



**Carney Forensics**

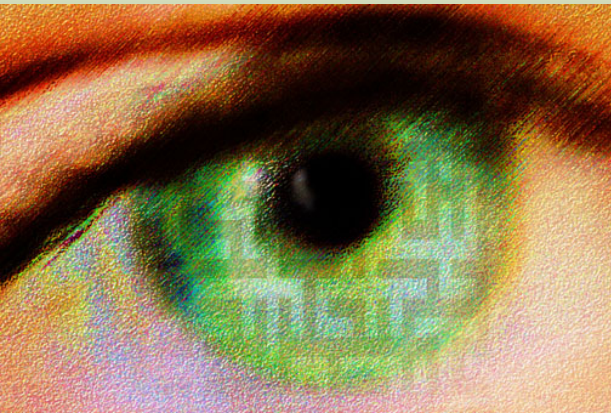
# ***Cell Phones Are the New DNA: The Emerging Role of Mobile Device Forensics in Wrongful Conviction Exonerations***

Hennepin County Law Library

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Carney Forensics



# Cell Phones Are the New DNA

- New evidence produced using scientific testing with innovative technology
- Opens door to wrongful conviction review and exonerations
- DNA testing has leveraged popular and effective forensic biology science
- Cell phone forensics now emerging as effective scientific tool for exonerations
  - Speed of technology innovation and adoption
  - Diversified number of proof vectors

# Presentation Hypothesis

- Steady stream of opportunities to recover exonerating evidence
- New science and rapidly changing methods and technology tools - “terra incognita”
- Advanced mobile device forensic science
- Practiced by lawyers, investigators, examiners with initiative and resourcefulness
  - Innocence Project
  - Appellate Public Defenders
  - Private Criminal Defense Attorneys

# Speed of Technology Innovation

- Underlying Mobile Device Technology
  - Cell Phones
  - Fitness Trackers
  - Digital Watches
- Mobile Device Forensic Artifacts
  - Messaging
  - Activities
  - Device Locations
  - Photograph / Video
  - Browser / Search
  - Pattern of Life
- Artificial Intelligence / Machine Learning
  - Categorization of Messages and Photographs
  - Reverse Image Search

# Cell Phone v. DNA Evidence

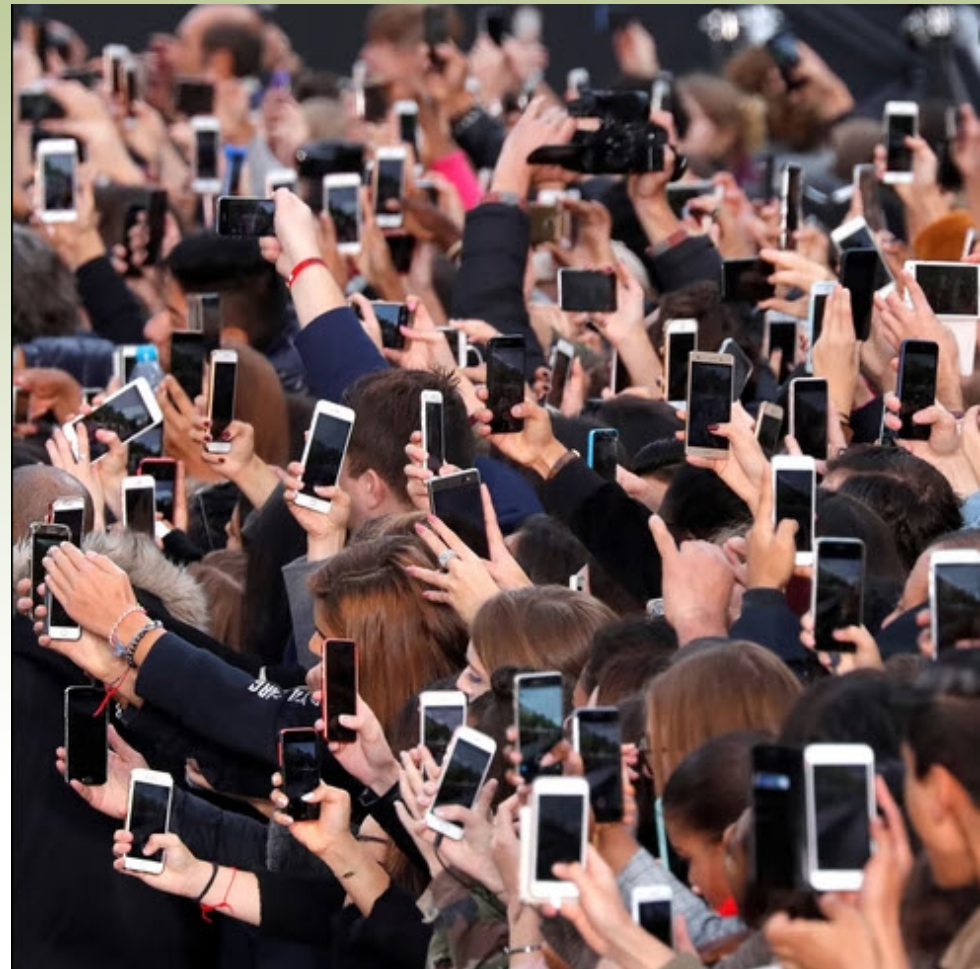
- Similarities
  - Several evidence characteristics in common between cell phones and DNA
  - Comport with effective success rate in overturning wrongful conviction cases in U.S.
- Differences
  - Many due to speed of tech innovation & adoption
  - Identify mobile / cell phone as most promising form of new evidence for exonerations
  - Establish affirmative evaluation of cell phone evidence for all wrongful conviction cases

# Similarities between Mobile and DNA

- Technology-based innovation goes to same novelty requirement for petitioner to open door to wrongful conviction review
  - Does new technology produce a result “reasonably probable to change the outcome at trial”?
  - Does new technology produce “clear and convincing proof of innocence”?
- Focus is not the new technology, but the new evidence derived from it

# Similarities between Mobile and DNA

- Both methods have universal applicability for all persons in the population
- Everyone has DNA
- Everyone has a cell phone





# Similarities between Mobile and DNA

- Frequency of relevant and probative evidence upon which wrongful conviction cases turn compared to other forms
  - Recovery
  - Analysis
- Both methods have destructive use cases
  - DNA sample consumption
  - Mobile device chip-off
  - iPhone jailbreaks
  - Android rooting



# Differences between Mobile and DNA

- DNA evidence regularly tested and examined before trial for decade or more
- Therefore, old, untested DNA challenges are now rare
- Fast pace and strong adoption rate for mobile technology innovation
- More older, untested cell phones available for examination and challenge
  - Stored in evidence lockers throughout U.S.
  - At multiple jurisdictional levels
  - Need for awareness & justification for challenges

# Differences between Mobile and DNA

- Diversified proof vectors for mobile as compared to binary DNA “match” outcome
  - GPS answers Where? When? How high? and How fast?
  - Photo and Video answer Who? What? Where? When? How? How much? and maybe Why?
  - Contacts answer Who?
  - Messages and Email answer Who? wrote What? to Whom? and When?
  - Voice Messages answer Who? spoke What? to Whom? and When?

# Differences between Mobile and DNA

- Material advantages of wrongfully convicted defendant's cooperation to recover mobile evidence
  - Access to DNA samples is not protected
  - Mobile device lock codes (passwords) protected by personal knowledge and Fourth and Fifth Amendments
  - Cloud account (Google, Apple, etc.) credentials protected similarly for mobile backups / syncs

# Differences between Mobile and DNA

- Vast majority of DNA labs are accredited
  - Must comply with standards & proficiency testing
- Broad range of training / proficiency mobile device examiners in law enforcement
  - Uneven mobile evidence recovery performance from newbies compared to world-class experts
- Law enforcement mobile examiners limited
  - Time budgets for cell phone exams (backlog)
  - Quotas for mobile device exams per day / week
- Private, defense examiners often have more time, resources, tools, discretion, etc.

# Differences between Mobile and DNA

- Phone glitches make recovery uncertain
  - Damaged screens, data ports, batteries
  - Unknown passcodes
- Feature phones recover limited evidence
  - Contacts, Call logs, Text Messages, Photos
- Feature phone evidence recovery support
  - Spotty for legacy tools
  - Nonexistent for new, advanced tools
- Evidence may not be responsive to user
- Counsel cannot always “put cell phone in hand of defendant”

# Differences between Mobile and DNA

- GPS Device Locations
  - Some GPS sources are off the smartphone
  - Some GPS is predictive or anticipatory
  - Careful interpretation and expertise needed
- Artifacts or metadata created passively by phone operating system or mobile apps
  - Photographic thumbnails
  - Events that reflect side effects of sensors
  - File activity and logs for incoming data
- Care, experience, nuanced understanding required to prove anthropomorphic activity

# Differences between Mobile and DNA

- Emerging awareness of mobile device evidence relevance and probativeness within criminal justice community
- DNA is the dominant evidentiary form with legacy and default authority
- DNA present in all evidence standard operating procedures and checklists





# Recover New Mobile Device Evidence

- Effective application of mobile device forensics to wrongful conviction cases
- ***Probative Mobile Artifacts***
  - Device Locations go to alibi
  - Photos and Videos go to location and alibi
  - Wi-Fi and Bluetooth go to location and alibi
  - Messages and Chat go to communications
  - Voice Calls and Mail go to communications
  - Activity and Health go to motion, status, and proof of life
  - Browsing & Search go to motive and intent

# Recover New Mobile Device Evidence

- Effective application of mobile device forensics to wrongful conviction cases
- ***“Pattern of Life” Mobile Artifacts***
- Insights into digital behaviors and habits including normal routines in day to day life
  - Power On and Off, Battery Usage
  - Lock Screen and Device Orientation
  - Device Connections using Bluetooth and Wi-Fi to vehicles, watches, fitness trackers, etc.
  - Data Consumption from Wi-Fi and Cellular (4G LTE)
  - Screen Time and Digital Wellbeing Statistics

# Opportunities to Leverage Feature Phones

- Recover new feature phone evidence qualifying for reduced standards of proof during post-appeal time window
  - ***Old Feature or Flip Phones and Burners***
  - Connect to impaired phone to get extractions
  - Examine phone with mobile device forensic tools
  - Replace photograph evidence of phone screens
  - Recorded by law enforcement in a rush
  - Missing phone screens and key metadata
  - Photographs cannot be text searched or filtered

# Opportunities to Leverage Feature Phones

- Recover new feature phone evidence qualifying for reduced standards of proof during post-appeal time window
  - ***Old Feature or Flip Phones and Burners***
  - New advanced hardware extraction techniques
    - Chip-off
      - Physically remove flash memory chip(s)
      - Acquire raw data using specialized equipment
      - Obtain physical binary image of most cell phones
      - Including phones with catastrophic damage
    - JTAG (Joint Test Action Group)
    - ISP (In-System Programming)



# Opportunities to Leverage iPhones

- Recover new iPhone evidence qualifying for reduced standards of proof during post-appeal time window
  - ***Apple iPhone Forensic Renaissance in 2020***
  - Examine new probative full file system extractions
  - Replace decades-old, limited iTunes backups
  - Recover abundant, deleted evidence
  - Recover new iPhone databases to expose “pattern of life” and other new evidence



# Opportunities to Leverage iPhones

- Recover new iPhone evidence qualifying for reduced standards of proof during post-appeal time window
  - ***Apple Legacy iPhones***
  - iPhone 4, 5, 5c
  - Recover deeply probative physical images using advanced mobile device forensic tools
  - Also unlock legacy iPhone passcodes
    - 4-digit combinations in 12 minutes
    - 6-digit combinations in up to one day
  - Analyze live and deleted exculpatory evidence



# Opportunities to Leverage Androids

- Recover new Android evidence qualifying for reduced standards of proof during post-appeal time window
  - ***Android Smartphone Forensic Innovations***
  - Examine new probative physical and full file system extractions, instead of limited backups
  - Recover, disable, or bypass Android passcodes
  - Overcome encryption with new bootloader tech
  - Overcome security patch levels with new tools
  - Analyze abundant, deleted evidence and new Android databases to expose new forms of evidence (pattern of life, digital wellbeing, etc.)

# Opportunities to Leverage Androids

- Recover new Android evidence qualifying for reduced standards of proof during post-appeal time window
  - ***Low-cost Android Burner Smartphones***
  - Unmarked, unidentified Android burners
  - Mobile identification tools for make and model
  - Or, call Verizon store, Metro PCS, etc.
  - Supported phone lists for recovery capabilities
  - Bypass or disable forgotten passcodes
  - Obtain physical or full file system extractions
  - Analyze live and deleted exculpatory evidence



# Opportunities to Leverage Wearables

- Recover new wearables evidence qualifying for reduced standards of proof during post-appeal time window
  - ***Digital Watches***
  - Limited to no support for some models using mobile device forensic tools
  - Access Apple watch evidence synced to paired iPhone
  - Perform “live” extractions of watches
  - Use digital watch vendor software like Garmin’s Basecamp to recover GPS and date/time stamp evidence



# Opportunities to Leverage Wearables

- Recover new wearables evidence qualifying for reduced standards of proof during post-appeal time window
  - ***Fitness Trackers***
  - Access evidence online with forensic collections
  - Or, by analyzing mobile app paired to tracker using tools
  - Personal Activity Metrics
    - Walk, Run, Swim, Sleep
    - Date & Time Stamps, Distance, Duration
    - Steps, Speed, Pace, Heart Rate



# Case Study: State v. Nidjia Dean Nicks

- Successful wrongful conviction case
- Hennepin County, Minnesota (Minneapolis)
- First degree murder with LWOP sentence
- Advanced mobile device forensic exam
- Deceased victim's old feature / flip phone
- New, chip-off extraction of old cell phone electronics
- Recovered new, material call log evidence
- Contradicted eyewitnesses' testimony

# Case Study: State v. Nidjia Dean Nicks

## Case Background

- Ms. Hollis' house was sprayed with bullets shortly after 1:00 A.M. causing her death.
- Mr. Nicks allegedly called and threatened the soon-to-be victim, Johanna Hollis, shortly after midnight.
- At trial, two witnesses testified they heard Mr. Nicks speaking with and threatening Ms. Hollis during the phone call.
- Mr. Nicks' defense strategy was to show the two phone calls which occurred shortly after midnight did not result in Mr. Nicks speaking with Ms. Hollis.
- Defense counsel said, "our whole theory is that the phone call didn't even occur, that they made that all up."

# Case Study: State v. Nidjia Dean Nicks

## Key Fact Issues

- Alleged threatening phone calls with victim most persuasive evidence in record directly showing requisite premeditation for first-degree murder.
- Parties have focused on whether Ms. Hollis' cell phone contained data to support or refute assertion she received calls from Mr. Nicks.

# Case Study: State v. Nidjia Dean Nicks

- Jury Found Defendant Guilty in June 2009
  - Murder in the First Degree
  - Attempted Murder in the First Degree
- Sentenced to Life Without Parole (LWOP)



# Case Study: State v. Nidjia Dean Nicks

- Petition for Post-conviction Relief Denied Without Evidentiary Hearing in December 2011
- Supreme Court Disagreed in May 2013
  - Held an Evidentiary Hearing Necessary
  - Determine the Ineffective Assistance of Counsel Defense/Claim



# Case Study: State v. Nidjia Dean Nicks

- Post-Conviction Mobile Device Forensics
- Partnership with Minneapolis Police Dept.
- Failure of Cell Phone Photograph Exams
- Probative Cell Phone Extraction Need
- Chip-Off Extraction – Destruction Issue
- Recovered New Call Log Evidence
- Revealed Materially New Facts
- Contradicted Eyewitness Testimony



# Case Study: State v. Nidjia Dean Nicks

- Evidentiary Hearing in September 2015
  - Two Days in Duration
  - Expert Witnesses Testify
- Judge's Order in January 2016
  - First Degree Murder Conviction Vacated
  - Attempted First Degree Murder Conviction Vacated
  - Request for New Trial Granted



# Case Study: State v. Nidjia Dean Nicks

Order Granting A New Trial, January 14, 2016

William H. Koch

Judge of District Court, Hennepin County



“The calls placed by Mr. Nicks to Ms. Hollis at 12:11 A.M. on March 2, 2008, did not show up on the Hollis phone's call log. One expert, Mr. Carney, believes if Ms. Hollis had answered one of those calls and spoken with Mr. Nicks, the received-call log would have reflected such information. Mr. Carney's testimony explaining the phone's first-in-first-out call log, in conjunction with the Hollis phone call log being full, casts serious doubt as to whether Mr. Nicks actually spoke with Ms. Hollis during either of the two 12:11 A.M. phone calls.”

# Case Study: State v. Nidjia Dean Nicks

Order Granting A New Trial, January 14, 2016

William H. Koch

Judge of District Court, Hennepin County



“Mr. Nicks has proven beyond a preponderance of the evidence that neither of the 12:11 A.M. phone calls made by Mr. Nicks resulted in conversation between he and Ms. Hollis. Per the Supreme Court's reasoning, which controls this Court, there is a reasonable probability the outcome at trial would have been different if Mr. Nicks' counsel had provided effective assistance.”

# Case Study: State v. Nidjia Dean Nicks

- Order Granting Public Defender in March 2016
- Omnibus and Other Hearings
- Petition for Guilty Plea in December 2016
  - Murder in the Second Degree
  - Without Intent
  - While Committing a Felony



# Case Study: State v. Nidjia Dean Nicks

- Sentencing Order in December 2016
  - 204 Months
  - Credit for 3,215 Days ( $\approx$ 106 months)
- Canceled Jury Trial
- Incarcerated on December 20, 2016
- **Released on Parole on July 1, 2019**
- Anticipated Release on March 30, 2021
- Expiration Release on February 28, 2025

# Questions & Answers

## Carney Forensics

“Digital Evidence is Everywhere”

**Cell Phones / Smart Phones**

**Smart Tablets**

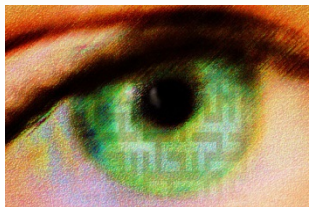
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