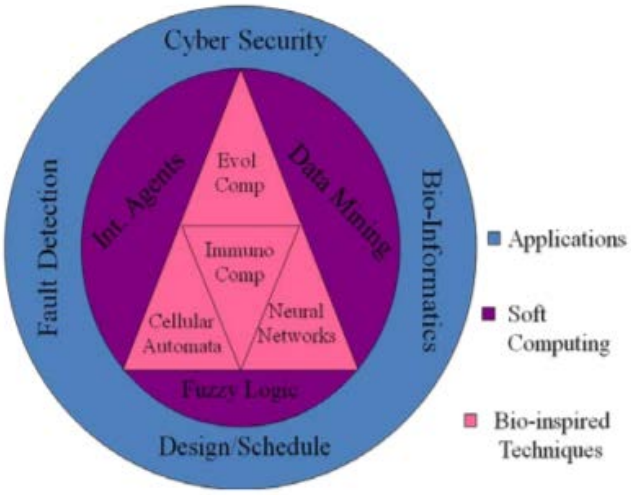
CyberSecurity Research

THE UNIVERSITY OF MEMPHIS

The **Center for Information Assurance (CfIA)** is a nationally-designated Center of Academic Excellence in Cyber Defense Education and Research. Center Director Dipankar Dasgupta has more than 25 years of experience in research which covers broad areas of innovating computational models for Information Technology, in particular, design and development of intelligent software solutions inspired by natural processes. He is internationally known for his work in Artificial Immune Systems, Evolutionary Computation, Negative Authentication, Adaption Multi-Factor Authentication, and Puzzle-Based Leaning techniques.

-Research Interests-



The Center focuses on bio-inspired techniques, other soft computing techniques, and a wide variety of real world applications. We also have teams working on Smart-Grid security and game theoretic approaches to address network security issues.

Goal 1- Develop robust tools for Digital Immunity that lead to system-level design for survivability, hardware design for self-immunity, and distributed control design for self-healing.

Goal 2 – Further develop patented adaptive multi-factor authentication system. The current framework incorporates a novel approach of calculating trustworthy values of different authentication factors while the computing device is being used under different environmental settings including surrounding conditions. Accordingly, a subset of authentication factors are determined (at triggering events) on the fly, thereby leaving no exploitable a priori pattern or clue for adversaries. Next steps are to use contemporary information from medical devices, operating environment, and user history, etc. to manage identity authentication factors for every attempt.

-Contributions-

Dr. Dasgupta's edited book on Artificial Immune Systems (1999) was the first book in the field and is widely used as a reference book. He is one of the founding fathers of the new field of artificial immune systems and conducted significant research to develop robust tools for Digital Immunity.

-Select Publications & Patents-

Adaptive multi-factor authentication system. D Dasgupta, AK Nag, A Roy - *US Patent 9,912,657*, 2018

Advances in User Authentication (book) D Dasgupta, A Roy, A Nag, *Springer International Publishing*, 2017.

"Multi-user Permission Strategy to Access Sensitive Information,"
D Dasgupta, A Roy and D Ghosh, *Journal of Information Sciences,* Elsevier, Volume 423, Pages 24-49 January 2018.

"Design and Implementation of Negative Authentication System," D Dasgupta, AK Nag, D Ferebee, SK Saha, K Subedi, A Madero, A Sanchez, and JR Williams, *International Journal of Information Security,* Springer-Verlag, pp 1-26, November 2017.

"Handling Big Data Using a Data-Aware HDFS and Evolutionary Clustering Technique," MH Hajeer, D Dasgupta - *IEEE Transactions on Big Data*, 2017.

For more information visit:
http://www.memphis.edu/cfia/

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