

# RAKAN A. ALSEGHAYER

210 South Bouquet Street, Room# 6412, Mailbox# 308, Pittsburgh, PA 15260

cell-phone: +1 (412) 706-3830 | e-mail: [ralseghayer@cs.pitt.edu](mailto:ralseghayer@cs.pitt.edu) | website: <http://www.alseghayer.com>

## EDUCATION

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University of Pittsburgh – Pittsburgh, PA

August 2014 – Present

- Ph.D. in Computer Science, The Department of Computer Science.

University of Pittsburgh – Pittsburgh, PA

May 2011 – April 2013

- M.Sc. in Information Sciences, School of Information (concentration on Information Security and Networking), GPA: 3.98

University of Washington – Seattle, WA

October 2010 – March 2011

- Business for International Professionals course, Educational Outreach
- Fundamentals of Project Management course, Educational Outreach.

University of Washington – Seattle, WA

January 2010 – September 2010

- ELP Campus Intensive English Program “IEP”

King Saud University, Riyadh, Saudi Arabia

August 2004 – June 2008

- B.Sc. in Computer Science with Second Class Honor, College of Computer and Information Sciences, GPA: 4.68/5.00

## COURSE WORK PROJECTS

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- **Simulator for a modified PowerPc 604 and 620 Architectures:**  
The goal was to design, implement, and evaluate the performance of a dynamically scheduled processor. Thus, we implemented the simulator using Tomasulo algorithm with renaming registers and reordering buffers. Also, we did implement a dynamic branch prediction using a target buffer.
- **Simulators for cache coherence protocols (MSI, MESI) in CMPs:**  
The goal was to build a CMP with dynamically configured cores, and each core has its own L1 private cache, and they all share a unified L2 cache. The protocols are writing back with invalidation. We implemented the simulator and evaluated the performance of each protocol.
- **Simple Remote Procedure Call System:**  
In this project, we were asked to design, implement, and evaluate the performance of a sRPC system. We implemented a client, server, and a port-mapper. We addressed issues related to parameter passing, binding, exception handling, call semantics, performance and data representation. We achieved server high availability and load balancing through replication and name resolution respectively.
- **MiniGoogle: Document Indexing and Querying:**  
The main objective of this project is to design and implement a basic data-intensive application to index and search large documents. More specifically, the goal is to design a simple search engine, referred to as tinyGoogle, to retrieve documents relevant to simple search queries submitted by users. We did implement a replicated and reliable client/server model that consists of: the client, the server (has the indexing and querying masters), the helpers (for the mapping and reducing), and the name-server (for the name resolution).
- **Simplified File Transfer Protocol System:**  
The purpose of a file transfer protocol is to enable the transfer of files between machines, typically under the command of a user. Several issues need to be addressed in the design of a file transfer protocol, including dealing with differences in file name conventions, text and data representation, and directory structure.

Furthermore, the protocol must ensure reliable transfer of files from one system to another. We did implement the system in a layered fashion with a replicated and load balanced servers and name-servers. Also, we did implement an error simulation module to introduce unreliability to the medium. We used the Go-Back-N as a sliding window protocol. Consequently, we did conduct a thorough analysis of the performance of the system with multiple experiments. Those involved different packet error rates, different packet drop rates, and different retransmission timeouts.

- **myTRC: my Transactional Row Column store DBMS:**  
The objective of the project is to develop the Transactional Row Column store myTRC that efficiently supports concurrent execution of OLTP (i.e., transactions) and OLAP (i.e., aggregate queries) workloads. myTRC will provide limited transactional support. By limited support we mean that it does not support full durability. In addition to serializable and atomic access, it will also provide the standard uncontrolled access to files.
- **Checkers Solver:**  
Developed a Checkers solver model that competed against my classmates' engines. The engine was developed using minimax algorithm with alpha beta pruning, and some cutoff techniques using some common heuristics, as well as some of my own developed heuristics, I was able to win the tournament of my class.
- **PASTRI - PAirwise STream CoRrelation Identifier: (only Time series no data streams)**  
Developed a system that aims at finding accurate results of correlations between pairs of time series in real-time. By doing this, we minimize the time to the first produced results - i.e. achieve interactive response of the system and keeps refining the results, while the user is busy, exploring a subset of the provided results. Our approach modeled the length of each time series, which is of interest, and used a utility cost function, to identify the highly correlated streams. Our experiments show a speedup of 10 times producing the first results, compared to other systems.

## WORKING EXPERIENCE

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**Advanced Electronics Company Ltd. (AEC), Riyadh, Saudi Arabia**

**October 2008 – July 2009**

- Associate Software Engineer, Systems Development, R&D Department:
  - Developed parts of the DCU “Data Collection Unit” as well as the communication part “TCP\IP” under the .Net environment. This was for the project (ADDAD4), which is an Energy Smart Meter System. Also, worked with the military sector in developing some military communication systems.

## TRAINING EXPERIENCE

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**Etihad Etisalat “Mobily”, Riyadh, Saudi Arabia**

**Summer 2007**

- Trainee in the “ERP” department:
  - Developed a knowledge base application under the .Net environment where the ERP team can log their day-to-day problems and challenges with their resolutions.

## TEACHING

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**University of Pittsburgh, Pittsburgh, PA**

**September 2015 - Present**

- Teaching Assistant, The Department of Computer Science.
  - Fall 2015: CS1645/CS2045: Introduction to High Performance Computing.
  - Fall 2016: CS1645/CS2045: Introduction to High Performance Computing
  - Fall 2017: CS1501: Algorithm Implementation

**King Saud University, Riyadh, Saudi Arabia**

**January 2012 – Present**

- Teaching Assistant, College of Computer and Information Sciences, Department of Computer Science.
  - Fall 2013: CS111: programming -1- (Recitation)
  - Fall 2013: CS 215: Procedural Programming using C Language (Lab)
  - Spring 2014: CS 113: programming -2- (Lab).
  - Spring 2014: CS 311: Design and Analysis of Algorithms (Recitation)

## COFERENCE AND WORKSHOP PUBLICATIONS

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- D. Petrov, R. Alseghayer, M. Sharaf, Panos K. Chrysanthis, A. Labrinidis. "Interactive Exploration of Correlated Time Series." Proc of the 4th Intl Workshop on Exploratory Search in Databases and the Web (ExploreDB '17), pp. 14–19, May. 2017. (Co-located with ACM SIGMOD 2017).
- R. Alseghayer, D. Petrov, P. K. Chrysanthis, M. Sharaf, A. Labrinidis. "Detection of Highly Correlated Live Data Streams." Proc of the 11th Intl Workshop on Real-Time Business Intelligence and Analytics (BIRTE '17), pp. Aug 28th - Sept 1st. 2017. (Co-located with VLDB 2017).

## SKILLS AND LANGUAGES

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- Programming: Java, C++, Python, C, and SQL.
- HPC: OpenMPI.
- Security: Secured Java, Cryptography.
- Computer Networks: TCP/IP programming, Traffic and Packet Monitoring (Wireshark, IPTraf), Performance Analysis, Routing Protocols, and Cisco routers.
- English: (Excellent level) speaking and writing. (6 out of 9 IELTS).
- Languages: Arabic (Native), English (Fluent), Spanish (Beginner).

## AWARDS

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- Member of the "Outstanding Students 2013" in the Saudi Arabian Cultural Mission for graduating from one of the top ten universities in the Information Science field.
- Dean's List for Excellence at the College of Computer and Information Sciences for obtaining a high GPA, King Saud University (2007).

## CERTIFICATES

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- CNSS 4011 Information Systems Security Professional, CNSS 4012 Designated Approving Authority, CNSS 4013 System Administrator in Information Systems Security, CNSS 4014A Information Systems Security Officer, CNSS 4015 System Certifier.

## INTERESTS

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- Big data management, time series analysis, database management systems, data stream management systems, distributed systems, cloud computing, high performance computing (HPC), reliability, computer and information security.

## REFERENCES

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- References are available upon request.