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Bioinformatics PowerTalk Seminar Series
Welcomes

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Curriculum Vitae

"Privacy-preserving techniques for analyzing and sharing biomedical data"

Abstract:
A large amount of biomedical data (e.g., human DNA sequences and electronic health records) are being rapidly generated in research laboratories and healthcare settings. Meanwhile, privacy concerns are growing for sharing these data in a broad community or analyzing these data in an open computing environment. For examples, the outsourcing of biomedical data into public cloud computing settings raises concerns about the inadvertent exposure of biomedical (e.g. human genomic) data to unauthorized users; in analyses involving multiple institutions, there is additional concern about data being used beyond agreed research scope and being processed in untrusted computational environments.

Significant advancements in secure computation methods have emerged over the past several years, including homomorphic encryption (HE) and secure multiparty computation (SMC), as well as the hardware-assisted Trusted Execution Environment (TEE), e.g., using Intel's Software Guard Extension (SGX). In this talk, I will provide a brief overview of these techniques, focusing on the recent efforts on their adaption to biomedical applications. Notably, the general-purpose encryption software may not work well when directly applied in biomedical scenarios. Thus, I will present a few case studies, in which customized algorithms that exploit special properties of biomedical data are developed. I will also report our findings from the genome privacy competition we organized in collaboration with the iDASH center at UCSD, aiming to assess the capacity of cryptographic technologies for secure analysis and sharing of biomedical data. Finally, I will discuss the opportunities to deploy these techniques on biomedical computing infrastructure.

Friday, 2/8/2019 at 10:15 AM
Shelby Biomedical Research Building, Room 515
1825 University Boulevard, Birmingham, AL 35294

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