



EXECUTIVE SUMMARY

I am a high energy leader with diverse capabilities and over 15 years of solar products experience. As a result of 13 years in startups, I am goal oriented and results driven. My unique balance of technical expertise and business experience allows me to make significant impacts across an organization. I have a proven track record of leadership, not only with direct reports, but across departments and with external vendors. My extensive knowledge of industry technology is leveraged to inform best practices as well as codes and standards development and interpretation. I am a straight shooter who gets to the root cause of a problem quickly and accurately and then provides solutions that are elegant and cost effective. Leveraging my written, verbal, and presentation skills, I effectively convey objectives and ideas across organizations. I am a professional mechanical engineer, inventor, problem solver and primary author of 16 patents. But most of all, I enjoy what I do and bring that enthusiasm to everything I work on.

CENTERS OF EXCELLENCE

Legal Support

- Bench and armchair witness
- Research & fault determination
- Fire dynamics - PV and roofing
- Product & installation failures
- Codes & standards compliance

Business Development

- Product management
- Engineering mgt.
- Markets & trends
- Marketing collateral & product spec sheets
- Sales & Sales tools
- NPI, ECR/ECO process
- Stage/Phase Gate process
- Business contracts, SOW, MSA, license agreements

Construction Practices

- All aspects of residential and commercial buildings
- Roofs and roof systems
- Electrical, plumbing, HVAC

Solar Products

- Racking, Resi & Commercial
- Ground mount, Trackers
- MLPE, DC optimizers
- String & Micro inverters
- Combiner boxes
- Rapid shut down devices
- Monitoring systems
- PV module construction

Product Development

- Product design
- Innovation
- Installation impacts
- Prototype construction
- PE stamp services
- Patents
- Manufacturing processes
- Vendor management
- Lean product design
- Machine shop and tools

Testing and Design Validation

- Electrical validation testing
- Thermal validation testing
- Test equipment and sensors
- Predictive performance modeling
- Data acquisition
- Test facilities and providers
- Test plans and reports

General Engineering

- Structural analysis & FEA
- Fastener analysis
- Solidworks 3D CAD
- Excel, Excel macros, VB
- Engineering drawings
- Electrical mechanical systems
- Material selection
- Manufacturing processes
- Wires and wire harnesses
- Lean processes

Quality & Reliability

- A3 problem solving process
- 8d problem solving processes
- Failure analysis
- RCCA process
- Test plans & test reports
- Data analysis
- Test equipment
- Trend analysis
- Solar installation audit
- Vendor/mfg audit
- FMEA

Codes and Standards

- Memberships
 - UL 2703 STP
 - Fire testing
 - Bonding and grounding
 - Mechanical loading
 - ASCE 7-22 Associate
 - SEIA Mounting Systems Cmte
- UL 1703, UL 2703, UL 1741
- IEC 61215, IEC 61730
- NEC, IBC, IRC, IEC
- AISC 360, NDS, ADM
- ASTM, ASME,
- SEIA, ASCE, SEAOC

Applications Engineering

- Installation impacts for design concepts
- Permitting and permit docs
- Solar installation practices
- Installation time study
- Site audits and audit tools

RELEVANT EXPERIENCE

SUNEDISON - Photovoltaic Racking & Module Manufacturer and System Installer

Engineering Director & Product Manager (5 years)

Responsible for residential and commercial rooftop product portfolio for the RSC division.

- Conducted market research and analysis for development of advanced product lines and benchmarked prototypes against market's existing best in class products.
- Invented and designed the Arcadia family of products that reduce installation time by more than 50% and increase profitability by 33%. Features include: single SKU product, tool free installation, and the industry's first complete modular design.
- Invented integrated wire management for advanced SunEdison modules reducing balance of system costs by \$0.01/W & making wire management devices (standard throughout the industry) obsolete.
- Built 2 product development engineering teams totaling 11 engineers (US and India) from ground up.
- Negotiated key vendor MSA that led to a 27% reduction in existing product line and negotiated a license agreement and established overseas manufacturing to realize an additional 35%.
- Created the ECO process and was instrumental in developing and implementing the Stage Gate process for NPI. Acting Solidworks and documentation mgr.
- Acting Quality Manager (8 months) setting priorities, goals and resource allocation. Decreased quality issues by 49% in 4 months. Developed quality control metrics and RCCA process.
- Acting NorCal Sales Manager (6 months), responsible for bringing on new dealers. Exceeded sales targets and developed auto tools to streamline sales process. Developed Sales Team pitch deck.
- Acting Field Service Manager (6 months), responsible for training dealers and providing customer service to homeowners. Increased customer loyalty from mostly detractors to mostly promoters.
- Developed ordering tools to reduce order time by 80% & increased order accuracy from 18% to 95%.
- Active participant for subject relevant codes and standards groups for UL, IBC, NEC and SEAOC.

Lead Design Engineer (2 years)

Responsible for residential and commercial rooftop product portfolio.

- Launched the Applications Engineering department. Directly responsible for: hiring 5 engineers, process and document development for permits, training, and business alignment.
- Primary author on deliverable for technical sections of DOE grants.
- Created product configuration tool for efficient and accurate order fulfillment.
- Designed the Tilt Rack Echo Solar Array & integrated plenum for solar thermal systems.
- Developed product design calculator that determines ASCE7 design loads, applies them to racking structure stress calculations, and then reports results certified by PE stamp.
- Developed new plenum design that increased array thermal efficiency by 8%.
- Installed several production PV and thermal systems utilizing construction skills such as ducting, plumbing, roofing, framing, and high voltage AC and DC wiring.
- Supported projects for more than 650 homes as systems design engineer specifying array designs, array layouts, BOS components, and permitting.

GREENVOLTS - Manufacturer of High Concentration Solar Tracker

Sr. Mechanical Engineer (2 years)

Responsible for tracker base, power & comm wire harnesses, controls enclosure, prototypes, and test eqpt.

- Designed tracker base meeting all design requirements and reduced manufacturing costs by 44%.
- Reduced tracker base installation time from 2 hours to 15 minutes by designing for assembly.
- Managed 4 direct reports on prototype production line of the power mods & electrical optical pkg.
- Managed field production and assembly line with 14 ironworkers for 1 MW of trackers & increased production 30% by relationship building, team motivation, work instructions and training.
- Key individual in maintaining operation of trackers.
- Designed and built test equipment, all of which met design and cost requirements.

SUNPOWER - Photovoltaic Racking & Module Manufacturer and System Installer

Sr. Product Engineer (3 years), **Testing Engineer** (3 years)

Responsible for all aspects of products including: design improvements, system cost, reliability, electrical performance, testing, certification, wind & seismic resistance, & field training. Managed 2 direct reports.

- Designed and contributed to the design of several PV products including PV modules, trackers, mounting systems, grounding clips, combiner boxes, wire trays, met stations and test fixtures.
- Increased system reliability and lowered cost through failure analysis and component redesign.
- New weld-less design was estimated to save 7.0 ¢/Watt or \$1.4 million/yr.
- Installed residential PV arrays and assisted in the construction of MWs of commercial trackers.
- Improved and standardized installation practices and trained teams.
- Applied knowledge of tracker hardware, software, and algorithms to reduce wind design loads.
- Designed, installed, monitored and analyzed the thermal and power performance of several residential and commercial PV systems. Collected and analyzed data that led to a \$250,000 PV supplier contract and \$150,000/year saving in production costs.
- Created new modeling technique for predicting power performance.
- Led all polymeric, adhesive and mechanical testing.
- Conducted in-house full scale UL fire tests.
- Responsible for seismic analysis of all roof top products.
- UL certified 11 different products.

EDUCATION & CERTIFICATIONS

P.E., Mechanical, State of California Lic# 36690
B.S., Mechanical Engineering, UC Davis
B.A., Art History, Minor Business, Kent State University

PERSONAL INTERESTS

Family, the environment, residential construction, motorcycles, automobile maintenance, backpacking, photography, reading, Foodie, WordPress website design.

REFERENCES

“Samuel is one of the most creative people I have worked with and always brings new ideas and approaches to solving a problem. However, what I find unique, is that he compliments that creativity with a strong drive and follow through to bring his ideas all the way through concept, development and into production. Along the way he uses his strong analytical abilities and a data driven approach to ensure that in the end we have created an optimized solution...” – James Cartwright, Director of Module Products at SunEdison

“Samuel is a solar rockstar who understands the space and what products are needed to take it to the next level. He is always asking why and digging into an issue until it is fully understood. He is a true engineer who can get into the weeds and a leader who understands the big picture.” – Brian Wildes, CTO Ecolibrium

“Samuel is a strong leader with clear thinking, passion and a tenacious focus on the goal. He provided solutions for my group with clear work scope, risks, and time frame. Samuel's ability to think strategically along with professional engineering knowledge have provided extremely valuable perspectives on projects.” – Karen Dzienkowski, Sr. Director Business Development at SunEdison

“He is technically strong and able to effectively supervise complex engineering development while simultaneously filling a high-level individual contributor role. He quickly identifies problems, be they technical or organizational, and is tenacious and effective at driving to a solution. Samuel's communication is extremely clear and straightforward - he creates a team environment that is very positive and productive. Samuel is also a lot of fun to work with.” – Kevin Fine, Engineering Manager, Tesla Energy

Not very often have I had the chance to work with someone who possesses the high level of ability and breadth of knowledge necessary to interface with as wide a variety of technical specialties and effectively manage them as Samuel. – Ronald Migdal, Principal Engineer RJMSE