Workshop on
Science of Cyber Security

22-26 January 2015

IFIP Working Group 10.4
Tortworth, Bristol, UK

Cyber Security is (still) in the news

- We've seen many attacks in the news lately …
  - Target, Home Depot, Sony, Stuxnet, Snowden, others
- Responding to such attacks, particularly if defensive, is perceived to be needed now more than ever.
- When the Russians launched Sputnik, the West's response was massive, but it was science based.
- In cyber security there is no recognized science upon which we can base a solution.
- If we were to avoid ad hoc responses, and to develop a science of cyber security, what would that science look like?

2

Retrospective on Science of Security

- There have been several calls for improving the science in computer-security research.

    - NSF/NSA/iARPA-sponsored workshop, November 2008
        - Deplorable state of computer security

    - *National Academy of Sciences report, April 2009
        - Bad science in forensics

    - JASON summer study, June 2010
        - Science of Cyber-Security

    - NSPW, September 2010
        - Why is there no science in cyber science?

    - Oakland Conference, May 2012
        - Panel on science of security

    - National Research Council / National Academy of Sciences (2015)
        - Committee on Future Research Goals and Directions for Foundational Science in Cybersecurity:

Perspective

- Our view in the next two days will be decidedly operational and experimental.

- This is because the theory side of the house appears to be in much better shape than the experimental side does.

- The community's experience and results as experimental scientists is, with some exceptions, appalling; hence the focus on experimentalism.

There are many burning issues

- Foundational science
- Experimental methods
- Incentive structures
- Architectures
- Measurement and metrics
- Resilience
- Quantification of security risks/benefits
    - Current issue at Davos World Economic Forum, 2015

- If such issues are best addressed through a scientific approach, where is that science?

Goals

- Learn
- Share
- Discuss
- Ask (questions)
- Challenge (the community, your colleagues)
- Improve
- Take (lessons home to students and colleagues)
- Do (better science as a result of being here)

"The rules"

- In keeping with usual practice ...
  - Questions are welcome at any time, particularly for clarifications (less so for arguments). ☺
  - Speakers manage questions per their own preference.
  - Speakers have 45 minutes.
    - Modest overage is ok, but please be considerate of the clock.
  - There will be a brief discussion after each session, led by the moderator.
  - Rapporteurs will share their reviews and thoughts at a wrap-up session at the end of the last day.
- We will try to reach a consensus on how best to proceed with a science of cyber security.
- It would be nice for the group to produce a report that could be published; a venue is already in place for that (IEEE S&P), if we so choose.

Without further adieu ...

Keep Calm and Carry On