

Engineering Systems Inc.

Engineering Consulting and Forensic Investigation

WACDL Annual Conference

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Chelan, WA

INTRODUCTIONS



Dale C. Mann, CFI, CFEI, D-ABC

Senior Managing Consultant

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Mr. Dale Mann is an ABC certified Forensic Chemist with over 35 years of experience performing a wide variety of forensic analyses in support of criminal and civil investigations. He spent over 18 years with the Washington State Patrol Crime Laboratory system prior to joining ESI.



Jennifer Nara, D.O.

Senior Consultant

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Dr. Nara has over 16 years of experience in forensic pathology, including more than a decade working as a medical examiner for local governments and four years working as the Chief Forensic Pathologist for law enforcement.



Michael M. Fitz, P.E., CFEI

Senior Managing Consultant

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Mr. Michael Fitz is a mechanical and civil engineer with 38 years of experience specializing in fires, explosions, large loss expert coordination, fire protection, civil, electrical, and mechanical failure analysis, with consultation in over 1000 projects.



Keith G. Cline, P.E.

Senior Managing Consultant

Manager of Washington Operations

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Mr. Keith Cline is a metallurgical engineer with experience in failure analysis, laboratory testing, consulting, and manufacturing. His failure analysis experience includes metallic, plastic, and composite materials.

ABOUT ESI

ESi is an engineering consulting and forensic investigation firm with an experienced network of technical consultants that cover almost every industry, discipline, and geography. ESi can provide rapid response to investigations virtually anywhere in the world.

Criminal Defense Expertise

ESi has assisted defense counsel in multiple states and federally with hundreds of criminal investigations and file reviews including:

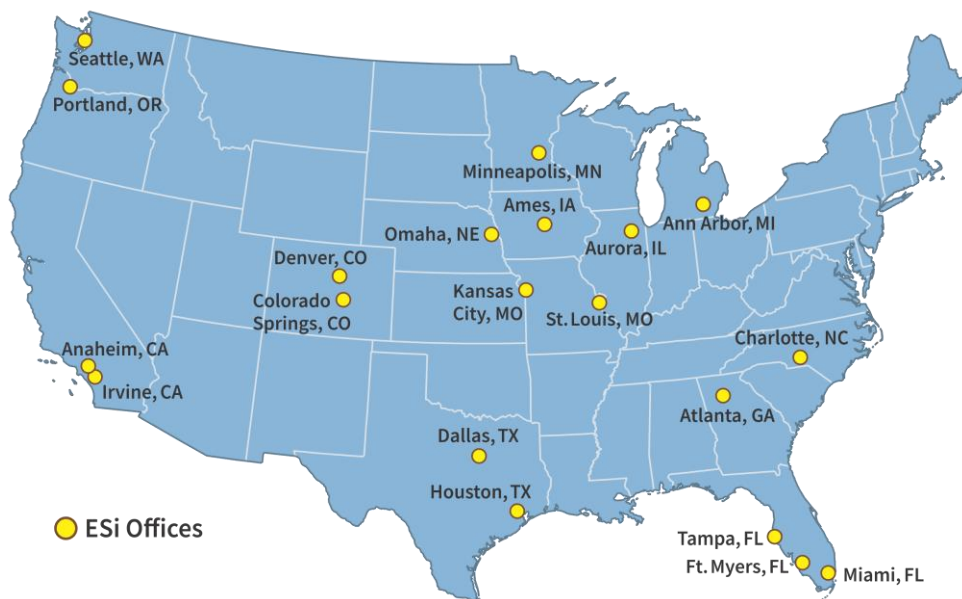
- Arson: origin and cause, laboratory analysis, responsibility
- Terrorism: explosives, manufactured IEDs, fireworks
- Drugs: possession, illicit manufacture
- Toxics: tear gas, poisons, chemical assault
- Scenario recreations: police Interactions, force evaluations, trace evidence analysis, firearms and gunpowder evaluations
- Property Crimes: burglary, breaking and entering, trespassing
- Vehicular Accidents: hit and run, driver identification, accident reconstruction, visibility evaluations
- Violent Crimes: homicides, assaults

Collaborative Teamwork

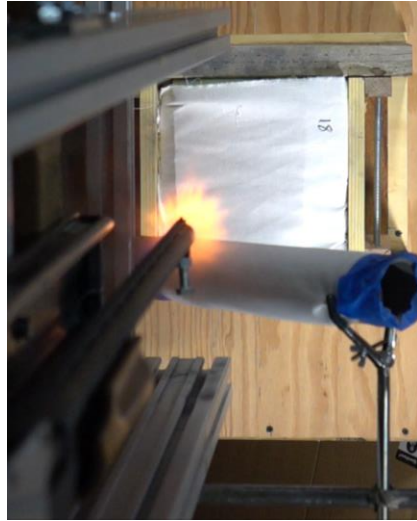
ESi applies a multidisciplinary approach that allows us to help with virtually any type of project, no matter how large or complex. We have engineers and scientists in almost every technical area with over 350 in-house technical personnel, including licensed Professional Engineers (P.E.s) with advanced degrees (both M.S. and Ph.D.). Our consultants pair technical expertise with in-depth knowledge of the criminal justice system and litigation experience. ESi is uniquely positioned, both professionally and physically, to provide our clients with superior results from the scene to the courtroom.

ESi Locations

ESi locations have expanded over the past 35+ years to include 20 offices in 14 states across the country.



FORENSIC LABORATORIES



ESi has provided laboratory testing, research and analysis in a variety of criminal investigations.

ESi has assisted in many criminal investigations, including:

- Fires and bombings
- Controlled substances and clandestine drug manufacturing
- Poisonings and chemical assaults
- Assaults and homicides
- Property crimes
- Vehicular incidents
- Firearms incidents
- Cause of death questions

State-of-the-Art Laboratories

ESi offers testing services including chemical composition, mechanical and metallurgical analysis, non-destructive testing using specialized test design, and performance evaluation.

ESi has trace evidence examination capabilities including optical microscopy, scanning electron microscopy, and a variety of analytical capabilities. Also available are optical, infrared, vapor, noise, vibration monitors and recorders, high speed photography, digital enhancements, testing chambers for fires, explosions, firearms, toxics, and more.

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Controlled Substances License

ESi is licensed by both the DEA and Washington State Department of Health to receive, handle, analyze, and store all classes of controlled substances. ESi has been performing drug analysis for over twenty-five years.

Firearms Analysis

- Residue analysis and pattern evaluation
- Muzzle velocity
- Trajectory analysis
- Chamber pressures
- Firearm and ammunition defects
- Gunpowder identification and comparison
- Contributor to NCFS gunpowder database

Case Review, Consultation and Expert Witness Qualified

ESi has reviewed hundreds of criminal investigations in which our experts have provided case review, consultation, and testimony. ESi can provide the criminal defense attorney with everything from a single drug sample reanalysis to complete file review and scenario testing including animation.

In a criminal investigation, ESI can assist the defense attorney with many aspects of their case.

Crime Lab Review

ESi often reviews analytical work from other local and federal forensic labs to determine accuracy, adherence to methodology, interpretation of results, and evaluation of the conclusions of the opposing experts.

Assisting with Aspects of a Case

ESi has the capability and experience to assess the prosecution's hypotheses and perform independent reconstructions by:

- Reviewing existing police files
- Reviewing scene and artifact examinations
- Performing independent laboratory examinations
- Enhancing existing digital evidence
- Assisting with interviewing individuals
- Designing and performing scenario testing
- Analyzing relevant human factors
- Producing trial-ready renderings and animations
- Assisting counsel in trial prep
- Assisting counsel with cross examination of prosecution witnesses
- Providing court recognized experts for trial testimony



Physicians, Forensic Pathologist, and Forensic Nurses

ESi has physicians, a forensic pathologist, and forensic nurses for analysis and investigation of medical matters. They can develop injury diagrams, review autopsy reports and cause of death determinations, and deliver medical-legal exhibits used as evidence in legal proceedings.

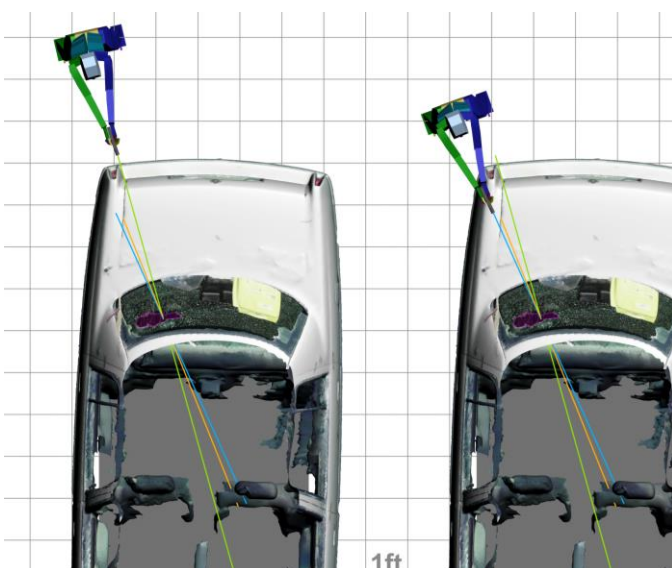
Our medical staff can prepare summaries that outline critical information such as pertinent medical history, current or pre-existing conditions or injuries, diagnoses, physical injuries, lifestyle factors, subjective evidence, medications, and missing medical documents.

ESi is proud to introduce Jennifer Nara, D.O., one of an elite group of board-certified forensic pathologists in the country.

Biomechanics and Human Factors

Our biomechanical experts routinely evaluate crime scene circumstances and recreate incidents pertaining to the mechanism and causation of injury in criminal cases.

ESi human factors consultants often collaborate to provide human performance analysis in a variety of criminal investigations.





ESi fire and explosion experts reconstruct and analyze incidents in detail to help uncover the circumstances of a criminal event.

Scene Inspections & Replication

ESi applies an abundance of resources from 3D scans, sample collection, and sample measurement with more detail and sophistication than a typical public agency. We can recreate site scenarios after a crime and deliver documentation and analytical results for the scene and the associated evidence. Our 3D scanning provides a detailed rendering of the scene.

Fire Investigation

ESi can identify the origin and cause of the fire responsible for the damage, deaths or injuries. ESi has a wealth of experience evaluating issues related to ignition, fire growth, flame spread and material fire performance and can perform 3D modeling of the fire development.

Bombings

ESi can evaluate the post-blast residues to identify the original bomb components, the veracity of the device and the potential damage effects. ESi has the ability to measure the important physical parameters such as pressure, forces and thermal output of the hypothesized device.

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ESi visualization products can be used in expert reports, exhibits for depositions, mediation tools, and courtroom presentations.

Data Collection & Scene Preservation

Accurate data is critical to investigations. Our clients benefit from precision data collection and the critical insights they reveal.

- 3D Laser Scanning
- Unmanned Aerial Systems (Drones)
- Light Detection and Ranging (LIDAR)

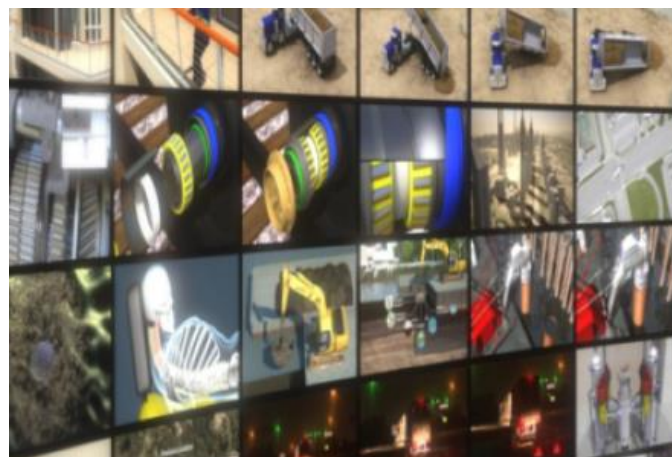
Data Visualization

Data can be combined to produce accurate, dynamic depictions of events. 3D digital images can help make the nuances of the science in a case accessible to everyone on the legal team and allow viewers to experience data-driven, scientifically constructed scenarios with the element of time included.

3D Animation and Virtual Reality

Expert 3D Animation – An important tool used in most cases today and a valuable asset in the litigation world.

Virtual Reality – Moving around in a factually accurate virtual environment and interacting with data collected from the scene.



SELECT CASE STUDIES

■ HOMOMICIDES

Anthony Todt Murder Trial

Anthony Todt was found guilty on four counts of first-degree murder in the deaths of his wife and three children. With the testimony of Dr. Jennifer Nara, he was sentenced to life in prison without the possibility of parole.

Learn more: <https://www.youtube.com/watch?v=xPLIHSjmNqA>

Nicole Montalvo Murder Trial

Christopher Otero-Rivera and his father Angel Rivera were found guilty of second-degree murder, abuse of a dead human body, and tampering with physical evidence in the death of Nicole Montalvo. Dr. Jennifer Nara, testified and the two men were sentenced to life in prison.

Learn more: <https://www.youtube.com/watch?v=dPUmMRoPI4E>

■ BOMBINGS

Pipe Bomb Mailings

ESi reviewed FBI case files and opined on the nature of 16 pipe bombs sent to a past US president, vice-president, senators and celebrities. The devices were determined to be hoaxes and not viable IEDs.

Learn more: <https://www.engsys.com/projects/pipe-bomb-mailings-net-20-year-conviction>

Bombs, Fireworks or Other?

ESi reviewed the police investigative files and clothing worn by the accused to determine the explosion was not from an IED or homemade fireworks gone awry. The damage, resulting fire and injuries were due to the rupture of small propane fuel cylinder. The case was dismissed after the ESi report was issued.

Molotov Cocktail Used in Seattle Riots

The investigation and reports produced by ATF were reviewed. The confiscated device was evaluated and recreated. The device as assembled was determined to not be a functional device. The case was dismissed.

■ POLICE SHOOTING

Self-defense or Police Brutality?

Using poor quality dash cam video, digital enhancement, 3D scanning of the incident site and subject vehicle, laboratory examination of evidence from the site and digital rendering, ESi accurately recreated the incident and determined the relative positioning of the active players at the beginning of the encounter. The issue was resolved after the ESi report was issued.

■ DRUGS

Veracity of the Use of “Thief Powder”

An intercepted drug package was coated with a UV sensitive powder to connect it to persons involved with the transaction. Research and testing demonstrated the powder’s reactive component was easily confused with everyday common materials one could expect to have on their hands. The case was dismissed.

■ ARSON/HOMICIDE

Review of an Investigative File with the Scene no Longer Available

The local police and fire investigative file was reviewed, revealing no qualified fire investigator was at the scene, the evidence chain was violated, interviews misrepresented, and final conclusions were unsupported. The case was dismissed.



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ESi Criminal Investigation & Litigation Support

Learn more



www.engsys.com/wacdl

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