

Zackery Sobin

Technical Portfolio & Patent Records

55 Summit Road,
Tryon, NC 28782
(919) 744-7129
thesobinfamily@gmail.com

Contents

Professional Resume	2
Summary	2
Work History	2
Education and Training.....	6
Intellectual Property & Patents	7
Patents	7
Independent Engineering Research.....	7
Appendix A – Professional Portfolio.....	8
Industrial OEM Product Development	8
Major Customer Infrastructure Projects	8
Appendix B – Index of Patents.....	9
Appendix C - Letters of Recommendation	10

Professional Resume

Summary

Senior Firmware Design Engineer and Navy-trained Nuclear Reactor Operator with 21 years of experience in Systems Architecture, Firmware Design, Industrial Automation and Nuclear Operations.

Inventor of record for 10+ patents in industrial telemetry, sensor infrastructure, and secure communications. **(See Attached Index of Patents)**

Proven expertise in bridging complex physics simulations with embedded systems for high-consequence control strategies.

Work History

Date	May 2011 – Present
Company	Schneider Electric - Foxboro, MA (Remote)
Title	Firmware, Senior Firmware Design Engineer
Supervisor	John Lavalee – Sr. Manager, Firmware/Software – Industrial Automation
Note:	See Attached Portfolio

Architected a comprehensive test automation framework for SCADAPack RTUs. This involved defining normalized SQL database schemas for global result sharing and establishing standardized technical procedures for automated firmware and hardware verification.

Engineered embedded control logic and VFD-driven strategies for high-power industrial applications. Implemented precise motion control for heavy hydraulic systems and optimized pump control algorithms to enhance operational efficiency and mechanical longevity.

Delivered end-to-end SCADA solutions for major utilities and high-consequence environments, including the Old Bridge, NJ Wastewater System, LA County Fresh-Water Infrastructure, and the Alaska Safe Water Project. These projects required the integration of telemetry and high-availability process logic.

Developed OEM solutions for pump and process control solutions.

Date	May 2010 to Sep 2010
Company	Zacktronics - Consultancy for Mesa Laboratories (formerly Apex Laboratories) for Autoclave Control Systems & Lethality Calculation Engine)
Title	Primary Electronic Designer and Firmware Developer
Client	Joseph P. Dalmaso PHD - President

I was responsible for the design and implementation of control logic and data processing for a prototype autoclave sterilization calculator. This role required the application of thermodynamic principles and biological kinetics to ensure the efficacy of sterilization cycles.

Utilized saturated steam tables to develop an interpolation algorithm for real-time pressure-temperature correlation, ensuring the unit could accurately validate the sterilization environment against physical properties.

Engineered the software logic to calculate cumulative lethality by integrating time-temperature data against biological values.

Developed the control strategy for the heaters and pressure-regulating valves to maintain desired conditions in a predictable way.

Developed integration for test reporting.

Date	May 2009 to Dec 2009
Company	Fujifilm Biotechnology (formerly DioSynth Biotechnology)
Title	Engineering Intern
Supervisor	Jerome Jackson – Senior Manager of Engineering
Note	See Attached Letter of Recommendation

Led the recovery and repair of the plant's emergency generator system following a catastrophic failure by reverse-engineering GE Fanuc automation code from archived documentation.

Reprogrammed the PLC with a watchdog signal integrated into the site-wide SCADA to allow remote confirmation of automatic startup and transfer protocols.

Developed a MS Access/SQL database to standardize and search load-center and distribution panel data for the entire pharmaceutical facility.

Date	May 2008 to Sep 2008
Company	ChemSee (formerly Appealing Products)
Title	Primary Electronic Designer and Firmware Developer
Supervisor	James Attar, PHD – President and CEO

Architected and programmed an experimental ionization gas detector, completing two full system design iterations.

Executed high-complexity PCB design and assembly, implementing specialized cleanliness and assembly protocols required for highly sensitive instrumentation.

Directed vendor communications.

Date	Mar 2000 to Mar 2006
Company	United States Navy USS San Francisco (SSN-711)
Title	Nuclear Reactor Operator and Electronics Technician
Supervisor	Maxwell Chi – Reactor Controls Division Chief
Note	See Attached Letter of Recommendation

Qualified as Reactor Operator and Reactor Technician for a fast-attack nuclear submarine. Charged with high-consequence decision making for the safe operation of the S6G nuclear reactor plant during maneuvers.

Provided engineering analysis of estimated fuel usage associated with maintenance schedules related to unprecedented 6,000-mile trans-Pacific surface transit.

Consulted directly and privately by the Engineer Officer for many technical decisions involving the dynamics involved with unusual but planned operations.

Provided critical engineering support for other divisions for the repair of six major electric plant breakers and two alarm instrument relays, maintaining system reliability to meet demanding sea-trial certification schedules.

Instrumental in the diagnosis and repair of three control rod drive mechanisms (CRDM), involving high-precision electromechanical logic and safety-critical timing.

Led the technical restoration of Primary Plant Detectors, ensuring the accuracy and reliability of the reactor's primary safety instrumentation suite during an intensive Reactor Plant Recertification Test Program.

Education and Training

University Education

(2007–2011)

North Carolina State University

B.S. Electrical Engineering

Technical Training

Navy Nuclear Power School (2001–2002).

Intensive curriculum in nuclear physics, thermodynamics, fluid dynamics, and electrical engineering theory.

Navy Advanced Electronics & Digital Systems (2000)

(Formerly Electronics Technician School).

Solid-state theory, digital logic, and complex system troubleshooting.

Nuclear-Grade Micro-Electronics & Reliability Training (2004)

(Formerly Electronics Technician Maintenance School).

High-consequence soldering, crimping, and assembly standards for nuclear-grade instrumentation.

Systems Architect CESAMES Institut & ArianeGroup (2021).

Advanced systems architecting, modeling of complex industrial structures, and cross-functional system management.

Intellectual Property & Patents

Patents

Total Patents: 10+ United States Patents (2012–2026).

Core Domains: Industrial Telemetry, Wireless Sensor Infrastructure, High-Availability Data Protocols, and Secure SCADA Communications.

Impact: Developed foundational technologies for Schneider Electric and Sensia, optimizing data integrity in mission-critical industrial environments.

Note: See **Appendix A** for a comprehensive list of patent numbers and titles.

Independent Engineering Research

VectorFlight Pegasus

GitHub: github.com/ZackTronics/VectorFlight

Developed a comprehensive flight control stack and physics simulation engine from the ground up in C/C++. This architecture allows for full software-in-the-loop testing, ensuring control algorithms are validated against simulated physical forces before deployment to hardware.

Researched and engineered a custom, high-efficiency communication protocol (ZPack) designed specifically for high-latency, lossy network environments. ZPack achieves lower overhead and higher data integrity than industry-standard protocols like MAVLink by utilizing optimized packet structures for remote applications.

Designed the "SuperVars" memory framework to manage real-time state synchronization between the simulation engine and the flight controller, ensuring deterministic behavior across asynchronous threads.

Implemented the flight physics and OpenGL-based visualization engine, bridging the gap between theoretical aerodynamics and embedded software execution.

Appendix A – Professional Portfolio

Industrial OEM Product Development

I was the lead firmware developer or major contributor to the firmware for the following products. I also assisted with the design of the surrounding system.

Sensia's Progressive Cavity Pump

Architected the firmware for torque and speed control in PCP systems, ensuring operational longevity and management of kinetic and potential energy.

Schneider Electric's Rod Pump Controller

Developed embedded control logic and VFD integration to optimize stroke speed and prevent mechanical failure in artificial lift systems.

Al-Khorayaf's Electrical Submersible Pump Controller

Engineered firmware for high-voltage Electrical Submersible Pumps

Schlumberger's Hydraulic Pumping Unit

Designed and implemented hydraulic control strategies for fast, high-power machinery, utilizing real-time sensor feedback for precision movement.

FMx Fuel Monitoring (Total Power):

Developed the embedded firmware and control logic for the FMx Fuel Management System, a scalable SCADAPack-based solution for heavy industry and mining.

Major Customer Infrastructure Projects

I was the lead SCADA Integrator or major contributor for projects for the following customers.

Old Bridge Municipal Utilities Authority NJ

This water and telemetry project helps to ensure no spills of sewage by ensuring monitoring of pump and hydraulic status and also fuel levels.

Los Angeles County Pitchess Detention Center

This project ensures continuity of water and prevents harmful erosion incidents that could potentially occur.

Alaska Village Safe Water

This was only small village but was unique due to the glycol loops involved with municipal supply through permafrost.

Appendix B – Index of Patents

Inventor of record for 10+ patents in industrial telemetry, sensor infrastructure, and secure communications.

Date	Number	Title
Issued Patents		
2026-04-07	US 12,598,534	Path study and antenna locating systems and methods
2025-11-11	US 12,469,183	Tag-to-image status image generation
2025-02-25	US 12,235,143	Energy autonomous gas flow meter
2024-01-23	US 11,881,902	Acoustic node for configuring remote device
2023-11-28	US 11,828,139	Pumpjack having linear alternator
2023-03-14	US 11,604,107	Load cell system for pumpjack and method of installing load cell
2022-08-23	US 11,421,674	Optical monitoring and control of pumpjack
2022-02-22	US 11,898,550	Progressing Cavity Pump Control Using Pump Fillage with PID Based Controller
2019-09-10	US 10,408,205	Method of determining pump fill and adjusting speed of a rod pumping system
Published U.S. Patent Applications		
2025-12-04	US 20250373693	Telemetry communication system
2025-11-20	US 20250355985	Graphical user authentication for edge devices
2025-11-20	US 20250358283	Sound-based user authentication for edge devices
2025-10-30	US 20250334945	Industrial process device fingerprinting
2024-05-30	US 20240175736	Flow computer with interface to an external API for data

Appendix C - Letters of Recommendation

Name	Jerome Jackson
Current Job Title	Sr. Manager, Engineering at Fujifilm Diosynth Biotechnologies

Jerome Jackson
Utility Operations Manager
Diosynth Biotechnology
RTP, North Carolina
(919) 606-5914

Feb 15, 2010

Re: Zackery Sobin

To Whom It May Concern:

During his employment her as an intern, Zack has displayed an excellent work ethic and attention to detail. While assigned a project to improve reliability of the site electrical distribution system, he worked both independently and with a team of electricians to compare actual field data with limited site documentation.

Following a catastrophic failure of an emergency generator controls system, Zack researched PLC software, wiring diagrams and associated documentation to develop the corrective actions needed to return the generator to operational condition. Zack identified additional improvements to the controls, which we implemented along with the corrective measures.

I highly recommend to anyone considering employment of Zack, to do so. He is a highly motivated and dependable individual



Jerome Jackson

Proficiencies

Languages & Frameworks: C/C++, Python (FastAPI/REST), JavaScript (Node.js, Node-RED), SQL (Dynamic Query Generation), Ladder Logic, Assembly, VB, PHP, and Pascal.



Linux (Ubuntu, RedHat, Yocto), Docker, Redis, Systemd, U-Boot, and ARM-based platforms.

I2C, SPI, RestAPI, DNP3, Modbus, and custom IP-based remote-control protocols (including ZPack).

Flash memory optimization (filesystem mounting strategies), PCB design and assembly, and digital signal processing (Fourier Transforms).


VFD design and selection, electrical noise mitigation, high-power hydraulic control, and extensive automotive/mechanical troubleshooting.


Other Certifications


 **CESAM Community** 

« Architecte Système »
Code NSF : 200n
Certification professionnelle de niveau confirmé
conforme au Répertoire National des Certifications Professionnelles (code RNCP : 25180)

Titulaire de la certification :
Mme/M. Zackery SOBIN Société : **Schneider Electric**
Né(e) le : **27/12/1981** à : **Greenville SC, USA**
A Paris, le **2 Février 2021**


Zackery SOBIN
Titulaire


Daniel KROB
Président,
C.E.S.A.M.E.S. INSTITUT


Thierry JEAN-MARIUS,
ArianeGroup
Président du jury
de certification

C.E.S.A.M.E.S. Institut – SIRET : 52963831400045 – Organisme de formation agréé N° 11 75 46653 75 – Etablissement gestionnaire de la formation

Military DD-214

CAUTION: NOT TO BE USED FOR IDENTIFICATION PURPOSES

THIS IS AN IMPORTANT RECORD. SAFEGUARD IT.

ANY ALTERATIONS IN SHADED AREAS RENDER FORM VOID

CERTIFICATE OF RELEASE OR DISCHARGE FROM ACTIVE DUTY						
1. NAME (Last, First, Middle) SOBIN, ZACKERY NMN		2. DEPARTMENT, COMPONENT AND BRANCH NAVY-USN		3. SOCIAL SECURITY NUMBER 250 51 0820		
4a. GRADE, RATE OR RANK ET2	b. PAY GRADE E5	5. DATE OF BIRTH (YYYYMMDD) 19811227	6. RESERVE OBLIGATION TERMINATION DATE (YYYYMMDD) 20070913			
7a. PLACE OF ENTRY INTO ACTIVE DUTY CHARLOTTE MEPS CHARLOTTE, NC 28202-1626		b. HOME OF RECORD AT TIME OF ENTRY (City and state, or complete address if known) 109 SOUTH PINE STREET HENDERSONVILLE, NC 28792				
8a. LAST DUTY ASSIGNMENT AND MAJOR COMMAND USS SAN FRANCISCO (SSN 711) HP: BANGOR, WA		b. STATION WHERE SEPARATED PERSUPP DET BANGOR WA				
9. COMMAND TO WHICH TRANSFERRED NAVAL RESERVE PERSONNEL CENTER, NEW ORLEANS, LA 70149			10. SGLI COVERAGE	NONE AMOUNT: \$ 400,000		
11. PRIMARY SPECIALTY (List number, title and years and months in specialty. List additional specialty numbers and titles involving periods of one or more years.) 3353 - SUBMARINE NUCLEAR PROPULSION PLANT OPERATOR - REACTOR CONTROL (03YRS, 07MOS). 3373 - NUCLEAR PROPULSION PLANT MAINTENANCE SUPERVISOR - ELECTRONICS (02YRS, 11MOS). X X X X X X X X X X X X X X X		12. RECORD OF SERVICE				
		a. DATE ENTERED AD THIS PERIOD	00	MAR	15	
		b. SEPARATION DATE THIS PERIOD	06	MAR	14	
		c. NET ACTIVE SERVICE THIS PERIOD	06	00	00	
		d. TOTAL PRIOR ACTIVE SERVICE	00	00	00	
		e. TOTAL PRIOR INACTIVE SERVICE	00	00	00	
		f. FOREIGN SERVICE	03	05	22	
		g. SEA SERVICE	03	05	22	
		h. EFFECTIVE DATE OF PAY GRADE	03	SEP	16	
		13. DECORATIONS, MEDALS, BADGES, CITATIONS AND CAMPAIGN RIBBONS AWARDED OR AUTHORIZED (All periods of service) NATIONAL DEFENSE SERVICE MEDAL, GOOD CONDUCT AWARD (2), GLOBAL WAR ON TERRORISM SERVICE MEDAL, SUBMARINE INSIGNIA (ENLISTED), SEA SERVICE DEPLOYMENT RIBBON, NAVY AND MARINE CORPS OVERSEAS SERVICE RIBBON (2). X X X X		14. MILITARY EDUCATION (Course title, number of weeks, and month and year completed) RECRUIT TRAINING (BMT), 8 WKS, MAY00; NUCLEAR FIELD - ELECTRONICS TECHNICIAN CLASS "A" SCHOOL, 24 WKS, JAN01; NAVAL NUCLEAR POWER TRAINING, 24 WKS, FEB02; NUPWR PLANT/OPER PROTOTYPE S7G, 24 WKS, AUG02. X X X X		
15a. MEMBER CONTRIBUTED TO POST-VIETNAM ERA VETERANS' EDUCATIONAL ASSISTANCE PROGRAM			YES	X	NO	
b. HIGH SCHOOL GRADUATE OR EQUIVALENT		X	YES		NO	
16. DAYS ACCRUED LEAVE PAID 23.5	17. MEMBER WAS PROVIDED COMPLETE DENTAL EXAMINATION AND ALL APPROPRIATE DENTAL SERVICES AND TREATMENT WITHIN 90 DAYS PRIOR TO SEPARATION			YES	NO	
18. REMARKS SERIAL: 43150-06-0320-VBD. "SUBJECT TO ACTIVE DUTY RECALL/ANNUAL SCREENING." "EXTENSION OF SERVICE WAS AT THE REQUEST AND FOR THE CONVENIENCE OF THE GOVERNMENT." X						
The information contained herein is subject to computer matching within the Department of Defense and with any other affected Federal or non-Federal agency for verification purposes and to determine eligibility for, and/or continued compliance with, the requirements of a Federal benefit program.						
19a. MAILING ADDRESS AFTER SEPARATION (Include ZIP Code) 4780 HIGHWAY 9 BLACK MOUNTAIN, NC 28711			b. NEAREST RELATIVE (Name and address - include ZIP Code) RONALD SOBIN (FATHER) 4780 HIGHWAY 9 BLACK MOUNTAIN, NC 28711			
20. MEMBER REQUESTS COPY 6 BE SENT TO		NC	DIRECTOR OF VETERANS AFFAIRS	X	YES	NO
21. SIGNATURE OF MEMBER BEING SEPARATED 		22. OFFICIAL AUTHORIZED TO SIGN (Typed name, grade, title and signature) A. T. TADYMAN, PSC(SW/AW), USN, SEPS DEPTH, BYDIROIC				
SPECIAL ADDITIONAL INFORMATION (For use by authorized agencies only)						
23. TYPE OF SEPARATION RELACDU AND TRANSFERRED TO NAVAL RESERVE		24. CHARACTER OF SERVICE (Include upgrades) HONORABLE				
25. SEPARATION AUTHORITY MILPERSMAN 1910-104		26. SEPARATION CODE MBK	27. REENTRY CODE RE-R1			
28. NARRATIVE REASON FOR SEPARATION COMPLETION OF REQUIRED ACTIVE SERVICE						
29. DATES OF TIME LOST DURING THIS PERIOD (YYYYMMDD) TL - NONE			30. MEMBER REQUESTS COPY 4 (Initials) 75			


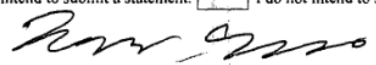
DD FORM 214, FEB 2000 (PP/FF - WHS/DIOR)

PREVIOUS EDITION IS OBSOLETE.

SERVICE - 2

EVALUATION REPORT & COUNSELING RECORD (E1-E6) (cont 'd)

RCS BUPERS 1610-1

1. Name (Last, First MI Suffix) SOBIN, ZACKERY NMN		2. Rate ET2	3. Desig SS	4. SSN 250-51-0820			
PERFORMANCE TRAITS	1.0* Below Standards	2.0 Pro-gressing	3.0 Meets Standards	4.0 Above Standards	5.0 Greatly Exceeds Standards		
38. TEAMWORK: Contributions to team building and team results NOB <input type="checkbox"/>	- Creates conflict, unwilling to work with others, puts self above team. - Fails to understand team goals or teamwork techniques. - Does not take direction well.		- Reinforces others' efforts, meets commitments to team. - Understands goals, employs good teamwork techniques. - Accepts and offers team direction.		- Team builder, inspires cooperation and progress. - Focuses goals and techniques for teams - The best at accepting and offering team direction.		
39. LEADERSHIP: Organizing, motivating and developing others to accomplish goals. NOB <input checked="" type="checkbox"/>	- Neglects growth/development or welfare of subordinates. - Fails to organize, creates problems for subordinates. - Does not set or achieve goals relevant to command mission and vision. - Lacks ability to cope with or tolerate stress. - Inadequate communicator. - Tolerates hazards or unsafe practices		- Effectively stimulates growth/development in subordinates. - Organizes successfully, implementing process improvements and efficiencies. - Sets/achieves useful, realistic goals that support command mission. - Performs well in stressful situations - Clear, timely communicator. - Ensures safety of personnel and equipment.		- Inspiring motivator and trainer, subordinates reach highest level of growth and development. - Superb organizer, great foresight, develops process improvements and efficiencies. - Leadership achievements dramatically further command mission and vision. - Perseveres through the toughest challenges and inspires others. - Exceptional communicator. - Makes subordinates safety-conscious, maintains top safety record. - Constantly improves the personal and professional lives of others.		
40. Individual Trait Avg. total of trait scores divided by number of graded traits. 3.67	41. I recommend this individual for (maximum of two). Assignment in Rating, Sea Special Programs, Shore Special Programs, Commissioning Programs, Special Warfare Programs, Rating Instructor Duty, Other. (Be specific) ASSIGNMENT IN RATE	42. Signature of Rater (Typed Name & Rate): I have evaluated this member against the above performance standards and have forwarded written explanation of marks 1.0 and 5.0.  CHIA, M L, ETC (SS)		Date: 2/21/06			
43. COMMENTS ON PERFORMANCE: * All 1.0 marks, three 2.0 marks, and 2.0 marks in Block 35 must be specifically substantiated in comments. Comments must be verifiable. Font must be 10 or 12 Pitch (10 or 12 point) only. Use upper and lower case. This evaluation is submitted on the occasion of Petty Officer Sobin's separation from the United States Navy. EXPERT TECHNICIAN: Petty Officer Sobin's extensive technical knowledge of both analog and digital electronic circuitry is widely sought after by all onboard. Combining consummate skill with dedicated hard work, he was instrumental in repairs to three control rod drive mechanisms, restoration of Primary Plant Detectors, and an intensive Reactor Plant Recertification Test Program. TEAM PLAYER: He provided assistance to other divisions on several occasion, including the repair of six major electric plant breakers and two alarm instrument relays ensuring the ship met her demanding sea-trials schedule. OUTSTANDING WATCHSTANDER: He performed flawlessly as Reactor Operator following a six month shutdown period, allowing the ship to successfully complete an unprecedented six thousand mile trans-Pacific surface transit and change of home port. An intelligent, hard-working individual, Petty Officer Sobin will make vital contributions to any organization.							
44. QUALIFICATIONS/ACHIEVEMENTS - Education, awards, community involvement, etc., during this period. Global War on Terrorism Service Medal							
Promotion Recommendation	NOB	Significant Problems	Progressing	Promotable	Must Promote	Early Promote	47. Retention: Not Recommended <input type="checkbox"/> Recommended <input checked="" type="checkbox"/>
45. INDIVIDUAL						X	48. Reporting Senior Address COMMANDING OFFICER USS SAN FRANCISCO (SSN 711) FPO AP 96678-2391
46. SUMMARY		0	0	0	0	1	
49. Signature of Senior Rater (Typed Name & Grade/Rate): I have reviewed the evaluation of this member against these performance standards and have provided written explanation to support the marks of 1.0 and 5.0.  PRESBY, A L, LCDR, USN Date: 2/21/06				50. Signature of Reporting Senior  Date: 2/21/06 Summary Group Average: 3.67			
51. Signature of Individual Evaluated. "I have seen this report, been apprised of my performance, and understand my right to submit a statement." I intend to submit a statement. <input type="checkbox"/> I do not intend to submit a statement. <input checked="" type="checkbox"/>  Date: 22 Feb 2006				52. Type name, grade, command, UIC, and signature of Regular Reporting Senior on Concurrent Report Date:			