Charles P. Keesee II
Adjunct Professor
Mechanical Engineering

Professional Profile

Experienced Electro-Mechanical/Thermal/Fluids Engineer, Engineering Analyst and Engineering Manager with core competencies in the following areas:

Reliability Engineering	Engineering Analysis	Engineering Management
Reliability Predictions and Parts Stress Derating	Machine Learning / Numerical Analysis / Simulations	Engineering Review Processes
Failure Modes Effects Analysis (FMEA)	Thermal / Fluid Analysis	Engineering Cost Analysis Basis of Estimate Development
Lifecycle Analysis	Computational Fluid Dynamics	Operational / Financial Risk Management
Failure Investigation / Failure Analysis	Statistical Analysis (Bayesian) / Probabilistic Modeling and Analysis	Engineering Curriculum Development and Instruction

Professional Experience

Raytheon Technologies: Raytheon Missiles and Defense   Dec. 2019 – Present
   Principal Systems (Electro-Mechanical) Engineer and Member, Technical Staff
- Lead Reliability Engineer
    - Responsible for execution of all reliability engineering activities and support for production, development, sustainment, obsolescence, and integration efforts
- Member, Technical Staff (Engineering Leadership Team)
    - Reliability Engineering Technical Staff point of contact for thermal and vibration effects engineering analysis and energetics reliability analysis
- Engineering data analyses using numerical methods, machine learning and probability analysis to estimate electronic and mechanical component reliability
- Provide analytical support to flight sciences group (fluid mechanics) to enhance in-flight sub-assembly and component reliability
- Electronics reliability analysis (parts stress derating, reliability prediction, FMECA)
- Utilize thermal analysis to evaluate electronics and mechanical reliability
- Utilize conventional and innovative methods to develop reliability predictions, parts stress derating and Failure Modes Effects and Criticality Analysis (FMECA)
- Failure investigations / Failure Analysis (mechanical and electrical components)
- Provide reliability engineering expertise and related engineering cost guidance for new business proposals

Prairie View A&M University, Prairie View, TX   Feb. 2023 – Present
   Adjunct Professor – Mechanical Engineering
- Teaching undergraduate courses:
- MCEG 3306 Fluid Mechanics
- MCEG 3301 Heat Transfer
    - Designed and maintained curriculum
    - Instructed undergraduates in basic principles of fluid mechanics, including fluid statics, internal and external flow analysis and computational fluid dynamics
    - Assessed student performance through testing and small group projects
    - Provided student counseling in academic performance and engineering course selection

Garmisch Labs, Houston, TX   Jun. 2018 – Dec. 2019
   Managing Engineer (Owner)
- Led failure / parts stress analysis of downhole drilling power system components leading to $50K cost savings
- Developed Weibull reliability analytics, reliability growth analysis and drilling parameter optimization modeling
- Fluid mechanics and computational Fluid Dynamics research, modeling and simulation to identify drilling mud failure impacts
- Engineering data / statistical analysis
- Collaborated with Geologists to utilize drilling geology data (stratigraphy) to optimize power system parameters

Xcel Energy, St. Paul, MN – Denver, CO   Jun. 2016 – May 2018
   Senior Principal Reliability Engineer
- Led cross-functional team (Engineering, Regulatory, Quality Assurance):
    o Performed risk optimization of natural gas pipeline construction, repair and replacement
    o Resulting in $250K cost reduction
- Led internal and external team (Engineering, Management Consultants, IT, Finance, Regulatory):
    o Natural gas pipeline risk / reliability model replacement project ($2MM total cost)
    o Responsible for developing risk model specifications, testing protocols and implementation
- Performed thermal failure analysis including Root Cause Analysis and FMEA of gas pipeline failures
- Applied fluid mechanics principles and gas dynamics analysis to model natural gas behaviors and predict pipeline escapes and failures
- Performed engineering statistical analysis using Excel, Python and MATLAB
- Revised engineering data analysis and risk reporting
- Responsible for integrity management compliance (ASME/API/IEEE/ASTM/ISO standards)
- Led pipeline construction and maintenance reliability optimization and HALT / stress testing methodologies
- Key contributor: Engineering design, construction, maintenance, and repair standards compliance

Garmisch Labs, Denver, CO   Jan. 2015 – June 2016
   Managing Engineer (Owner)
- Provided industrial engineering, operational risk analysis and decision guidance modeling
- Optimized conveyor inspections and maintenance scheduling
- Provided data analysis and industrial engineering supervision at a United Parcel Service (UPS) delivery center
- Applied advanced data analysis and machine learning techniques (including linear, multiple and non-linear regression modeling) to delivery route optimization problems

COBANK, Greenwood Village, Colorado   Feb. 2013 – Jan. 2015
Director, Quantitative Risk Modeling and Analysis (Financial Engineering)
- Project Lead: Successfully developed and delivered a credit risk model including risk algorithms and IT / system architecture
- Led predictive analysis and simulations to quantify market, credit, and certain economic risks
- Developed a risk analytics approach using Monte Carlo Analysis and Markov Theory that reduced portfolio risk by 10%
- Developed and implemented a software reliability framework for credit risk software
- Developed Python based model risk analytics for algorithm optimization and stress testing parameters
- Data trend analysis and operational metrics

CITY AND COUNTY OF DENVER, Denver, Colorado   Apr. 2006 – Jan. 2013
Deputy Chief Financial Officer / Deputy Chief Operations Officer
- Ensured the execution of day-to-day operational and engineering objectives
- Managed the City's CAPEX analysis, budget development and resource capacity planning
- Led the City's investment analysis function and day to day trading risk for $3 billion investment portfolio
- Led the City's debt management and financing activities for a $5 billion municipal debt portfolio
- Led Failure Review Board (FRB) for high profile voting machine and voting process failures
- Prepared Root Cause Analysis for equipment deployment failure events
- Developed data trend analysis and predictive analysis for electrical and natural gas energy consumption
- Led a team that improved technology assessment, procurement / supply chain decision analysis by 15%
- Technology Maturity Assessment / Analysis and system lifecycle assessments / system replacement analysis

ALEXANDRIA COMMERICAL ADVISORS, Denver, Colorado   Jan. 2005- Apr. 2006
Managing Consultant
- Developed telecommunications network performance analytics
- Performed telecommunication network optimization

CENTURY LINK / LEVEL 3 (ICG) COMMUNICATIONS, Broomfield, Colorado   Jan. 1998 - Oct. 2004
Senior Vice President and General Manager - Carrier / Network Operations
- Led 100 member department with $150MM annual revenue
- Led network systems interoperability negotiations and systems engineering with national network partners
- Managed / optimized network reliability and risk mitigation framework
- Led telecommunications network Failure Reporting and Corrective Action System (FRACAS)
- Led directional drilling cost optimization / cost engineering strategy
- Responsible for network facilities engineering optimization (reliability and systems engineering)
- Responsible for engineering and audit standards compliance (FCC, IEEE, ISO, ANSI Compliance)
- Developed network failure root cause analysis / operational risk and reliability model
- Led regulatory reporting and government affairs activities
- Managed network risk/reliability analytics and reporting, including reliability demonstration and growth testing

Education

PhD, Mechanical Engineering – University of Alabama at Birmingham, Birmingham, AL (Exp. 12/2024)
(Fluid Mechanics / Thermal Analysis / Computational Fluid Dynamics / Engineering Analysis / Numerical Modeling)
Research Area: Optical Signal Distortion Analysis in Hypersonic Flight Environments
Advisor: Roy Koomullil, PhD

Bachelor of Science, Electrical Engineering – Prairie View A&M University, Prairie View, TX

Selected Presentations / Conferences / Trainings

Attendee – <u>Thermal and Fluids Analysis Workshop</u>
National Aeronautics and Space Administration - Glenn Research Center (2022)

Presenter - <u>"Thermal Analysis in Aerospace Electronics Reliability";</u>
Raytheon Technologies: Reliability, Availability and Maintenance Symposium (2021)

Attendee – <u>Raytheon Thermal Analysis Boot Camp (2021)</u>
Raytheon Technologies, Tucson AZ
- 13 rigorous courses taught by University of Arizona and Raytheon Technologies faculty. Topics including thermal loads and environments, MATLAB for thermal analysis and numerical analysis and modeling of heat transfer and thermodynamics equations

Selected Teaching and Tutoring Experience

- Adjunct Professor – Prairie View A&M University, (Prairie View, Texas (2023)
  - Provided instruction in fundamentals of fluid mechanics, Heat Transfer and Thermal Science Laboratory

- Mathematics Instructor – <u>Xcel Energy, Denver Colorado (2016)</u>
  - Provided instruction in calculus and differential equations to Xcel Energy employees who were candidates for the Professional Engineering licensure examination

- Mathematics Teaching Assistant / Tutor (Volunteer) – <u>Metropolitan State College of Denver (2014)</u>
  - Provided supplemental lectures and individual tutoring in statistics and calculus

- Mathematics / Mechanics Instructor – <u>City and County of Denver, Department of Public safety (2012)</u>
  - Taught engineering mathematics, mechanics, and basic thermochemistry to candidates in preparation for the fire department entry examination

- Guest Lecturer - <u>University of Colorado at Denver, Department of Mathematics (2010)</u>
  - Provided lectures in mathematical techniques used in optimization analysis and financial engineering (advanced mathematics for finance)

- Lecturer – <u>Colorado Technical University: Denver, Colorado (2010)</u>
  - Provided lectures in applied mathematics for finance, including calculus and differential equations
- Mathematics Teaching Assistant / Tutor (Volunteer) – Metropolitan State College of Denver (2010)
  - Provided supplemental lectures and individual tutoring in statistics and calculus

Appointments / Associations

Member - American Society for Mechanical Engineers
<u>Executive Committee, Safety Engineering and Risk / Reliability Division (Appointed 9/2020)</u>
<u>Vice Chairman, Technical Committee on Risk/Reliability Technology (Appointed 9/2020)</u>

Member - Institute for Electrical and Electronics Engineers (IEEE)
Member - American Institute of Chemical Engineers (AIChE)
Member - American Physical Society (APS)
Member - American Mathematical Society (AMS)

Selected Skills and Languages

Microsoft Office (MS-Word, MS-Excel, MS-PowerPoint)
Ansys Modeling and Simulation
MATLAB
Python
C++
ReliaSoft – Reliability analysis software