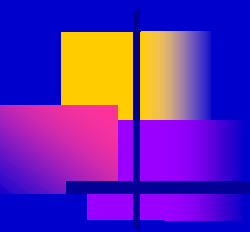
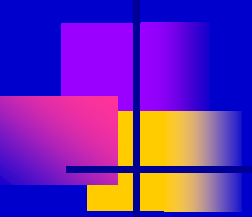


Forensic Science: Fact v. Fiction (TV v. Reality)



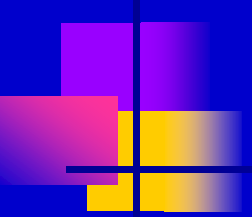
Kimberley Johnston, M.Sc., B.A.
(A) Section Head, Organizational
Development
Centre of Forensic Sciences
August 2008



Fact

“We want the public to be aware that the glorious vision it may have—of labs more spacious than the Taj Mahal, equipped with devices the Jetsons would find futuristic, staffed by people who can get a DNA result out of a copy machine, or about as fast as a copy machine can duplicate a page (if it jams, they can simply ask the staff psychic to reveal the killer’s identity)—bears no resemblance to reality.”

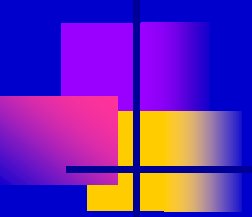
—Barry Fisher (Crime Laboratory Director, LA County Sheriff's Department), “Legislative Corner”, *Academy News* 36(5): 3 (Sept 2006)



Fact

“One problem is that many Americans believe that what they see on television dramas is a realistic portrayal of crime labs. While this problem can’t be completely eliminated, it may be a mistake to blame CSI, Crossing Jordan, Bones, or other dramas for causing it. There will always be a few mentally ill persons who believe that Leonard Nimoy had secret ear reduction surgery so that he could live among us, who long for a doctor on Grey’s Anatomy to cure them, or who would be happy to have a love child with David Letterman.”

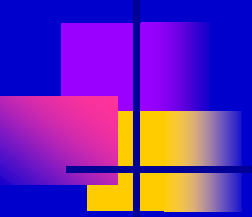
–Barry Fisher, “Legislative Corner”, *Academy News* 36(5): 3 (Sept 2006)



Fact

“*CSI* has as much to do with criminalistics as *Baywatch* had to do with being a lifeguard.”

—John Houde, author of *Crime Lab: A Guide for Nonscientists*



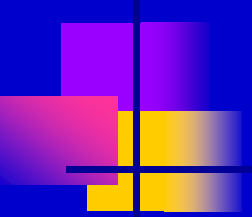
Fiction: CSI Crime Lab (LVPD)

- Staff

- 5 scientists
- 1 technologist

- Expertise Covered (in one episode)

- fire scene analysis
- bomb reconstruction
- forensic entomology
- document analysis
- DNA analysis
- toolmark analysis



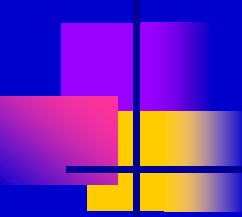
Fiction: NCIS

- Staff
 - 1 forensic scientist
 - 1 pathologist
 - 1 pathologist's assistant
 - 4 investigators (one of whom doubles as a computer forensics expert)
- Expertise covered
 - You name it, Abby can do it!

Fact: The Centre of Forensic Sciences



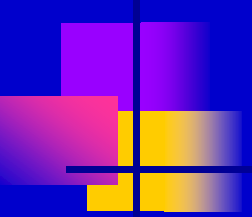
- A forensic laboratory
 - *Forensic science* is the application of science to questions which are of interest to the legal system
- A branch of the Public Safety Division of the Ministry of Community Safety and Correctional Services
- A Government of Ontario analytical laboratory
- A laboratory accredited by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB)
 - 1st accredited Canadian forensic lab



Centre of Forensic Sciences (Toronto + NRL)

- 27 managers
- 1 R&D coordinator
- 1 policy analyst
- 108 scientists
- 76 technologists
- 7 receiving officers
- 4 lab attendants
- 21 administrative support staff
- 3 systems analysts
- 3 library staff
- 8 housekeeping staff

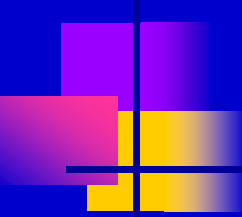
TOTAL 259 STAFF



Centre of Forensic Sciences (Toronto + NRL)—cont.

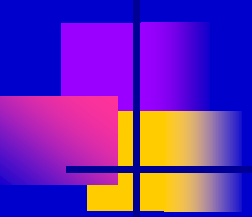
■ Expertise

- DNA analysis, body fluids, bloodstain pattern interpretation, hair and fibre analysis/damage (Biology)
- Fire and explosives, glass, paint, soil, GSR and metal analysis, engineering (Chemistry)
- Signatures, ink, printers, counterfeit documents, etc. (Documents)
- Specialized photography, physical comparisons, photographic enhancements (Photoanalysis)



Centre of Forensic Sciences (Toronto + NRL)—cont.

- Digital/electronic devices, stun guns, audio tapes (Electronics)
- Firearm identification & classification (& components), bullets & cartridge cases, firing distance determinations, serial number restorations, trajectory analysis, striations from tools (Firearms)
- Drugs, poisons, alcohol (Toxicology)

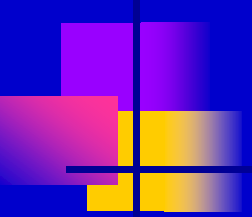


CFS Mission

We will support the justice system and enhance public safety by:

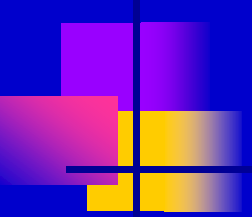
- performing relevant scientific tests
- providing education and training
- provide scientific expertise
- conducting research, and
- producing reports and testimony that are understandable, objective, accurate, and timely

within the scope of government policy and resource availability, and respecting the needs of staff and clients.



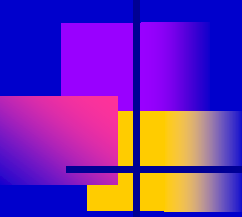
Fiction: Generalists

- On TV, the CSIs do everything: they go to crime scenes, collect the evidence, analyze it, question and confront suspects and witnesses, and testify in court.
- The CSIs are experts in every forensic discipline, including some that are neither forensic disciplines nor science (e.g., graphology).
- In one episode of *CSI*, Sara Sidle does a vaginal exam on a comatose sexual assault victim. Not only is she not a nurse or a doctor—and therefore can't legally perform such an examination—but she warms the speculum with her breath, thereby potentially contaminating it and any samples she took with her own DNA.



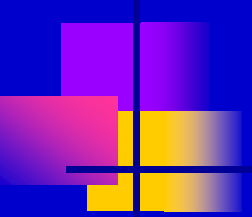
Fact: Specialists

- In reality, we rarely go to crime scenes. When we do we provide specialized advice to forensic identification officers who collect the evidence and submit selected items to the lab. We analyze the items, write reports and testify in court.
- We never question or confront suspects or witnesses. In fact, we generally don't deal with people, only with evidence.
- We specialize in one forensic discipline, often specializing even further in one or more sub-disciplines.



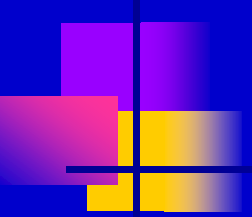
Fiction: Unlimited Budgets

- On TV, the forensic labs have all the instruments and equipment any forensic lab could ever want—including some that don't exist or are in development.
- The TV labs have the luxury of throwing all their resources at any given case; they do every type of analysis scientifically possible, whether required or not.



Fact: Limited or Inadequate Budgets

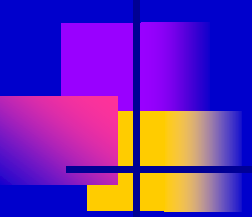
- CFS is among a fortunate few to be adequately funded and a brand new facility that will house both the CFS and the Office of the Chief Coroner is currently being designed.



Fact: Limited or Inadequate Budgets—cont.

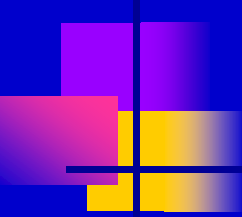
- A 2003 study indicated that more than a quarter of American crime labs did not have the computers they needed to track evidence. Over 9,000 more forensic scientists were needed. \$1.3 billion was needed for facilities modernization and construction. \$285 million was needed for equipment.

—Burke, Jan. “The State of American Crime Labs, 2006.” *Forensic Magazine*, Feb/Mar 2006, pp. 45-46



Fiction: No Backlogs

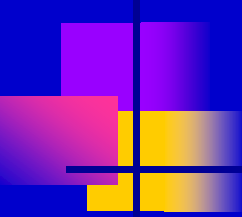
- On TV, there are no backlogs.
- Each and every case is processed when received.
- Each CSI works on one case at a time.



Fact: Backlogs

- At the end of 2002, over half a million cases were backlogged in American public crime labs, despite the fact that tests were being processed at or above 90% of the expected rate of completion. To achieve 30-day turnaround of the requests for that year, the study estimated that another 1,900 full time employees would have been needed.

—Burke, Jan. “The State of American Crime Labs, 2006.” *Forensic Magazine*, Feb/Mar 2006, pp. 45-46



Fact: Backlogs—cont.

- The fifty largest U.S. labs received over 1.2 million requests for forensic services in 2002. The backlogs at these labs doubled in the course of one year. There is almost universal agreement that the workload placed on public crime labs has increased dramatically over the intervening three years.

—Burke, Jan. "The State of American Crime Labs, 2006." *Forensic Magazine*, Feb/Mar 2006, pp. 45-46

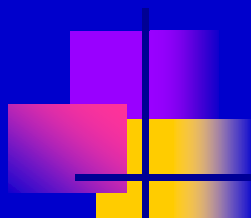
- From Jan 1/02 – Aug 1/02 CFS received 4, 043 cases involving 28,373 requests for analysis. In the same period in 2008 CFS received 6,713 cases involving 32,383 requests for analysis (166% of 2002 case levels). We anticipate the number of cases received to continue increasing.

Top L.A. County Law Officials Decry DNA Lab Backlog: Bratton, Baca and Cooley call on the governor and state lawmakers to address a lack of manpower and a funding shortfall.

...staffing shortages at the state lab, which have resulted in a backlog of more than 287,000 unprocessed DNA samples taken from criminals in an effort to tie them to unsolved crimes....

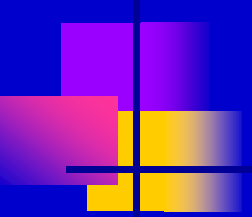
...the LAPD is unable to bring to trial 46 of every 100 murderers and 80 of every 100 rapists in the city because critical DNA evidence has not been tested.

–Henry Weinstein, Times Staff Writer, *Los Angeles Times*, September 18, 2006



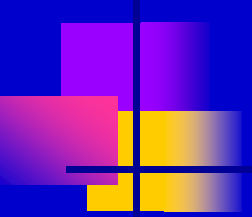
Fact: Backlogs—cont.

- Because of the sheer (and increasing) volume of work backlogs are a reality. CFS is no exception.
- Staff never have only one case open.
- In the real world, it can take several people months to do the work one TV CSI does in an hour.



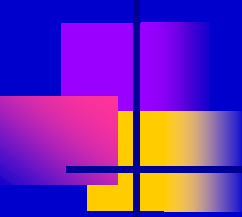
Fiction: There Is Always Forensic Evidence

- On TV, there is forensic evidence in every case
 - Every item tested always returns a conclusive result.
- Forensic science solves every case, every time.



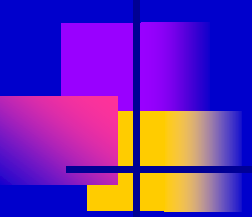
Fact: There Isn't Always Forensic Evidence

- Some items are not suitable for some analyses.
- The environmental conditions to which items have been exposed may affect our ability to obtain results.
- Some tests are destructive in nature and may preclude performing other tests.
- Some samples are too degraded to be useful.
- In some cases forensic evidence is unnecessary.



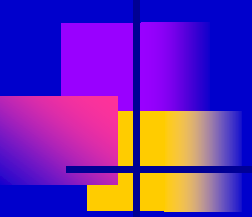
The Result of the Fiction: The “CSI Effect”?

- Today’s jurors demand unreasonable levels of physical evidence when it’s not reasonable or relevant? Maybe—anecdotal evidence only
- Victims expect evidence to be collected even when it’s not reasonable or relevant? Maybe—anecdotal evidence only
- Police watch the shows too and send more evidence to forensic labs than they used to? Yes
- A lot of students want to be forensic scientists because of what they see on TV? Yes



The “CSI Effect”?

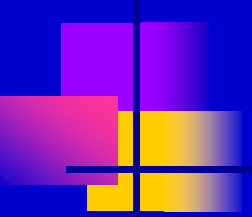
- Jurors in an LA murder case complained that a bloody coat had not been tested for DNA, even though such tests were unnecessary: the accused had already admitted to having been at the crime scene. The judge noted that TV had taught the jurors about DNA tests but not about when they should be used.
- A Knoxville, TN, police officer reported, “I had a victim of a car robbery, and he saw a red fiber in the back of his car. He said he wanted me to run tests to find out where it was from, what retail store the object was purchased at, and what credit card was used.”



Fiction: Forensic Culture

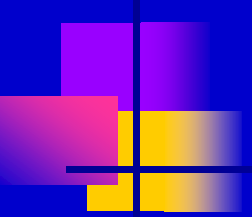
- Objective and impartial? **ABSOLUTELY NOT!**
 - On TV the role of the CSIs is to “get the bad guys”

“If you did this I will get you.”—Horatio Caine, *CSI: Miami*



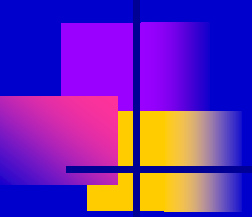
Fiction: Forensic Culture— cont.

- Well trained and competency tested prior to performing casework? **ABSOLUTELY NOT!**
 - From *CSI: Miami* “Under the Influence”
 - CSI Calleigh Duquesne's father seeks her help when he fears that he may have killed someone after a night of drinking and Lt. Horatio Caine assigns a new CSI, Ryan Wolfe, to the case--on his first day in the lab, having previously been a patrol officer.



Fiction: Forensic Culture— cont.

- Professional? **ABSOLUTELY NOT!**
 - From the *CSI* Pilot episode:
 - Experienced CSI Warrick Brown takes new CSI Holly Gibbs (first day on the job) to process a home robbery scene. When they reach the scene Warrick sees a patrol car on the street, assumes the officers are there to secure the scene, tells Holly he has an errand to run and leaves her alone at the unsecured scene. Warrick goes to a betting agent where he puts a judge's \$5000 bet on the wrong team. Holly is killed by the robber who returns to the scene.

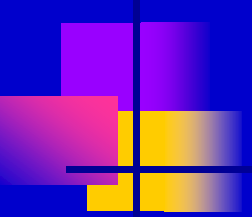


Fact: Forensic Culture

- Objective and impartial? ✓
 - CFS works very hard to instill a culture of objectivity and impartiality in our staff
 - It's one of the things we instill in staff during training and one of the things we watch for in testimony

"If the law has made you a witness, remain a man of science. You have no victim to avenge, no guilty or innocent person to convict or save. You must bear testimony within the limits of science."

–19th Century Medical-Legalist Dr. P.C.H. Brouardel



Fact: Forensic Culture— cont.

- Well trained and competency tested prior to performing casework? ✓
 - Comprehensive training and competency testing are an absolute requirement
 - It is totally unacceptable to have an untrained, untested scientist or technologist work on any case
 - Doing so would result in loss of accreditation and, more to the point, would not serve the best interests of justice

Fact: Forensic Culture— cont.

■ Professional



- NOUN: Professional status, methods, character, or standards. *–American Heritage® Dictionary*
- Forensic scientists are expected to meet international standards; use authorized procedures that are generally accepted in the discipline; and act with integrity at all times.

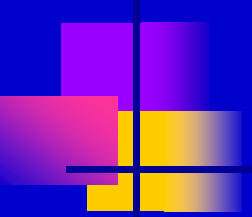
(Integrity [NOUN]: steadfast adherence to a strict moral or ethical code. *–American Heritage® Dictionary*)

- As with other professions, forensic scientists comply with a code of ethics.

Fiction: The Lab Vehicle

- Hummer H2s are the vehicle of choice.

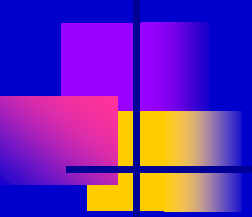




Fact: The Lab Vehicle

- Hummer H2s are not used as lab vehicles.





Fiction: The Ambience

- On TV they have dim, sexy blue lighting in the lab.
- They never turn on the lights or open a blind at a crime scene—they'd rather use a flashlight.

Fact: The Ambience

- We have bright, buzzing fluorescent lights in our lab instead of sexy blue lighting.
- It's a lot easier to see and photograph the evidence when the crime scene is well lit.



Fiction: Crime Scenes

- Crime scenes are glitzy and glamorous.
- Crime scenes are clean.
- You wear good clothes to crime scenes.



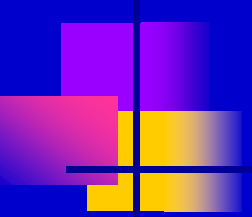
Photos courtesy CBS
Television



Fact: Crime Scenes

- More often than not, spending any significant time at a typical crime scene makes you want to burn your clothes and shower for 24 hours.
- You hope desperately you won't catch anything nasty.
- You make great effort not to contaminate the scene.
- Proper crime scene attire is Tyvek oversuits and latex gloves, not leather pants, high heels and long, flowing hair.

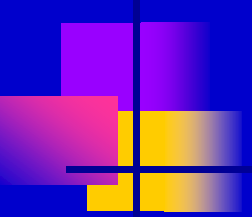




Fiction: The Science

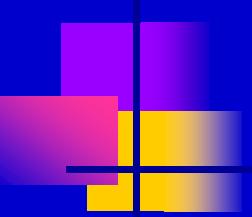
"The fundamental science is always accurate. There's nothing we make up," said Richard Catalani, senior technical adviser on CSI. "What we do stretch is the time factor."

—Article by Jim Walsh, azcentral.com, Aug 30, 2004. "Science is accurate, time not, 'CSI' producer says."



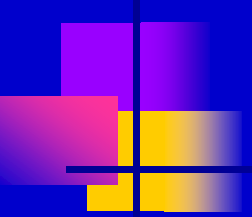
Fact: The Science

- It's been estimated that about 40% of the forensic science shown on the TV shows doesn't exist.
- Some things the TV shows got wrong:
 - DNA data and drug data do not come from the same instrument.
 - You can't pour caulk into a knife wound and make a cast of the weapon.
 - Machines that can identify cologne from scents on clothing are still in the experimental phase.
 - You can't tell from a microscopic cross section of a fibre who the manufacturer was, how many yards were produced, and the destination to which it was shipped.



Fact: The Science—cont.

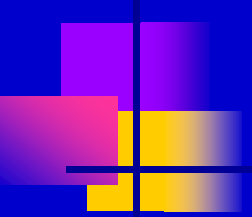
- Some things the TV shows got wrong—cont.
 - You can't perform a single instrumental analysis on a sample and immediately determine it's Maybelline lipstick, colour #42, batch A-439.
 - A criminal case based on "neuro-linguistic programming" — detecting lies by the way a person's eyes shift — is not likely to withstand a *Daubert* or *Mohan* challenge.
 - The vast majority of the databases consulted on the CSI shows do not exist.



Fact: The Science—cont.

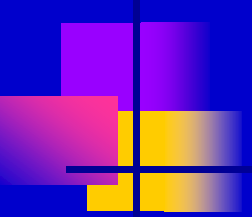
- Some things the TV shows got wrong—cont.
 - Blurry videos and photos can be greatly magnified and sharpened to clearly reveal the most minute details, and audio recordings can be similarly processed, to a totally unrealistic degree.

(Still photos from security cameras were used in the real life DC sniper cases in 2003. The photos showed what appeared to be a dark-coloured extended cab pickup truck. Neither the driver nor the licence plate number could be identified from the photos.)



Fact: The Science—cont.

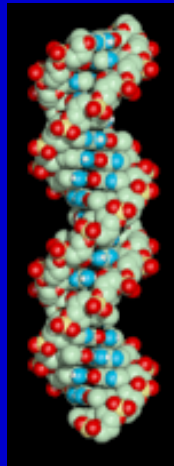
- Some things the TV shows got wrong—cont.
 - In the *CSI* episode “Fahrenheit 932” it was obvious a backdraft was supposed to have occurred but it was referred to throughout the episode as a flashover (The suspect opened a door and a fire ensued. The only burn damage was a V pattern against a wall, a breach through the ceiling, and a charred upper doorframe).
(A **flashover** is the near simultaneous ignition of all combustible material in an enclosed area. Flashover occurs when the majority of surfaces in a space are heated to the point at which they give off flammable gases that are hot enough to sustain combustion. A **backdraft** is a situation that can occur when a fire is starved of oxygen; consequently combustion ceases but the fuel gases and smoke remain at high temperature. If oxygen is re-introduced to the fire, e.g., by opening a door to a closed room, combustion can restart, often resulting in an explosive effect as the gases heat and expand.)

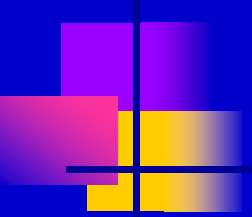


Fact: The Science—cont.

- Some things the TV shows got wrong—cont.

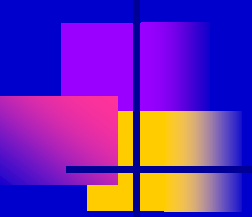
YOU CAN'T GET DNA
RESULTS IN AN HOUR!





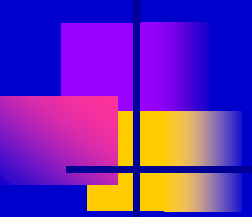
Fiction: Documentation and Evidence Tracking

- Not something that seems to happen a lot on TV.
- Nobody ever seems to make notes.



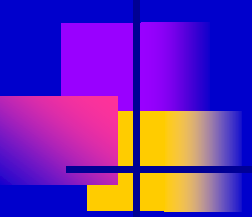
Fact: Documentation and Evidence Tracking

- Documentation is crucial to maintaining continuity.
- Accuracy is absolutely essential.
- Voluminous notes are generally the rule.
 - In some cases a single Biology case file fills a banker's box—or more.



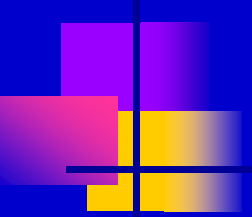
Fiction: Quality Assurance

- Never mentioned, seems to be non-existent.



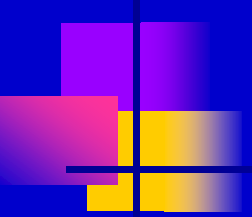
Fact: Quality Assurance

- Absolutely essential in a good forensic lab.



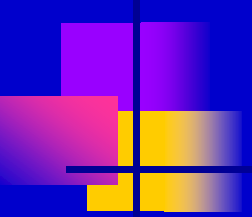
Fiction: Personnel Qualifications

- An ex-stripper
- A gambling addict
- An alcoholic
- A CSI who buys marijuana for his sister
- An ex-bomb disposal expert who is particularly fond of one liners
- A degree in science seems to be irrelevant



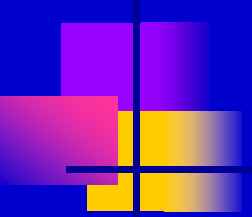
Fact: Personnel Qualifications

- Minimum government standard for a scientist is an Honours B.Sc. For a technologist, the minimum is a community college diploma.
 - Many of our scientific and technical staff have one or more post-graduate degrees.



Fiction: Devotion to Duty

- All the CSI staff are modern-day heroes who go above and beyond the call of duty, often putting themselves in physical jeopardy.
 - On *CSI* Sarah Sidle and Warrick Brown removed a bloodstained door from a closet full of pipe bombs BEFORE the bomb squad removed the bombs!
 - On *CSI: Miami* and *CSI: NY* Lt. Horatio Caine and Det. Mac Taylor have both defused bombs rather than waiting for the explosive ordnance technicians to diffuse the bombs.

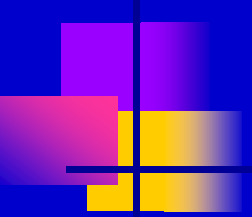


Fact: Devotion to Duty— cont.

- While there are some dangers inherent in being a forensic scientist (the routine dangers faced by anyone working in a medical or chemical laboratory), forensic scientists are not expected to put their lives in jeopardy unnecessarily

Fact: Devotion to Duty





Forensic Science: Fact v. Fiction (TV v. Reality)

- The bottom line:
 - Fictional forensic TV shows are just that—fiction!
 - They provide an unrealistic, glamourized portrait of forensic science and forensic scientists.
 - The science is often wrong.