BHARGAV BHAMWALA

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SUMMARY

An Advanced Battery Cell Engineer with over 7 years of experience in the end-to-end development of lithium-sulfur cells. A proven track record of leading cell development programs, from initial design and prototyping to full-scale production and system integration for electric vehicle (EV) and grid storage applications. Adept at serving as a liaison between design, process, and cell engineering teams to drive innovation and refine cell designs.

PROFESSIONAL EXPERIENCE

Staff Scientist, *NexTech Batteries* (Oct 2023 – Current)

- Led end-to-end cell development and test programs as part of a $3M public-private CEC grant, delivering performance-validated 10 Ah Li-S cells for system-level integration.
- Designed and executed DOE-based test plans across >200 electrolyte and cathode trials to boost charge retention and discharge utilization; increased sulfur utilization by 33%, and formation speed by 20%.
- Defined charge/discharge protocols on Neware and Arbin cyclers to simulate high-power EV loads; optimized rate performance and thermal stability.
- Conducted cell failure analysis under extreme thermal, high-rate, and overdischarge conditions; implemented corrective actions using 8D and PFMEA tools.
- Directed FAT/SAT commissioning of pilot lines at vendor facilities, managing line bring-up and line audits to ensure technology scale-up from 0.5 Ah R&D cells to 10 Ah production formats.
- Established internal sync meetings and presented test results to cross-functional teams (pack, BMS, reliability) for cell integration and validation.
- Collaborated with UCSD and igrenEnergi to integrate 48 V Li-S BESS modules, conducting system-level validation including OCV vs SOC calibration, impedance mapping, and functional diagnostics — directly relevant to pack-level test development.

Cell Research Engineer, *NexTech Batteries* (Sept 2018 – Sept 2023)

- Optimized slurry/coating processes via PFMEA, doubling solids loading and reducing binder use by >60%, improving coating uniformity and process reliability.
- Built and deployed "NexTData," an internal Python-based analytics platform to automate evaluation of >250 cell cycles/month, extracting key parameters to develop and validate cell models and support control/estimation algorithms used in the BMS.
- Designed and conducted full lifecycle testing (formation, cycling, storage, abuse) aligned with USABC/OEM, SAE J2464 protocols; generated data for DV/PV readiness.
- Evaluated internal and supplier cell formats for gravimetric/volumetric energy, impedance growth, and calendar fade.
- Optimized fast charge performance and thermal stability by defining charge/discharge protocols on cyclers to simulate high-power EV loads.
- Developed strategic relationships with vendors by working with them on DFMEA/PFMEA and spec development to ensure quality and timely delivery of custom cell builds.

Manufacturing Engineer, *Klöckner DESMA Elastomertechnik GmbH* (Jan 2015 – Jun 2016)

- Increased production efficiency by 15% by reconfiguring two production lines and implementing 5S across 15 workstations.
- Reduced scrap rate by 26% using SPC and Pareto-driven corrective actions.
- Managed IQ/OQ documentation and FAT/SAT execution for elastomer molding systems.

SKILLS

- **CAD/Design:** SolidWorks, Fixture Design for Manufacturing, 3D Modeling and Tolerance analysis.
- **Languages & Software:** Python, JMP, MATLAB, Asana, Ansys.
- **Battery Technologies:** Lithium-Sulfur Development, Electrolyte Optimization, Cathode Engineering, Characterization, including Cryo-SEM-FIB, ICP-MS, GC-MS, HPLC, and TGA-DSC.
- **Testing and Validation:** Cell validation protocols, fast-charge optimization, life-time estimation, failure analysis, HPPC, GITT, EIS, CV, UN 38.3 Compliance, Facility and Site Acceptance Testing (FAT/SAT).
- **Software and Analytics:** Python, MATLAB, JMP Statistical Software, Asana.
- **Quality & Process Systems:** Six Sigma DMAIC, 8D Problem Solving, DFMEA/PFMEA, PPAP, Statistical Process Control (SPC), IQ/OQ/PQ Validation.
- **Project Management:** Grant Administration, Stakeholder Alignment, Risk Management, Cross-functional Team Leadership, Capital Project Planning, Vendor Contract Negotiation, Cost Tracking & Analysis.

RESEARCH & PATENTS

Research Projects:

- **Li/S Inventory Tracking Study** *(Battery500 Consortium)*: Developed novel quantitative analytical methods using HPLC, TGA, and GC-MS to characterize inactive Li and S species in aged lithium-metal and lithium-sulfur chemistries, providing critical insights for cycle life optimization.
- **Interdisciplinary Li Metal Benchmarking Program** *(Mercedes-Benz R&D North America & DOE)*: Led multi-partner research initiative benchmarking Li reactivity and SEI stability across academic and industrial partners, including CEL, Albemarle, Gangfeng, and Applied Materials, establishing standardized testing protocols for the industry.

Intellectual Property:

- **US Patent**: "Pouch Cell Battery with Ion Exchange Membrane" (2019) - Innovative Li-S cell architecture design addressing polysulfide shuttling challenges through selective membrane integration.

CERTIFICATIONS

- Six Sigma (Simplilearn)
- MATLAB Battery Modelling (MathWorks)
- Algorithms for Battery Management Systems Specialization (University of Colorado)
- Statistical Thinking for Industrial Problem Solving (JMP)
- Google Project Management (Coursera)

EDUCATION

- **Master of Science, Chemical Engineering |** *University of California, San Diego, CA.*
- **Master of Science, Mechanical Engineering |** *University of Houston, Houston, TX.*

'Ever Positive, Never Negative'