RUPANSHU SOI

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EDUCATION

Birla Institute of Technology and Science, Pilani *2018–2022*
Bachelor of Engineering in Computer Science ***CGPA: 8.99***

PROGRAMMING SKILLS

Languages C, Python, Lua, Go, Racket, Regent
Systems LLVM, Flex, Bison, Linux, MERN stack, LaTeX

RESEARCH EXPERIENCE

Exploring LLVM using Software Engineering Techniques *Summer 2021*
MITACS Globalink Research Intern

- Developed modular probes to extract and compose information about LLVM's architecture.
- Employed techniques used in exploration of microservices.
- Advised by Prof. Sébastien Mosser and Prof. Jean Privat.

Dynamic Program Analysis for Index Launches *Fall 2020–Spring 2021*

- Wrote a dynamic analysis that allows a much greater class of loops to be safely index launched. [Code]
- Demonstrated its negligible performance impact by benchmarking it on the Piz Daint supercomputer.
- Advised by Dr. Elliott Slaughter. Collaborated with Legion contributors.

Development of an Implicitly Parallel Meshfree Solver in Regent *Spring 2020*

- Implemented a high-performance CFD solver in the Regent programming language. [Code]
- Achieved higher performance than corresponding Fortran and Julia implementations.
- Advised by Dr. Anil Nemili.

REFEREED PUBLICATIONS

R. Soi, M. Bauer, S. Treichler, M. Papadakis, W. Lee, P. McCormick, A. Aiken, E. Slaughter.
Index Launches: Scalable, Flexible Representation of Parallel Task Groups.
Supercomputing (**SC21**), to appear.

R. Soi, N. R. Mamidi, E. Slaughter, K. Prasun, A. Nemili, S. M. Deshpande.
An Implicitly Parallel Meshfree Solver in Regent. [Abstract][Paper][Slides]
2020 IEEE/ACM 3^{rd} Parallel Applications Workshop: Alternatives to MPI+X (**PAW-ATM**).
In conjunction with Supercomputing (**SC20**).

SUMMER SCHOOLS

Programming Language Implementation Summer School (PLISS) *Summer 2021*

Programming Language Analysis and Optimizations *Summer 2021*
Hosted online by IIT Hyderabad

SELECTED PROJECTS

Open-Source Contributions to the Regent Compiler *2020–2021*

- Added support for some bitwise operators, the `__future` keyword, and reported several bugs. [Pull Requests][Bug Reports]

Misty: A Scheme Interpreter in Lua *Spring 2021*

- Implemented lexical scoping, HOFs, and tail-call optimization. [Code]

Selective Repeat Inspired File Transfer Protocol in Racket *Spring 2021*

- Built reliability into the application layer over UDP sockets. [Code]

Runi: Handwritten Lexer and Parser in Go *Spring 2021*

- Wrote a CFG, lexer, and predictive recursive descent parser for a C-like language. [Code]
- Visualized the parse tree using Graphviz.

TEACHING ASSISTANTSHIPS

Theory of Computation *Fall 2021*

Operating Systems *Spring 2021*

Differential Equations (Math III) *Fall 2020*

Mechanics, Oscillations and Waves (Physics I) *Spring, Fall 2019*

SCHOLASTIC ACHIEVEMENTS

MITACS Globalink Research Internship *Summer 2021*

- A competitive 12-week undergraduate research internship in Canada.

10/10 Semester GPA *Fall 2018*

- Top 5 in 1100 students.

BITS Pilani Merit Scholarship *Spring, Fall 2019*

- Top 1-3% of the batch.

Sir CV Raman Prize *Spring 2019*

- Awarded once per semester for outstanding performance in Physics I.

LEADERSHIP & MANAGEMENT EXPERIENCE

Joint Secretary, Ad Astra (Astronomy and Science Club) *Fall 2019–Spring 2020*

- Managed and organized club activities including discussions, talks, quizzes and star-gazing sessions.
- Responsible for club events during our annual technical fest, ATMOS.