Baber Rehman

baberrehman.github.io | baberrehman | baberrehman
baberrehman26@gmail.com | +852 6734 0119

Summary

I wish to play the leading role in the well-being of the humanity. Love to explore what's happening in the box instead of seeing things as a black box. Have a quality to work and adjust in dynamic environments.

Academics

2018 - 2023 PhD in Computer Science at **University of Hong Kong**, Hong Kong
Research Area: Programming Languages, Type Systems, Functional Programming, Object-oriented Programming
Supervisor: Dr. Bruno C. d. S. Oliveira

2011 - 2015 Bachelor's Degree at **University of Punjab**, Lahore, Pakistan (CGPA: 3.81/4.0)
Major: Computer Science
Result: Distinction (Class: 1/54, Batch: 2/191)

Research Summary

Programming languages define the constructs to instruct the machines. Various programming languages paradigms provide disparate styles of talking to the machines, such as imperative programming and functional programming. It has become essential with the growing need of technological transformation and pressing automation to design user-oriented, accessible, and robust programming languages. The more errors a programming language captures before compilation, the robust the program is. Such a language provides some static guarantees that the programs may not terminate abnormally at runtime. The study of type systems is an area of practical research interest to build robust programs. This is reflected by the fact that *a sound type system guarantees the absence of certain (abnormal) program behaviors*.

My current research revolves around type systems. Specifically, I am working on the integration of intersection types and union types. Intersection and union types are powerful features available in many modern programming languages such as Scala, Typescript, and Ceylon. The adequacy of intersection and union types lies in the fact that they naturally are able to encode various advance programming constructs, for example, function overloading, multiple interface inheritance, and nested composition.

Technical Skills

Functional Programming	**Coq Theorem Prover**
Constructive Logic	**Type Systems**
Scala	Microsoft Azure (VNet, Virtual Machines)
Haskell	Computer Networking / VPC / VPN / PfSense
Chef / Ansible	Amazon Web Service (EC2, VPC, S3)

Experience

Resident Tutor Sep 2019 - present

New College, The University of Hong Kong

- Main ethos of New College are **Sustainability** and **Responsibility**
- Maintain a lively environment for the students
- Assist students both academically and socially
- **Mental Health First Aid Certification** (Hong Kong)
- **Suicide Prevention Service** (Hong Kong)
- Responsible for the **Photography Team**, **Web Team**, and **News and Media Team**

Teacher Assistant Sep 2018 - Jun 2019

University of Hong Kong

- Functional Programming
- Principal of Programming Languages

Software Engineer (DevOps) Jun 2015 - Aug 2018

CloudPlex PVT LTD, Lahore, Pakistan

- Build a cloud platform to automate cloud orchestration and deployment
- Worked with AWS and Azure cloud services including VPC, S3, EC2, VNet
- Worked on automating the configuration of firewalls (PfSense and Fortinet)
- Lead one local team in Lahore and one remote team located in Argentina
- Conducted technical interviews of candidates for the backend team
- Held meetings with clients for requirement gathering, demos, and delivery
- Tools and technologies: Golang, Chef, Ansible, Networking, Docker, Shell scripting, Cloud Computing

Visiting lecturer Oct 2015 - Jun 2016

University of the Punjab, Lahore, Pakistan

- Fall 2015: Computer organization and Assembly Language course
- Spring 2016: Enterprise Application Development course (C#/MVC4)

Intern Jul 2014 - Sep 2014

Mentor Graphics, Lahore, Pakistan

- Worked in Java programming language and used eclipse as a tool
- Explored Java GUI library i.e. SWT
- Did debugging of source code of Sourcery Codebench (an eclipse based IDE used in Mentor Graphics) and removed few of its GUI bugs

Teacher Assistant Oct 2013 - Jul 2015

University of the Punjab, Lahore, Pakistan

- Discrete Mathematics
- Data Structures and Algorithms
- Database Systems
- System Programming
- Enterprise Application Development

Research Assistant Jun 2013 - Oct 2013

AIM Lab, University of the Punjab, Lahore, Pakistan

– Worked with business process management research repository

Review Committee Member

- Artifact Evaluation Committee **ISSTA** 2024
- Artifact Evaluation Committee **ECOOP** 2024
- Extended Review Committee **ECOOP** 2024
- Artifact Evaluation Committee **PLDI** 2024
- Artifact Evaluation Committee **POPL** 2024
- Artifact Evaluation Committee **ATC** 2023
- Artifact Evaluation Committee **OSDI** 2023
- Artifact Evaluation Committee **ECOOP** 2023
- Extended Review Committee **ECOOP** 2023
- Artifact Evaluation Committee **POPL** 2023
- Artifact Evaluation Committee **APLAS** 2022
- Artifact Evaluation Committee **ECOOP** 2022
- Extended Review Committee **ECOOP** 2022

Key Achievements

- Promoted to Senior Software Engineer and Team Lead after two years of professional experience at Platalytics Inc., Lahore, Pakistan which normally takes three years.
- 2nd position (2/191) in BS Computer Science (2011 – 2015) at PUCIT, University of the Punjab, Lahore, Pakistan.
- 2nd position in **Belal Hashmi Programming Competition SOFTEC'15** held in FAST-NU Lahore (Team Code:Threads).
- 2nd position in **Speed Programming Competition SOFTEC'14** held in FAST-NU Lahore (Team Code:Threads).
- 2nd position in **Speed Programming Competition APTA'14** held in GCU Lahore (Team Code:Threads).

Publications

- Baber Rehman and Bruno C. d. S. Oliveira. 2024 (In Submission). "Disjoint Polymorphism with Intersection and Union Types". In *26th Workshop on Formal Techniques for Java-like Programs (FTfJP)*.
- Baber Rehman and Bruno C. d. S. Oliveira. 2023 (In Submission). "Type Soundness with Unrestricted Merges". In *Journal of Functional Programming (JFP)*.
- Baber Rehman. 2023. "Correctness-by-Construction meets Refinement Types". In *25th Workshop on Formal Techniques for Java-like Programs (FTfJP)*.

- Baber Rehman, Xuejing Huang, Ningning Xie and Bruno C. d. S. Oliveira. 2022. "Union Types with Disjoint Switches". In *European Conference on Object-Oriented Programming (ECOOP)*.
  - Baber Rehman, Xuejing Huang, Ningning Xie and Bruno C. d. S. Oliveira. 2022. "Union Types with Disjoint Switches (Artifact)". In *European Conference on Object-Oriented Programming (ECOOP)*.
- Bruno C. d. S. Oliveira, Cui Shaobo and Baber Rehman. 2020. "The Duality of Subtyping". In *European Conference on Object-Oriented Programming (ECOOP)*.
  - Bruno C. d. S. Oliveira, Cui Shaobo and Baber Rehman. 2020. "The Duality of Subtyping (Artifact)". In *European Conference on Object-Oriented Programming (ECOOP)*.