

Ravi Shankar

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Education

10th grade 440/500 (91%)	2009 – 2010 Ponjesly Public Matriculation School
12th grade 1131/1200 (94.25%)	2011 – 2012 DVD Higher Secondary School
Bachelors Degree - Aeronautics CGPA: 6.23	2012 – 2016 Madras Institute of Technology

Experience

Backend Developer Intern Ref. Giriraj Namachivayam (Product Manager)	January, 2016 – May, 2016 Genome Life Sciences
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- Introduced Rust language to the team, and rewrote a number of Bash and Python scripts in Rust, which showed a drastic improvement in performance.
- Wrote a few utilities in Rust for bulk parallel processing of chromosome and DNA sequence data in FASTQ, SAM and VCF file formats.
- Earned the "game changer" award.

Bioinformatics Programmer Ref. Giriraj Namachivayam (Product Manager)	June, 2016 – Present Genome Life Sciences
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- Wrote an utility which collects known species data from various references and tries to predict the species from the given DNA sequence in $O(1)$ time or $O(\log-n)$ time depending on the space-time tradeoff.
- Wrote a few more utilities for analysis of bio-data, some of which now power the backend pipelines.

Programming skills

Languages: Python, Rust, HTML5, Javascript, CSS, Bash

Technologies: Git, Mercurial, Flask

Open source contributions

- [Active contributor](#) and [reviewer](#) for the [Servo browser engine](#) project, primarily concentrating on the python code used by the build system, style system, and mentoring the newcomers.

Notable contributions:

- A [compiler plugin](#) for checking sorted order of declaration statements.
- Various [handlers](#) for [highfive](#) (a bot that responds to Github webhook payloads by welcoming newcomers, assign/tag issues and pull requests, post build failures, etc.) and a "mark and sweep" [JSON cleaner](#) for its tests.
- A [watcher](#) that tests Servo builds in a dedicated machine, analyzes the logs, maintains a database of "rr" recordings of intermittent failures, and uses the Github API to file issues or comments to notify the people who work on such issues.
- Occassional contributor to the [Rust programming language](#), its documentation and related tooling.
- [Mozillian](#) since the summer of 2015.

Personal projects

- **Highfive**: A complete rework of all the webhook event handlers from Servo's [highfive](#) for efficiency. Apart from handling Github's webhook events, it supports sharing the load between multiple bots, and offers configuration for individual repositories, events and their corresponding handlers.
- **Helix**: A Rust library to map short DNA sequence reads to the reference genome. It makes use of suffix array to generate the Burrows-Wheeler transform, from which an FM-index is built and used for finding exact matches in $O(1)$ time.
- **Catalog**: A "file-backed" map written in Rust, for maintaining key/value pairs in a file (sorted with respect to their hashes), which uses binary search and file seeking to "get" the values in $O(\log-n)$ time.
- **Biographer**: A command-line based private diary written in Python, which allows users to write their everyday stories, view them, or search through them later. It makes use of a simple shifting cipher to encrypt/decrypt the contents. It also contains a Rust library, which uses FFI and parallelization to reduce the searching time by a factor of ≈ 100 .
- **Free fall**: A terminal based 2D-ASCII game written in Rust, where the users try to save a jumper from hitting the cliffs. The game makes use of the terminal's raw mode and interacts with the Unix C libraries for polling the keystroke inputs and prints thousands of characters frame by frame to indicate motion.

Miscellaneous

- I also play with code and make some cool stuff in my free time:
 - A [responsive website](#) (for a symposium) without the use of any external libraries.
 - A [method](#) for selective-plotting of volcano plots.
 - A [CSS injector](#) that slowly injects a stylesheet into a style element in the DOM and gets rendered in realtime.
 - An [ASCII Art Generator](#) for JPEG/PNG images which [extracts the necessary details](#) for generating the ASCII sketch.
- Blogger since 2013 on [wafflescrazypeanut.wordpress.com](#) and now, at [wafflespeanut.github.io](#)
- [Contributor and reviewer](#) of posts at Physics Stack Exchange for two years (2013-2015).
- I'm also an avid gamer, hobby composer and juggler when I'm AFK.

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EMBL Recruitment team
European Molecular Biology Laboratory

March 19, 2017

Dear member(s) of the committee,

I'm writing to apply for the Backend Developer position advertised in your website. I'm currently a research programmer at *Genome Life Sciences*, a bioinformatics company, where I've been writing code for backend engines for over an year. I'm extremely interested in obtaining the position at EMBL, where I can continue exploring new things in the domain, improve my skills and apply them in problems that matter in the field.

Even though I dropped out of college in my final year, my academic experience and diversified knowledge in Aeronautics, Physics and Computer Science is what makes me believe that I could be an effective asset in your research environment. I have 3 years of experience in Python and 2 years in Rust (a compiled language that offers the performance of C++).

Throughout the year in my current job, I've been developing applications for handling large datasets in FASTQ, SAM and VCF file formats, to produce results as fast as possible while utilizing the available resources. One such application was FASTQ+, a parallel processing engine for validating FASTQ files. With help from the bioinformaticians in our company, I rewrote FastQC (the existing validation tool widely used by the bioinformatics community) in Rust in a week, and it turned out to be 5x faster than the existing tool.

I'm a science enthusiast, an avid programmer, and a quick learner. I love learning new stuff, I enjoy solving problems (either by my own, or collaboratively with other people), and I especially like creating applications or features that save time for a lot of people. I also love to share my knowledge to others, which explains my contributions to Mozilla's open-source software. It's all these experiences that have built my confidence over time, and that's also why I think I'm fit for this job.

I don't really know whether this is enough to convince you about my potential for this position, but I can assure you that I'll prove my worth if I'm given a chance. I would enjoy discussing this with you in the weeks to come. In the meantime, I'm enclosing my curriculum vitae along with this letter.

Thank you very much for taking your time for consideration.

Yours sincerely,
Ravi Shankar