Mirza O Beg

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Career Objective

Intending to work as a researcher at a reputable institution in the area of Artificial Intelligence.

Research Interests

Research interests include but are not limited to: Artificial Intelligence, Natural Language Processing, Text Mining, Resource Allocation, Constraint Programming, Machine Learning and, Optimization for Sustainability.

Teaching Interests

Natural Language Processing, MultiAgent Systems, Artificial Intelligence, Data structures, Mathematical Logic, Discrete Mathematics, Programming Fundamentals, Computer Architecture, Programming Languages.

Education

June 2013	**Doctor of Philosophy in Computer Science** University of Waterloo, Waterloo, Ontario, Canada Supervisors: Peter van Beek and Ondrej Lhotak Thesis: Combinatorial Problems in Compiler Optimization
October 2007	**Masters of Mathematics in Computer Science** University of Waterloo, Waterloo, Ontario, Canada Supervisors: Martin Karsten and Srinivasan Keshav Thesis: FLECS: A Data-Driven Framework for Rapid Protocol Prototyping
August 2001	**Bachelor of Science in Computer Sciences** - High Honors University of Texas, Austin, USA Supervisor: Michael Dahlin Thesis: Memory Management in the Active Names System

Research Experience

July 2019 - Present	**Associate Professor** National University of Computer and Emerging Sciences Heading the Artificial Intelligence and Machine Learning(AIM) Lab Currently working on Green Computing and Natural Language Processing. My current research work attempts to connect Artificial Intelligence and Deep Learning techniques for semantic analysis of various text corpora. Also interested in the Internet of Things(IoT).
December 2013 - June 2019	**Assistant Professor** National University of Computer and Emerging Sciences Established the Artificial Intelligence and Machine Learning(AIM) Lab worked on Computational Sustainability. The idea was to connect Artificial Intelligence optimization techniques with programming languages, compilers and computer architecture along with mining large and complex software repositories. My work tackled challenges in compiler optimization, design, constraint programming and graph theoretic analysis.
September 2007 - May 2013	**Research Assistant** Artificial Intelligence Lab, University of Waterloo Worked on a number of compiler optimization problems targeted towards low-end, power constrained processors. These include instruction scheduling for clustered architectures, cache optimizations and code generation. This work applies graph theoretic techniques and constraint programming to compiler optimizations. Implemented and tested prototype optimizations independently and within compilers such as LLVM and Trimaran. In addition to constraint optimization, also worked with integer programming and linear programming.
September 2005 - August 2007	**Research Assistant** Networks and Distributed Systems Lab, University of Waterloo Studied packet processing techniques and network protocols for current and future communication networks. Developed a universal forwarding engine based on axiomatic formulation of fundamental mechanisms in communication networks. Extended the formal analysis of communication networks described in, *An Axiomatic basis for Communication (SIGCOMM 2007)* by developing a protocol prototyping tool called FLECS.
August 2000 - August 2001	**Undergraduate Research Assistant** University of Texas, Austin Worked on Resource Management issues in Distributed Systems under the supervision of Dr. Michael Dahlin. Designed and implemented a memory management system for Java to enhance the security structure of the Java Runtime Environment. The system is developed using bytecode rewriting techniques using the Jikes bytecode toolkit.

Teaching Experience

April 2012 -
August 2013

Sessional Lecturer
UNIVERSITY OF WATERLOO
Taught Mathematical Logic and Data Structures courses. These courses cover topics ranging from introductory algorithm design, propositional and predicate logic, to program verification and graph theoretic algorithms. These course required programming in C and Python. The work also included preparing and delivering three hours of lectures per week to 120-220 students. Prepared assignments, exams and tutorials as well as maintaining a course website and a discussion forum.

September 2007 -
May 2012

Instructional Assistant
UNIVERSITY OF WATERLOO
Assisted is teaching several courses ranging from introductory computer science and software engineering to computer networks and artificial intelligence. Duties included delivering tutorials, review sessions, assigning duties to teaching assistants, holding office hours, preparing and administering assignments and exams.

September 2005 -
August 2007

Teaching Assistant
UNIVERSITY OF WATERLOO
Assisted in delivering several courses. Duties included administering exams and marking assignments and exams.

Professional Experience

February 2013 -
March 2013

Training Consultant
INFOSEC GLOBAL
Prepared training material and delivered C++ training to security software designers to implement advanced cryptographic schemes. Training was held at the Accelerator center in Waterloo.

May 2003 -
August 2005

Software Engineer
STREAMING NETWORKS INC.
Worked with the development of embedded systems and embedded applications. Key responsibilities included development and integration of device drivers for the Phillips Trimedia processor for the NREF PNX1500 board. Worked with the development of the LAN100 driver and UDP stack implementation to provide network access to the multimedia applications. Also worked on the development of network applications for the NREF based standalone system.

September 2001 -
May 2003

Software Engineer
SABRE AIRLINE SOLUTIONS
Worked with the development of software solutions for the airline industry. Contributed to several groups as a developer including Airport Resource Management, Yield Management and Product Integration using C++ and Java technologies. Was involved in designing and implementing software solutions for the travel marketing business as well as developing solutions in host connectivity, server side processes as well as user interface creation for worldwide carriers including American Airlines, Malaysian Airlines, TACA and Cathay Pacific.

Teaching

CS564	Text Mining	Fall 2019
CS535	Natural Language Processing	Fall 2018
CS545	MultiAgent Systems	Fall 2016, Fall 2017, Spring 2019
EE502	Advanced Computer Architecture	Fall 2014, Fall 2015, Fall 2016, Fall 2017, Fall 2018
CS507	Theory of Programming Languages	Spring 2014, Spring 2015, Spring 2016
CS559	High Performance Computing	Fall 2015
EE204	Computer Architecture	Spring 2014, Spring 2015, Spring 2016, Spring 2017, Spring 2018, Spring 2019, Summer 2019
CS218	Programming Fundamentals	Fall 2019
CS211	Discrete Structures	Fall 2014, Fall 2015
CS234	Data Structures (UW)	Spring 2013
CS245	Logic for Computer Science (UW)	Spring 2012

Book Chapters

Mirza O. Beg, Mubashar Nazar Awan, Syed Shahzaib Ali, "Algorithmic Machine Learning for Prediction of Stock Prices", Chapter 7 in *FinTech as a Disruptive Technology for Financial Institutions*, pp. 142-169. 2019.

Journal Publications

Abdul Rehman Javed, Muhammad Usman Sarwar, Mirza Omer Beg, Muhammad Asim, Thar Baker, Hissam Tawfik."A Collaborative Healthcare Framework for Shared Healthcare Plan with Ambient intelligence". Human-centric Computing and Information Sciences 2020 (Impact factor: 3.700)

Saira Qamar, Hasan Mujtaba, Hammad Majeed, Mirza O. Beg. "Relationship Identification between Conversational Agents using Emotion Analysis". Cognitive Computation. 2020 (Impact factor: 4.980)

Mubashar Nazr Awan, Mirza O. Beg. "TOP-Rank: A TopicalPostionRank for Extraction and Classification of Keyphrases in Text". Computer Speech and Language. Volume 65. 2020 (Impact factor: 1.857)

Bilal Naeem, Aymen Khan, Mirza O. Beg, Hasan Mujtaba. "A Deep Learning Framework for Clickbait Detection on Social Area Network using Natural Language Cues". Journal of Computational Social Science, Volume 3, Issue 1, Pages 231-243. 2020

Abdul Rehman Javed, Mirza O. Beg, Muhammad Asim, Thar Baker, Ali Hilal Al-Bayatti."AlphaLogger: Detecting Motion-based Side-channel Attack using Smartphone Keystrokes". Journal of Ambient Intelligence Humanized Computing Journal. Pages 1-14. 2020 (Impact factor: 1.910)

Adeel Zafar, Hasan Mujtaba, Mirza O. Beg. "Search-based procedural content generation for GVG-LG". Applied Soft Computing. Volume 86. 2020. (Impact factor: 4.873)

Muhammad Asad, Muhammad Asim, Talha Javed, Mirza O. Beg, Hasan Mujtaba, Sohail Abbas. "DeepDetect: Detection of Distributed Denial of Service Attacks Using Deep Learning". Computer Journal. Volume 63, Issue 7, July 2020, Pages 983994. 2020 (Impact factor 0.792)

Adeel Zafar, Hasan Mujtaba, Mirza Tauseef Baig, Mirza O. Beg, "Using Patterns as Objectives for General Video game Level Generation". International Computer Games Association Journal. Volume 41. No. 2. pp 66-77. IOS Press. 2019 (Impact factor 0.313)

Ahmed Uzair, Mirza O. Beg, Hasan Mujtaba, Hammad Majeed "WEEC: Web Energy Efficient Computing: A Machine Learning Approach". Sustainable Computing: Informatics and Systems. Volume 22. pp 230-243 Elsevier. 2019 (Impact factor 1.196)

Hareem Sahar, Abdul A. Bangash, Mirza O. Beg, "Towards Energy Aware Object-Oriented Development of Android Applications". Sustainable Computing: Informatics and Systems, Elsevier. Volume 21, pp. 28-46, 2019 (Impact factor 1.196)

Muhammad Tariq, Hammad Majeed, Mirza Beg, Farrukh Aslam Khan, Abdelouahid Derhab "Accurate Detection of Sitting Posture Activities in a secure IoT based Assisted Living Environment". Future Generation Computer Systems. Elsevier. Volume 92, pp. 745-757. 2019 (Impact factor 3.997)

Hafiz Tayyeb Javed, Mirza O. Beg, Hasan Mujtaba, Hammad Majeed, Muhammad Asim "Fairness in Real-Time Energy Pricing for Smart Grid Using Unsupervised Learning". Computer Journal. Volume 62, Issue 3, pp. 414-429, 2018 (Impact factor 0.792)

Noman Dilawar, Hammad Majeed, Mirza O. Beg, Naveed Ejaz, Khan Muhammad, Irfan Mehmood, Yunyoung Nam. "Understanding Citizen Issues through Reviews: A Step towards Data Informed Planning in Smart Cities." Applied Sciences, Volume 8, Issue 9, 1589. 2018 (Impact factor 1.69)

Mirza Beg, Peter van Beek "A Constraint Programming Approach for Integrated Spatial and Temporal Scheduling for Clustered Architectures". ACM Transactions on Embedded Computing Systems (ACM TECS), Volume 13, Issue 1, August 2013 (Impact Factor: 1.178)

Mirza Beg, Peter van Beek "A Graph Theoretic Approach to Cache-Conscious Data Placement for Direct mapped Caches". ACM SIGPLAN Notices, Volume 45, Issue 8, August 2010 (Impact Factor: 0.148)

Martin Karsten, S.Keshav, Sanjiva Prasad, Mirza Beg "An Axiomatic Basis for Communication". ACM SIGCOMM Computer Communication Review, Volume 37, Issue 4, October 2007 (Impact Factor: 1.056)

CONFERENCE PUBLICATIONS

Muhammad Umer Farooq, Saif ur Rehman Khan, Mirza Omer Beg. A Method Level Energy Estimation Technique for Android Development. International Conference on Innovative Computing 2019 (ICIC'19).

Saif ur Rehman Khan, Muhammad Umer Farooq, Mirza Omer Beg. BigData Analysis of Stack Overflow for Energy Consumption of Android Framework. International Conference on Innovative Computing 2019 (ICIC'19).

Arshad, Muhammad Umair, Muhammad Farrukh Bashir, Adil Majeed, Waseem Shahzad, and Mirza Omer Beg. "Corpus for Emotion Detection on Roman Urdu." In 2019 22nd International Multitopic Conference (INMIC), pp. 1-6. IEEE, 2019.

Adeel Zafar, Hasan Mujtaba, and Mirza Omer Beg. "A Constructive approach for general video game level generation". In Proceedings of the 11th Computer Science and Electronic Engineering Conference. 2019 (IEEE-CEEC), Colchester, UK, September 2019.

Hussain Khawaja, Saira Qamar, Mirza Beg "Domain Specific Emotion Lexicon Expansion". In Proceedings of the IEEE International Conference on Emerging Technologies. 2018 (ICET '18), pages 1-6, Islamabad, Pakistan, December 2018.

Adeel Zafar, Hasan Mujtaba, Mirza Omer Beg, Sajid Ali "Deceptive Level Generator". In Proceedings of Experimental AI in Games. Alberta, Canada, 2018.

Hamza Alvi, Hareem Sahr, Abdul Ali Bangash, Mirza Beg "EnSights: A Tool for Energy Aware Software Development". In Proceedings of the IEEE International Conference on Emerging Technologies. 2017 (ICET '17), pages 1-6, Islamabad, Pakistan, December 2017.

Abdul Ali Bangash, Hareem Sahr, Mirza Beg "A Methodology for Relating Software Structure with Energy Consumption". In Proceedings of the 17th IEEE International Conference on Source Code Analysis and Manipulation. 2017 (SCAM '17), pages 111-120, Shanghai, China, September 2017.

Mirza Beg, Peter van Beek "A Constraint Programming Approach for Instruction Assignment". Proceedings of the 15th Workshop on Interaction between Compilers and Computer Architectures (INTERACT-15), pages 25-34, San Antonio, Texas, February 2011

Mirza Beg, Peter van Beek "A Graph Theoretic Approach to Cache-Conscious Data Placement for Direct mapped Caches". In Proceedings of the 9th International Symposium on Memory Management 2010 (ISMM '10), pages 113-120, Toronto, Canada, June 2010.

Mirza Beg "Instruction Scheduling on Multicores". PLDI '10 Student Research Competition, Poster Presentation Toronto, Canada. June 2010. Winner of third place in graduate student track of ACM SRC PLDI 2010

Mirza Beg "FLECS: A Framework for Rapidly Implementing Forwarding Protocols". In Proceedings of the First International Conference on Complex Sciences (COMPLEX 2009), pages 1761-1773, Shanghai, China, February 2009

Martin Karsten, S.Keshav, Sanjiva Prasad, Mirza Beg "An Axiomatic Basis for Communication". Proceedings of the 2007 Conference on Applications, Technologies, Architectures and Protocols for Computer Communications (SIGCOMM '07), pages 217-228, Kyoto, Japan, August 2007.

Aaditeshwar Seth, Mirza Beg "Achieving Privacy and Security in Radio Frequency Identification". Proceedings of Fourth Annual Privacy Security Trust 2006 (PST '06), pages 362-365, Markham, Ontario, Canada, October 2006

NON-REFEREED PUBLICATIONS

Mirza Beg "Critical Path Heuristic for Automatic Parallelization". University of Waterloo, David R. Cheriton School of Computer Science. Technical Report CS-2008-16. August 2008

Mirza Beg, Laurent Charlin, Joel So "MAXSM: A Multi-Heuristic Approach to XML Schema Matching". University of Waterloo, David R. Cheriton School of Computer Science. Technical Report CS-2006-47. December 2006

Mirza Beg, Mike Dahlin "A Memory Accounting Interface for Java Programming Language". The University of Texas at Austin, Department of Computer Sciences. Technical Report CS-TR-01-40. October 2001

THESES

Mirza Beg "Combinatorial Problems in Compiler Optimization". Doctoral Thesis, University of Waterloo, David R. Cheriton School of Computer Science. April 2013

Mirza Beg "FLECS: A Data-Driven Framework for Rapid Protocol Prototyping". Masters Thesis, University of Waterloo, David R. Cheriton School of Computer Science. August 2007

Mirza Beg "Memory Management in the Active Names System". Undergraduate Honors Thesis, University of Texas at Austin, School of Computer Science. August 2001

Honors and Awards

2010	Third Prize at the ACM Student Research Competition at PLDI
2010	ACM SIGPLAN Professional activities grant
2010	University of Waterloo Graduate Scholarship
2007-2008	University of Waterloo Doctoral Student Scholarship
2005-2008	University of Waterloo Graduate Scholarship
2005-2007	University of Waterloo International Masters Student Award
2001	Special Honors in Computer Science, The University of Texas at Austin
2000	Novell Scholarship for Active Research
1999	The Tivoli Scholarship for Academic Excellence
1998-2000	University Honors, The University of Texas at Austin

Supervision

15.1 Masters Students

Shoaib S. Khattak	Measurement of Energy Consumption of Software	Aug 2014 - Aug 2016
Sarosh Shahid	A Cache Conscious Data Placement Model using Graph Theory	Aug 2015- Aug 2016
Zain Awais	Machine Learning for Computational Sustainability	Aug 2014 - Mar 2017
Shan Ahmad	Achieving Green Compilation through Software Optimization	Aug 2014 - May 2015
Rashid Ahmed	Implementation of Data Security for Transmission in Networks	Aug 2014 - Dec 2014
Hafiz Tayyab Javed	LCFDP: Fair Pricing in Smart Grid	Aug 2014 - Feb 2016
Umair Quddus	Parallelism in Constraint Search	Jan 2015 - Dec 2015
Omer Arshad	Text Summarization using Semantic Affinity	Aug 2015 - Aug 2016
Abdul A. Bangash	A Methodology to Relate OO Structure with Energy	Aug 2016-Aug 2017
Ahmed Uzair	WEEC: Web Energy Efficient Computing	Aug 2016- Aug 2017
Saif ur Rehman	Analysis of Stack Overflow Questions	Aug 2017- Aug 2018
Mubashar Nazar Awan	Semantic Relation Extraction	Aug 2017- Jan 2019
Saira Qamar	Relationship Identification between MultiAgents on Social Network	Aug 2017- Jan 2019
Saira Khan	Analysis of Javascript Energy Greedy APIs	Aug 2017- Jan 2019
Mohibullah Khan	Opinion Mining and Sentiment Analysis	Aug 2017- Jan 2019
Hussain Shahbaz	Emotion Detection in Text	Aug 2017- Jan 2019
Umar Farooq	Energy Profiling Android Applications	Aug 2017- Jan 2019

15.2 FYP Projects (with completion year)

Rehan, Zeeshair, Noman Ahmed	AMVIS: Smart Monitor	2017
Asad, Hassan, Faraz	Battery Doc	2017
Ubaid, Usman, Adnan	Sentilytic	2017
Shahzaib, Zaid, Daniyal	Stock Stalker	2017
Fawad, Faizan, Saalar	TextLytics	2017
Yasir, Mughees, Farhan	Penman	2017
Ashhad, Sair, Hammad	IVN Evolution of IOVisor Technologies for DS	2016
Rja Bilal, Talha	Angry Birds Playing Bot	2016
Ali Kahoot, Bilal Sarwar	Kakuro Puzzle Solving	2016
Hafsa Rasheed, Hamza Rasheed	Text Summarization	2016
Saad, Mujahid	Trans Promo	2016
Burhan, Omer	Home Automation System	2016
Anum Bilal, Atif, Hassan	Course Scheduler	2015
Shoaib, Asif, Sheeraz	Software Evolution Analysis	2015
Aamir, Zohab, Hammad	Online Clearance System	2014
Sabeeh Ziadi, Zainab Saleem, Rana Aqib	FAST Book	2014

Professional Activities

Reviewer for Sustainable Computing: Informatics and Systems (SUSCOM)
Program Committee Member IEEE INMIC 2019
Program Committee Member IEEE ICOSST 2019
Program Committee Member IEEE INMIC 2017
Program Committee Member IEEE ICOSST 2017
Program Committee Member IEEE ICOSST 2016
Program Committee Member IEEE ICOSST 2015
Program Committee Member International Conference on Complex Sciences (COMPLEX 2009)

References

Dr. Peter van Beek, Professor, University of Waterloo (vanbeek @ uwaterloo.ca)
Dr. Ondrej Lhotak, Associate Professor, University of Waterloo (olhotak @ uwaterloo.ca)
Dr. Peter Buhr, Associate Professor, University of Waterloo (pabuhr @ uwaterloo.ca)

Personal Data

Citizenship	- Canadian
Marital Status	- Married
Activities	- Reading, Travel