



PROFESSIONAL SUMMARY

- Well-balanced and well-organized engineering backgrounds in both academia and industry
- Teaching experience in engineering mechanics, mechanical design and analysis, materials and manufacturing, measurements, and other relevant courses for undergraduates and graduates
- Professional experience with emphasis on product design, optimization, analysis, and testing for structural integrity and failure prevention in mechanical and automotive engineering
- Ability to deliver the system level solutions to practical engineering problems using analytical simulations and experimental approaches
- Practical experience in hands-on engineering for operation and maintenance of mechanical and vehicular systems

PROFESSIONAL APPOINTMENTS

- **The University of Akron** (Akron, OH)
 - Professor of Engineering Practice, Associate Professor of Engineering Practice in Mechanical Engineering
- **Cleveland State University** (Cleveland, OH)
 - Visiting Assistant Professor in Mechanical Engineering
- **California State University, Northridge** (Northridge, CA)
 - Lecturer in Mechanical Engineering
- **Estoc Consulting Group** (Seoul, South Korea)
 - Co-founder and Technical Director in Engineering R&D Services
- **Shinhan University** (Gyeonggi, South Korea)
 - Associate Professor, Assistant Professor, and Lecturer in Mechanical and Automotive Engineering
- **Kia Motors Corporation** (Seoul, South Korea)
 - Assistant Manager and Research Engineer at Kia Technical Center

EDUCATION

- **Post-Doctorate** in Mechanical and Industrial Engineering: **University of Toronto** (Toronto, Canada)
 - Engineering Mechanics and Design: Micromechanics and failure analysis in smart structures
- **Doctorate** in Mechanical Engineering (PhD): **Yonsei University** (Seoul, South Korea)
 - Applied Mechanics and Failure Analysis: Imperfections in piezoelectric materials under electromechanical loads
- **Master of Science** in Mechanical Engineering (MSME): **Yonsei University** (Seoul, South Korea)
 - Fracture and Fatigue Mechanics: Structural integrity under dynamic and thermal fatigue loadings
- **Bachelor of Science** in Mechanical Engineering (BSME): **Yonsei University** (Seoul, South Korea)
 - Mechanical Design and Product Engineering

CERTIFICATION AND LICENSURE

- **PE (Professional Engineer):** Machine Design and Materials (NCEES PE Exam)
- **EIT (Engineer-In-Training):** General Engineering Disciplines (NCEES FE Exam)

TEACHING ACTIVITIES

• The University of Akron

- Tools for Mechanical Engineering (Computer Aided Engineering Tools: SolidWorks & MATLAB)
- Analysis of Mechanical Components (Mechanics of Materials: W. F. Riley, L. D. Sturges, D. H. Morris)
- Design of Mechanical Components (Shigley's Mechanical Engineering Design: Budynas and Nisbett)
- Concepts of Design (Engineering Design: G. E. Dieter and L. C. Schmidt)
- Vehicle Dynamics (Fundamentals of Vehicle Dynamics: Thomas D. Gillespie)

• Cleveland State University

- Statics (Engineering Mechanics, Statics: R. C. Hibbeler)
- Dynamics (Engineering Mechanics, Dynamics: R. C. Hibbeler)
- Differential Equations for Engineers (Differential Equations: Computing and Modeling: Edwards et al.)
- Eng. Materials and Manuf. Processes (Manufacturing Engineering and Technology: Kalpakjian and Schmid)
- Manufacturing Processes Lab (Seven topics in mechanical design and manufacturing)
- Machine Analysis (Shigley's Mechanical Engineering Design: Budynas and Nisbett)
- Engineering Measurements (Theory and Design for Mechanical Measurements: Figliola and Beasley)
- Measurements Lab (Thirteen topics in experimental measurements)

• California State University, Northridge

- Mechanical Engineering Design (Fundamentals of Modern Manufacturing: Mikell P. Groover)
- Mechanical Measurements and Lab (Theory and Design for Mechanical Measurements: Figliola and Beasley)

• Shinhan University

- Engineering Mechanics: Statics (Engineering Mechanics, Statics: J. L. Meriam and L. G. Kraige)
- Mechanics of Materials (Mechanics of Materials: R. C. Hibbeler)
- Vehicle Body Structure Engineering (The Automotive Body: L. Morello, et al.)
- Automotive Production Engineering (Automotive Production Engineering: K-NCS)
- Capstone Design (Senior Group Design Project)
- Mechanical Behavior of Materials (Solid Mechanics: William F. Hosford)
- Vehicle Inspection and Diagnosis (Automobile Manufacturer's Technical Manuals)
- Welding Technology and Practice (Fabrication and Welding Engineering: Roger Timings)

PROFESSIONAL ACTIVITIES

• The University of Akron

- Faculty Advisor: Zips Baja SAE Student Design Team, College of Engineering and Polymer Science
- Faculty Advisor: Senior Design Projects, Department of Mechanical Engineering

• Shinhan University

- Interim Chair: Department of Mechanical and Automotive Engineering, College of Engineering
- Faculty Advisor: Baja KSAE Student Design Team, College of Engineering
- Executive Director: Center for Vehicle and Transportation Convergence Technology, College of Engineering
- Executive Director: National Human Resources Development Consortium, College of Engineering
- Faculty Advisor: Hyundai Motor Group Apprentice Program for New Research Engineers

• Engineering Society and Industry

- ASME (The American Society of Mechanical Engineers): Professional member
- SAE (The Society of Automotive Engineers): Professional member
- KSME (The Korean Society of Mechanical Engineers): Professional member
- KSAE (The Korean Society of Automotive Engineers): Professional member
- Ember STIC (Houston, TX): Principal consultant in Engineering R&D Services
- Additive Manufacturing (Elsevier): Journal article reviewer

RESEARCH AREAS AND INTERESTS

• Engineering Design with emphasis on Structural Integrity, Materials, and Manufacturing Technologies

- Engineering design, analysis, and manufacturing based on structural integrity and failure prevention in static, dynamic, thermal, and fatigue loads / linear and nonlinear contacts / elasto-plastic behaviors

- Topology and robust optimization for lightweight designs based on the mechanism of contact, wear, fatigue, and fracture of engineering materials, elements, modules, and systems
- Virtual qualification test and actual accelerated qualification test focusing on reliability engineering based on the statistical approaches through measurements and signal processing analyses for monitoring the fundamental material properties and the functional performance of mechanical components, modules, and systems
- **Electric Vehicle Structures and Components**
 - Standardizations of body collision repair to prevent hazardous effects on the structural properties and reliability
 - Qualifications of vibration durability and reliability for electric vehicle battery packages and their structures

RESEARCH AND PROJECT EXPERIENCES

- **Materials and Manufacturing Technologies**
 - Self-assessment standardization for small-scale special vehicle manufacturers (Principal investigator)
 - Standardization for vehicle inspection and diagnosis (Principal investigator)
 - Residual stress and deformation analysis on aluminum die-casting products (Principal investigator)
 - Back pressure forging process for reaction hub in automatic transmission (Principal investigator)
 - Optimal design of dimpled seals for high temperature and large deformed material properties (Principal advisor)
 - Multi-phase-single-process (MPSP) press works for steel bushes (Principal investigator)
 - Micromechanics and failure studies on piezoelectric smart structures (Assistant investigator)
 - Experimental characterization of residual stresses (Assistant investigator)
 - Fracture analysis on piezoelectric ceramic structures (Assistant investigator)
 - Material properties of nuclear pressure vessel under high thermal impact (Assistant investigator)
- **Mechanical Components, Modules, and Systems**
 - Multi-degree-of-freedom blast response analysis on oil and gas facilities (Principal advisor)
 - Conceptual design development of home/office air shower systems (Principal advisor)
 - Structural validation of emergency maintenance system in road tunnels (Principal investigator)
 - Optimal design and validation of running board system (Principal investigator)
 - Dynamic simulation on tumble impact of smartphones (Principal investigator)
 - Evaluation on emotional quality of battery cover hook in smartphones (Principal investigator)
 - Strength evaluation of gas plant dryer (Principal investigator)
 - Optimal design and analysis on excavator arm (Principal investigator)
 - Strength and reliability analysis on mobile hinge springs (Principal investigator)
 - Optimization on beam structures of FPSO (floating production storage and offloading) air dryer (Principal advisor)
 - Optimal shape design of U-type seals under high pressure (Principal investigator)
 - Optimal design and experimental validation of butterfly valve with rubber coated disk (Principal investigator)
 - Product design of coupling housing in grooved piping system (Principal investigator)
 - Design optimization of pedicle screw for spine implants (Principal investigator)
- **Vehicle Body: BIW (Body-In-White) and Components**
 - Cooling structure of electric vehicle battery modules (Principal investigator)
 - Topological design optimization of auxiliary structure for vehicle body stiffness enhancement (Principal advisor)
 - Lift, gate, and seat systems of express and intercity buses for wheelchair users (Principal advisor)
 - Optimization on panel thickness of vehicle BIW and under-body structures (Principal investigator)
 - Structural optimization of BIW with TRB (tailor rolled blank) members (Principal investigator)
 - Optimization on combined unit-structure of floor and local components for SUV (Principal investigator)
 - DFSS (design for six sigma) for low-floor bus body structure (Principal investigator)
 - Structural evaluation on BIW of minivan (Principal investigator)
 - Structural evaluation on BIW of passenger car adopting laser welding (Principal investigator)
 - Durability evaluation on passenger car seat (Principal investigator)
 - Stiffness analysis of passenger car door module plates (Principal investigator)
- **Vehicle Chassis: Suspension, Brake, and Drivetrain**
 - Structural durability evaluation on suspension components of rally car (Principal investigator)
 - Durability evaluation on suspension and steering systems of special performance vehicles (Principal investigator)
 - Thermal and structural interactions in brake caliper hub (Principal investigator)
 - Design validation of powertrain module for large size four-wheel drive vehicle (Principal investigator)
 - Performance evaluation of trunnion pin type double cardan shaft in military tactical vehicle (Principal advisor)

- Optimal design and structure analysis on leaf spring system of commercial vehicle (Principal advisor)
- Thermal and vibration analysis on brake system of commercial vehicle (Principal investigator)
- NVH effects on instrument panel and steering system of commercial vehicles (Principal advisor)
- Design and performance evaluation on double disc brake system in KTX (Korea Train Express) (Principal advisor)
- Structural design and analysis on axle module of commercial vehicles (Principal investigator)
- Expert system of accelerated testing for automotive chassis (Assistant investigator)
- Algorithm programming for durability testing of automatic transmission (Assistant investigator)
- Continuously variable transmission (CVT) system (Assistant investigator)
- Full-time four-wheel drive (4WD) system (Assistant investigator)
- Active engine mount system (Assistant investigator)
- Active suspension system (Assistant investigator)
- Fatigue life of compression-type engine mount (Assistant investigator)

PUBLICATIONS

- **Research Papers**
 - 38 peer-reviewed journal articles and 12 conference proceeding articles
- **Technical Patents**
 - 12 registrations and 20 applications