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TCIPG Reading Group – Fall 2012

Today's Plan:

- Fall 2012 Overview
- Introductions
- Collaborative Research Professors Sanders and Sauer
- Next Week's Plan

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Reading Group Purpose

- 1. To provide TCIPG students a broad understanding of "smart grid" actors, their interactions, and cyber security aspects of those interactions – especially to bridge the knowledge gap between the computer and power engineering disciplines.
- 2. To provide a forum to build enduring personal and professional relationships between the TCIPG computer and power engineering communities...and have fun along the way.
- 3. To build a cross-disciplinary knowledge base to facilitate reading group interaction and collaboration supporting leading edge power system cyber security research

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CS 591 TCI -- "TCIPG" Expectations

- Credit: 1 hours "Pass"/"Fail"
- Class will Meet in 301 CSL (Normally). The course provides students a fundamental understanding of the electric power systems "smart grid" domains with emphasis upon the interplay between the domains and supporting cyber security requirements. Course content bridges the gap between computer science and power engineering disciplines including power system fundamentals, supporting computer network requirements/fundamentals, and cross-cutting cyber security concepts. Combines lecture, discussion, and hands-on laboratory work to provide and intuitive, enduring understanding of the fundamental concepts.
- Attendance to be taken Normally cannot miss more than 3 sessions for "Pass"
- Weekly Reading Assignments
- Pre- Seminar Preparation and Active Participation Expected
- Occasional 1-2 paragraphs synthesizing the material will be required.

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Reading Group Schedule – Fall '12

Date	Торіс	Responsibility	Description
31 Aug 12	Introductions – Getting to know each other	Karl Reinhard Ahmed Fawaz	Building relationships among the reading group members
7 Sep 12	Power Laboratory	Karl Reinhard	Hands on lab experience introducing non-Power Engineer students to making voltage, current, and power measurements – EL 50 (power lab)
14 Sep 12	Power Flow Basics	Karl Reinhard	Introduction to the power flow equations
21 Sep 12	Power World: Hands On	Karl Reinhard	Introduction to Power World as a means to solving the power flow equations. Conducted in the computer lab using Power World

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28 Sep 12	Power Sys Networks I: Application and Transport Layers	Ahmed Fawaz	 Application layer (HTTP, SMTP, FTP, video streaming) Study structure using "wireshark" Introduce port number Transport (TCP, UDP,) Study reliability (netem)
5 Oct 12	Power Sys Networks II: Network Layer	Ahmed Fawaz	 Network layer: Routing (intra and inter-as) using "traceroute," Introduce IP addresses (DHCP,) Man-in-the-middle, IP spoofing ICMP (ping messages) Routers
12 Oct 12	Power Sys Networks III MAC/Physical Layers & Wireless	Ahmed Fawaz	 MAC layer: MAC addresses (check ARP caches) Switches ARP cache poisoning Physical layer:
19 Oct 12	Power Sys Networks IV Cyber Security	Ahmed Fawaz	Introduce IDS and Firewalls

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26 Oct 12	TCIPG Industry	TBD	
	Day Prep		
2 Nov 12	Phasor Measurement	Karl Reinhard	Description and demonstration of a Phasor Measurement Unit implemented using National Instruments Hardware and LabVIEW
	Demonstration		
9 Nov 12	NIST Smart	Karl Reinhard	Read and discuss NISTR 7628 Vol 1. Executive Summary
	Grid Framework I	Ahmed Fawaz	
16 Nov 12	NIST Smart	Karl Reinhard	Group brief backs on NISTR Vols 2 and 3. Sub-groups will be
	Grid Framework II	Ahmed Fawaz	assigned to read and summarize key points.
30 Nov 12	Adv Meter	Ahmed Fawaz	Introduce AMI architecture
	Infrastructure		
	l – Architecture		
7 Dec 12	Advanced		Hands on analysis of communications traffic in the AMI network
	Meter		using TCIPG advanced meter Test Bed
	Infrastructure		
	II		
	Traffic Analysis		

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Possible Meeting Topics to Carry Over to Spring 2013

TBD	Topology Perturbation for Detecting Malicious Data Injection	Ahmed Fawaz Kate Morrow	TCIPG Test Bed Demonstration using the subject demonstration to illustrate TCIPG test bed capabilities
TBD	IEC 61850 – Electrical Substation Standards I	Karl Reinhard TBD	SISCO Tutorial on IEC 61850. Possible guest speaker Ralph Mackwiecz, VP SISCO. A vehicle for discussing the 7 layer OSI model – and security implications
TBD	IEC 61850 – Electrical Substation Standards II	Karl Reinhard TBD	Discussion IEC 61850 – Electrical Substation Standards (cont)

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Introductions

- Name? What do you prefer to be called?
- Who is your advisor
- What are your research interests?
- Where is home?
- Describe your family
- What is your life's ambition?
- What are you famous for?

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Establishing Successful Research Partnerships / Collaborations

Professors Sanders and Sauer

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Next Week – 7 Sep 12

- Kick off 11:30 Power Lab (Rm 50), Basement, Everitt Lab
- Hands on Exploration of Power Engineering Terminology
- "Pre-Lab" Reading Assignment on TCIPG Reading Group Webpage





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