# Jaton N. Wince, Ph.D.

The Woodlands, TX · (713) 888-7183 · jaton.wince@scienalysis.com

**Forensics Engineer | Continuum Mechanics Expert | National Security Technologist**

Forensic engineer and continuum mechanics expert with more than 25 years of experience in aerospace, defense, computational science, and forensic engineering. Architect of advanced digital engineering platforms, including GPU-accelerated digital twins and multiphysics material modeling systems applied in safety-critical, mission-critical, and litigation-sensitive environments.

Extensive background in mechanical and materials failure analysis, gas and explosion investigations, blast-structure interaction, biomechanics of traumatic injury, and standards-based forensic evaluation. Experienced in directing complex technical programs, leading multidisciplinary engineering teams, and performing first-principles analysis to support causation assessment, system reliability evaluation, and engineering decision-making.

Formerly supported national security programs requiring Top Secret / SCI eligibility, with a career spanning government laboratories, defense contractors, and commercial engineering practice. Provides objective, technically rigorous analysis for attorneys, insurers, and institutional clients where accuracy, reproducibility, and defensibility are required.

## EXPERT WITNESS TESTIMONY

**Trial Testimony (Expert):** None

**Sworn Testimony**

- Depositions and examination under oath provided in connection with accident-related matters. Testimony includes expert-retention matters and sworn proceedings in a personal context. Expert witness engagements are identified separately in the case list.

## FORENSIC ENGINEERING & LITIGATION CONSULTING EXPERIENCE

*(Non-testifying, consulting, and pre-retention engagements)*

- Forensic engineering investigations involving gas explosions, pressure-driven failures, structural damage, and mechanical system failures in residential, commercial, and industrial contexts.
- Engineering inspections, failure reconstruction, and causation analysis for litigation support, insurance disputes, and pre-trial technical evaluation.
- Development of inspection protocols, testing plans, and standards-based engineering analyses for counsel in advance of expert designation.
- Biomechanical and injury-mechanics analyses supporting litigation strategy, settlement evaluation, and insurance claim resolution.
- Confidential advisory roles for defense counsel and government contractors involving mechanical, structural, thermal, and materials failure assessment.

*These engagements involved engineering analysis and consulting services and did not include sworn testimony unless separately listed above.*

## ENGINEERING INVESTIGATIONS & TECHNICAL REPORTING (NON-TESTIFYING)

- Gas explosion investigations and blast-effects analysis, including ignition-sequence reconstruction and mechanical system evaluation.
- Structural and building-science evaluations addressing code compliance, remediation scope, and post-loss reconstruction requirements.
- Mechanical systems inspections and failure assessments for pressure vessels, rotating machinery, consumer products, and safety-critical equipment.
- Preparation of formal engineering reports, technical addenda, and standards-based analyses used in litigation, insurance, and regulatory contexts.

## TECHNICAL EXPERTISE

- Mechanical Failure Analysis (Gas, Blast, Structural)
- Biomechanics of Traumatic Injury (Brain, Bone, Composite Tissue)
- Blast-Structure Interaction & Overpressure Effects
- Equation-of-State and Constitutive Modeling
- Forensic Simulation & Digital Twin Reconstruction
- Thermo-Mechanical Response of Complex Systems
- Multiphasic Composite Mechanics (Ceramic, Polymeric, Biological, Geomaterial)
- Damage Mechanics, Viscoelasticity, Viscoplasticity, and Anisotropic Redistribution

### Biomechanics and AFRL-Based Research

- Dissertation research focused on multiphase composite systems including brain tissue and cortical bone, developing a physics-based ISV model for materials subjected to high strain rate, temperature, and pressure conditions.
- Developed the Wince-Horstemeyer Multiphysics Multiscale Material Model (WHM4), a transformational ISV framework coupling corrected deformation gradients, Lie derivative-based objective rates, and thermodynamically consistent history-dependent evolution equations.
- Integrated AFRL biomechanics experience under the Unitary Warhead and Lethality/Vulnerability Program, modeling lethality response of fixed, mobile, and soft targets.
- Supported advanced constitutive model validation in high-assurance national defense and biomedical applications.

## PROFESSIONAL EXPERIENCE

### SCIENALYSIS, INC – President

*The Woodlands, TX | April 2011 - Present*

Founded and lead a specialized engineering firm serving the legal and aerospace sectors, delivering high-precision failure investigations, computational material modeling, and digital twin technologies tailored for litigation-critical and aerospace performance environments.

- **Developed and deployed a proprietary GPU-accelerated micro-continuum mechanics digital twin**, enabling end-to-end, multiscale simulations for IRAD applications with unprecedented accuracy and time-to-solution efficiency.
- **Directed firm-wide strategy and business operations**, securing new contracts, increasing annual revenue by 20%, and expanding presence in high-stakes legal engagements by 30%.
- **Co-led forensic investigations in complex, high-liability engineering cases**, including biomechanics and explosive failure events—translating multi-physics simulation results into admissible technical conclusions for legal proceedings.

- **Led strategic capture and authored advanced technical volumes** for SBIR and commercial solicitations in aerospace and defense-adjacent sectors; despite equipment loss from a major incident, proposals reflected full technical authorship and program-ready architecture.
- **Advanced computational materials R&D**, achieving a 38% improvement in analysis fidelity while reducing project timelines by 30% through precision modeling and automated pipeline optimization.
- **Established academic and industry collaborations**, positioning SCIENALYSIS as a trusted expert resource for structural diagnostics, litigation support, and mission-critical aerospace analysis.
- **Advanced Aerospace & Space Systems Analysis**: Directed spacecraft systems assurance projects, including development of Product Assurance Plans and Radiation Hardness Assurance methodologies, ensuring mission-critical reliability under extreme radiation, thermal, and structural environments .
- **Finite Element Analysis (FEA) Training & Technical Lectures**: Independently authored and delivered FEA lecture series and tutorials on dynamic environments, structural mechanics, and test-assessment workflows, strengthening internal training and customer-facing technical education programs.

**Parsons – Lead Systems Engineer**
*Huntsville, AL | November 2020 - October 2022*
Served as lead systems architect and strategic engineering advisor for key national defense programs under the Missile Defense Agency (MDA), advancing operational capability and technical maturity across ground-based intercept and thermal battery platforms.

- **Delivered 30% acceleration in project timelines**, enabling a $20M cost savings by implementing a system-wide assessment framework for missile defense capabilities.
- **Led mission assurance initiatives** for Ground-Based Interceptor (GBI) and Advanced Thermal Battery systems, contributing to a 20% improvement in reliability and combat-readiness.
- **Directed strategic integration of C5ISR technologies** across defense communications and control architectures; provided executive briefings and technical recommendations to government stakeholders.
- **Advised Integrated Product Teams (IPTs)** and chaired the Specialty Engineering Working Group, setting technical standards and alignment across subsystems.
- **Authored cyber-resilient planning and integration strategy** for future MDA missions—ensuring secure system interconnectivity with evolving communication link infrastructure.
- **Reduced failure rates by 25%** across materials, propulsion, and structural systems through targeted diagnostics, which improved system uptime by 20% and generated $15M in downtime avoidance.

**a.i. Solutions Inc. – Consulting Systems Engineer/Principal Investigator**
*Huntsville, AL | October 2010 – October 2020*
Principal technical lead and strategic advisor supporting high-assurance defense systems with lifecycle engineering, mission assurance, and large-scale systems integration for the Missile Defense Agency and affiliated DoD programs.

- **Served as Principal Investigator** on multiple high-value government contracts, contributing to over $2B in awarded programs by leading technical volume development, mission-aligned solution design, and field validation strategies.

- **Directed end-to-end production assurance and sustainment** for a $17.7B missile defense system—delivering a 20% improvement in operational readiness and reducing system downtime by 30%, generating $10M in annual cost savings.
- **Led field test planning, airborne sensor mission coordination, and system reliability evaluation**, ensuring platform transition to production with optimized maintainability and mission availability.
- **Identified and mitigated manufacturing design risks**, reducing scrap rates by 10%, increasing throughput efficiency by 15%, and saving $5M annually in material and rework costs.
- **Chaired multi-site Failure Review Boards** and resolved system-level ballistic missile design issues—contributing to a 25% improvement in reliability and $5M in maintenance cost avoidance.

**Additional Experience**

**Jacobs Technology Inc. – Senior Engineer II**
*Huntsville, AL | February 2009 – October 2010*

- Delivered advanced predictive modeling for NASA propulsion and materials systems. Achieved 18% improvement in simulation accuracy (ANSYS & LS-DYNA) supporting aerospace innovation and material certification.

**General Electric (Aviation) – Lead Engineer/Technologist**
*Cincinnati, OH | March 2007 – February 2009*

- Directed mechanical design and simulation (UGX, CATIA, ANSYS, ABAQUS) of advanced aircraft engine components. Enhanced inertia welding process, reducing nonconformance by 90% through system-level redesign.

**US Air Force Research Laboratory – Mechanical Engineer** *&* **Systems Safety Engineer**
*Eglin AFB, FL | August 2002 – March 2007*

- Conducted advanced penetration mechanics and systems safety analysis for defense systems. Improved predictive models with ≥80% statistical accuracy; developed safety protocols resulting in zero mishaps across directorate-level programs.

**Mississippi State University Engineering Research Center – Associate Research Engineer**
*Starkville, MS | January 2001 – August 2002*

- Pioneered computational mechanics research using DYNA 3D to advance structural analysis and materials modeling for federal infrastructure and defense applications.

**EDUCATION**

**Ph.D., Engineering**
Liberty University, Lynchburg, VA | Conferred May 2025
Dissertation: *A Unified Multiphase Composite Material Model: An Advanced Computational Continuum-Micro Mechanics Framework*

**M.S. / B.S., Mechanical Engineering** – Mississippi State University

**Certifications & Security Clearance**

- Department of Defense Secret & Top Secret Security/SCI Clearance (Formerly Held)
- Department of Defense Secret Clearance (Active)

- Level III DAWIA Certification in Systems Planning, Research, Development, and Engineering
- Level II DAWIA Certification in Program Management
- Level II DAWIA Certification in Test and Evaluation
- Materials Science and Engineering Certification – Mississippi State University
- Nondestructive Testing Level II Certification
- ASME Geometric Dimensioning and Tolerancing Professional Certification

**Specialized Training**
- Damage and Fracture Investigation – Liberty University College of Engineering
- Coarse Grain Molecular Dynamics Development and Optimization – John Hopkins University
- Computational Material Science & Engineering – Penn State University
- Transmission Electron Microscope and Dynamic Mechanical Analyzer Training – Mississippi State University
- GE Aviation Edison School of Engineering: Jet Engine Mechanical Design Fundamentals
- Lean Six Sigma (Green Belt) - GE Aviation
- Lean Six Sigma (Green Belt) - National Aeronautical & Space Administration
- Project Management & Leadership - GE Aviation
- Operations & Risk Management – US Air Force Safety Center
- System Safety Management Course – US Air Force Safety Center
- Practical System Safety Course - Southern California Safety Institute
- Safety Course for Explosive Firing Site and Laboratory Personnel - Energetic Materials Research and Testing Center
- Applied Explosive Science – US Air Force Research Laboratory Munitions Directorate
- Computational Continuum Mechanics – US Air Force Research Laboratory Munitions Directorate

## STRATEGIC & TECHNICAL COMPETENCY AREAS

**Leadership & Program Management**
Executive Program & Project Management · Earned Value Management (EVMS) · Stakeholder Engagement · Government Advisory · Technical Proposal Development

**Technical & Domain Expertise**
Multiphysics & Multiscale Material Modeling · Digital Twin Systems · GPU-Accelerated Simulation · Space & Missile Defense Architecture · Failure Investigation · Forensic Engineering Analysis · Satellite & Aerospace Systems Integration

**Simulation & Engineering Tools**
PHYNEX · ANSYS · LS-DYNA · ABAQUS · UGX · CATIA · MATLAB · Python

**Governance & Compliance**
Model-Based Systems Engineering (MBSE) · Cybersecurity-Integrated Systems Design · Technical Readiness Strategy · DoD Top Secret/SCI Clearance · Legal-forensic negotiation · Insurance claim substantiation · Expert witness reporting

## AWARDS & DISTINCTIONS

- **ASME Meritorious Research Award** – Recognized for advancing the field of computational mechanics and material modeling in high-impact applications.

- **Missile Defense Agency Contractor of the Year (Honor Roll)** – Acknowledged for outstanding contributions to national defense systems engineering and mission assurance.
- **U.S. Air Force Research Lab Commander Challenge Cup Award** – Awarded for innovation and excellence in applied systems research and safety engineering.
- **U.S. Air Force Volunteer of the Year & Angel Star Medallion** – Honored for exemplary service and leadership in community-based engineering and outreach initiatives.
- **American Society of Mechanical Engineers (ASME) – Research Recognition** – Commended for breakthrough work integrating simulation and forensic analysis methodologies.

**PUBLICATIONS**

- Wince, J. N. (2025). *A Unified Multiphase Composite Material Model: An Advanced Computational Continuum-Micro Mechanics Framework* [Doctoral dissertation, Liberty University]. Liberty University Digital Commons. https://digitalcommons.liberty.edu/doctoral/7131/
- Wince, J. and Schneider, J., 2002. "Determining the Material Properties for Aluminum 6061-T6 for Implementation in the Johnson and Cook Constitutive Equation for Predicting Dynamic Material Behavior," *ASME Southeastern Region XI Technical Conference*, Vol. 1, No. 1, pp. 12.1–12.5.
- Wince, J., 2002. *Modeling Chip Formation in Orthogonal Metal Cutting Using Finite Element Analysis*, Master's Thesis, Mississippi State University.
- Wince, J., 2004. *Heat Transfer Analysis of High-Speed Penetrator Payload and Fuze*, AFRL Munitions Directorate.
- Wince, J., 2004. *Validation of Material Constants for the Johnson and Cook Constitutive Equation and the Mie-Gruneisen Equations of State*, AFRL Munitions Directorate.
- Wince, J., 2006. *Response of Structural Components of Fixed and Mobile Targets*, DoD HPCMP Modernization Plan.
- Wince, J. and Vaughan, D., 2006. "Development of High-Fidelity Physics-Based Fast Running Model for Progressive Collapse Assessment of Above Ground Fixed Structures," *AIAA Missile Sciences Conference*.
- Darden, J., Earhart, E., Strong, H., Wince, J., Becht, D., Chilcoat, T., 2010. "Experimental Characterization and Analytical Comparison of Rolling Element Bearing Radial Stiffness," *JANNAF Joint Subcommittee Meeting*.

**Pending Submissions**

- Wince, J. N., Cho, H., Atwater, M., Zegeye, E., Conyers, H., and Horstemeyer, M. F.
  **Title:** A Unified Multiphase Composite Material Model
  **Target Journal:** *Acta Mechanica*
  **Objective:** To formalize and validate a thermodynamically consistent constitutive model that captures the nonlinear behavior of multiphase composite systems spanning metals, polymers, ceramics, geomaterials, and biological tissues.
- Wince, J. N., Cho, H., Atwater, M., Zegeye, E., Conyers, H., Cariappa, K., and Horstemeyer, M. F.
  **Title:** A Pressure, Temperature, and Rate-Dependent Elastic Modulus Model
  **Target Journal:** *Acta Materialia*
  **Objective:** To develop and validate an equation-of-state-driven model for the elastic modulus as a function of pressure, temperature, and strain rate in polymers, biomaterials (brain, bones & ligaments), and geological media.

- Wince, J. N., Cho, H., Atwater, M., Zegeye, E., Conyers, H., and Horstemeyer, M. F.
  **Title:** An Elastic, Viscoelastic, Viscoplastic Damage Model for Complex Materials
  **Target Journal:** *Mechanics of Materials*
  **Objective:** To present a multiscale damage mechanics model combining elasticity, viscoelasticity, viscoplasticity, and void nucleation/coalescence for high-fidelity stress-strain predictions under complex thermomechanical histories.
- Wince, J. N., Cho, H., Atwater, M., Zegeye, E., Conyers, H., and Horstemeyer, M. F.
  **Title**: Advanced WHM4 Multiphysics Multiscale Modeling of Additively Manufactured **Materials**: Predicting Anisotropic Damage and Multistage Fatigue Behavior
  **Target Journal**: *Computational Mechanics*
  **Objective**: To advance the WHM4 model by capturing failure mechanisms in additively manufactured materials under multiaxial, cyclic loading.
- Wince, J. N., Hammi, Y., Tabiei, A., and Horstemeyer, M. F.
  **Title**: Real-Time Predictive Digital Twin Implementation for Industrial Applications via WHM4-Based Multiphysics-Multiscale Framework
  **Target Journal**: *Journal of Intelligent Manufacturing*
  **Objective**: To demonstrate real-time digital twin deployment using WHM4 for predictive performance modeling across industrial systems.
- Wince, J. N., Hammi, Y., Tabiei, A., and Horstemeyer, M. F.
  **Title**: Machine Learning-Enhanced WHM4 Framework for High-Fidelity Predictive Modeling of Material Response Under Extreme Environments (Ballistic, Space, Hypervelocity Impact)
  **Target Journal**: *Acta Mechanica*
  **Objective**: To fuse WHM4 with ML surrogates for rapid high-accuracy predictions of material behavior in high-energy environments.

**Patents and Intellectual Property**

- **Provisional Patent Filed – PHYNEX**
  *Title: PHYNEX: A Unified Physics-Informed Hybrid Neural Platform for Multiphysics Materials Characterization, Simulation, and ICME-Based Performance Prediction*
  *Serial No.:* 63/843,379 | *Filing Date:* July 14, 2025
  *Inventor:* Dr. Jaton Wince
  *USPTO Confirmation No.:* 7334
  *Status:* On file with USPTO under 35 USC 111(b)

**DISCLOSURE STATEMENT**

- This CV distinguishes between expert witness testimony and engineering consulting experience in accordance with Rule 26 and accepted expert-disclosure practice.
- Pipeline matters, Expert Institute intake reviews, “selected” but unretained engagements, and pro se analyses are not represented as expert witness testimony.