RATAN LAL BUNKAR

SYSTEMS INTEGRATION ENGINEER
APPLICATION SOLUTIONS ENGINEER

+886-0975010438

ratanbunkar2@gmail.com

No. 36, Liufu Rd, Luzhu District, Taoyuan City, Taiwan-338.

CAREER OBJECTIVE

Results-driven Systems Engineer with extensive experience in product development, test automation, and regulatory compliance. Seeking to leverage my expertise in requirements engineering, cross-functional collaboration, and system integration to advance New Product Development (NPD) and New Product Introduction (NPI) initiatives. Offering proven skills in test fixture development, risk assessment, and automated system validation to ensure high-quality, compliant product delivery while driving innovation in technical solutions.

WORK EXPERIENCE

System Engineer

SHL Medical • May 2023 - Present

- **Requirements Engineering & System Definition** - Defined and documented system-level requirements across multiple domains including manufacturing, reliability, labeling, packaging, maintenance, and user functionality, ensuring complete traceability throughout the development cycle.
- **User & Stakeholder Requirements Gathering** - Engaged with end users, product managers, and cross-functional stakeholders to collect user needs and stakeholder expectations, translating them into clear, actionable system requirements.
- **Cross-Functional Collaboration** - Collaborated with cross-functional teams—mechanical, electrical, software, usability, risk, and safety engineers—to ensure alignment of system design with business objectives and manufacturability.
- **Risk Assessment & DFMEA** - Support Design Failure Mode and Effects Analysis (DFMEA), contributing to proactive risk mitigation strategies in compliance with ISO 13485 and ISO 14971.
- **Design Transfer & Regulatory Alignment** - Facilitated design transfer activities by aligning design outputs with regulatory and industry manufacturing standards, enabling smooth transitions from development to production.
- **Test Fixture Development & Specification Drafting** - Developed custom test jigs and contributed to drafting of equipment and design specifications for verification of product functionality and performance.
- **Test Automation & System Integration** - Programmed Python-based automation for custom jig interfaces and Computer-Aided Test Systems (CATS), optimizing test execution and repeatability during validation.
- **Design Evaluation & Failure Analysis** - Conducted sub-assembly design evaluations under varying environmental conditions, identifying root causes of failures and delivering actionable insights for resolution.

KEY CONTRIBUTIONS AND PROJECT ACCOMPLISHMENTS

Elexy – Electromechanical Autoinjector

- Supported the development of the Power Unit Test Bench to evaluate plunger capacity and performance for the electromechanical autoinjector.
- Assisted in early-phase manual assembly of Elexy units and contributed to the testing and verification of LTE functionality during prototype validation.
- Authored Incoming Quality Control (IQC) protocols and executed stepper motor testing during the B-phase of development.
- Identified multiple design-related failures across electronics, mechanical components, and firmware; proposed and implemented improved testing methods for issue detection and resolution.
- Wrote detailed Design Specifications for the C-phase of the Elexy project, enhancing traceability and regulatory alignment.

SmartHub – Wireless Medical Data Collector

- Successfully delivered the A-phase of the SmartHub project, a central device collecting BLE data from nearby autoinjectors and transmitting it to the cloud.
- Authored System Requirements Specification (SRS), System Design Specification (SDS), System Test Specification, and System Bill of Materials (BOM).
- Conducted complete system-level verification and compiled the System Stage Verification Summary Report.
- Managed system-level integration, testing, and troubleshooting; performed root cause analysis on design and functionality issues.
- Currently executing the B-phase, leading system-level definition and handling all associated failure modes and requirement and design updates.

Molly cCap – BLE-Enabled Autoinjector Cap

- Leading systems engineering and design assessment for Molly cCap, a cap-triggered BLE broadcasting autoinjector.
- Collaborating with the SHL testing team for the development and validation of test methods aligned with device-specific requirements.
- Initiated and led Test fixture development by defining hardware requirements, coordinating with mechanical engineers, sourcing components, and designied a low-cost circuit-based solution.
- Fully programmed and deployed the automated testing software for the Molly cCap fixture, ensuring reliable and repeatable system verification.
- Designed and built a dedicated Computer-Aided Test System to verify BLE activation time and payload accuracy upon uncapping.
- Authored Equipment User Requirement Specification (URS) and Equipment Design Specification (EDS) for test fixture qualification; actively collaborating with the validation team for execution.
- Participated in early-phase manual assembly of Molly cCap units and conducted Incoming Quality Control (IQC) for key components to ensure conformance with design specifications.

Research Assistant

Taipei Tech – Systems and Control Lab • 2021 – 2023

- **Academic Research & Peer Review** - Assisted in academic research activities, including reviewing journal and conference papers for quality and relevance under the guidance of faculty at the Systems and Control Lab.
- **NMF Noise Reduction Algorithm Development & Validation** - Contributed to the development and validation of a noise reduction algorithm using Non-Negative Matrix Factorization (NMF), leading to a co-authored publication presented at ICSS&E 2022.

ACCOMPLISHMENTS

- Supported academic research activities under the supervision of faculty by assisting in the review of journal and conference papers for technical quality, clarity, and relevance.
- Evaluated manuscript submissions for conferences and journals, providing structured feedback to support faculty in peer review and academic editing tasks.
- Conducted research on signal processing techniques, contributing to the development of a novel noise reduction method using Non-Negative Matrix Factorization (NMF).
- Designed and validated signal separation algorithms to isolate singing voices using hybrid approaches integrating RPCA and REPet.
- Co-authored and presented research findings at the International Conference on System Science and Engineering (ICSS&E) 2022:
- Publication: Ratan L. Bunkar, K.Y. Lian, "Nonnegative Matrix Factorization based noise reduction method over singing voices extracted from RPCA and REPet", ICSS&E 2022, I.D. 1147.
- Awarded the Taipei Tech International Student Scholarship (2021–2023) in recognition of academic excellence and research contribution.
- Received the SVS Project Research Grant from the Systems and Control Lab, NTUT (2021–2023) to support advanced signal processing research.

Control Systems Engineering Intern

DCM Engineering Products • Mar – Aug 2019

- **Industrial Automation & PLC Systems Implementation** - Assisted the automation team in modernizing manufacturing systems by supporting the design, implementation, and testing of PLC-based control systems. Gained practical experience with industrial automation tools such as Ladder Logic programming, Simatic Step 7, and Human Machine Interfaces (HMIs).

ACCOMPLISHMENTS

- Participated in the automation of key manufacturing processes by configuring and testing Programmable Logic Controllers (PLCs) using Ladder Logic and Simatic Step 7.
- Supported the development of modular and reusable control logic components for scalable system integration.
- Worked with Human Machine Interface (HMI) systems to enable intuitive operator control and monitoring for production equipment.
- Created and updated system documentation, including control flow diagrams, component lists, and signal mapping for troubleshooting and validation.
- Assisted in the installation, wiring, and commissioning of PLC systems on-site, contributing to reduced machine downtime and smoother transitions during system upgrades.
- Collaborated with multidisciplinary teams to understand system requirements and recommend logic improvements for better process efficiency.
- Enhanced proficiency in Ladder Logic through hands-on training and real-time system application, leading to innovative control strategies and improved process automation.
- Actively observed and assisted in the implementation of digital circuits in industrial settings, gaining a deep understanding of interfacing digital electronics with PLC-based control systems.
- Proactively engaged in self-directed learning on advanced digital circuit design and modern PLC programming techniques, ensuring the application of cutting-edge industry practices.

PROFESSIONAL SKILLSET

- **Systems & Engineering Competencies**
  - Requirements & Systems Engineering: System lifecycle development, stakeholder collaboration, requirements gathering, system design documentation, DFMEA, design transfer
  - Regulatory Compliance & Standards: ISO 13485, ISO 14971, IEC 60601, ISO/IEC/IEEE 15288, ISO/IEC/IEEE 29148
  - Modeling Languages & Tools – SysML (Systems Modeling Language), UML (Unified Modeling Language); System Modeling Software including Enterprise Architect and Catia Cameo
- **Test Development & Automation**
  - Custom test jigs, Python-based test automation, Computer-Aided Test Systems (CATS)
  - Test Method Development & Validation (TMV), fixture qualification, test protocol writing (IQ, OQ, PQ)
- **Embedded & Control Systems**
  - Familiar with PLC programming (Ladder Logic, HMI, SCADA), Simatic Step 7
- **Programming & Scripting Languages**
  - Python, C, C++, JavaScript, HTML, CSS
- **Machine Learning & Statistical Tools**
  - Supervised learning, classification, regression models, basic neural networks
  - Minitab (Statistical Process Control, DOE, ANOVA, capability analysis)
  - Familiar with scikit-learn, pandas profiling, and basic ML pipeline development
- **Frameworks & Libraries**
  - Web & Backend Frameworks: Node.js, Express, React, NEXT.js, Bootstrap, Tailwind CSS
  - Python Libraries: NumPy, Pandas, Matplotlib, Torchtext, Pyroomacoustics, scikit-learn
  - JavaScript Libraries: React-Redux, @reduxjs/toolkit, classnames, Stripe, bcryptjs, dotenv, jsonwebtoken, nodemailer
- **Databases**
  - MySQL, MongoDB, Mongoose, Sequelize
- **Software & Developer Tools**
  - Visual Studio Code, Git, Linux, Docker, Kubernetes
- **Data Processing & Analysis**
  - Signal processing, noise reduction, root cause analysis, data visualization, algorithm validation

LANGUAGES KNOWN

- English (Professional)
- Hindi (Professional)

EDUCATION BACKGROUND

Master's Degree (Electrical Engineering)• Feb 2021- Jan 2023

National Taiwan University of Technology Taipei, Taiwan

Bachelor's Degree (Electrical Engineering)• Apr 2016 - Aug 2020

Indian Institute of Technology Ropar Ropar, Punjab, India

DECLARATION

I hereby declare that the above particulars of facts and information stated are correct to the best of my belief and knowledge.

RATAN LAL BUNKAR