MATTHEW HARPER

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SUMMARY

Results-driven electrical engineering professional with a proven track record of leveraging advanced analytics and automation to optimize operations, enhance safety, and drive significant cost savings. Experience in programming, machine learning, and process & project management, combined with a passion for developing innovative solutions that deliver measurable results. Strong background in leading cross-functional teams and managing complex projects. Poven ability to translate complex data into actionable insights and implement data-driven solutions that deliver significant cost savings and performance improvements. Additional experience in research, development, and exploration of new artificial intelligence techniques and applications with the objective to bridge the gap between theoretical AI concepts and practical, real-world solutions.

EXPERIENCE

University of Houston - Victoria, ***Artificial Intelligence Researcher,*** *Aug 2024 – Feb 2025.*
Research, development, and exploration into new artificial intelligence techniques and applications with the objective to bridge the gap between theoretical AI concepts and practical, real-world solutions. Collaborated with other Researchers, Professors, Scientists, and Engineers to advance the field of artificial intelligence and machine learning.

Model development and training accomplished by selecting appropriate machine learning and deep neural networks. Models were successfully trained large datasets using optimization techniques and fine-tuned to improve accuracy and repeatability. In depth understanding of machine learning algorithms and deep learning frameworks such as TensorFlow, PyTorch, and Keras. Model development of forward and back propagation such that model overfitting and loss of gradient was minimized or eliminated.

Domain experience and knowledge in waste management (Department of Energy), in healthcare diagnosis and rule generation, finance and association rule mining with Apriori algorithms, and industrial reliability and safety modeling and predictions with deep neural networks.

Major accomplishments:

Data Preparation:
Data Cleaning and Preprocessing: Cleanse datasets of inconsistencies, missing values, and outliers, and transform data into suitable formats for analysis.
Feature Engineering: Create and select relevant features that enhance model performance.
Data Augmentation: Generate synthetic data to improve model generalization and robustness.
Data Visualization: Explore data patterns and trends through visualizations to gain insights and identify potential issues.

Model Development:
Algorithm Selection: Choose appropriate machine learning algorithms based on problem characteristics and data properties.
Model Architecture Design: Design and implement neural network architectures tailored to specific tasks.
Model Training and Optimization: Train models efficiently using optimization techniques and hyperparameter tuning. Model Evaluation: Evaluate model performance using relevant metrics and identify areas for improvement.

Experimentation:
Design and conduct experiments to test hypotheses and compare different approaches. Analyze experimental results and draw meaningful conclusions.

Evaluation:
Assess model performance using relevant metrics (statistics, evaluation metrics, accuracy, confusion matrix). Identified areas for model improvement and tuning of hyperparameters such as cross entropy, early stopping, regularization, number of neural network layers, hidden layers, epochs, learning rate adjustment for local minima and maxima, and dropout.

Documentation:
Document research findings, methodologies, and code.
Contribute to technical reports and papers.

Surge Energy, ***Technical Engineering Lead (Automation |Data| Electrical| Instrument),*** *Aug 2021 - Mar 2024.*

Team lead in instruments, electrical, and autonomous strategies for development and use in well artificial lift, smart automated systems, autonomous production facility operation, and water disposal facility applications integrated with Smart systems featuring embedded field level intelligent agents and distributed learning algorithms. Project management of MM projects from development to completion phases including software CI/CD. Programming and data visualization in Python, Allen-Bradley RSLogix, Field View, Tableau, and Spotfire.

Machine learning and data visualization techniques developed and implemented for alarm data mining, research, and analysis performed for process alarms (Spotfire, Python, Tableau) utilizing machine learning methods including regression, classification, clustering, and rule mining, which led to the development of real-time production dashboards for situational awareness and business intelligence for operations to perform real-time data driven decisions.

Provided hands-on functional/technical expertise for troubleshooting and commissioning to the field organization in support of new projects and on-going facility operations. Led process safety and optimization projects including risk assessments, process hazard analysis, and issuance of recommended resolutions and key mitigations for enhanced operability. Lead developer of autonomous systems such as Smart Lift, Smart Tank, Smart Level, and Tankless Battery designs.

Project management and engineering documentation generated for all projects including electrical power, control system drawing packages control point-to-point and I/O diagrams, electrical, instrument, and control cable schedules, instrument loop diagrams, junction box wiring diagrams, control panel layout, wiring diagrams, electrical one-lines, and arc flash studies with labeling. Developed design basis which included engineering specifications and operational requirements, CI/CD development life cycles with phases of implementation and milestones. Scalable software development and debugging, hardware installation, and commissioning & testing.

Major accomplishments:

- Led the development and implementation of data-driven solutions to optimize process alarms, improve facility performance, and enhance operational decision-making.
- Successfully designed and deployed automated systems, including Smart Tank, Smart Level, and Tankless Battery, resulting in increased efficiency and production optimization with reduced operating cost with higher availability.
- Conducted comprehensive risk assessments and implemented safety measures to minimize operational risks and decrease probability of failure on demand of process shutdown systems and unplanned shutdown events and maintenance. This increased MTBF and optimized facility and unit production and safety.
- Provided technical leadership for electrical engineering and instrumentation projects, including design, implementation, and maintenance of electrical infrastructure. Developed instrument and electrical design basis for use in new and existing projects and facilities. This provided engineering and project teams with documented specifications for design, construction, installation, and operation which led to increased efficiency and reduced alarm and shutdowns during unit operation.
- Developed and implemented condition-based maintenance strategies to improve equipment reliability and reduce maintenance costs. This included the increased real-time monitoring of process conditions and instrument devices through the use of machine learning algorithms and models to detect trends and anomalies leading to advanced detection techniques and operational alerts.
- Achieved significant cost savings through process optimization, automation, and risk mitigation initiatives.
- Awards – Technical Innovation Award for development of Autonomous Smart Artificial Lift, Smart Level & Tanking Systems initiatives and projects.

Firefly Aerospace, ***Lead I&C Engineering Consultant,*** *Feb 2021 - Jul 2021.*

Thought leader in the design and development of space vehicle launch and testing ground support systems, with instrumentation, controls, communications, human-machine interface, cRIO, cDAQ and PLC systems programming for equipment involving mechanical, electrical, electronic controls, and fluid handling systems. Provided project and mission assurance and direction to ensure engineering designs met or exceeded Air Force Space Command 91-710 range safety requirements for launch vehicle, payload, and ground support software and hardware systems.

Data Analytics

Developed and implemented a predictive analytics platform that provided real-time insights for management, enabling more efficient and informed decision-making. The platform utilized machine learning algorithms to accurately predict launch performance, identify potential bottlenecks, and optimize resource allocation. Key performance indicators were identified to measure system reliability and identify areas for improvement. Predictive analytics dashboard programmed as an autonomous launch monitoring system for project, test, and master launch procedure user interface that provided real-time situational awareness for management with functional graphical user interfaces (GUI), integrated machine learning process and launch prediction algorithms, including reliability enhancing key performance indicators that calculated and displayed desired and projected launch, testing, and project schedule. Supervised and unsupervised autonomous algorithms enhanced computational systems utilizing data analytic trending alerts for bottlenecks, areas requiring additional resources, situational awareness, and training and machine learning purposes.

Launch Area Warning System (AWS)

Developed the Area Warning System (AWS) which served as the sites safety alert notification system providing Space Launch Complex 2 (SLC-2) at Vandenberg AFB, CA with a site wide hazardous communication alert system complete with robust audible and visual signals. The system architecture included a console accessible interface that integrated a public address and strobe light warning beacon system into one standalone infrastructure. Moreover, the AWS Standard Design provides written documentation on how the SLC-2 complex met or exceeded requirements listed in AFSPCMAN 91-710 Range Safety. In addition, developed acceptance testing documentation and procedures in which the AWS is periodically proof tested to identify potential safe and dangerous failures prior to and after launch. In addition, testing was required after any development change made to the system regardless of how small or insignificant of a change. Functional testing demonstrated that the system operates as intended and testing results shall be recorded as proof of operation.

Networking
Developed and generated design for mission network communications systems with triple redundant precision time protocol (PTP) satellite timing network utilizing GPNS/GPS pulse per second (PPS) Master Clock Timing Synchronization System (MCTSS) for all timing operations and interface with western range operations at Vandenberg Air Force Base. Highlights of the MCTSS system design included a system design which meets or exceeds the general design policy 3.2.1 of AFSPCMAN91-710 for system failure with catastrophic hazards. Featured a triple redundant design has a calculated mean time to fail MTTF < 858 years.

System Receiver Autonomous Integrity Monitoring (RAIM) that sends an email when error is detected. Synchronized leap second global time correction across the system for enhanced precision. Signal attenuated time delay compensation specific for each clock installation (~1.24 nS per linear foot of cable). Precision Time Protocol with time accuracy better than 100nS utilizing both NTP/PTP protocols. Proof test procedure developed and performed in conjunction with Master Launch Procedure (MLP) 1452.

Project Management
Engineering documentation generated for all projects including control system drawing packages Control and I/O diagrams, instrument and control cable schedules, instrument loop diagrams, junction box wiring diagrams, control panel layout and wiring diagrams. Developed design basis which included specifications and operational requirements, development life cycles with phases of implementation and milestones Software development/debugging, Hardware installation, Commissioning & Testing, and final Activation with management authorization. Evaluated test systems to meet or exceed Launch Range standards for all required instruments, data transport and electrical equipment to be purchased for projects. Interfaced with launch personnel in performing check outs and commissioning of installed instrument and electrical systems, including the calibration and/or configuration of instrument devices.

Reliability
Developed proof testing procedures for systems including Area Warning System, Network Communication Systems, and Public Address systems. Worked with operations team to ensure compliance with all regulatory and safety requirements, proper and timely build of equipment, and cost reduction in design. Assigned and review of all controls and communications aspects of installation, including pre-installation site surveys, instrument and controls installation preparedness, personnel training, engineering support to launch technicians, and equipment commissioning. Performed launch site checkouts for test and launch operations and support launch day as directed by traveling to test and launch sites as required to support the overall program.

Major accomplishments:
- Led the design and development of critical safety systems for space vehicle launch and testing, including the Area Warning System and network communication systems.
- Provided technical leadership for projects involving instrumentation, controls, and automation systems, ensuring compliance with safety standards and operational requirements.
- Successfully developed and implemented data network systems, including a triple redundant PTP satellite timing network.
- Utilized advanced programming techniques to develop automated launch procedures and enhance system reliability.
- Played a key role in ensuring engineering designs met stringent safety requirements for launch vehicle, payload, and ground support systems.

Oxy, ***Sr. Automation Engineer****, October 2018 - June 2020.*

Lead engineer for facility design and engineering specifications of alarm management, reliability and safety systems, instrumentation specification and design, and control system architecture and software programming. Project management for MM facility projects and deliverables including front end design, initial project costs, cost tracking and project scheduling. Engineering control narrative, P&IDs, cause & effects, instrument index lists and data sheets, safety and reliability mission requirements and life cycle specifications, operational performance metrics and requirements. Performed calculations for reliability probability of failure on demand targeted extended maintenance intervals and increased safety, reliability and operability. Developed advanced process control algorithms with artificial intelligence logic based on failure mode effect analysis (FMEA) combined with multi-variable monitoring matrix for determined control actions with machine learning. Lead electrical designs based on reduction of arc flash analysis and improved reliability. Developed arc flash calculation models for proof of concept and standard design specifications complimentary to ETAP modeling. Developed strategic risk analysis for process scenarios in which a more defined level of ALARP was warranted. Implemented advanced methods to detect and monitor KPIs including safe and dangerous failures which increased diagnostic coverage factors and improved reliability. Developed corporate 5 step engineering process that detailed and managed design initiatives and projects with required sequenced steps and KPIs for project life cycle development including testing, verification, and validation requirements. This strategic change improved our management and documentation of designs and increased visibility of improvement of designs. Thought leader for innovation and change based on continuous improvement.

Autonomous AI/ML Based Artificial Lift - Developed autonomous artificial lift program that featured stochastic optimization with artificial intelligence to search via random walk. This allowed operations to target dynamic identified optimized gas injection rates. Additional routines developed for electrical submersible pump and production flowback for optimized operations with improved production and reliability. Testing targeted increased production rate of 2-5% based on downhole well gradients and conditions.

Autonomous Production - Developed engineering specifications and safety requirements including Key Performance Indicators (KPIs) for well tree designs located in the Permian region that reduced well production failures by implementing electric actuated Surface Safety Valves (SSV) with close/open limit feedback, travel deviation detection, and automated partial stroke testing for maintenance

free operations with targeted 5-year turnaround. Engineering specifications increased the Risk Reduction Factor (RRF) of existing valve designs by a factor > 40. Safe failure factor increased from 60% to > 91% achieved by design. Benefits to cost ratio > 17 achieved with enhanced safety and reliability systems design. This resulted in higher availability and increased production with virtually no planned maintenance for 5 years* with hands free operations which equated to increased ROI of >100K per well year. (*condition-based maintenance only based on KPIs such as failed PVST or travel deviation detected during valve actuation when compared to run to fail operation or testing requirements for solenoid pneumatic operated valves)

Electrical design and specification for well site locations including one lines, electrical switch rack designs, underground, cable schedules, arc flash studies and equipment labeling. UPS battery back up design and specification with back up time calculator for testing and validation. FAT/SAT testing procedures and reports developed for quality assurance and SAP system maintenance tracking of components and maintenance. System design reduced cost and installation time while increasing reliability and operability.

Safety systems analysis, design and specification of safety functions, IPLs and ITP development, and Toxic and flammable gas monitoring systems in hazardous areas including H2S and high LEL gas concentrations. Safety systems design with audible and visual alert system visible at multiple layers in the control architecture for remote operation and viewing.

Overall PM compliance increased >15% and improved unit availability by allowing operations to target strategic maintenance of assets. Project management, detail design, FAT/SAT test procedures and test reports created to verify, document, and communicate results within multiple levels of organization and across business units. Provided training for installation, commissioning, and operations of all designs and specifications. Developed targeted maintenance intervals for instrument and electrical assets based on reliability and safety calculations and Return on Investment (ROI) for optimized operations, and owner cost while dynamically evaluating ALARP over time.

Production Facility - Developed engineering specifications and designs including the operational performance requirements with identified Key Performance Indicators (KPIs) for monitoring and control at production, separation, storage, and custody transfer facilities in the Permian region. Developed critical equipment list based on PHA/IPL identification and operability criteria which assisted operations & maintenance after mechanical/project completion and unit hand over. FAT/SAT procedures and verification criteria developed with FAT/SAT report documentation. Commissioning procedures created and developed with Inspection & Test Procedures (ITPs) for critical assets such as IPL/SIS instrument protection systems and control loops, environmental and HSE equipment including gas monitoring and flare operations.

Burner Management Systems - Developed engineering specifications and designs of fired heaters and burner management systems. This resulted and increased availability and reliability and lower failure rates. Created FAT procedures for Heater/BMS verification and report with Operational Pre-Commissioning checklist and procedures Pre-PSSR. Additionally, developed and created energy balance equations based on fired heater/BMS efficiency and proof of design/installation/operation for documented and verified operation base line data. Targeted efficiency and control schemes varied by design type and direct/indirect heater operation.

Wireless Networks - Wireless instrument designs created and developed for BPCS IPL layers of protection. Performed all safety and reliability calculations, probability of failure comparisons, and specified pillars of operation including physical firewalls, layer 1 vs. layer 2 vs. layer 3 communications requirements and targeted maximum event likelihood of each communication layer and performance of IPL. As a result, engineering documentation demonstrated mathematically that improved safety and reliability of systems was possible when combined with reliability centered maintenance and proven safety system design and analysis techniques.

Control Architecture - Developed operational communication philosophies and specifications for automation systems which specified the targeted maximum event likelihood (TMEL), MTTF, MTTR, MTBF of architecture components. Overall reliability was increased by a factor >100 while reducing materials and installation cost and operational cost in maintenance and testing. TMEL achieved <1E-3 which featured physical firewalls via physical layer protocol transitions, device level ring topology design with self-healing configuration and ability. Single fault tolerance achieved with 1oo2 or better configurations. Fiber optic transition hot cut-over plan (FOTP) developed and managed for transition of > 200 facilities from 2.4 GHz radio communication to fiber optic cable communication for real-time network control and increased reliability. Multi MM Project was complete success and reduced control architecture failure rates significantly while reducing maintenance time. Hot cut-over success or failure rate achieved < .009 which exceeded initial calculations. Root cause analysis revealed that failure was due to procedure deviation from Fiber Optic Transition Plan (FOTP) procedure and sequenced validation steps including failure to test AS Left state.

Alarm Management - Developed alarm management and philosophy specification for automation systems which targeted enhanced operability by reducing nuisance operator alarms while increasing response to operator and safety alarms. This contributed to increased production and operation of control systems and reduced operator man hour requirements for continuous unit operations. Multi-variable alarm techniques implemented for optimized operator control and response. Alarm strategies such as fist in first out (FIFO), alarm grouping by process disturbance based on FMEA and debottlenecking analysis, and dynamic alarm priority strategies.

Major accomplishments:

- Led the development and implementation of advanced automation systems to optimize well production, improve facility reliability, and enhance safety.
- Utilized data science and machine learning techniques to analyze operational data, identify trends, and optimize processes, resulting in increased process availability and production, reduced alarm rates, and improved safety.

- Provided technical leadership for electrical engineering and instrumentation projects, ensuring compliance with safety standards and operational requirements with consideration for maintenance and operation.
- Successfully implemented risk management strategies to minimize operational risks and improve facility safety.
- Achieved significant cost savings through process optimization, automation, and reliability improvements.
- Developed innovative process reliability improvement initiatives to enhance process designs which automated the detection of both safe and dangerous failures and allowed continued operation of our process within acceptable 72-hour MTTR when deviation detected.
- Developed and implemented safety reliability analysis into engineering specifications and designs to improve the final design and operability outcomes of projects and standards specifications and development.
- Implemented advanced reliability concepts into automation systems significantly reducing facility and unit shutdowns and spurious trips.
- Developed autonomous control systems to detect and safely react to process deviations extending operation time and reducing inherent hazardous operations created by initiating and intermediate events.

Chevron Phillips, ***IEC Engineer****, September 2015 - May 2017.*

Lead O&M project engineer for electrical, instrumentation, and control project design specifications and review. Lead participant in Operational Readiness activities including standard operating procedures writing, control narrative review and implementation, Instrumentation Loop Check and Inspection Testing Plan (ITP) for validation, planning and specifications, technical procedures, and training development.

Project management provided for contract exhibit interpretation and assurance. Design of real-time monitoring, condition-based maintenance systems for reliability centered maintenance implementation. SME on alarm management and rationalization, critical safety alarms, IPL alarms, and SIF related alarm identification and notification methodologies related to safety system bypassing, Fire & Gas, Burner Management Systems, Operator Action Risk Reduction Factors (RRF), Fire alarms, eye wash/safety shower alarms, and SIS diagnostics. Analyzed and reviewed control loops required for boiler and furnace operation including purge requirements for pre-ignition permissives. Lead participant for ID and FD fan operational safety requirements and interlock requirements in SRS and control and interlock narratives based on NFPA 85/ANSI/ISA77. 3 element control schemes for drum level, main steam flow, and feedwater variables. Asset management planning for optimized life cycle costs and intelligent device management (IDM).

Process automation & control systems programming on ControlLogix, Yokogawa Centum VP, Triconex, SEL, Honeywell, and Foundation Fieldbus systems for unit operational readiness. Instrumentation Group training development, standard maintenance procedures development, and implementation of modern technologies and practices including Foundation Fieldbus, HART, Programmable Partial Stroke Testing (PST), and SCADA of these components and systems. Quality Inspection reporting system, training, and control narrative review for Boiler, Water Treatment, Fractionation, Furnace, Cracked Gas, and Flare areas.

Led the Mechanical Integrity Program (MIP) implementation for instrumentation and electrical functional areas and enhanced the evaluation process and increased process reliability. Developed and created an enhanced Reliability Centered Maintenance (RCM) program complete with selective adaptive maintenance strategy selection matrices based on conditions including criticality, FMEA, RCA, and input from a predictive data collection asset database. O&M cost projections for maintenance budgeting and planning. This included maintenance practice standardization, roles and responsibilities matrix creation to define the roles of personnel, as well as equipment feasibility studies, tool list development, PM scheduling with planners, and spare parts. SIS and IPL proof test procedure (PTP) and functional testing lead participant, reviewer, and training developer for technicians.

Quality Assurance calibration procedures and tolerance standards development and implementation to improve safety, quality, reliability, and reduce maintenance costs. Championed safety cultures and delivered training on Safe Task Analysis evaluations during construction inspections. Electrical power load flow, short circuit, arc flash, and motor trip characteristic studies performed with ETAP. Motor and power relay setting and programming scheme development with acSELerator software for SEL relays for zones of protection, motor start protection schemes, Power Management System remote monitoring (TCP/Modbus over Fiber optic mediums), and reporting. Electrical switchgear testing (ANSI/NETA), maintenance, and switching procedures.

Major accomplishments:

- Led process automation projects involving electrical, instrumentation, and control systems, ensuring efficient and safe operations.
- Successfully implemented safety systems, including SIS, fire and gas detection, and burner management systems, to enhance plant safety.
- Provided technical leadership for project design, specification, and review, ensuring compliance with industry standards and regulations.
- Developed and implemented data-driven solutions to optimize process control, reduce alarm rates, and improve overall plant performance.
- Achieved significant cost savings through process improvement initiatives, including reliability-centered maintenance and optimized asset management.

SpaceX, ***Electrical Engineer,*** *March 2014 - July 2015.*

Led development of automation, electrical power, instrumentation, and control engineering and maintenance at the McGregor, TX Rocket Test facility. Performed cost feasibility studies and developed specifications for mission critical projects and reliability objectives. Evaluated vendor bid packages and developed SOW and bid criteria. Directed the development, design, start-up and commissioning, operations, FAT/SAT testing, PHA/PSM, LOPA/SIL/SIF determinations, and troubleshooting of all mission electrical, instrument, control, and safety systems.

Software programming, SCADA systems, and integration of Allen Bradley programmable logic controllers SLC 500's, ControlLogix 5000, Rocket test stand process control, tank overfill, pressure, and temperature control protection. Control valve, instrument, and electrical specification and selection. Control systems training and support for technicians and junior engineers.

Lead electrical engineer for capital project engineering including Falcon Heavy, LOX, Raptor, Crew Dragon, COPV, Merlin, and MVAC test stand revitalization. Electrical power distribution 24Vdc to 12kV, including data center design, generator and UPS power electrical specification and requirements. Design of instrument, electrical and control systems, from conception thru development of BOM's, P&ID for process designs, instrument selections, loop sheets, load analysis, panel load list, site layout, raceway plans, one-line drawings, MCC sizing and selection, as well as installation detail drawings and wiring diagrams for devices.

Lead participant in feasibility studies for control system and networking upgrades, and root cause investigations for system failure, diagnosis, and prevention. Additionally, I managed medium and low voltage power distribution, SG and IG grounding plans, lighting, motor control, variable frequency drive, and equipment specification and selection as well as initial power studies including load flow, short circuit, relay coordination, motor starting, and demand factor analysis.

Major accomplishments:

- **Automation**: Led the development of novel autonomous automation systems for rocket test stands, including cryogenic rocket fuel conditioning systems, test stand architecture and control, reactor pressure and level, and dynamic autonomous safety systems.
- **Electrical engineering**: Designed and installed mission critical electrical power distribution systems, including generators, automatic transfer switching, UPS, and dynamic load analysis.
- **Instrumentation and control**: Specified, selected, and integrated instrumentation and control systems for various applications.
- **Software programming**: Developed software for SCADA systems, PLC programming, and HMI/GUI interfaces.
- **Project Management**: Led capital projects, including Falcon Heavy, LOX, Raptor, Crew Dragon, and MVAC test stand revitalization.
- **Team leadership**: Directed teams of engineers and technicians for project development, design, testing, construction, and operations.
- **Safety and reliability**: Ensured compliance with NASA and Space Launch range standards and implemented reliability improvement initiatives which supported continuous improvement and long-term objective strategies.
- Led the **development** and implementation of autonomous systems for rocket test stands, including process control, cryogenic fuel storage conditioning, and real-time dynamic safety systems.
- **Provided technical leadership** for capital projects, including Falcon Heavy, LOX, Raptor, Crew Dragon, and MVAC test stand revitalization.
- **Designed and implemented** electrical power distribution systems, including generators, UPS, and load analysis, to ensure reliable and efficient operation.
- **Developed and integrated** instrumentation and control systems for mission-critical applications, enhancing system performance and safety.
- **Achieved significant cost savings** through project and resource efficiency initiatives, optimized system designs for rapid deployment, and streamlined project management processes.
- **Streamlined design process** and increased productivity by implementing project design procedures with complete project design templates with project documentation including scope of work, design specifications for instrument, electrical, and control systems, electrical load studies, arc flash studies, cable schedules and sizing requirements, hazardous area classifications, panel load list and schedules for load studies for sizing requirements and balancing, one line drawings, instrument loops, plc programming specifications and templates including user defined functions.
- **Championed implementation of reliability** techniques for mechanical/electrical integrity and engineering design based on NASA RCM quality and reliability requirements for improved performance.

San Jacinto College, ***Course Instructor/Adjunct Faculty****, August 2012 - May 2016.*

Preparing lectures that support student development in the areas of digital and analog control systems, electrical controls, PLC programming, and DCS programming. Motor control, relay logic, ladder logic, and programmable logic instruction sets for motor controllers and permissives, with implementation examples in RsLogix 500.

Automated distributed control schemes with peripheral digital networking protocol systems such as HART and Foundation Fieldbus. PID closed loop calculations and tuning for optimization. Feedback, Cascade, and Feed-Forward process schemes. DCS programming with DeltaV, process control schemes with analog and digital instrumentation, SIS applications, and process tuning methods. Analog to digital control methods and theory of implementation and function.

Physics of instrumentation including Ohm's Law, Pascal, Faraday, Bernoulli's principle, Charles Law, Ideal Gas Law, and measurement element types, physical principles, and advantages and disadvantages of operation. Instrumentation and control life cycle specification, installation, maintenance, and troubleshooting.

Calibration principles and methods including accuracy, precision, reproducibility, repeatability, tolerance, calibration drift, zeroing, URV and LRV, total probable error, and sensing device reliability practices. SIS vs. BPCS maintenance applications for technicians with basic configuration and testing techniques.

Major accomplishments:

- **Course development**: Prepared lectures and curriculum for courses in digital and analog process control systems, electrical controls, instrument specification and calibration, PLC programming, and DCS programming.
- **Student development**: Stimulated student learning and development in science, technology, math, and science.
- **Student outcomes**: Developed course materials to implement successful student outcomes and objectives.
- **Curriculum improvements**: Revitalized curriculum with modern and advanced instrument and electrical data.
- **Developed** and delivered engaging lectures that supported student learning and development.
- **Provided hands-on instruction** in electrical wiring and controls, PLC/DCS programming, and instrumentation configuration and calibration principles.
- **Successfully prepared** students for careers in automation and control engineering.

EDUCATION

University of Houston-Victoria
MS • ***Data Science*** *'2025*

University of Houston-Victoria
MS • ***Computer Science***

Texas A&M University
BS • ***Electrical Engineering***

San Jacinto College
AAS • ***Instrumentation Technology***

SKILLS Automation • Network • Data Science • Reliability • Project Management

Automation: Yokogawa, Rockwell RSLogix 500, Controllogix 5000, Modicon, Siemens S5, GE Fanuc, Triconex TS32, Texas Instruments C2000 Piccolo, Arduino Uno w/Ethernet card, Emerson DeltaV, Honeywell Experion & Safety Manager, OSI PI, IP21, Smartphone Google Android application programming, real-time digital watermarking.

Network: TCP/UDP, APIs, Ethernet, Fieldbus, HART, Profibus, Modbus, fiber optics, Device net, DH+, DH485, RS232/422/485, Network Address Translators (NATs), MOXA NPort serial device servers, Ethernet-to-fiber converters (single/multi modes), Wireshark, Cisco Switches/Routers.

VFD: Allen Bradley Power Flex, Omron, Schneider, Toshiba, Texas Instruments Piccolo.

DAQ: National Instruments SCXI, PXI, PCI, Fieldpoint modules DSP Texas Instruments C6748.

HMI: Rockwell FactoryTalk, Allen Bradley PanelView, Invensys Wonderware, Modicon, DeltaV, Honeywell, National Instruments Labview, Yokogawa, PyQT, C++.

Programming: C, C++, C#, R, Python, Java, Visual BASIC, VB.NET, DOS, Linux, SQL, Ladder Logic, Function Blocks, Sequential Function Chart, and Structured Text. Web Interpreters Jupyter Notebook, Colab, Visualization – Tableau, Spotfire, Matplot.

AI/ML: Deep Learning Models (CNN,RNN,LSTM), Data Mining, Data Analytics, NLP and LLMs, Computer Vision, Image Recognition, Classification, Regression, Time-Series Models, ANNs, Decision Trees, Random Forest, Logistic Regression, Clustering, Predictive Analytics, Semantic Analysis, Artificial Process Control and Artificial Alarm Analysis

Libraries: NumPy, Pandas, TensorFlow, Pillow, PyTorch, Scikit-learn, Matplot, PySpark, Seaborn, Beautiful Soup, OpenCV, SciPy, Theano, MLflow, and Streamlit data visualization.

Compilers: Texas Instruments TMS320C55x Optimizing C/C++ Compiler, NI LabView, Microsoft VisualStudio, Android Studio for Android Development. Additional Modeling and simulation experience with PSpice, Matlab Simulink. Code Composer Studio for TMS320C6748 DSP (Texas Instrument C6748). Jupyter Notebook.

Engineering: exSILentia, AutoCAD, 2000LT , 2010, MathWorks MATLAB, Microstation, SmartPlant, ETAP, SKM, MATLAB.

CERTIFICATIONS

UH Data Analytics & Machine Learning Certificate
ISA 84 SIS Expert
NFPA Certified Electrical Safety Expert
NCCER Certified Instrument Technician
Certified Fieldbus Technical Specialist
Certified Honeywell Field Device Manager Programming Associate
DHS Industrial Cyber Emergency Response Certificate

HONORS & AWARDS

2025 Top Graduate Award *- University of Houston-Victoria, College of Natural & Applied Sciences*
2023 Technical Innovation Award *– Surge Energy, Drilling & Operations*
2018 Thanx Award *– Innovation and Dedication – Oxy, New Mexico*
2015 Kick Ass Award *- SpaceX, McGregor Test Site*
Electrical Design Project *– Texas A&M University*
Phi Theta Kappa *- Honor Society*
Phi Kappa Phi *- Honor Society*