using runtime systems like starPU and parSEC.

October 2019 – present **PyTorch, Quansight Inc..**

Regularly contributing bug fixes and feature updates to PyTorch's C++ backend. Many PRs accepted into the PyTorch master branch using concepts of advanced C++ and fast tensor processing, GPUs and the implementation of deep learning algorithms. Priceless learning about managing large codebases and co-ordinating big, structured issues with contributors from a diverse background.

October 2018 **Rubypplot, Quansight Inc and Ruby Science Foundation.**

– December 2019 Building the most advanced library for visualization in the Ruby programming language. Focuses on providing a simple, Ruby-like interface to work with multiple backends with speed, flexibility and ease of use.

August 2018 – **The XND project: Developer libraries for array computing., Quansight Inc..**

September 2018 Worked with some of the former members of the numpy core team to develop a Ruby wrapper for the XND project, which aims to refactor numpy into language-neutral low-level libraries that can be interfaced with any high-level language binding.

October 2016 **Rubex: Ruby-like language for writing Ruby C extensions, Ruby Science Foundation.**

– January 2018 Wrote a compiler written in pure Ruby for compiling a language with syntactic and semantic similarities to Ruby, but which compiles to C and implicitly interfaces with the Ruby interpreter. Inspired by Cython for Python.

October 2015 **Daru: Data Analysis in Ruby, Ruby Science Foundation.**

– August 2017 Wrote a hugely popular dataframe library for Ruby inspired by Python's pandas. I am still associated with the daru project but only in a mentorship role.

Workshops

- June 2019 SIAM Gene Golub Summer School for High Performance Computing
Aussois, France
- Feb 2020 RIKEN CCS HPC Youth Workshop
Kobe, Japan

Posters

- January 2020 Distributed Memory Task-Based Block Low Rank Direct Solver
HPC Asia 2019, Fukuoka, Japan
- Sept. 2018 MPI Parallelization of Hierarchical Matrices
CREST Symposium, Tokyo Institute of Technology, Japan

Publications

- 2015 S. Deshmukh, C. Laulkar and S. Rajankar, “Automatic Recognition of Class Variants of Marathi Consonants”, 2015 International Conference on Pervasive Computing (ICPC).

Grants and Scholarships

- April 2018 – **Research Assistant,**
present *AIST RWBC-OIL, Japan.*
Working as a research assistant for the National Institute of Advanced Institute of Science and Technology. Stipend of 1,70,000 JPY/month.
- August 2018 – **Academic Graduate Leadership Program scholarship,**
March 2018 *Tokyo Institute of Technology, Japan.*
AGL is a program within Tokyo Tech that aims to foster leadership skills within Master's and Ph.D. with a point of view of preparing them for leadership roles in diverse domains in Academia and Business. Grant payment of 1,00,000 JPY/month.
- Sept. 2017 – **JASSO: Japanese Government Aid for Foreign Students,**
April 2018 *Tokyo Institute of Technology, Japan.*
Received the JASSO scholarship from the Japanese government for a period of 6 months. Grant payment of 50,000 JPY/month.
- 2016 **Ruby Association Grant 2016, Matsue, Japan.**
Create the **Rubex programming language** for simple interfacing between Ruby and C extensions. Grant payment 5,00,000 JPY.
- 2015 **Ruby Association Grant 2015, Matsue, Japan.**
Work on improving support for linear algebra libraries in Ruby. Specifically work on the **NMatrix** Ruby library. Grant payment 5,00,000 JPY.
- 2015 **Google Summer of Code 2015.**
Work with the Ruby Science Foundation to create **daru**, a library for data analysis in Ruby. Stipend of 5500 USD.

Soft skills

- Languages English, Marathi, Hindi, Japanese (intermediate)
- Teamwork Part of the **Academic Graduate Leadership (AGL) Program** at Tokyo Tech that aims and to teach better communication and leadership skills to academics. I have been to numerous Leadership seminars and participated in many discussions and group work sessions on various topics ranging from Design Thinking to interdisciplinary communication.

Technical Skills

- Programming Languages Advanced: C, C++, Ruby, Python.
- Intermediate: Java, Scala, FORTRAN, OCaml, Emacslisp

Technologies MPI, StarPU, Parsec, CUDA, emacs, UNIX-like systems (Debian, Ubuntu, etc.), macOS, Android.

Hobbies

Karate Practicing Karate with the Tokyo Tech Karate club since October 2018.

Bass guitar Played the bass guitar with my band Cat Kamikazee in India. We played a 7 city India tour and released our debut EP Raining Cats in late 2016.

Reading Avid reader of history and fiction.

Traveling Solo traveller and hiking enthusiast.

Links

GitHub <https://github.com/v0dro>

Blog <https://v0dro.in>

Twitter <https://twitter.com/v0dro>