

# The application of scientific methods and techniques in the administration of justice

- **Forensic Science:** Forensic techniques involve various scientific disciplines such as DNA analysis, fingerprinting, ballistics, toxicology, and more. These methods help in crime scene investigation, identifying perpetrators, and presenting evidence in court. For instance, DNA analysis can link suspects to crime scenes, while fingerprinting helps in identifying individuals present at the scene.
- **Digital Forensics:** With the proliferation of digital devices, digital forensics has become crucial. It involves recovering and analyzing digital data from computers, phones, and other electronic devices. This information can be used as evidence in cases involving cybercrimes, intellectual property theft, or data breaches.
- **Expert Testimony:** Experts in various scientific fields often provide testimony in court to explain complex scientific concepts or analyze evidence. For example, a medical expert might testify about injuries in a case, or a forensic accountant might explain financial transactions.

# Application.....

- **Crime Scene Investigation:** Systematic approaches are employed in collecting and preserving evidence from crime scenes. These methods, such as grid searches, use of forensic tools, and proper documentation, ensure the integrity of evidence for presentation in court.
- **Psychological and Behavioral Sciences:** Psychological profiling and behavioral analysis assist in understanding criminal behavior. These methods aid in creating profiles of potential suspects or understanding motives, contributing to investigations.
- **Ballistics and Firearms Analysis:** Techniques such as ballistic analysis help in linking firearms to specific crimes by examining bullets, shell casings, and firearms to determine if they match evidence found at crime scenes.
- **Data Analysis and Statistics:** Statistical analysis is used to assess the probability of events, particularly in cases where numerical data or patterns are involved, such as in accident reconstruction or determining the likelihood of certain occurrences.

# Application ..integration

- The integration of these scientific methods ensures a more comprehensive and accurate approach to determining facts and making decisions in legal proceedings.
- However, it's essential to note that while scientific methods enhance the administration of justice, their interpretation and presentation in court require expertise to ensure their proper application and understanding by judges and juries.

# Locard's Principle-civil cases

- In civil cases, Locard's Principle can have some relevance, particularly in cases where physical evidence is pivotal. Here's how it might be useful:
- 1. Property Disputes: In cases involving disputes over property damage or ownership, the principle can be applied to trace evidence left at the scene. For instance, in a case involving **a car accident** where one party claims innocence, trace evidence like paint transfers or material exchange could help establish liability.
- 2. Contractual Disputes: In disputes involving contracts or agreements, trace evidence might be present to validate or refute claims. For example, in a breach of contract case, physical evidence such as documents, **signatures, or electronic traces could support or contradict arguments.**
- 3. Personal Injury Claims: In cases of personal injury, Locard's Principle might apply to establish causation. **Trace evidence like fibers, DNA, or other physical materials can link an individual to an incident, supporting or refuting claims of injury or negligence.**

# Locard's Principle-civil cases

- 4. Environmental Disputes: In cases related to environmental damage or pollution, trace evidence can be crucial. **Soil, water, or air samples** can provide evidence of contaminants and their sources, aiding in determining responsibility.
- While Locard's Principle is foundational in forensic science, its application in civil cases may vary depending on the nature of the dispute and the availability of physical evidence.
- Courts may consider trace evidence as part of the overall picture when determining the rights and liabilities of the parties involved. However, its direct application might not always be straightforward or conclusive, and other factors often contribute to the final decision in civil cases.

# Merits:

- **High Accuracy:** DNA fingerprinting is highly accurate in identifying individuals. The chances of two individuals having the same DNA profile (except identical twins) are extremely low, making it a robust method for identification.
- **Forensic Applications:** It's an invaluable tool in forensic investigations, helping to **establish or exclude suspects from criminal investigations** based on DNA evidence found at crime scenes.
- **Paternity and Family Relationship Testing:** It's used to establish biological relationships, such as paternity testing, determining familial relationships in immigration cases, or identifying missing persons.
- **Medical Applications:** DNA fingerprinting aids in identifying **genetic diseases** and disorders, allowing for personalized medical treatments and identifying predispositions to certain conditions.
- **Preservation of Evidence:** DNA evidence can be stored for extended periods, allowing for re-analysis or use in future investigations.

# Issues and concerns

- **Privacy Concerns:** DNA carries highly sensitive information. Misuse or unauthorized access to genetic data could lead to privacy breaches and potential discrimination in insurance or employment.
- **Invasion of Privacy for Relatives:** Testing one individual's DNA can inadvertently reveal genetic information about family members who didn't consent to testing, raising ethical concerns.
- **Cost and Resources:** DNA testing can be expensive and requires specialized equipment and trained professionals, limiting its accessibility in some cases.
- **False Matches:** While the probability of a false match is low, it's not entirely impossible. **Contamination, mishandling of samples, or human error in analysis could lead to incorrect conclusions.**
- **Ethical Concerns:** There are ethical dilemmas surrounding the use of DNA information, including questions about consent, ownership of genetic data, and the potential for misuse or discrimination.

# issues.....

- **Third-Party Access:** There's a risk that DNA testing companies or other entities might share or sell genetic data to third parties for research, commercial, or other purposes without the explicit consent of the individuals involved.
- **Use in Legal Proceedings:** DNA evidence can be used in legal cases, and while it can serve justice, it also raises questions about the privacy of the individuals whose genetic information becomes part of the legal record.
- **Insurance and Employment Discrimination:** Genetic information might be used by insurance companies or employers to make decisions regarding coverage, premiums, or employment, leading to **potential discrimination based on health predispositions.**



# privacy concerns in DNA testing:

- **Disclosure of Sensitive Information:** DNA testing reveals highly personal and sensitive information about an individual, including genetic predispositions to diseases, ancestral origins, and familial relationships. Unauthorized disclosure of this information can have serious privacy implications.
- **Familial Privacy:** When one person undergoes DNA testing, it can inadvertently expose genetic information about relatives who did not consent to the test. This can raise ethical concerns about the right to privacy of family members.
- **Data Security Concerns:** DNA data needs to be stored and handled securely to prevent unauthorized access or hacking. Breaches in security could lead to the misuse of sensitive genetic information.

# Section 112 in The Indian Evidence Act, 1872

- 112. **Birth during marriage, conclusive proof of legitimacy.**—The fact that any person was born during the continuance of a valid marriage between his mother and any man, or within two hundred and eighty days after its dissolution, the mother remaining unmarried, shall be conclusive proof that he is the legitimate son of that man, **unless** it can be shown that the parties to the marriage **had no access to each other** at any time when he could have been begotten.

## Interplay between biological truth (DNA evidence) and legal presumptions

- One of the challenging cases involving presumption of DNA and legitimacy in evidence is the case of *Michael H. v. Gerald D.* in the United States Supreme Court.
- In this case, the presumption of legitimacy clashed with DNA evidence. The facts involved a child born to a married woman (Melissa) but conceived during an extramarital affair with another man (Michael H.). Melissa's husband (Gerald D.) was listed as the child's father on the birth certificate.
- Michael H. sought to establish paternity based on DNA evidence.
- The California law at that time established a presumption of legitimacy for children born to married couples, stating that a child born during a marriage is presumed to be the legitimate child of the husband.

# presumption of legitimacy

- Michael H. filed a lawsuit seeking to establish paternity, presenting DNA evidence that conclusively proved he was the biological father of the child. However, this conflicted with the presumption of legitimacy under California law.
- The Supreme Court was faced with reconciling the presumption of legitimacy with the biological evidence presented through DNA testing.
- The decision revolved around whether the biological truth (established through DNA evidence) should supersede the presumption of legitimacy.
- Ultimately, the Supreme Court ruled in favor of upholding the presumption of legitimacy. They argued that the interests of the child and the stability of the family outweighed the biological connection established by DNA evidence. The court maintained that California's presumption of legitimacy for children born into a marriage was constitutional, even when contrary DNA evidence existed.

# Goutam Kundu vs. State of West Bengal

- In India, the case of Goutam Kundu vs. State of West Bengal is significant in addressing issues related to paternity, DNA evidence, and the presumption of legitimacy.
- In this case, the Supreme Court of India dealt with a situation where a married woman had a child, but the husband denied paternity. **The woman claimed that the child was born out of wedlock.** The husband sought a paternity test to establish whether he was the biological father.
- The Supreme Court held that unless it can be shown that parties to the marriage had no access to each other at any time when the child could have been begotten, there cannot be any roving enquiry by holding a blood group or DNA test to ascertain the paternity.

## Nandlal Wasudeo Badwaik v. Lata Nandlal Badwaik-AIR 2014 SC 932

DNA test - Prevails over presumption of conclusive proof under S. 112.

- The Supreme Court in Nandlal Wasudeo Badwaik v. Lata Nandlal Badwaik, AIR 2014 SC 932, observed that Section 112 of the Evidence Act was enacted at a time when the modern scientific advancement and DNA test were not even in contemplation of the Legislature.
- The result of DNA test is said to be scientifically accurate.
- Although section 112 raises a presumption of conclusive proof on satisfaction of the conditions enumerated therein but the same is rebuttable.
- Where there is evidence to the contrary, the presumption is rebuttable and must yield to proof. Interest of justice is best served by ascertaining the truth and the court should be furnished with the best available science and **may not be left to bank upon presumptions, unless science has no answer to the facts in issue.**
- Section 112 of the Evidence Act does not create a legal fiction but provides for presumption. The presumption under the section not only arises where the question of legitimacy is raised for the purposes of inheritance by succession but also for maintenance application under Section 125, Cr.P.C, 197