Mohammed J.F. Alenazi

Department of Computer Engineering
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EDUCATION

The University of Kansas, Lawrence, KS **GPA: 3.88/4.0**
Ph.D. in Computer Science **Aug. 2012 – May. 2015**
Dissertation: Network Resilience Improvement and Evaluation Using Link Additions
Advisor: James P.G. Sterbenz
Committee: Victor S. Frost, Bo Luo, Tyrone Duncan, Lingjia Liu, David Tipper, and Krzysztof Walkowiak

The University of Kansas, Lawrence, KS **GPA: 4.0/4.0**
MS. in Computer Engineering **Aug. 2010 – July. 2012**
Project Title: AeroNP and AeroRP Implementation in Python
Advisor: James P.G. Sterbenz
Committee: Gary J. Minden and Bo Luo

The University of Kansas, Lawrence, KS **GPA: 3.75/4.0**
BS. in Computer Engineering **Jan. 2006 – Dec. 2010**
Project Title: Implementation of True 3D Display Systems
Advisor: Swapan Chakrabarti
Committee: James Rowland and Bo Luo

RESEARCH & TEACHING INTERESTS

- Design and analysis of resilient and survivable networks
- Network routing design and implementation
- Development and simulation of network architectures and protocols
- Performance evaluation of communication networks
- Graph algorithmic approaches for modeling networks
- Mobile ad hoc networks (MANET) routing protocols

CAREER HIGHLIGHTS

- Conducted research in communication networks and systems funded by the National Science Foundation (NSF), the US Department of Defense (DoD).
- Collaborated on networking research with the national and international institutions in the field of resilient and survivable networks, DTN (delay tolerant networks).
- Published 14+ scholarly articles in the design and analysis of resilient communication and control systems resulting in 72+ citations according to Google Scholar
- Contributed to the open software ns-3 network simulator that is being used by the network research and education community

RESEARCH EXPERIENCE

The University of Kansas, Lawrence, KS
Graduate Research Assistant **Aug. 2010 – May. 2015**

- Conducted research in the ResiliNets group under the supervision of Professor James P.G. Sterbenz in the Information and Telecommunication Technology Center (ITTC) for the following six projects:

1. Highly-Dynamic Airborne Ad Hoc Networking (ANTP):
   - Funding agency: DoD
   - Developed highly-mobile aeronautical communication protocol suite
   - Modelled non-IP network and routing layer protocols and studied performance in the ns-3 network simulator
   - Implemented and prototyped the ANTP protocol suite using the Nokia N810 smartphones programmed with Python
2. OpenFlow-enabled switches deployment
   - Funding agency: NSF
   - Configuration and management of several Brocade OpenFlow switches
   - Installation and configuration of OpenFlow controllers
3. In-Home Monitoring in Support of Caregivers for Patients with Dementia
   - Funding agency: NSF
   - Building a system to monitor patients at home using video cameras
   - Building a dynamic website to manage videos

- Mentored M.S. and junior level Ph.D. students in the ResiliNets research group

TEACHING EXPERIENCE

The University of Kansas, Lawrence, KS
Graduate Teaching Assistant

- Spring 2013 - KU-EECS 780 Communication Networks
- Spring 2014 - KU-EECS 745 Network Implementation
- Fall 2014 - KU-EECS 780 Communication Networks

HONORS & AWARDS

- Best Student Poster Presentation at KanSec 2013 conference
- Rummer Design Award for the best senior year design project
- KAUST Discovery scholarship award
- Saudi Student Association Award for outstanding volunteer
- Deans List for most of the undergraduate semesters
- *Travel Grant* from US NSF to attend GENI Conference (GEC) – GEC 20
- *Travel Grant* from US NSF to the Fifth Central Area Networking and Security Workshop CANSec 2014
- *Travel Grant* from US NSF to AIAA workshop on Airborne Networks and Communications
- *Travel Grant* from US NSF to attend GENI Conference (GEC) – GEC 14
- *Travel Grant* from US NSF to attend GENI Conference (GEC) – GEC 13
- *Travel Grant* from US NSF to attend GENI Conference (GEC) – GEC 12
- *Honor Society* member of Upsilon Pi Epsilon (UPE)

CONFERENCES

- Central Area Networking and Security Workshop , 2015, Kansas City
- Design of Reliable Communication Networks Conference, 2015, Kansas City
- Central Area Networking and Security Workshop, 2014, Fayetteville, AR
- GENI Engineering Conference (GEC20), 2014, Davis, CA, USA
- AIAA Infotech@Aerospace Conference 2013, Boston, MA, USA
- GENI Engineering Conference (GEC14), 2012, Boston, MA, USA
- The 48th International Telemetering Conference(ITC), 2012, San Diego, CA, USA
- GENI Engineering Conference (GEC13), 2012 , Los Angeles, CA, USA
- Greater Kansas Area Security Workshop (KanSec), 2013, Lawrence, KS
- The 31st Annual IEEE International Conference on Computer Communications (IEEE INFOCOM), 2012 , Orlando, FL, USA
- GENI Engineering Conference (GEC12), 2011 , Kansas City, MO, USA
- The 47th International Telemetering Conference(ITC), 2011, Las Vegas, NV, USA

AFFILIATIONS

- *Faculty* of King Saud University in Saudi Arabia
- *Vice President* of Upsilon Pi Epsilon (UPE)
- *Treasurer* of Saudi Student Association at the University of Kansas
- *Member* of IEEE – Communications Society
- *Member* of ACM – SIGCOMM

SKILLS

Programming languages: Python, Java, Visual Basic, C, C++
Operating systems: Linux, UNIX, Mac OS X, MS Windows, Cisco IOS
Web Development: HTML, JavaScript, CSS, Ruby on Rails
Database software: MySQL, Microsoft Access
Simulation software: ns-3, ExtendSim
Network Emulation: Mininet
Document preparation: LaTeX, BibTeX, MS Office

PUBLICATIONS

Journal Articles

1. **Mohammed J.F. Alenazi**, Egemen K. Çetinkaya, and James P.G. Sterbenz, "Cost-Efficient Algebraic Connectivity Optimisation of Backbone Networks," *Elsevier: Optical Switching and Networking.* vol 14, Part 2, August 2014, pp. 107 116.
2. Egemen K. Çetinkaya, **Mohammed J.F. Alenazi**, and James P.G. Sterbenz, "A Comparative Analysis of Geometric Graph Models for Modelling Backbone Networks," *Elsevier: Optical Switching and Networking.* vol 14, Part 2, August 2014, pp. 95 – 106.
3. Egemen K. Çetinkaya, **Mohammed J.F. Alenazi**, Andrew M. Peck, Justin P. Rohrer, and James P.G. Sterbenz, "Multilevel Resilience Analysis of Transportation and Communication Networks," *Telecommunication Systems.*

Conference and Workshop Proceedings (peer-reviewed)

1. **Mohammed J.F. Alenazi** and James P.G. Sterbenz, "Evaluation and Comparison of Several Graph Robustness Metrics to Improve Network Resilience," submitted to *Proceedings of the 7th IEEE/IFIP International Workshop on Reliable Networks Design and Modeling (RNDM)*, Munich, Germany, October 2015.
2. **Mohammed J.F. Alenazi** and James P.G. Sterbenz, "Evaluation and Improvement of Network Resilience against Attacks using Graph Spectral Metrics," submitted to *3rd International Symposium on Resilient Communication Systems*, Philadelphia, August 2015.
3. **Mohammed J.F. Alenazi**, Dongsheng Zhang, Yufei Cheng, and James P.G. Sterbenz, "Epidemic Routing Protocol Implementation in ns-3," *to appear in Workshop on ns-3 (WNS3)*, Spain, Barcelona, March 2015.
4. **Mohammed J.F. Alenazi** and James P.G. Sterbenz, "Comprehensive Comparison and Accuracy of Graph Metrics in Predicting Network Resilience," in *11th International Conference on Design of Reliable Communication Networks (DRCN)*, Kansas City, March 2015.
5. **Mohammed J.F. Alenazi**, Egemen K. Çetinkaya, and James P.G. Sterbenz, "Cost-Efficient Network Improvement to Achieve Maximum Path Diversity," in *Proceedings of the 6th IEEE/IFIP International Workshop on Reliable Networks Design and Modeling (RNDM)*, Barcelona, Spain, November 2014, pp. 202 – 208.
6. **Mohammed J.F. Alenazi**, Egemen K. Çetinkaya, and James P.G. Sterbenz, "Cost-Constrained and Centrality-Balanced Network Design Improvement," in *Proceedings of the 6th IEEE/IFIP International Workshop on Reliable Networks Design and Modeling (RNDM)*, Barcelona, Spain, November 2014, pp. 194 – 101.
7. **Mohammed J.F. Alenazi**, Egemen K. Çetinkaya, and James P.G. Sterbenz, "Network Design and Optimisation Based on Cost and Algebraic Connectivity," in *Proceedings of the 5th IEEE/IFIP International Workshop on Reliable Networks Design and Modeling (RNDM)*, Almaty, September 2013.
8. Egemen K. Çetinkaya, **Mohammed J.F. Alenazi**, Yufei Cheng, Andrew M. Peck, and James P.G. Sterbenz, "On the Fitness of Geographic Graph Generators for Modelling Physical Level Topologies," in *Proceedings of the 5th IEEE/IFIP International Workshop on Reliable Networks Design and Modeling (RNDM)*, Almaty, September 2013.
9. Egemen K. Çetinkaya, **Mohammed J.F. Alenazi**, Justin P. Rohrer, and James P.G. Sterbenz, "Topology Connectivity Analysis of Internet Infrastructure Using Graph Spectra," in *Proceedings of the 4th IEEE/IFIP International Workshop on Reliable Networks Design and Modeling (RNDM)*, St. Petersburg, October 2012, pp. 752 – 758.

Conference and Workshop Proceedings (non-peer-reviewed / abstract-reviewed)

1. **Mohammed J.F. Alenazi**, Santosh Ajith Gogi, Dongsheng Zhang, Egemen K. Çetinkaya, Justin P. Rohrer, and James P.G. Sterbenz, "Implementation of Aeronautical Network Protocols," in *Proceedings of the AIAA Infotech@Aerospace Conference*, Boston, MA, August 2013.
2. **Mohammed J.F. Alenazi**, Egemen K. Çetinkaya, Justin P. Rohrer, and James P.G. Sterbenz, "Implementation of the AeroRP and AeroNP Protocols in Python," in *Proceedings of the 48th International Telemetering Conference (ITC)*, San Diego, CA, October 2012.

3. **Mohammed J.F. Alenazi**, Cenk Sahin, and James P.G. Sterbenz, "Design Improvement and Implementation of 3D Gauss-Markov Mobility Model," in *Proceedings of the 48th International Telemetering Conference (ITC)*, San Diego, CA, October 2012.
4. **Mohammed Alenazi**, Santosh Ajith Gogi, Dongsheng Zhang, Egemen K. Çetinkaya, Justin P. Rohrer, and James P.G. Sterbenz, "ANTP Protocol Suite Software Implementation Architecture in Python," in *Proceedings of the 47th International Telemetering Conference (ITC)*, Las Vegas, NV, October 2011.

Extended Abstracts

1. Egemen K. Çetinkaya, Justin P. Rohrer, Abdul Jabbar, **Mohammed J.F. Alenazi**, Dongsheng Zhang, Dan S. Broyles, Kamakshi Pathapati, Hemanth Narra, Kevin Peters, Santosh Gogi, and James P.G. Sterbenz, "Protocols for Highly-Dynamic Airborne Networks," in *Proceedings of the ACM MobiCom*, İstanbul, August 2012, pp. 411 – 413.

Posters

- **Mohammed J.F. Alenazi**, Egemen K. Çetinkaya, and James P.G. Sterbenz,"Improving Network Resilience in KanREN with OpenFlow,"in *GENI Engineering Conference GEC20*, Davis, CA, USA, June 2014
- **Mohammed J.F. Alenazi**, Egemen K. Çetinkaya, and James P.G. Sterbenz,"Increasing Physical Level Network Resilience,"in *Great Plains Network Annual Conference*, Kansas City, MO, USA, June 2014
- **Mohammed J.F. Alenazi**, Egemen K. Çetinkaya, and James P.G. Sterbenz, "Network Resilience Improvement Using Link Additions," in *the Fifth Central Area Networking and Security Workshop - CANSec*,Fayetteville, AR, USA, April 2014.
- **Mohammed J.F. Alenazi**, Egemen K. Çetinkaya, Justin P. Rohrer, Abdul Jabbar, Dongsheng Zhang, Dan S. Broyles, Kamakshi Pathapati, Hemanth Narra, Kevin Peters, Santosh Gogi, and James P.G. Sterbenz,"Protocols for Highly-Dynamic Airborne Networks,"in *Great Plains Network Annual Conference*, Kansas City, MO, USA, June 2012