

# MD ABDUL MOTALEB FAYSAL

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## RESEARCH INTEREST

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Parallel and Distributed Computing, Machine Architecture, Graph Algorithms, Data Science, Community Discovery, HPC Performance Modeling, Scalable Algorithm Design, Big Data Mining and Analytics

## EDUCATION

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**University of Nevada, Las Vegas (UNLV), NV**

*Fall 2022 - Present*

Ph.D. Candidate in Computer Science

**University of New Orleans (UNO), LA**

*Fall 2017 - Summer 2022*

Ph.D. Student in Computer Science

**University of New Orleans (UNO), LA**

*Spring 2020*

M.S. in Computer Science

**Thesis:** Accelerating the Information-Theoretic Approach of Community Detection Using Distributed and Hybrid Memory Parallel Schemes

**Bangladesh University of Engineering and Technology (BUET), Bangladesh**

*July 2014*

B.Sc. in Computer Science and Engineering

**Thesis:** Content-Based Image Retrieval using Relevance Feedback

## PUBLICATIONS

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### Conference Publications:

- Md Abdul Motaleb Faysal, Shaikh Arifuzzaman, Cy Chan, Maximilian Bremer, Doru Popovici and John Shalf, “HyPC-Map: A Hybrid Parallel Community Detection Algorithm Using Information-Theoretic Approach”, IEEE HPEC 21.
- Md Abdul Motaleb Faysal and Shaikh Arifuzzaman, “Distributed Community Detection in Large Networks using An Information-Theoretic Approach”, In proc. of 2019 IEEE International Conference on BigData (BigData 2019), pages 4773–4782, IEEE, December 2019.
- Md Abdul Motaleb Faysal and Shaikh Arifuzzaman, “Fast Stochastic Block Partitioning using a Single Commodity Machine”, In proc. of 2019 IEEE International Conference on BigData (BigData 2019), pages 3632–3639, IEEE, December 2019.
- Md Abdul Motaleb Faysal and Shaikh Arifuzzaman, “A Comparative Analysis of Large-scale Network Visualization Tools”, In Proceeding of 2018 IEEE International Conference on BigData (BigData 2018), pages 4837–4843, Seattle, WA, USA, IEEE, Dec 2018.
- Shaikh Arifuzzaman, Naw Safrin Sattar, Md Abdul Motaleb Faysal, “Parallel Algorithms for Mining Large-scale Time-varying (Dynamic) Graphs” Nov 2018, In PDSW-DISCS Workshop in SC’18, Dallas, TX, USA, Nov 2018
- Naw Safrin Sattar, Md A. M. Faysal, Minhaz Zibran, Shaikh Arifuzzaman, Md Rakibul Islam, “Data Mining in-IDE Activities: Why Software Developers Fail”, ISCA 27th International Conference on Software Engineering and Data Engineering, SEDE 2018

## TECHNICAL SKILLS

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<b>Language</b>	C, C++, Java, C#, L <sup>A</sup> T <sub>E</sub> X, Assembly, Python, PHP, Prolog
<b>HPC Frameworks</b>	MPI, OpenMP, CUDA, TAU, Metis, ZSim, Hadoop
<b>Other Frameworks</b>	Ant, JavaFX, JUnit, OpenGL, .NET
<b>RDBMS</b>	MySQL, MSSQL, Oracle
<b>Version Control</b>	Git, SVN, TFS
<b>Operating System</b>	Linux, Windows
<b>Others</b>	Intel Pin, Vtune, OSU Benchmark, Amazon AWS, Matlab, Weka, Shell

## RELEVANT GRADUATE COURSES

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Applied Combinatorics & Graph Theory, Parallel & Sci Computing, Concurrent Programming, Cloud Computing, Machine Learning, Advanced Machine Learning, Big Data Analytics and Systems, Categorical Data Analysis, Network Penetration, Agile Software Engineering

## WORK EXPERIENCE

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**Graduate Research Assistant, UNLV** *Fall 2022 - Present*

Data-intensive Scalable Computing Group

**Supervisor:** Dr. Shaikh Arifuzzaman

**Role:**

- Designing distributed algorithm for local community discovery using K-truss decomposition
- Software-hardware co-design in heterogeneous architecture

**Graduate Summer Intern, Berkeley Lab (LBNL)**

*Summer'20, Summer'21, Summer'22*

**Role:**

- Fast Community Detection in Graphs with Infomap Method using Accelerated Sparse Accumulation delivering  $5.6\times$  performance
- Improved  $5\times$  speedup of a billion-size graph clustering application
- Identified performance bottleneck of the SpGEMM application at Berkeley Lab

**Graduate Affiliate, Berkeley Lab (LBNL)**

*Fall 2020 - Present*

Exascale Computing Group, **PI:** John Shalf

**Role:**

- Software-hardware co-design in heterogeneous architecture using ZSim and Intel Pin tool
- Performance modeling of the massive-scale graph and genomics application kernels in HPC platforms
- Validation of theoretical performance models against true performance *roofline* modeling

**Graduate Research Assistant, UNO**

*Fall 2017 - Spring 2022*

Big Data and Scalable Computing Group

**Supervisor:** Dr. Shaikh Arifuzzaman

**Role:**

- Categorization and optimization of graph algorithm kernels in heterogeneous architecture
- Hybrid memory parallel Community Detection using an information-theoretic approach
- Stochastic Block Partitioning for temporal/dynamic networks
- Network visualization and analytics

**Course Instructor, UNO**

*Spring 2022*

Course Title: Introduction to Programming in C++

**Role:**

- Teaching C++ as a high-level programming tool to solve computational problems
- Preparing quizzes, and problem-setting for assignments

**Course Instructor, UNO**

*Fall 2020*

Course Title: Introduction to Computers

**Role:**

- Introducing computers and computing technologies to students majorly from non-CS background
- Preparing quizzes, problem-setting for assignments, and grading

**Course Instructor, UNO**

*Spring 2020*

Course Title: Machine Structure and Assembly Language Programming

**Role:**

- Teaching assembly language programming and machine architecture
- Preparing questions for quizzes, problem-setting for assignments
- Grading quizzes, and assignments

**Graduate Teaching Assistant, UNO**

*Fall 2019*

Course Title: Machine Structure and Assembly Language Programming

**Role:**

- Grading quizzes and assignments

**Software Engineer**

*August 2014 - July 2017*

ReliSource, Bangladesh

**Role:**

- Developed and maintained software solutions for health care management.
- Developed IoT-based software solution for the cold chain management.

## **SOME PROJECTS**

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### **CloudCached: A Distributed Memcached in Cloud**

- A distributed Memcached client in Amazon AWS
- Data duplication, data recovery, scaling up, and scaling down of Memcached server instances

### **Art Man: A Sales Management Software**

- A software to manage the sales of artworks
- Developed following the *agile* software development process
- Frameworks used: JavaFX, Junit

### **3D Modeling, Simulation, and Animation Using OpenGL**

- Drawing 3D models of the mega-structure with lighting and texturing effect
- Simulation of physical properties of 3D objects such as mass, velocity, friction, damping, collision
- Applying animation on 3D object models
- Language and Frameworks: C, OpenGL, glut

### **Household Protection by Flammable Gas Detection, and SMS Alert**

- An embedded application for detecting combustible gas leakage in household gas pipelines
- Provides alarm, switching on an exhaust fan, short message service alert
- C, WinAVR, Atmega16/32 (microcontroller), SIMCOM-300 (GSM module), MQ-5/6 (Sensors)

### **Electronic Medical Record System**

- A full-stack application for Patients record management
- An application for online access to medical records for doctors and patients
- Key Technology Used: PHP, MySQL, CodeIgniter

### **ACHIEVEMENT & AWARD**

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- Student Volunteer SC'21, and SC'20
- Secretary, Bangladesh Student Association (BSA), UNO, 2021-22
- Champion, UNO Intramural Table Tennis Tournament, 2019
- 2<sup>nd</sup> Runner Up, Inter-University Project Competition, BUET, 2013