Doctoral Research in Cyber Security: A Personal Perspective
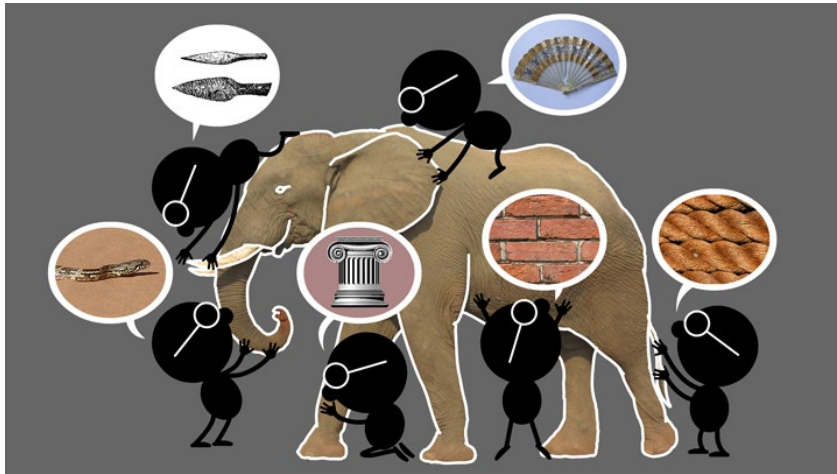
Ravi Sandhu

Professor of Computer Science
Lutcher Brown Chair in Cyber Security
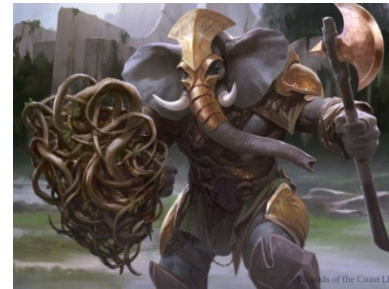Executive Director, ICS
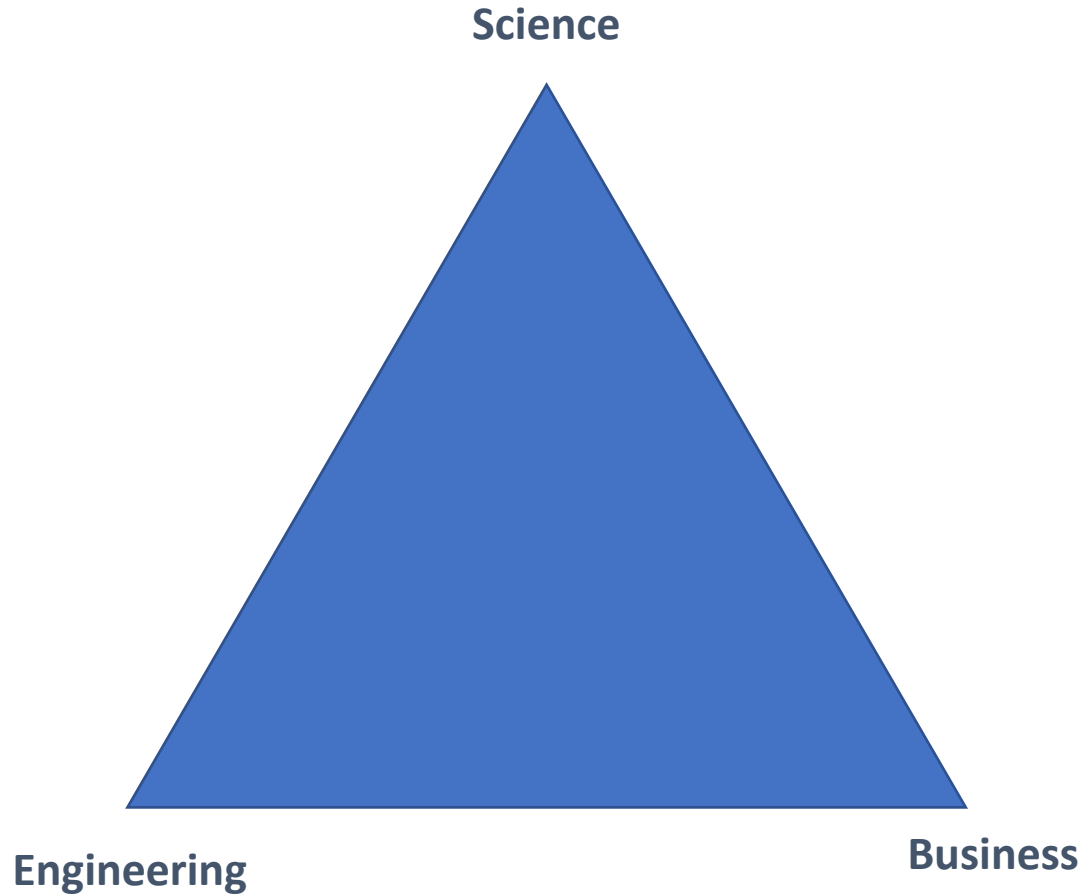Lead PI, NSF C-SPECC Center

April 2022
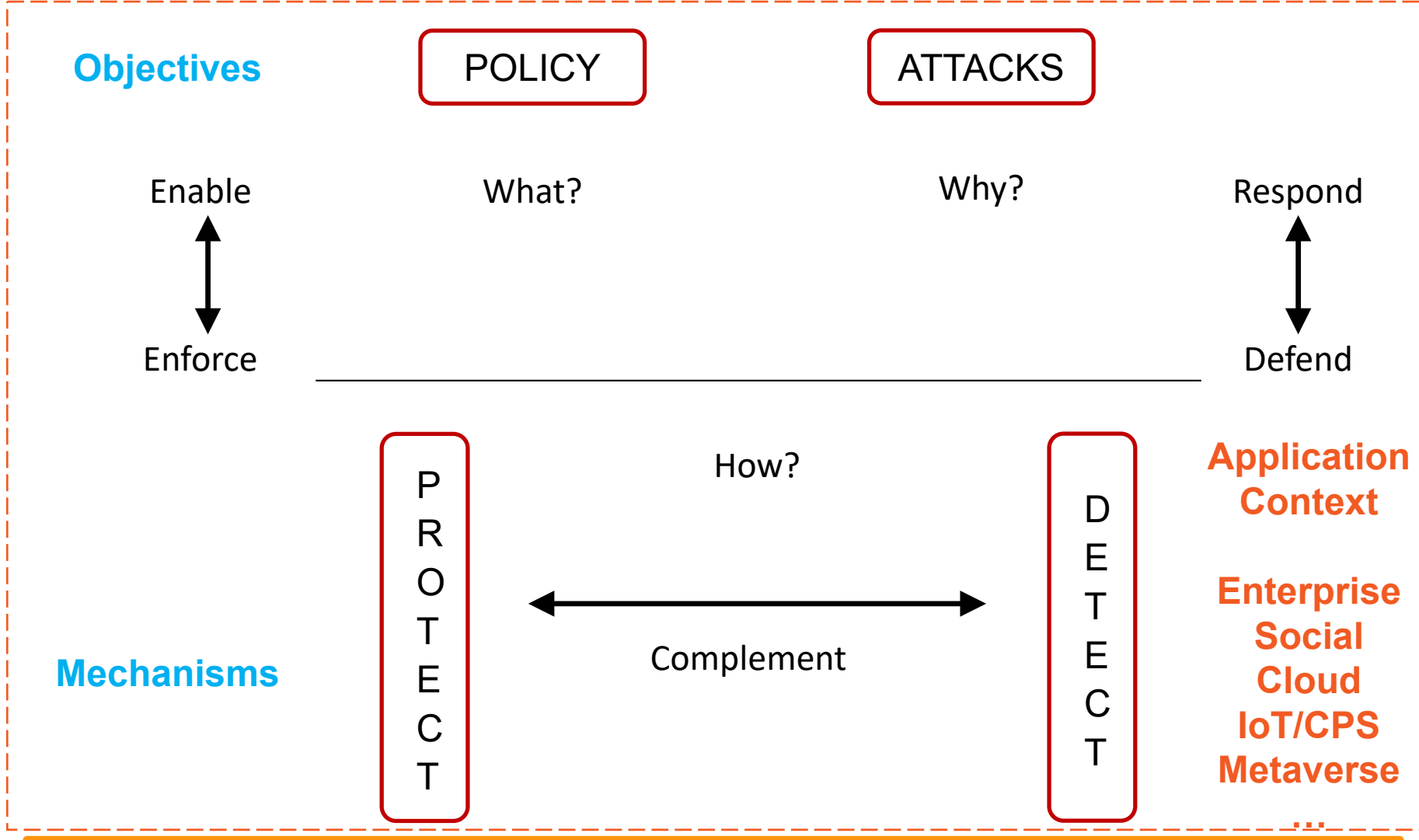

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World-Leading Research with Real-World Impact!

Elephant Problem

Cyber-Elephant Problem

Cyber Security Context

Science

Engineering

Business

Holistic Cyber Security Research

Objectives

POLICY   ATTACKS

Enable   What?   Why?   Respond

Enforce   Defend

Application Context

How?

P R O T E C T   D E T E C T

Enterprise Social Cloud IoT/CPS Metaverse

Mechanisms

Complement

World-Leading Research with Real-World Impact!
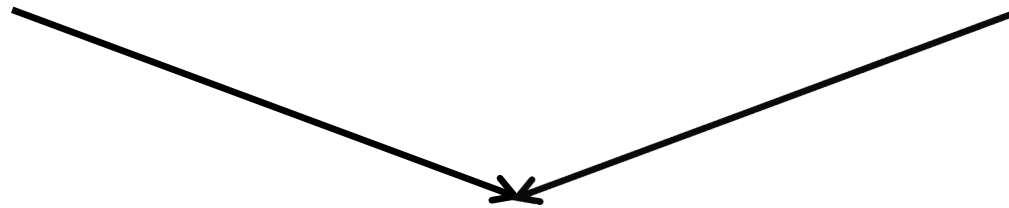
Access Control

Discretionary Access Control (DAC)
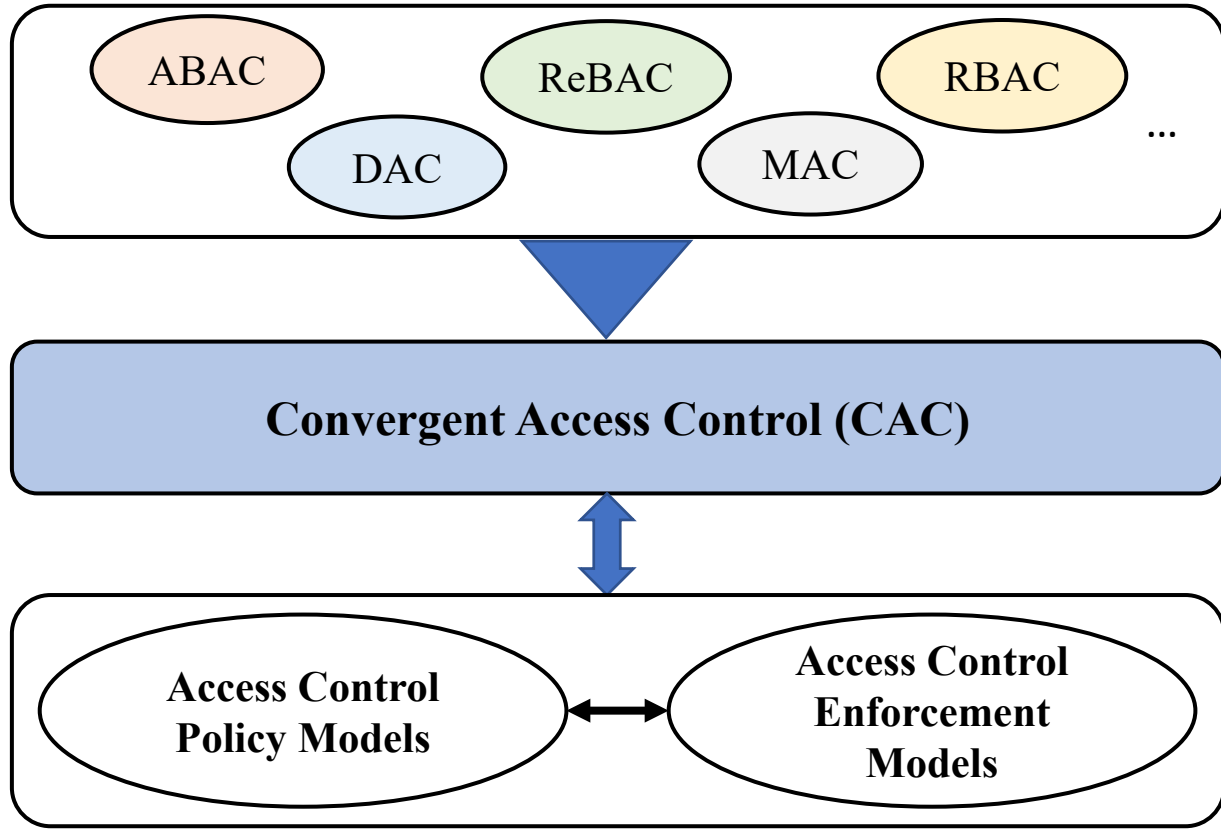**1970**

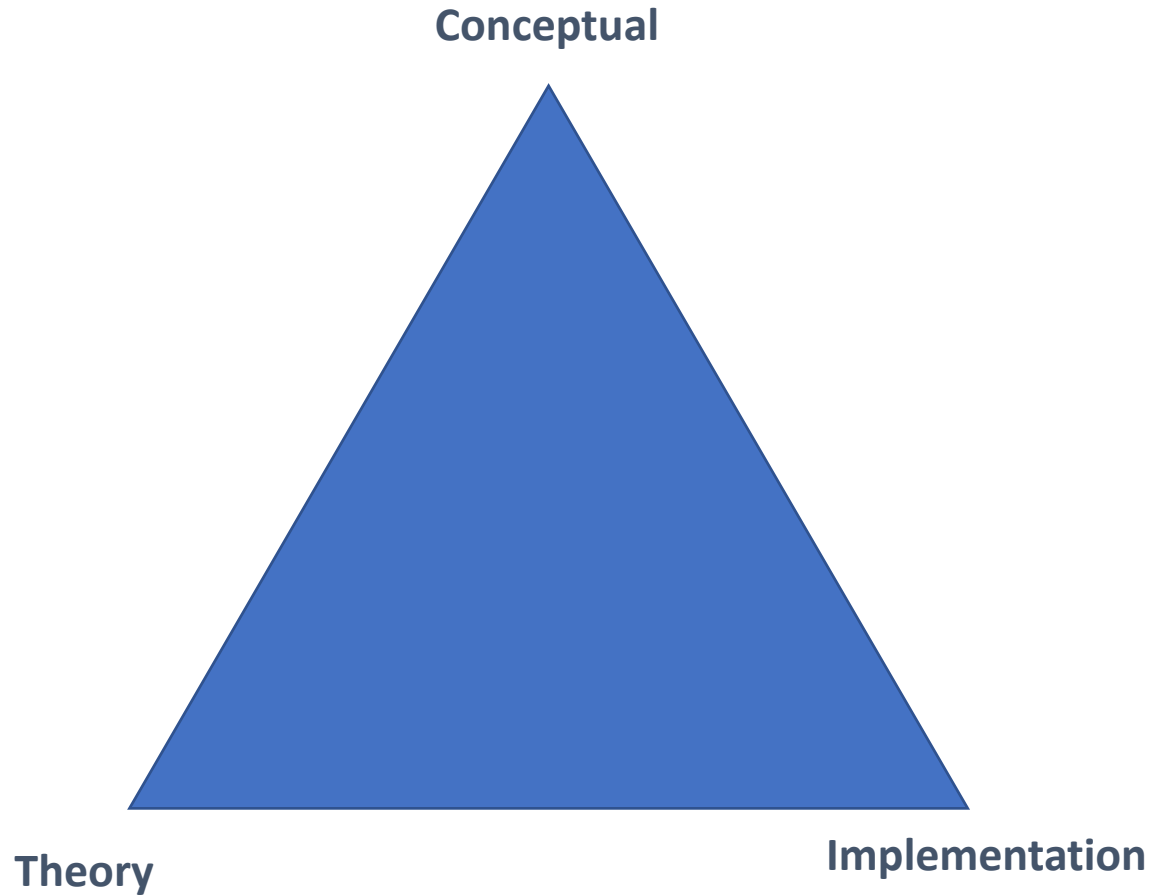**Mandatory Access Control (MAC)**
1970

Role Based Access Control (RBAC)
1995

Attribute Based Access Control (ABAC)
Relationship-Based Access Control (ReBAC)
Usage Control (UCON)
2020s (Hopefully)

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UTSA
Computer Science

I·C·S
The Institute for Cyber Security

C·SPECC
Center for Security and Privacy
Enhanced Cloud Computing

ABAC ReBAC RBAC
DAC MAC ...

Convergent Access Control (CAC)

Access Control Policy Models ↔ **Access Control Enforcement Models**

Application Context

Enterprise Social Cloud IoT/CPS Metaverse

...

This slide prepared by Smriti Bhatt

World-Leading Research with Real-World Impact!

UTSA
Computer Science

Conceptual

Theory

Implementation

World-Leading Research with Real-World Impact!

Cyber Security Doctoral Research

Conceptual

OSI NW Stack

Theory

P = NP?

Implementation

RESTful API

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Cyber Security Dissertation Structure
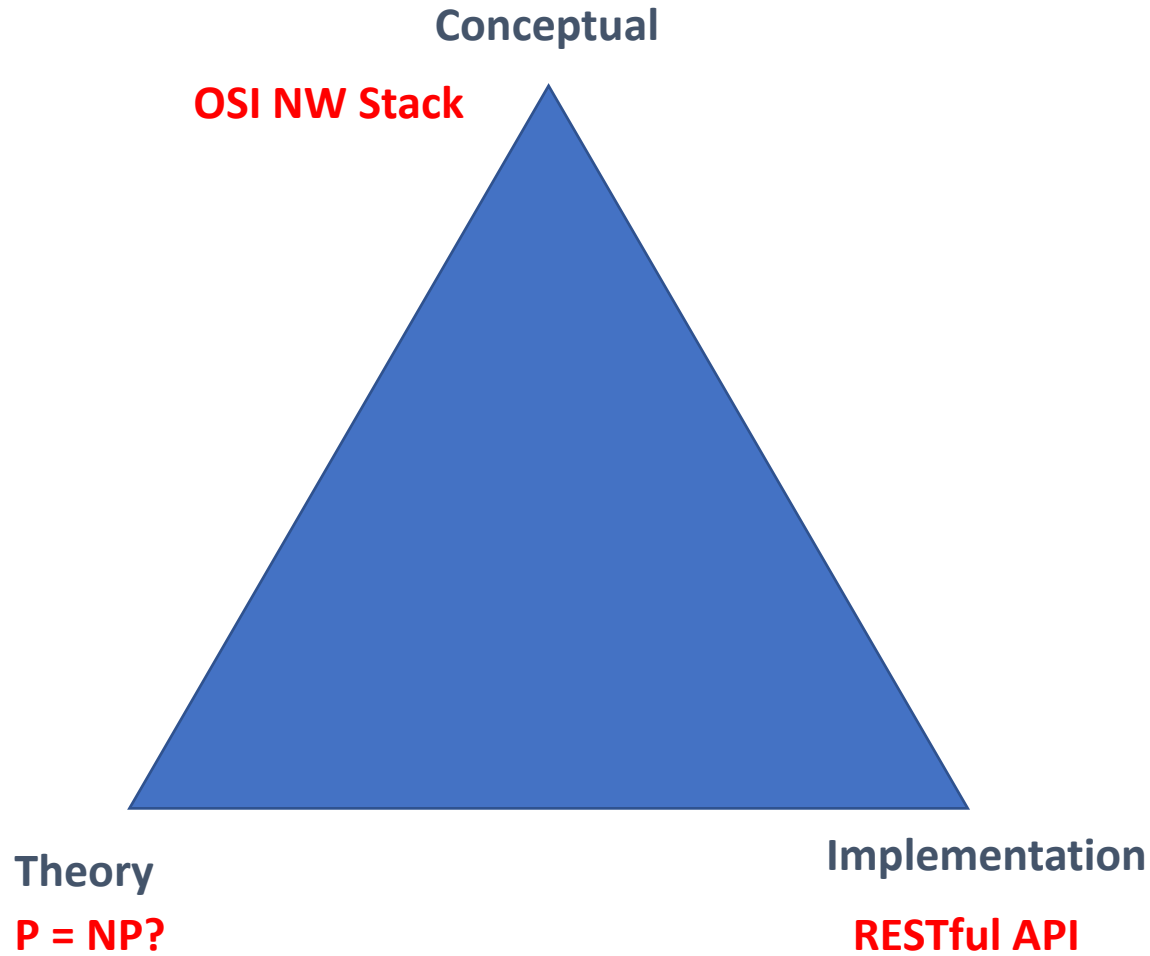
Ch 1: Introduction/Problem Definition/Summary of Contributions
Thesis statement

Ch 2: Background/Related Work/Literature Survey

Ch 3:
Ch 4:
Ch 5:

original contributions
1-3 conference papers/chapter

Ch 6: Conclusion/Future Work
Appendices: if appropriate

World-Leading Research with Real-World Impact!