

# Sameer Deshmukh

## Curriculum Vitae



DOB: 30 July 1993

## 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 and computer architectures.
- Understand the role of low rank approximation, low precision arithmetic and distributed computation in various areas of application like Artificial Intelligence.

## 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 Run-time 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 run-time systems like starPU and parSEC.

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

– present Regularly contributing bug fixes and feature updates to PyTorch's C++ back-end. 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. Learning about managing large code bases and co-coordinating big, structured issues with contributors from diverse backgrounds.

October 2018 **Rubyplot**, *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 back ends 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*

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## 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*

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## Publications

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

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## Awards and Scholarships

- April 2018 – present **Research Assistant,**  
*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 – March 2018 **Academic Graduate Leadership Program scholarship,**  
*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 – April 2018 **JASSO: Japanese Government Aid for Foreign Students,**  
*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.
- 2017 **Ruby Hero India, Kochi, India.**  
Received the Ruby Hero India award from the Indian Ruby community for contributions to the Ruby Programming Language.
- 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.

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## Soft skills

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

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## Technical Skills

- Programming Languages Advanced: C, C++, Ruby, Python.

Intermediate: Java, Scala, FORTRAN, OCaml, Emacs  
Technologies MPI, StarPU, Parsec, CUDA, emacs, UNIX-like systems (Debian, Ubuntu, etc.), macOS, Android.

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## 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 traveler and hiking enthusiast.

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## Links

GitHub <https://github.com/v0dro>  
Blog <https://v0dro.in>  
Twitter <https://twitter.com/v0dro>