NIST
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Is Mobile Device Forensics Really "Forensics"?

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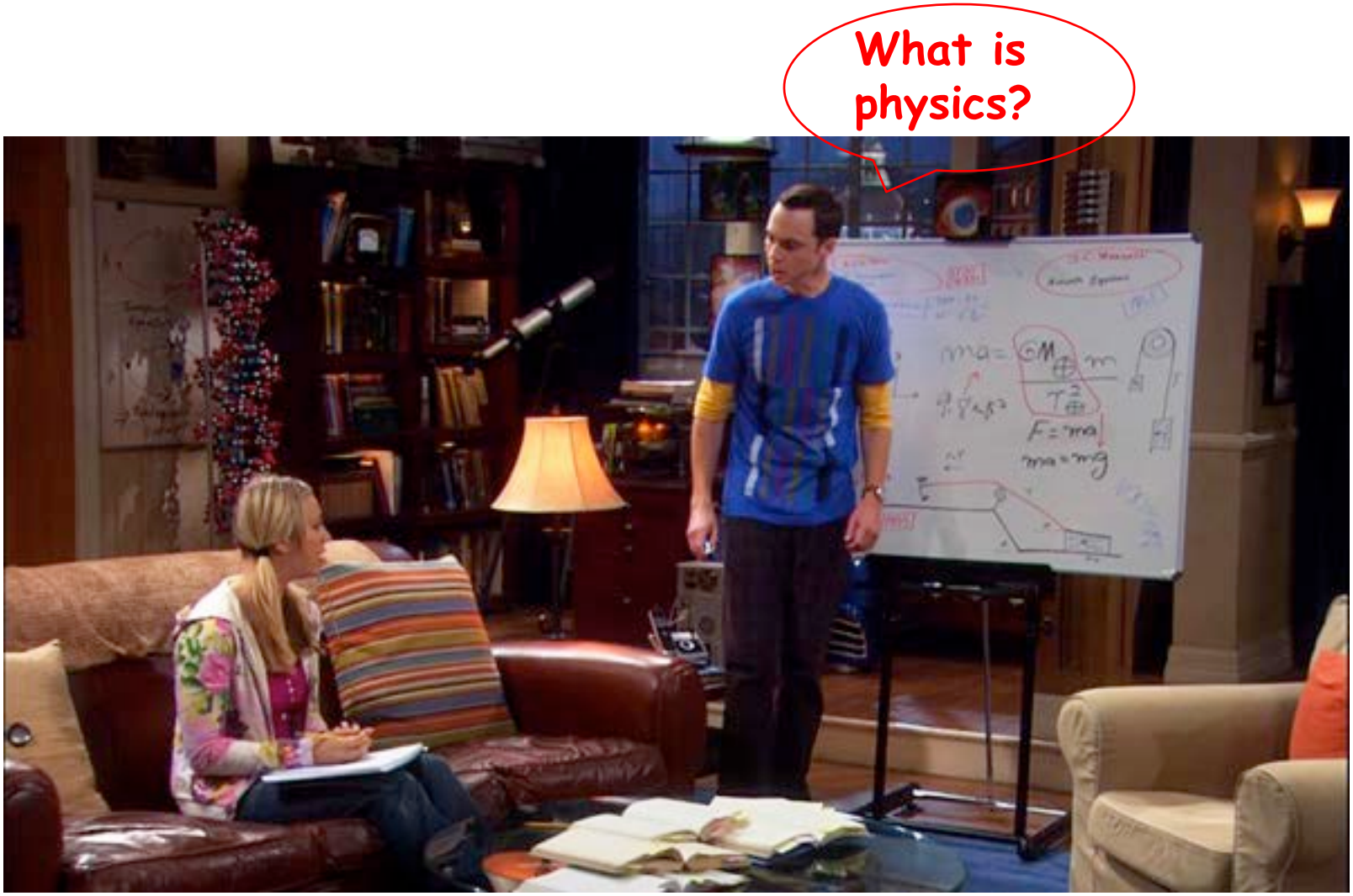
Gary C. Kessler
Embry-Riddle Aeronautical University

Overview

- Is digital forensics a forensic *science*?
- Is mobile device forensics part of digital forensics?
- Is the practice of mobile device analysis good forensics?

Definition of Terms



Defining *forensics*

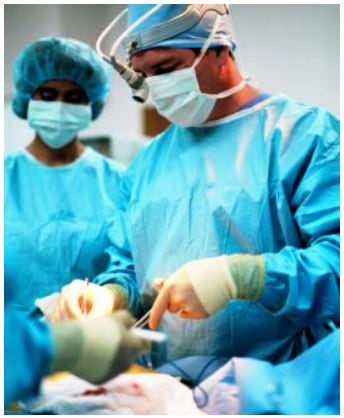
- "The application of scientific knowledge to legal problems" (Merriam-Webster)
  - Includes forensic medicine, physics, chemistry, dentistry, fingerprints, DNA, firearm analysis, accounting, ...
- Forensic sciences widely tied to Locard's Exchange Principle
  - "Every contact leaves a trace" (Prof. Edmond Locard, c. 1910)

How Does Digital Forensics Fit?

- Does Locard's Principle apply in cyberspace as it does in the real world?
- Does the National Academy of Science report (2009) call *all* forensics processes into question?
- Is *digital forensics* a forensic science?
  - American Academy of Forensic Sciences (AAFS) accepted Digital and Multimedia Science in Feb. 2008
  - Aren't DOJ and NIST grappling with this question?

Forensic Process

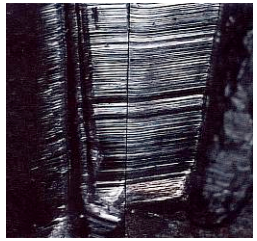
- The basic process of forensics
  - Identification
  - Preservation
  - Collection
  - Examination
  - Analysis
  - Reporting



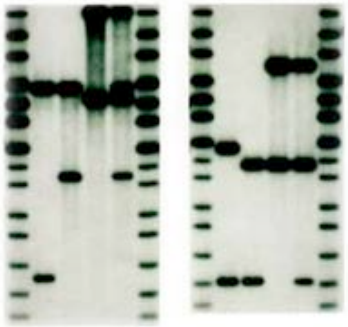
But Digital Forensics **Is** Different...

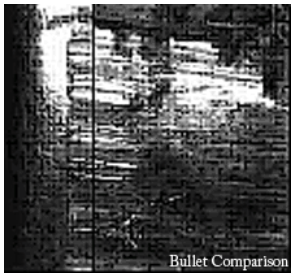
- Most forensic sciences are comparing a latent sample to a known sample

  - E.g., fingerprints, DNA, blood, bullets, tire prints, tool marks, shoe prints, etc.



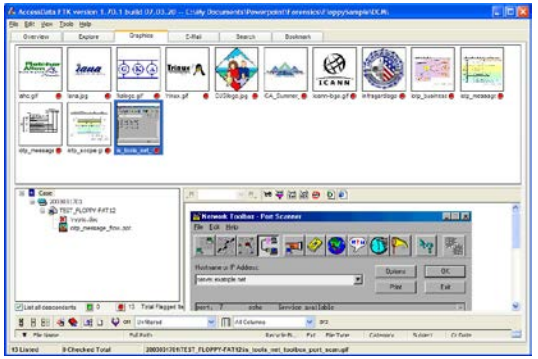
- Digital forensics is not a "comparing" science





More Differences

- The *tools* of the physical forensic sciences have changed but the properties of the samples have remained mostly the same
  - DNA and blood haven't changed in millions of years but the science and the tools have improved
- Computers are changing constantly
  - New devices, new architectures, new tools



Where's the Science?

- *Science* is an organized structure for understanding a body of knowledge
  - We are not using digital forensics to seek greater truths
- Digital forensics employs the scientific method to guide our approach to:
  - Find information
  - Apply a context to the information
  - Determine probative value of the information

Mobile Device Forensics

- Does the examination of mobile devices meet this test?
  - Are we imaging mobile devices?
  - Are we changing the state of the device during examination?

Changes in Technology

- It is difficult for laws, investigators, and practitioners to keep up with the increasing acceleration of technological change
- Consider cell phones
  - 1993: We were happy to have dial tone (RAM = 0)
  - 2003: Phone, call history, contact list, SMS, images, videos (RAM = 10-100 MB)
  - 2013: Phone + portable Internet terminal with e-mail, browser history, GPS locations, documents (RAM = 8-64 GB)

Mobile Devices vs. Computers

- Operating systems
  - Computers: 2½ (Windows, Linux/Unix/Mac OS X)
  - Mobile devices: 4+ (Android, Blackberry, iOS, Windows, and more)
- The power of tools such as Cellebrite and XRY have caused some to believe that:
  - The tools are 100% complete
  - If the tools don't report it, it's not there
- There is more probative information on a cell phone per byte examined than on a computer (GCK, 2006)
  - But it's not all easy to come by

Is This *Forensics*?

- Many people in our field claim that cell phone analysis is not "forensics"
- Given that *forensics* is the use of science and technology to answer questions in a court of law
  - Mobile device forensics absolutely *is* forensics
  - Yet it *is* different from traditional computer forensics
    - E.g., cell phone power is on, we are not making an "image," the state of the device changes over time, ...
- We do ourselves a disservice to imply that our processes would not pass a Daubert challenge

So....

- Is mobile device forensics actually "forensics"?
- YES!!!!!

- Unfortunately, we don't practice it that way...

The Relentless Pursuit of The Easy Button

Mobile Device Forensics as Practiced...

- Would any police dept. in the U.S. just hand an EnCase or FTK dongle to a cop and ask them to analyze a computer?
  - So, why do so many police depts. hand a UFED, Touch, or XRY to a cop and ask them to "dump" a smartphone?
- There is so much information on a phone that more and more examiners merely provide the output to the investigator in the form of a several hundred page PDF...
  - We only grab what the tools easily find
  - We are relegating ourselves to the role of technician and not doing any analysis

The Result of This Attitude

- We are not providing sufficient training and education related to
  - Proper seizure procedures for mobile devices
  - Proper transport procedures
  - Proper forensic examinations and analysis
  - The difference between acquisition and parsing
- *This* is where mobile device forensics suffers as "forensics"

Summary

- Digital forensics *is* an engineering science
- Mobile device forensics *is* a digital forensic science
- The *profession* of digital forensics requires continued education, training, and practice
  - Digital forensics *is* a computer science
- In U.S. law enforcement, computer forensics is *practiced* more professionally than mobile device forensics

Author Contact Information

Gary C. Kessler, Ph.D., CCE, CCFP, CISSP
Embry-Riddle Aeronautical University
600 S. Cylde Morris Blvd.
Daytona Beach, FL 32114

mobile: **+1 802-238-8913**
office: **+1 386-226-7947**
e-mail: **gary.kessler@erau.edu**
gck@gary*kessler.net*
Skype: ***gary.c.kessler***

http://www.garykessler.net