Mohamed Mahmoud Mahmoud Azab

-Assistant Prof., Informatics Research Institute, The City of Scientific Research & Technology Applications, Alexandria-Egypt.
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Education:

- Doctor of Philosophy holder from the Bradley Department of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University (Virginia Tech), USA, Jan, 2013.
    - Thesis: CyPhyCARD, Cooperative Autonomous Resilient Defense Platform for Cyber Physical Systems.
- Master of Science holder from the Arab Academy for Science Technology and Maritime Transport, Computer Engineering Department, Feb, 2006.
- Computer Engineering degree holder from the Arab Academy for Science Technology and Maritime Transport, Computer Engineering Department, Feb, 2002.

Ongoing research:

My current research is directed towards the development of an evolutionary Cyber-Physical System (CPS) defense platform. This platform termed as CyPhyCARD (Cooperative Autonomous Resilient Defenses for Cyber-Physical systems), is a uniform defense platform designed to monitor, manage, and control the heterogeneous composition of CPS components. CyPhyCARD relies on three interrelated pillars to construct its defense platform. CyPhyCARD comprehensively integrates these pillars, therefore building a large scale, intrinsically resilient, self- and situation-aware, cooperative, and autonomous defense cloud-like platform that provisions adequate, prompt, and pervasive defense services for large-scale, heterogeneously-composed CPS. The CyPhyCARD pillars are:

- Autonomous management platform (CyberX) for CyPhyCARD's foundation. CyberX enables application elasticity and autonomic adaptation to changes by runtime diversity employment, enhances the application resilience against attacks and failures by multimodal recovery mechanism, and enables unified application execution on heterogeneously composed platforms by a smart employment of a fine-grained environment-virtualization technology.
- Diversity management system (ChameleonSoft) built on CyberX. ChameleonSoft encrypts software execution behavior by smart employment of runtime diversity across multiple dimensions to include time, space, and platform heterogeneity inducing a trace-resistant moving-target defense that works on securing CyPhyCARD platform against software attacks.
- Evolutionary Sensory system (EvoSense) built on CyberX. EvoSense realizes pervasive, intrinsically-resilient, situation-aware sense and response system to seamlessly effect biological-immune-system like defense. EvoSense acts as a middle layer between the defense service provider(s) and the Target of Defense (ToD) creating a uniform defense interface that hides ToD's scale and heterogeneity concerns from defense-provisioning management.

Mentoring and Teaching activities:

In Aug 2014 , I was invited by the organizing committee of the 15th IEEE International Conference on Information Reuse and Integration; San Francisco; USA, to give a tutorial about Nature Inspired Cyber Security.

Additionally, I have taught multiple graduate/undergraduate courses mainly focusing on the domain of computer networks and cyber security. Computer networks and architectures, Network and information security, and secure compiler design are examples of such courses.

Currently I am either a committee member or a primary advisor for a set of PhD and Master Students working in a group of cyber and/or CPS security oriented research projects.

Active research grants

The following is a list of active research grants that I participated in either as a PI or a CO-PI among other grants that has either a pending decision or a contract signing state:

- Nano-enriched, Autonomous, and Trustworthy Sensing Framework for Water-pollution Detection, TAC Collaborative Research Fund, 900K le, 2014-2016
- Scientific Cloud Computing Center of Excellence, Science & Technology Development Fund, 9.7 M le, 2012-2015

Selected Publications:

- Ahmd Khalifa, Mohamed Azab and Mohamed Eltoweissy, , "Towards a Mobile Ad-hoc Cloud Management Platform, " the 7th international conference on utility and cloud computing , London, UK , 2014
- Mohamed Azab and Mohamed Eltoweissy, "CyPhyMASC: Evolutionary Monitoring, Analysis, Sharing and Control Platform for SmartGrid Defense, " in proceedings of the 15th IEEE International Conference on Information Reuse and Integration (IRI 2014).
- Mohamed Azab, Bassem Mokhtar, Mohamed Morsy, " CyNetPhy: Towards Pervasive Defense in Depth for Smart Grid Security", the 9th International Conference on Critical Information Infrastructures Security, 2014.
- Mohamed Morsy, Mohamed Azab, Bassem Mokhtar, "Cross-Layer Security Framework for Smart Grid: Physical Security Layer" in proceedings of the IEEE PES ISGT Europe 2014
- Mohamed Azab, "Multidimensional Diversity Employment for Software Behavior Encryption, "Sixth IEEE& IFIP International Conference on New Technologies, Mobility & Security (NTMS 2014).
- Mohamed Azab, Bassem Mokhtar, Mohamed Morsy, " CyNetPhy: Towards Pervasive Defense in Depth for Smart Grid Security", Springer Lecture Notes in Computer Science (LNCS) - 2014
- Mohamed Azab and Mohamed Eltoweissy, "ChameleonSoft: Software Behavior Encryption for Moving Target Defense," Springer Journal on Mobile Networks and Applications (MONET), 2012, DOI: 10.1007/s11036-012-0392-0
- Mohamed Azab and Mohamed Eltoweissy, "Bio-inspired Evolutionary Sensory System for Cyber-Physical System Defense," IEEE Technologies for Homeland Security, Nov2012.

- Mohamed Azab and Mohamed Eltoweissy,"CyberX: A Biologically-inspired Platform for Cyber Trust Management," 8th International Conference on Collaborative Computing, Oct 2012
- Mohamed Azab, Reham Hassan and Mohamed Eltoweissy, "ChameleonSoft: A Moving Target Defense System," 7th International Conference on Collaborative Computing, Oct 2011
- Mohamed Azab and Mohamed Eltoweissy, "Towards A Cooperative Autonomous Resilient Defense Platform for Cyber-Physical Systems," 7th Annual Cyber Security and Information Intelligence Research Workshop, Oct 2011
- Mohamed Azab and Mohamed Eltoweissy," Defense as a Service Cloud for Cyber-Physical Systems," 7th International Conference on Collaborative Computing, Oct 2011

Book Chapters:

- Mohamed Azab and Mohamed Eltoweissy," Intrusion Detection and Prevention in Cyber Physical Systems,", The State of the Art in Intrusion Prevention and Detection, Part III, CRC Press, 2013
- Mohamed Azab and Mohamed Eltoweissy," Bio-inspired Evolutionary Sensory System for Cyber-Physical System Security,", Springer's BICCS 2013 : Bio-Inspired Computing in Cyber Security, 2014

US. Patents:

- ChameleonSoft: Software Behavior Encryption for Moving Target Defense [Application 61731489, EFS ID 14347009] 2012
- CyberX: Resilient Software Management and Operation Technology [Application 61724987, EFS ID 14198975], 2012
- Bio-inspired Evolutionary Sensory System for Cyber-Physical System Defense [pending]

Awards:

- "Employing Software behavior encryption techniques as a moving-target defense for Software-defined networks " A short-period Postdoc grant funded by the ministry of scientific research in Egypt, 2014
- "CyPhyCARD, Smarter Cyber-Physical Security", nominated as one of the top ten projects in the Sixth Annual National Security Innovation Competition, USA, 2012

- “ChameleonSoft: Software Behavior Encryption for Moving Target Defense“ nominated as one of the top ten projects in the Seventh Annual National Security Innovation Competition, USA, 2013
- “Situation- and Context-Aware Cross-Layer Defense Framework for Enhanced Smart Grid Security “, nominated as one of the selected Idea Carrier, 1st Euro-Mediterranean Brokerage, H2020 matchmaking event, 2014

Certificates:

- Oracle Certified Professional Database Administrator
- Oracle Certified Professional Internet Application Developer ,Oracle Forms
- Developer Release 6/6I
- Oracle Certified Application Developer ,Oracle Developer Release 2
- Mentor Certified VLSI designer

Skills:

Very Good Knowledge and Experience in:

- Oracle database administrator & application developer
- Developing Applications using C#, MATLAB , C++ & C Languages.
- Microsoft SQL Server
- Leadership\Team Work Organization.
- Teaching Courses related to Computer Engineering and Science.
- Strategies Development.